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Consumer insights and willingness to pay for attributes: Kiwifruit in Shanghai, China

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Research Report No. 346
June 2018

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Suggested citation for this report:

Tait, Peter, Paul Rutherford, Tim Driver, Xuedong Li, Caroline Saunders and Meike Guenther (2018). *Our Land and Water: kiwifruit products in Shanghai, China.* Research Report No. 346, Lincoln University: Agribusiness and Economics Research Unit.

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Report prepared for the Integrating Value Chain project funded by Our Land and Water National Science Challenge

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ISSN 1170-7682 (Print)
ISSN 2230-3197 (Online)
ISBN 978-1-877519-56-7 (Print)
ISBN-978-1-877519-57-4 (Online)

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Executive Summary

A theme of the Our Land and Water (OLW) National Science Challenge is to achieve "greater value in global markets". This includes "understanding our international customers' demands for products from New Zealand's land and water". This research is funded by the OLW national science challenge from the programme Integrating Value Chains and is one of a series of four reports assessing consumer behaviour and preferences in market. In addition the report examines the consumer's use of media and technology to obtain information on and/or purchase products. This report is on consumer's behaviours and attitudes towards purchasing, using and gaining information on kiwifruit in Shanghai.

New Zealand is one of the largest kiwifruit producing nations in the world, with exports valued at over NZ$1.6 billion in 2017. China, the world's largest kiwifruit consumer, is currently New Zealand's second largest export market for kiwifruit by value. However, despite kiwifruit being a popular fruit product in China, there is a lack of literature on Chinese consumer preferences for kiwifruit, particularly with regards to credence, especially sustainability, attributes. However, existing literature has shown that the sustainability and credence attributes of food and beverage products are important to Chinese consumers, including ecological, environmental, health and animal welfare, with consumer segments willing to pay a premium for food and beverage products with these attributes.

Previous studies have shown that Chinese consumers have a relatively high use of digital media and smart technologies to access information about and purchase food and beverage products, including online shopping, social media and mobile devices. Thus this study explores consumer's attitudes towards this with the aim of helping those who exporting kiwifruit on ways to provide information and support purchases.

To examine Chinese consumer preferences and willingness-to-pay (WTP) for, as well as use of digital media and smart technology in relation to, finding information on and/or purchasing kiwifruit products, the Agribusiness & Economics Research Unit (AERU) undertook an online survey of 740 consumers. This included asking consumers about their reasons for consumption; where and how they purchased kiwifruit; knowledge and perceptions of Māori culture and enterprise; attitudes to kiwifruit consumption and production methods; sustainability label awareness, and the use of digital media and smart technology to find out more and/or purchase kiwifruit. A choice experiment was also conducted to elicit consumer WTP for a range of kiwifruit product attributes.

Chinese consumer kiwifruit consumption and purchasing habits

The research shows that most participants consumed kiwifruit at least two to five times per week, with the most common method of consumption being raw, just as they are. The research also demonstrates participants' average consumption on the three varieties of kiwifruit: Green, Yellow and Red. The most frequent average consumption amount was between one to four kiwifruit per week, with a significant number of respondents consuming much higher amounts, with about one quarter respondents consuming at least 8 kiwifruit per week.

In addition, the results show that the Green variety of kiwifruit was the most frequently purchased variety. Average prices paid per kg ranged from 37 to 41 Yuan over the three varieties when purchased for personal consumption. The most frequent usual price paid for personal consumption was 14 to 27 Yuan/kg of Green or Yellow and 27 to 40 Yuan/kg for Red. About two out of every five participants spent more than 40 Yuan/kg for personal consumption. The prices paid for kiwifruit given as gifts were higher, ranging from 41 to 46 Yuan/kg on average, with more respondents paying higher prices across varieties compared to personal consumption.

Chinese consumer attitudes to kiwifruit products

The most important attributes of kiwifruit were shown to be flavour (89 per cent very important/somewhat important), followed by nutritional value (87 per cent very important/somewhat important) and quality certification (86 per cent very important/somewhat important). The environmental effects of production were also important to respondents, as well as provenance attributes (such as where it is grown and place of purchase) and social responsibility of production were also important when buying kiwifruit.

Chinese kiwifruit was the most visible country-of-origin in market (94 per cent), followed by New Zealand (82 per cent) and then Chile (56 per cent). Over half of participants had purchased New Zealand labelled kiwifruit either weekly (29 per cent) or monthly (39 per cent). New Zealand was ranked first for producing high quality kiwifruit (above Chile, China and Italy). Zespri was identified as the most frequently purchased kiwifruit brand (55 per cent mostly this brand/often this brand).

Participants indicated the most important attribute of New Zealand kiwifruit products to be high food safety (40 per cent very important), followed by higher quality (39 per cent very important) and the high quality of the natural environment in New Zealand (39 per cent very important). The environmental and social attributes were also valued highly, such as 'New Zealand's "clean and green" image', 'environmental sustainability of production', 'social responsibility of production', 'organic production' and 'traceability to grower'.

Regarding Zespri kiwifruit, over half of participants stated that having Zespri kiwifruit grown in New Zealand was either very or somewhat important, but most participants said that they would buy at least the same amount of Zespri kiwifruit if they were grown in another country.

Chinese consumer knowledge of Māori culture and enterprise

The research presents participants' knowledge and perceptions of Māori culture and enterprise in relation to kiwifruit. Results show that more than fifty percent of the participants knew a few things about Māori culture. In addition, participants stated that the top three associated attributes with kiwifruit produced from a Māori enterprise were natural (46 per cent strong association), high quality (42 per cent strong association) and sustainability (33 per cent strong association). Other environmental, social and cultural attributes, such as reduced environmental impact, traditional, care of traditional cultures, social responsibility were also strongly agreed by the participants.

Chinese consumer attitudes to kiwifruit consumption and production practices

The research presents Chinese consumers' attitudes to kiwifruit consumption and production practices. The findings of this research confirm that the majority of participants agreed with 'I eat kiwifruit mainly for the health benefits' (82 per cent agree/partly agree), followed by the statement of 'the quality of kiwifruit is directly related to the quality of the natural environment where it is grown' (80 per cent agree/partly agree), and then 'kiwifruit is one of my favourite types of fruit' (79 per cent agree/partly agree). Most participants also agreed that 'the food safety of kiwifruit is directly related to the quality of the natural environment where it is grown' (79 per cent agree/partly agree), 'the health benefits for kiwifruit are directly related to quality of the natural environment where it is grown' (78 per cent agree/partly agree), as well as 'I trust the quality claims made by Zespri' (78 per cent agree/partly agree).

Chinese consumer WTP for selected kiwifruit attributes

The choice experiment results reveal that country-of-origin plays an important role in kiwifruit consumer choices with the highest average marginal WTP being for NZ country-of-origin kiwifruit (¥108/kg), followed by Chile (¥65/kg), and China (¥44/kg). The most preferred production attributes were organic (¥49/kg), followed by social responsibility and water use and pollution minimisation equally (¥40/kg). Relative to the average price of a kilogram of kiwifruit, on average, respondents are WTP 123 per cent more for kiwifruit from NZ and 50 per cent more for organic production

Chinese consumer's use of digital media and technology in relation to finding information about and purchasing kiwifruit

This research demonstrates Chinese consumers' use of digital media and smart technology for finding product information and/or purchasing kiwifruit products. Firstly, most participants indicated that they accessed the Internet using both mobile devices and home computers, with participants using mobile devices slightly more frequent than a home computer. In addition, the most overall used online information sources for informing choices and searching information regarding kiwifruit production were WeChat, Tabao, Tmall, Jingdong (JD) and Weibo. Participants also stated that health professionals had the greatest influence on both informing kiwifruit choices and searching for kiwifruit production information.

Participants were then asked a range of question pertaining to their use of mobile devices, with participants most frequently using their mobile device at home to search for information about or purchasing kiwifruit products (40 per cent usually), followed by in-store (15 per cent usually). A range of smartphone interactive technologies (e.g. barcodes, QR codes, RFID/NFC) were used for these purposes, with barcodes being used most frequently. The most frequent use of mobile apps by participants was to purchase fruit, (55 per cent currently use, 36 per cent interested in using), followed by obtaining discounts/coupons (45 per cent currently use, 44 per cent interested in using) and then product reviews (43 per cent currently use, 44 per cent interested in using). Specific apps used highly frequently were WeChat (68 per cent), followed by Ele-me (62 per cent) and Dianping (60 per cent). These specific apps allow consumers to search product information, purchase products and/or write product reviews.

In addition, the majority of participants stated that they purchased kiwifruit online (73 per cent) with conducting an average of 18 per cent of kiwifruit purchases online. The most common kiwifruit variety purchased online was Green (66 per cent often), followed by Organic Green (41 per cent often) and Yellow (35 per cent often). The main reason that participants used online shopping for kiwifruit products was to access a greater variety of products (26 per cent), followed by the convenience of home delivery (19 per cent) and access to special offers/promotions (14 per cent).

The results of this research present participants' level of trust in a number of digital media sources and smart technologies. Firstly, the most trusted source for online kiwifruit purchases was TMall (63 per cent often/sometimes), followed by Jingdong (JD) (59 per cent often/sometimes) and online fresh fruit stores (56 per cent often/sometimes). Participants mostly used their mobile device (over home computers) at home for the purpose of purchasing kiwifruit products online.

To obtain information online for kiwifruit information sources, participants had the highest trust in information on generic mobile apps, followed by branded mobile apps and then online customer reviews, and for purchasing, participants had the highest trust in mobile devices, followed by personal computers and online shopping. In addition, a small number of participants indicated that they had a low-level trust in generic mobile apps or branded mobile apps for either searching product information and/or purchasing kiwifruit online. In terms of low trust in searching product information in generic or branded mobile apps, the most commonly stated reasons were that 'I do not trust the provider of the information' and 'I have privacy concerns regarding the technology involved'. In terms of low trust in purchasing kiwifruit product in generic or branded mobile apps, the most commonly stated reasons were that 'I have privacy concerns regarding the technology involved' and 'I am not familiar with the technology involved'.

Finally, participants most often found out about or became aware of new kiwifruit products 'in-store (from where I did most of my food product shopping)', followed by 'online (from where I currently do most of my food product shopping)' and 'online advertising (websites)'

Chapter 1
Introduction

A theme of the Our Land and Water (OLW) National Science Challenge is to achieve "greater value in global markets". This includes "understanding our international customers' demands for products from New Zealand's land and water". This research is funded by the OLW national science challenge in the programme Integrating Value Chains and is one of a series of four reports assessing consumer behaviour and preferences in market. In addition the report examines the consumer's use of media and technology to obtain information on and/or purchase products. This report concerns Shanghai consumer's behaviours and attitudes towards kiwifruit. The other reports are on yogurt in Shanghai, and beef and wine in California. These markets and products were selected in consultation with the project advisory board.

The current report details the development and application of a survey of Shanghai kiwifruit consumers. The survey is designed to examine three main areas: consumption behaviour, Willingness to Pay (WTP) for credence attributes, and the use of digital media and smart technologies.

While search attributes such as price or colour can be observed directly, and experience attributes such as flavour or texture can be assessed when consumed, credence attributes such as environmental sustainability cannot be immediately seen or experienced at the point of sale (Wirth et al., 2011). For products promoting credence attributes, the role of verification including labelling is of significant importance.

Agricultural exports are an important contributor to the New Zealand (NZ) economy. While NZ historically relied on key markets such as the United Kingdom for export trade, over the last decade it has shifted its export focus to China. It is important for NZ exporters to understand these markets and the different cultures and preferences of those consumers. Doing so is critical for market access, and for realising potential premiums (Guenther et al., 2015). It is also important to assess the use of smart media by consumers to find information and purchase products. This covers online shopping (e-commerce), social media and mobile devices (smartphones) as well as the use of QR Codes and barcodes. These technologies provide mechanisms for the effective marketing and selling of NZ food and beverage products. It is important for exporters to both understand and consider their use in the development of effective digital marketing and sales strategies (Driver et al., 2015).

1.1 New Zealand kiwifruit market profile

New Zealand is the third largest kiwifruit producer in the world. NZ grown kiwifruit production reached a record in 2016, with over 120 million trays submitted, and 117 million trays sold, as shown in Table 1-1. The planting of kiwifruit increased to 12,185 productive hectares in the same year (HEA, n.d.).

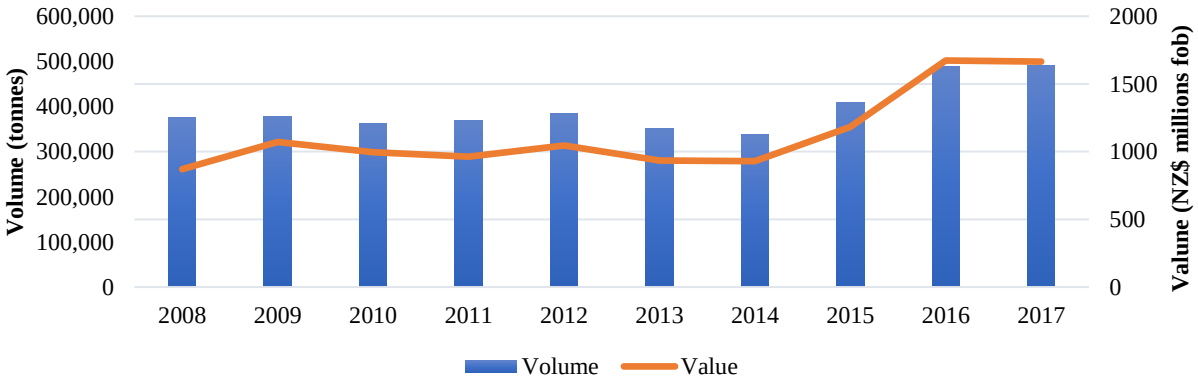
Table 1-1: Kiwifruit industry statisticsTable

Season (to 31 March)	2008	2009	2010	2011	2012	2013	2014	2015	2016
Trays submitted (million)	102	109.4	107	105.9	119.5	105.7	97.69	97.8	123.4
Trays sold (million)	92.4	100	98.6	98.1	109.1	101.3	95.1	95.2	117
Yield (trays/ha)	8,371	8.866	8,546	8,255	9556	8621	8,684	8,076	10,157
Planting (ha)	12,186	12,337	12,525	12,825	12500	12263	11,250	11,233	12,185
Growers	2,727	2,710	2,711	2,706	2662	2636	2,556	2,540	2,516
Packhouses	75	71	71	67	63	59	46	50	51
Coolstores	83	92	77	83	79	76	77	62	64

Source: HEA, n.d.

Kiwifruit is the highest-earning fruit crop in NZ, by both export value and volume. In 2017 (year ended in June), the total volume of NZ-grown kiwifruit exports reached 490,760 tonnes. The total value of NZ kiwifruit exports was valued at over NZ$1.6 billion (Figure 1-1), which accounted for more than 60 per cent of fruit export earnings in 2017 (Statistics NZ, 2018).

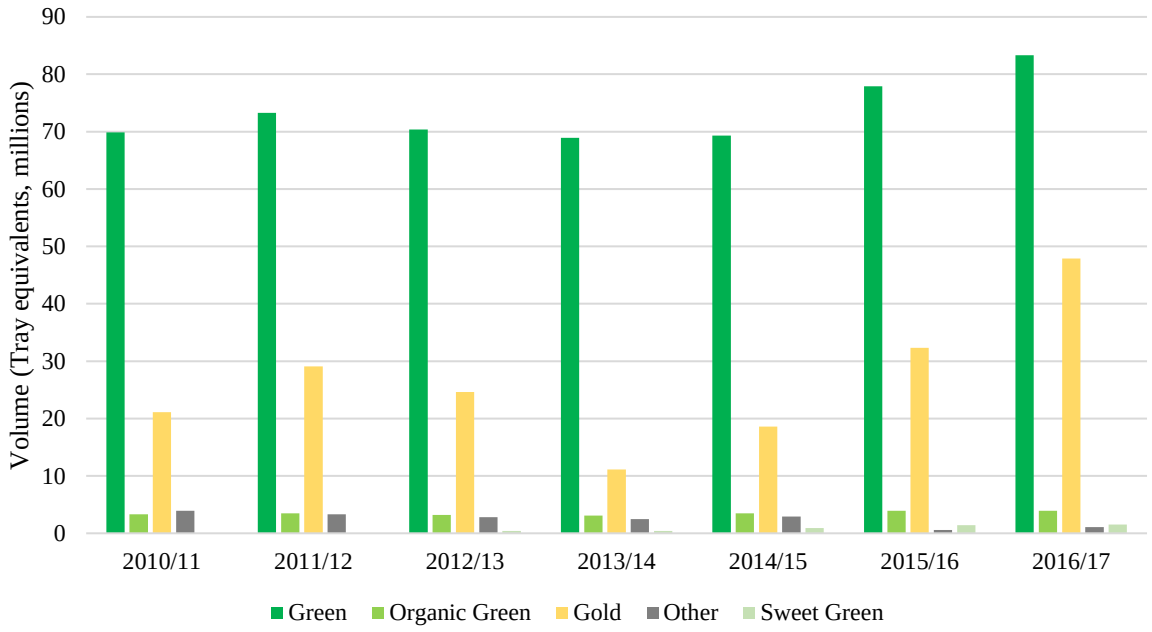
Figure 1-1: Volume (tonnes) and value of New Zealand kiwifruit exports, 2008–2017



Source: Statistics New Zealand, 2018

Zespri is NZ's single desk kiwifruit exporter to all countries, except Australia. Zespri supplies five main kiwifruit varieties: Hayward (green), Organic Green, Sweet Green, Sun Gold, and Gold. As shown in Figure 1-2, the Hayward variety is the main variety sold by volume from NZ accounting for 83.3 per cent followed by Gold accounting for 47.9 per cent.

Figure 1-2: Total volume sold of New Zealand grown kiwifruit, 2010-2017



Source: Zespri Annual Report, 2016/17

The top ten markets for NZ kiwifruit exports are presented in Table 1-2. This shows that China, in 2015, 2016 and 2017, was one of the three largest markets for NZ kiwifruit exports by value. The value of NZ kiwifruit exports experienced a significant increase from NZ$200 million in 2015 to NZ$373 million in 2017 (Statistics New Zealand, 2017).

Table 1-2: Value of NZ kiwifruit exports (NZ$000 fob), 2015-2017

Rank	Country	2015	2016	2017	% change (2016–17)
1	Japan	274,757	390,487	381,600	-2.3
2	China	200,747	373,361	364,843	-2.3
3	EU	230,431	286,033	290,121	1.4
4	Taiwan	101,850	155,990	146,869	-5.8
5	Spain	88,249	108,166	97,116	-10.2
6	Korea, Republic of	51,435	56,715	86,045	51.7
7	Australia	66,826	80,229	74,950	-6.6
8	USA	32,642	61,962	63,082	1.8
9	Hong Kong (SAR)	28,537	38,651	33,124	-14.3
10	Italy	32,165	38,666	31,611	-18.2

Source: Statistics New Zealand, 2017

1.2 China kiwifruit market: background

China is the largest kiwifruit producer in the world, accounting for over 50 percent of the world's kiwifruit output. Shaanxi Province is the main growing region, where kiwifruit production increased from 1.23 million metric tonnes in 2015 to 1.31 million metric tonnes in 2016. In addition, China's domestic kiwifruit consumption increased significantly from 0.86 million metric tonnes in 2000 to 1.83 million metric tonnes in 2013.

Currently, Chinese-grown kiwifruit is primarily sold and consumed domestically, with kiwifruit exports accounting for only two percent of its total production, and in 2016 only 0.5 percent of total global kiwifruit exports by value (ChinaAg, 2017).

In recent years, China has concentrated on investing in new kiwifruit varieties, which are expected to be suitable to Chinese growing conditions. China now has two new cultivars: the *Jintao* and the *Red Sun*. The *Jintao* is similar to the NZ Gold variety. The *Red Sun* has hairless green skin, yellow flesh and red core.

Shanghai is the main destination for NZ kiwifruit exports to China, taking more than 50 percent of NZ kiwifruit exports into China. Zespri is a well-recognized fruit brand in China's major cities, such as Shanghai and Beijing (Boot, 2017; Zespri, 2017). Therefore in consultation with the project advisory board and Zespri, it was decided to undertake the survey in Shanghai.

1.3 The Chinese kiwifruit consumer sustainability preferences

Previous work undertaken by the AERU has examined consumer preferences for credence attributes of food and beverage products including sustainability attributes, in several international markets relevant to NZ exporters (Guenther et al., 2015; Miller et al., 2014, 2017; Saunders et al., 2015). In particular, Guenther et al. (2015) identified a range of sustainability attributes important to Chinese consumers in relation to food and beverage products, as well as the factors that underpinned these. For example, the authors identified that food safety, environmental condition and animal health ranked within the top 5 attributes important to Chinese consumers in relation to food and beverage products, with similarly high importance placed on health-enhancing foods and social responsibility in production. In relation to food safety, one of the most important underpinning factors for Chinese consumers was environmental condition, signalling the importance of sustainability attributes in relation to other factors in this market (Guenther et al., 2015). These have included China, but not specific to kiwifruit nor Shanghai. However, the results of that research provided important information in developing the survey.

Specific research on kiwifruit includes a recent study conducted by Jaeger et al. (2011) examining consumer preferences for kiwifruit products in Japan. The authors measured the importance of dry matter (DM), size and price of kiwifruit in relation to purchase intention, showing that DM was valued positively. Kiwifruit size had less of an impact on the likelihood of purchase.

Several recent studies have investigated Chinese consumer preferences for sustainability attributes across a range of developed Chinese cities. For example, Zhao el al. (2018) examined Chinese consumer perceptions, purchase intentions and willingness-to-pay (WTP) for carbon-labelled products in Chengdu. The results showed that the majority of respondents intended to buy carbon-labelled products, however, the level of product premium that consumers were willing to pay was relatively low. The authors also found that perceived consumer effectiveness, occupation and level of income significantly influenced the WTP for carbon-labelled products (Zhao et al., 2018).

Qing et al. (2017) investigated the importance of eco-labels in relation to rice products for Chinese consumers. The authors used a choice experiment to analyse Chinese consumers' preferences and motives for purchasing eco-labelled rice in four provincial areas in China (Shanghai, Zhejiang, Jiangsu and Guangdong). The study revealed that consumers in the selected four areas are willing to pay a premium for

eco-labelled rice to meet food safety and environmental concerns. The authors found that consumers' knowledge of the different production standards does not increase consumers' WTP for eco-labelled rice products. Their finding shows that consumers with relatively poor knowledge of the production standards of eco-labelled still present positive attitudes toward eco-label rice products (Qing, et al., 2017).

Wang et al. (2018) used a choice experiment to assess Chinese consumers' WTP for pork for four attributes: governmental certification, location-of-origin, "free from veterinary drug residues" label, and price in the Jiangsu and Anhui provinces in China. The authors included five levels of certification including Governmental certification; no certification, "Safe Food" certification, "Green Food" certification, and "Organic Food" certification. Their findings showed that Jiangsu consumers' WTP for pork with a "Organic Food" certification was ranked the highest of all, followed by "Green Food" certification, and then "free from veterinary drug residues" label (Wang et al., 2018).

Jin et al. (2017) analysed Chinese consumers' WTP for two types of traceability system based on abbreviated and detailed information among consumes in Hangzhou, China. The authors used apples as their research subject. Their findings showed that Chinese consumers had a positive WTP for both types of food traceability system. However, for most consumers' WTP for traceability with detailed information was higher than that for traceability with abbreviated information. The authors also found that gender, marital status, education background, and self-reported health affected Chinese consumers' WTP for traceability systems (Jin et al., 2017).

Similarly, Wang and Huo (2016) investigated Chinese consumers' WTP a price premium for apple products. The authors conducted their study in two developed cities (Wuhan and Ningbo) and two less-developed cities (Lanzhou and Guiyang) in China. Wang and Huo (2016) found that gender, education background, salary, confidence in certified fruits, and consumer preferences in fruits (such as nutritional value and production place) had impact on Chinese consumers' WTP. Their results confirmed that better knowledge and higher confidence in certified fruits would increase consumers' WTP for certified apples (Wang and Huo, 2016).

1.4 China digital media and smart technology use in relation to kiwifruit products

Digital media and smart technologies offer channels for communicating information about products and providing alternative way for consumers to purchase fruit. These include online shopping (e-commerce), social media and mobile devices (such as smartphones and tablets) that have potential to increase direct marketing of NZ products. They also can help provide information and authenticity in market through, for example, barcodes and QR codes.

The AERU has conducted work on a selection of countries to examine the use of digital media and smart technologies in relation to food and beverage products in overseas markets relevant to NZ exporters. Findings have shown that the use of digital media and smart technologies to find out about and/or purchase food and beverage products is growing, especially in emerging economy markets (Driver et al., 2015; Miller et al., 2014).

Driver et al. (2015) studied the use of digital media and smart technologies by food and beverage consumers in five countries, including China. The authors found that Chinese participants used digital media and smart technology to find out about and/or purchase food and beverage products more than the other countries that were included in the study (India, Indonesia, the UK and Japan). A high proportion of Chinese consumers used mobile apps to find information on food and beverages, with QR codes used most frequently by Chinese participants. In addition, the authors identified that lower prices were the most important reason that Chinese consumers chose to shop for food and beverage products online followed by the ability to purchase products from overseas, or those that are not available domestically (Driver et al., 2015).

China's digital media and smart technology has developed rapidly. China had 731 million Internet users and 695 million mobile Internet uses in 2016 (year-end December). The online retail market value reached to 5.3 trillion Yuan (US$770 billion) in 2016, with a total of 500 million people engaged in online shopping (CNNIC, 2017).

Recent studies have examined Chinese consumer use of digital media and smart technologies. For example, Weibo is one of most influential and popular social media and mobile apps in China. It is considered to have an impact on Chinese consumers, as well as an increasing influence on consumers overseas (Duan and Dholakia, 2015). Both of them allow people to post information about their products, and also provide a payment method for consumers (Duan and Dholakia, 2015). Duan and Dholakia (2015) studied the impact of Weibo on Chinese consumer values, finding that the use of Weibo has a significant influence on transforming Chinese consumer values. For example, they found the modern Chinese consumer value of "enjoy now" is rapidly replacing traditional Chinese consumer values, such as suppressing desire, delaying gratification and thriftiness (Duan and Dholakia, 2015).

Other studies have investigated the relationship between Chinese consumer use of technology and preferences/behaviours. Vazquez et al. (2017) found that smart technologies have significant direct relationships with the generation of positive word of mouth among Chinese consumers. Previous studies have also suggested that electronic word-of-mouth can have considerable influence on consumer perceptions and purchase behaviour (Doh and Hwang, 2009; Gruen et al., 2006; Gupta and Harris, 2010; Park and Kim, 2008). Finally, Gao et al. (2015) investigated the critical determinants of Chinese consumers' intentions toward continued use of mobile purchase systems. The findings of the study indicated that system quality, information quality, service quality, and privacy and security concerns impact on consumers' continued use intentions towards mobile purchase.

While the use of digital media and smart technology in China in relation to food and beverage products is significant, there are no published studies investigating its use in relation to kiwifruit products. However, some studies have specifically examined the use of digital media and smart technology in relation to kiwifruit products in other international markets. For example, Gautam et al. (2017) examined the use of Radio Frequency Identification (RFID) tags in reducing transportation costs incurred in a kiwifruit supply chain in NZ. The results showed that using RFID tags could help supply chain managers to minimize the risks of delivery of perished fruits by tracing it at an earlier stage (Gautam et al., 2017).

Chapter 2
Methodology

The method included a structured and self-administered online survey that included a Choice Experiment, conducted in Shanghai, China in January 2018. The surveys were administered through Qualtrics™, a web-based survey system, and had a sample size of 740 kiwifruit consumers.

The survey was developed by the research team drawing from a literature review on Chinese consumer trends for fruit products (see Chapter 1), results from previous surveys examining consumer attitudes in overseas markets (Guenther et al., 2015; Miller et al., 2014; Saunders et al., 2015), a pilot survey of 100 Shanghai kiwifruit consumers (November 2017) and consultation with industry partners and stakeholders especially those on the advisory board.

Sampling involved the recruitment of participants from an online panel database of consumers provided by an international market research company. These panels are profiled, broadly recruited and frequently refreshed by the company. The respondents for each survey are recruited by online marketing. The company holds a participation history of each panel member. Each respondent who completes the survey is compensated with a retail voucher. Potential respondents were recruited by e-mail which included a short description of the study, a link to start the online survey and instructions to run the survey.

Potential respondents who received an invitation to complete the survey were screened out if they purchased kiwifruit less than monthly (Figure 2-1) or knew nothing about NZ (Figure 2-2).

Figure 2-1: Kiwifruit purchase frequency (screen-out rate)

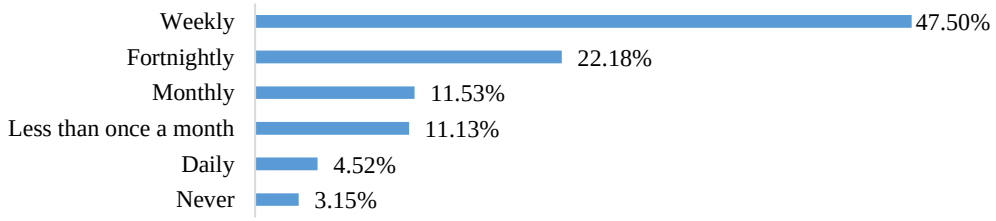
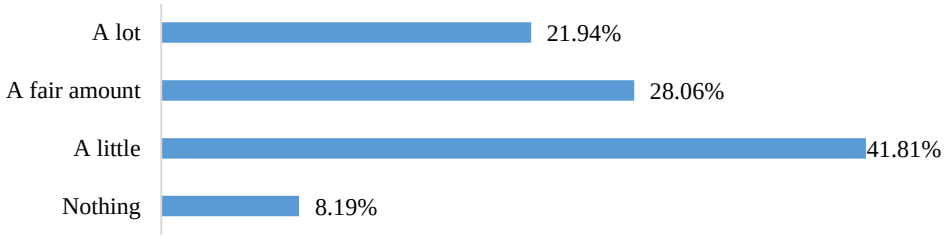


Figure 2-2: Knowledge of New Zealand (screen-out rate)



In order to ensure data quality some respondents were removed from the sample for analysis. Respondents were considered as careless or inattentive, and therefore removed, if they had completed the survey in a time considered insufficient to allow for adequate consideration of questions. Timing thresholds were determined within an evaluation of the distribution of survey completion times across the sample. The validity of responses was also checked with respondents removed who: constantly selected ‘don’t know’ options; provided non-varying responses over multiple questions; provided gibberish in open-ended question answers. Final sample demographics are presented in Appendix 1 Demographics.

2.1 Choice Experiments

This study employs the stated preference method of choice experiments to estimate consumer WTP for credence attributes of kiwifruit. Choice experiments have been extensively used to value consumer preferences for food product attributes (Tait et al., 2015; 2016; 2016b; Miller et al., 2017b). As opposed to revealed preference methods such as using direct or indirect market prices, this survey based approach facilitates valuation of attributes that may not be directly observable in market prices such as the attributes explored in the current report. The ability of this method to identify which individual attributes are more important in consumer choices, and to estimate marginal WTP for these attributes, has seen this approach to valuation become increasingly favoured by researchers.

The method involves simulating the context in which consumers would normally make choices among a set of competing kiwifruit alternatives. This is achieved by designing an experiment in which kiwifruit attributes are systematically and independently varied to produce multiple choice scenarios. In this study, alternative kiwifruit products presented to consumers are described by the varietal, production practices, country of origin and price. Consumers are then asked to indicate their preferred kiwifruit alternative in each scenario, with the observed levels of attributes in the chosen and non-chosen alternatives modelled in a probabilistic econometric framework. The resulting model outputs can then be used to estimate consumer WTP for the kiwifruit attributes of interest. A fuller presentation of theoretical foundation and statistical procedure can be found in Appendix 2 Statistical Method.

The central objective of the Choice Experiment is motivated by the following hypothesis:

> *"It is possible to use original research in key international markets to determine credence attributes matched to NZ production systems that are valued by international consumers of all agri-food products sourced from NZ, especially from Maori enterprises"*

While *search* attributes such as price or colour can be observed directly, and *experience* attributes such as flavour or texture can be assessed following consumption, *credence* attributes are not able to be directly observed or verified by consumers' consumption of the product. For products promoting credence attributes, the role of labelling is of significant importance.

Relevant credence attributes were identified through examination of the individual elements that comprise the Zespri sustainability approach (Figure 2-3). In conjunction with literature review, and the scoping survey, a set of attributes to be included in the choice experiment was determined (Table 2-1).

Figure 2-3 Sustainability the Zespri way

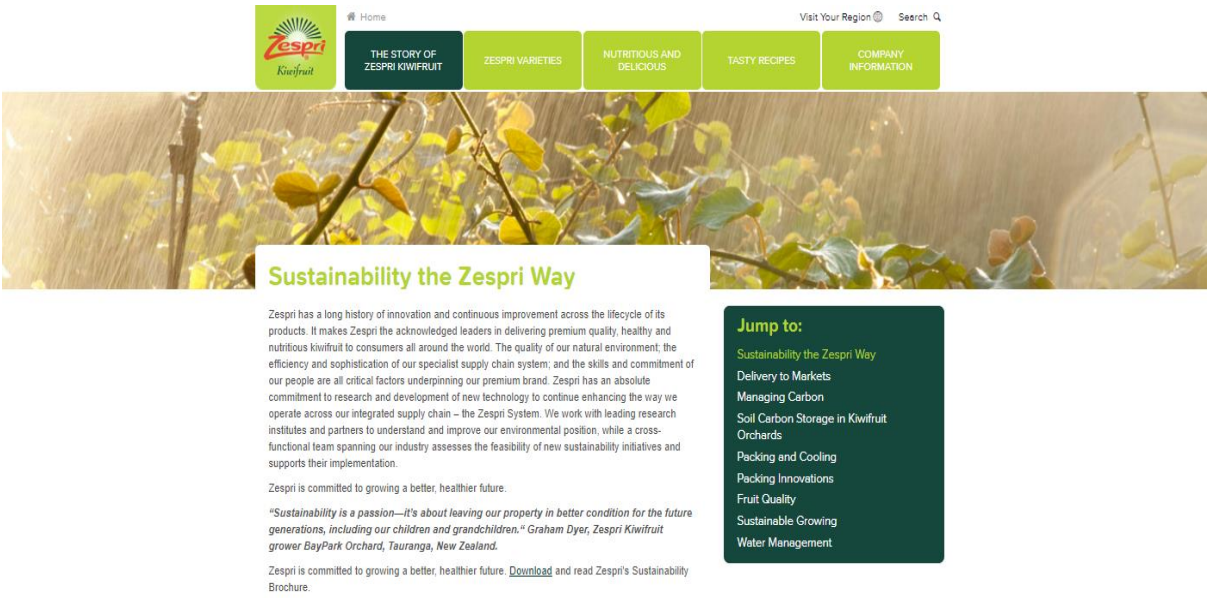


Table 2-1: Kiwifruit attributes included in the choice experiment

Water use and pollution minimisation certification	The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises water use and pollution of freshwater resources.
Integrated pest and disease management certification	The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises use of agrichemicals, and uses integrated pest management tools including natural biological controls. All kiwifruit are tested for agrichemical residues
Certified Organic	Kiwifruit are 100% grown organically, are GE free, and no synthetic fertilisers or pesticides are used
Waste minimisation certification	The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises fruit waste in production system. All packaging is 100% recyclable, made from renewable sources. Minimise waste to landfill.
Greenhouse Gas Emissions minimisation certification	The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises GHG emissions in production and in transport of fruit to market.
Social responsibility	The kiwifruit has been produced by orchards that are community owned and operated. Socially responsible growers and suppliers actively include public interest into decision making.
Country where the kiwifruit is grown	This attribute displays the country where the kiwifruit was grown
Variety	Green, Yellow, or Red
Price	Yuan per kg of kiwifruit

Social responsibility attributes have been defined in many diverse ways, with no clear dominant definition (Miller et al., 2017). The description used here was formed on the basis of being a central defining characteristic of Maori enterprises. This view was formed by reviewing of Māori enterprise definitions available online used in current products. These reflected an important Māori enterprise characteristic concerning collective ownership structures. The review also revealed a second major defining characteristic, stewardship over relevant natural resources including land. We consider that the environmental sustainability attributes already included are sufficient to meet this criteria and so do not specify a stewardship specific attribute.

2.2 Kiwifruit attribute levels

The levels that each kiwifruit attribute can take are presented in Table 2-2. Price levels were determined by the distribution of observed market prices in Shanghai for kiwifruit (as at December 2017). Countries of origin were selected based on volumes of sales in China for 2017.

Table 2-2 Kiwifruit attribute levels used in the choice experiment

Kiwifruit attributes	Attribute levels					
Water use and pollution minimisation	No label	Certified				
Integrated pest and disease management	No label	Certified				
Organic	No label	Certified				
Waste minimisation	No label	Certified				
GHG emissions minimisation	No label	Certified				
Social responsibility	No label	Community owned and operated				
Variety	Green	Yellow		Red		
Country of Origin	No label	NZ	China	Italy	Chile	Greece
Price Yuan/kg 2017	30, 40, 60, 80, 90, 120, 160					

2.3 Experimental design

It is not possible to present respondents with all possible combinations of attribute levels (Table 2-2). Instead, Experimental Design methodology is used to create combinations of attribute levels, which represent a subset of the total combinations possible, and maximise the amount of statistical information available. These combinations are formed into choice sets. Figure 2.4 presents an example of a choice set shown to respondents. Each choice set comprises four options, of which respondents chose their preferred option. Three options present alternative kiwifruit, while the fourth is a 'none of these' option.

The study employs NGene™ software to apply a D-efficient fractional factorial design approach. Providing information on the likely values of model coefficient estimates improves this process. For the initial experimental design, we looked at similar studies for design parameters, then updated these with coefficient estimates from a model fitted to pilot survey data (n=100). The resulting updated experimental design is applied to the remaining number of respondents with each respondent answering ten choice sets.

Figure 2-4 Example kiwifruit choice set shown to respondents

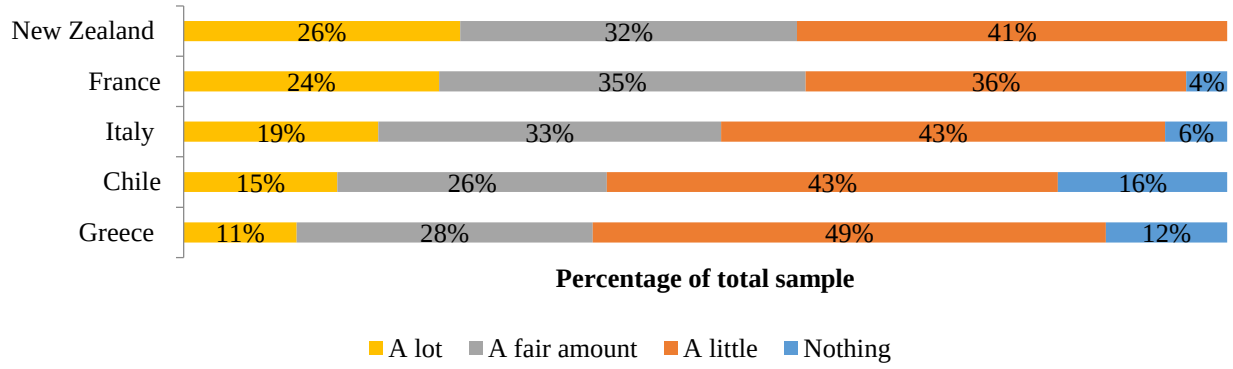
Chapter 3
Results

This chapter presents the results of the survey examining Shanghai consumer preferences for kiwifruit products, including their knowledge of particular countries (3.1), kiwifruit purchasing habits (3.2), attitudes to kiwifruit products (3.3), knowledge of Māori culture and enterprise (3.4), attitudes to kiwifruit production (3.5), as well as their use of digital media and smart technology in relation to kiwifruit products (3.6). The results of a choice experiment are presented in Chapter 4.

3.1 Knowledge of countries

Participants were asked to indicate how much they knew about a series of countries using a four-point Likert scale, ranging from a lot to nothing. For the purposes of this research, these countries were selected based on their status as significant kiwifruit producing/exporting countries, including Greece, Chile, France and Italy, as well as NZ. Results are shown in Figure 3-1. All participants indicated some level of knowledge of NZ, with about a third of participants stating that they know a lot. This is perhaps not surprising given knowledge of NZ was a screening factor for completing the survey.

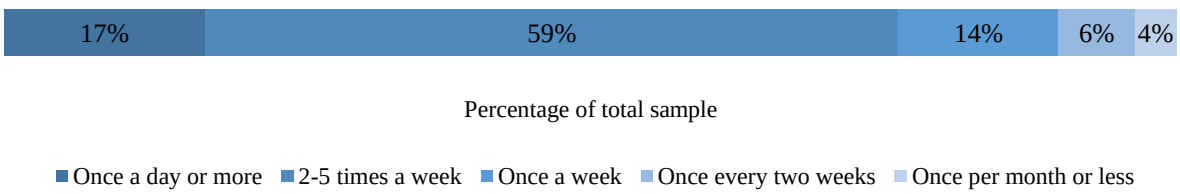
Figure 3-1: Knowledge of countries



3.2 Kiwifruit purchasing habits

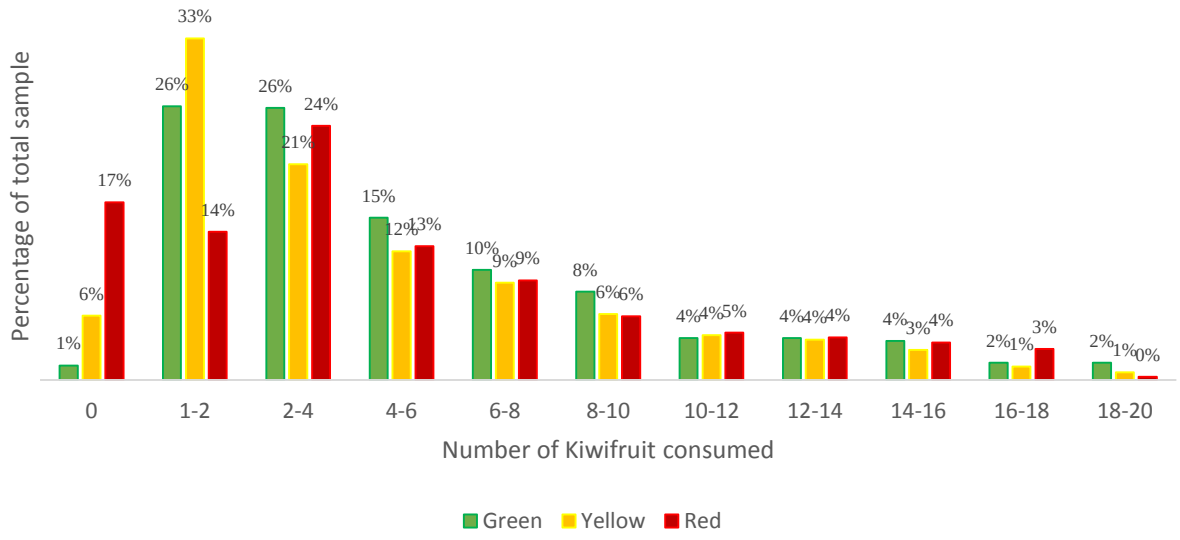
The next set of questions were concerned with participants' purchasing habits in relation to kiwifruit. Participants were first asked to indicate the frequency at which they ate kiwifruit, ranging from once a day or more, to once per month or less. Figure 3-2 shows that the largest group of participants consumption of kiwifruit was 2-5 times a week (59 per cent), followed by once a day or more (17 per cent) and then once a week (14 per cent).

Figure 3-2: Kiwifruit consumption frequency



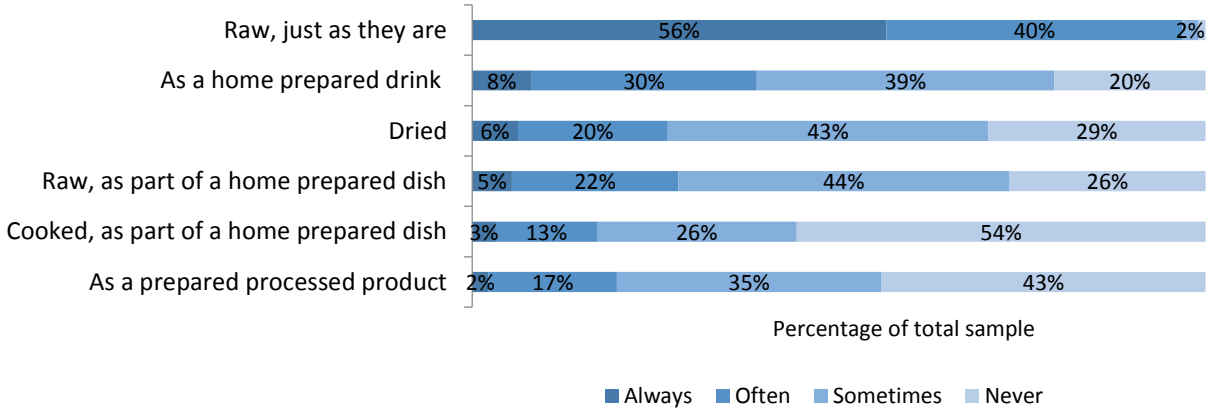
Following this, participants were asked to indicate their average number of Kiwifruit consumed per week of three varieties. Results are presented in Figure 3-3, and shows that most respondents consumed on average between 1-2, and 2-4 kiwifruit per week. The Yellow variety was most often consumed at a rate of 1 to 2 per week, Green at 1-4, and Red at 2 to 4 per week.

Figure 3-3: Average kiwifruit consumption per week



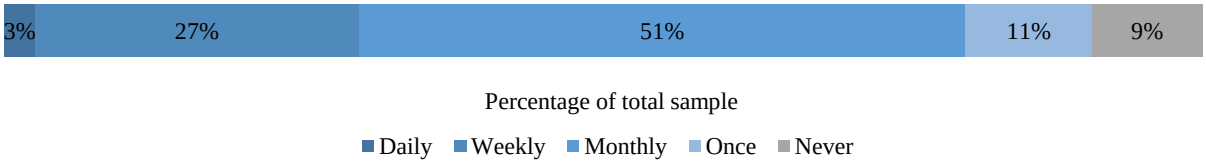
Participants were also asked to indicate the frequency at which they ate kiwifruit in a variety of different ways. Results are presented in Figure 3-4. These show that the most frequent method of consumption of kiwifruit was 'raw, just as they are' (96 per cent always/often), followed by 'as a home prepared drink' (38 per cent always/often), and 'dried' (26 per cent always/often).

Figure 3-4: Methods and frequency of consumption of kiwifruit



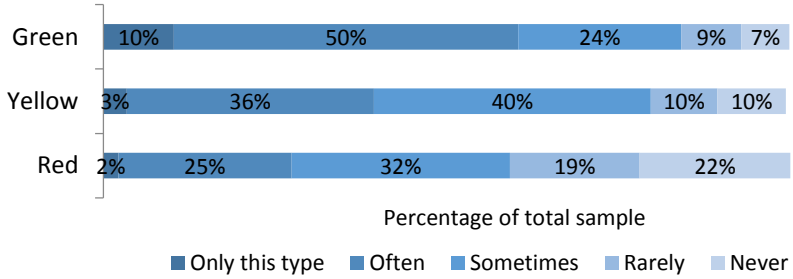
There is a tradition in China to gift fruit so the survey asked respondents about their Kiwifruit gifting practices. Figure 3-5 shows that 51 per cent of respondents gifted kiwifruit monthly, followed by 27 per cent weekly.

Figure 3-5: Frequency of kiwifruit purchases for gifting



Respondents were asked to indicate the frequency of which varieties of kiwifruit they purchased for gifting, as shown in Figure 3-6. Overall, the most frequently purchased variety of kiwifruit for gifting was Green (74 per cent often/sometimes), followed by Yellow (76 per cent often/sometimes) and Red (57 per cent often/sometimes).

Figure 3-6: Frequency of purchase of particular varieties of kiwifruit for gifting



Participants were then asked to indicate their usual spend on the three varieties of kiwifruit for personal consumption and gifts. Figure 3-7 shows that the most commonly stated usual price of kiwifruit bought for personal consumption was 14-27 Yuan/kg for Green and Yellow, and 27-40 Yuan/kg for Red.

Figure 3-7: Usual price of kiwifruit bought for personal consumption

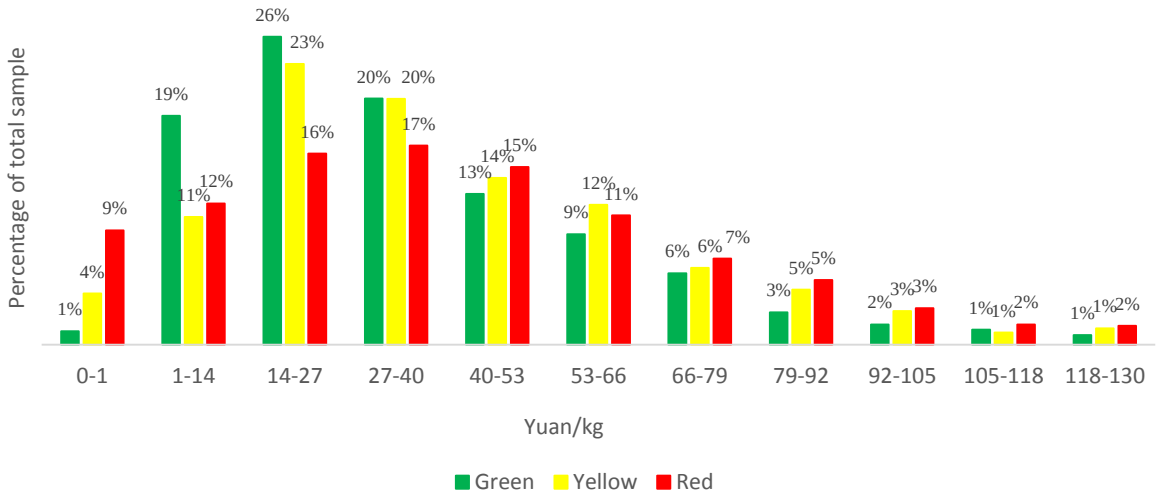
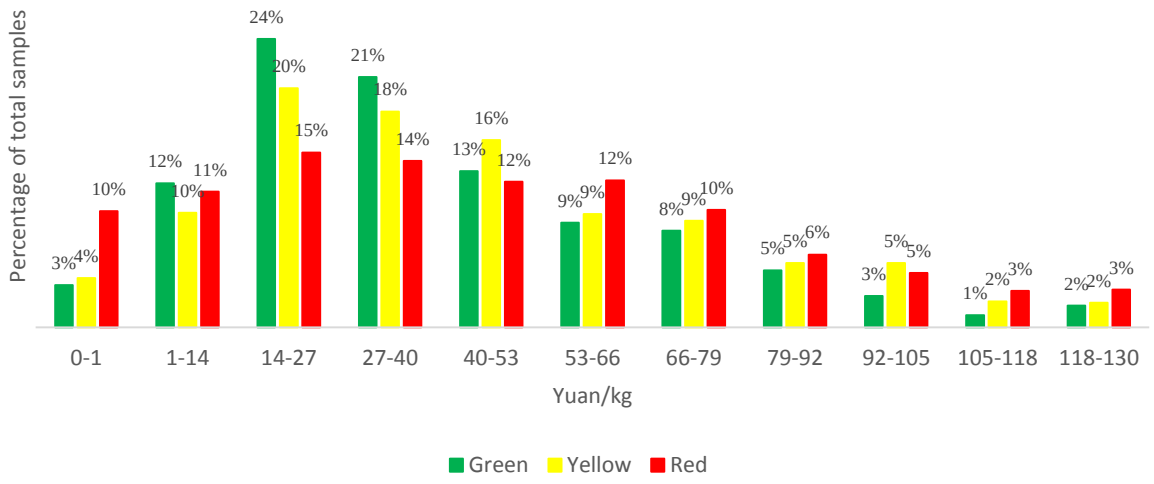


Figure 3-8 shows that the most commonly stated participants' usual price of kiwifruit bought for gifting was 14-27 Yuan/kg, followed by 27-40 Yuan/kg. The results of participants' usual price of kiwifruit bought for gifting are shown to be similar to the results of participants' usual price of kiwifruit bought for personal consumption (see Figure 3-7).

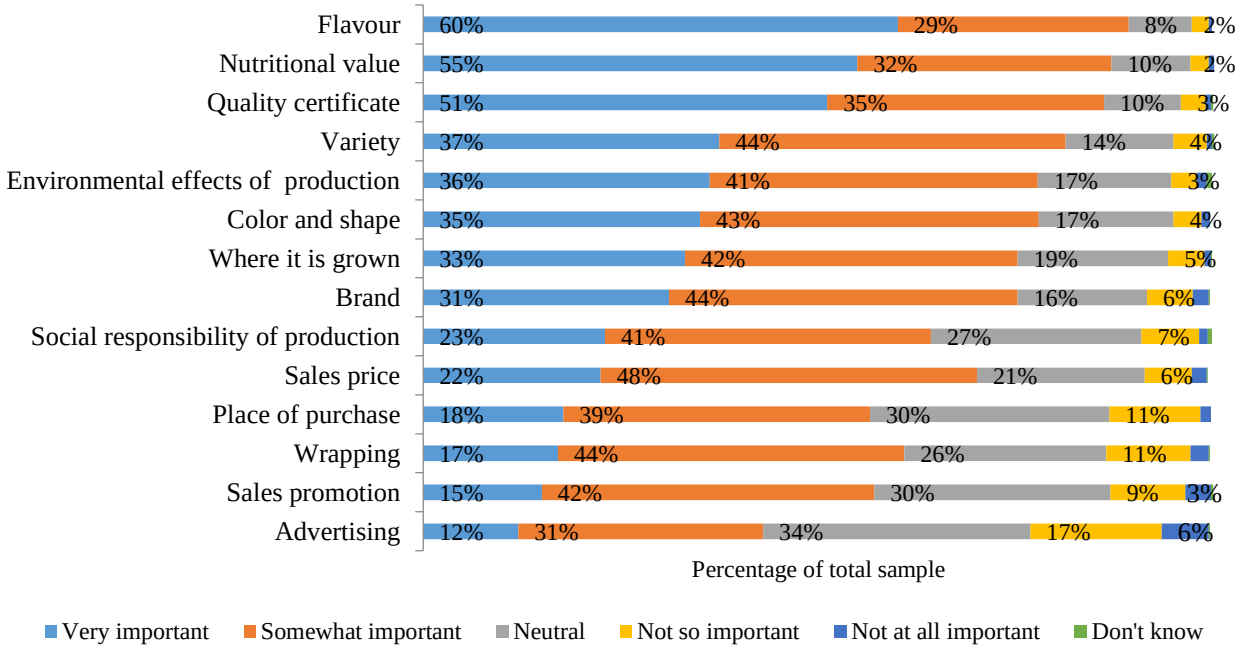
Figure 3-8: Usual price of kiwifruit bought for gifts



3.3 Attitudes to kiwifruit product characteristics

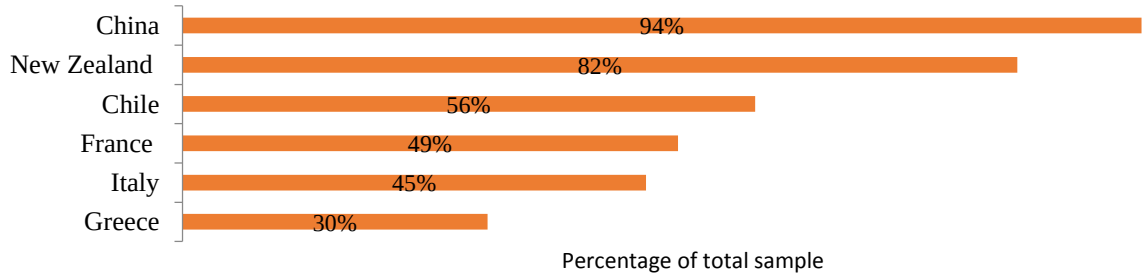
Participants were then asked to indicate how important a range of factors are to them when buying kiwifruit. Results are presented in Figure 3-9 and show that flavour (89 per cent very important/somewhat important), was the most important factor, followed by nutritional value (87 per cent very important/somewhat important) and then a quality certificate (86 per cent very important/somewhat important). The environmental effects of production were also important to respondents, as well as provenance attributes (e.g. where it is grown and place of purchase) and social responsibility of production were also important when buying kiwifruit.

Figure 3-9: Importance of factors when buying kiwifruit



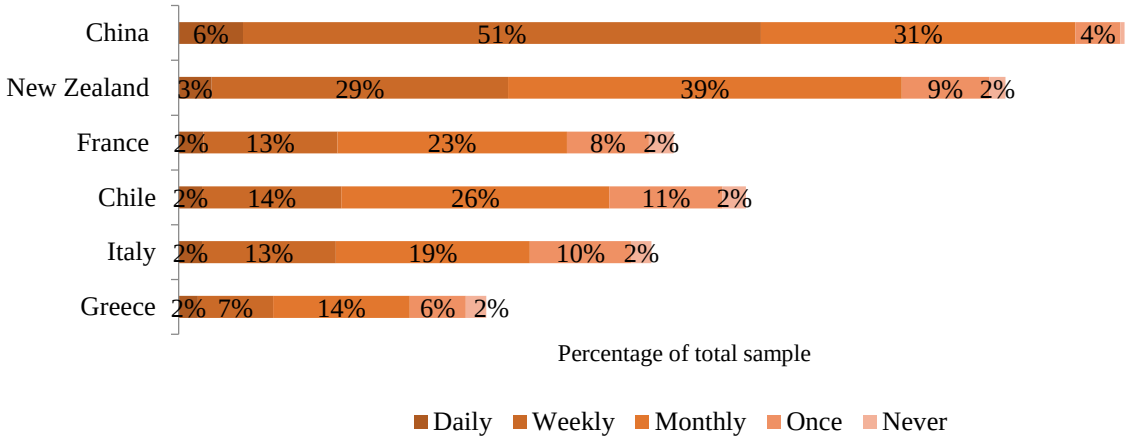
Participants were asked if they had seen kiwifruit being sold from a particular country of origin. Results presented in Figure 3-10 show that China was the most commonly seen country of origin (94 per cent), followed by NZ (82 per cent) and then Chile (56 per cent).

Figure 3-10: Percentage of participants who had seen kiwifruit being sold with a particular country of origin



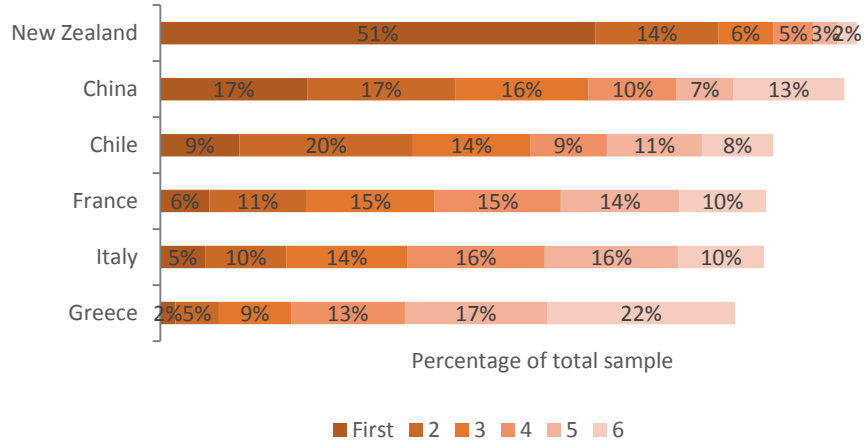
Following this, participants were asked to indicate the frequency at which they had purchased kiwifruit from a particular country. Results presented in Figure 3-11. show that the highest frequency of seen and purchase (seen and purchased) was Chinese kiwifruit (56 per cent daily/weekly). Over half of participants stated that they had purchased NZ kiwifruit either weekly (29 per cent) or monthly (39 per cent).

Figure 3-11: Frequency of purchase of kiwifruit with a particular country of origin



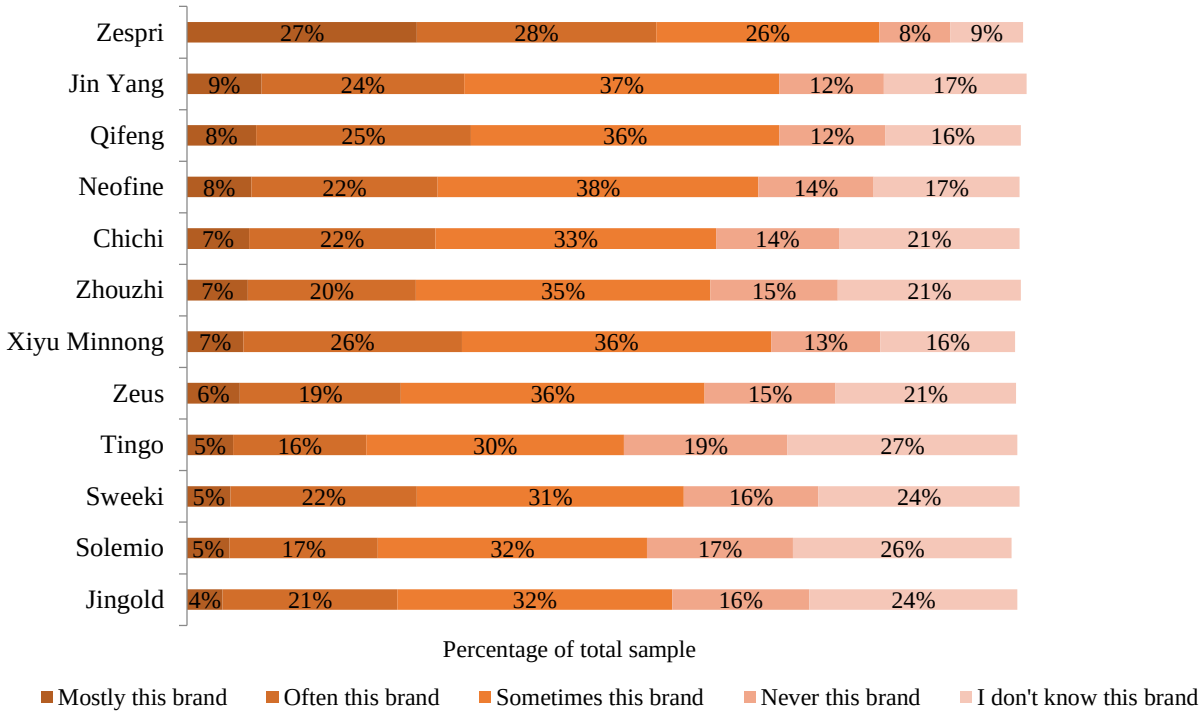
Participants were asked which countries they think produced the highest quality kiwifruit. As shown in Figure 3-12, NZ was ranked first most often, followed by China and then Chile.

Figure 3-12: Ranking of countries for producing the highest quality kiwifruit



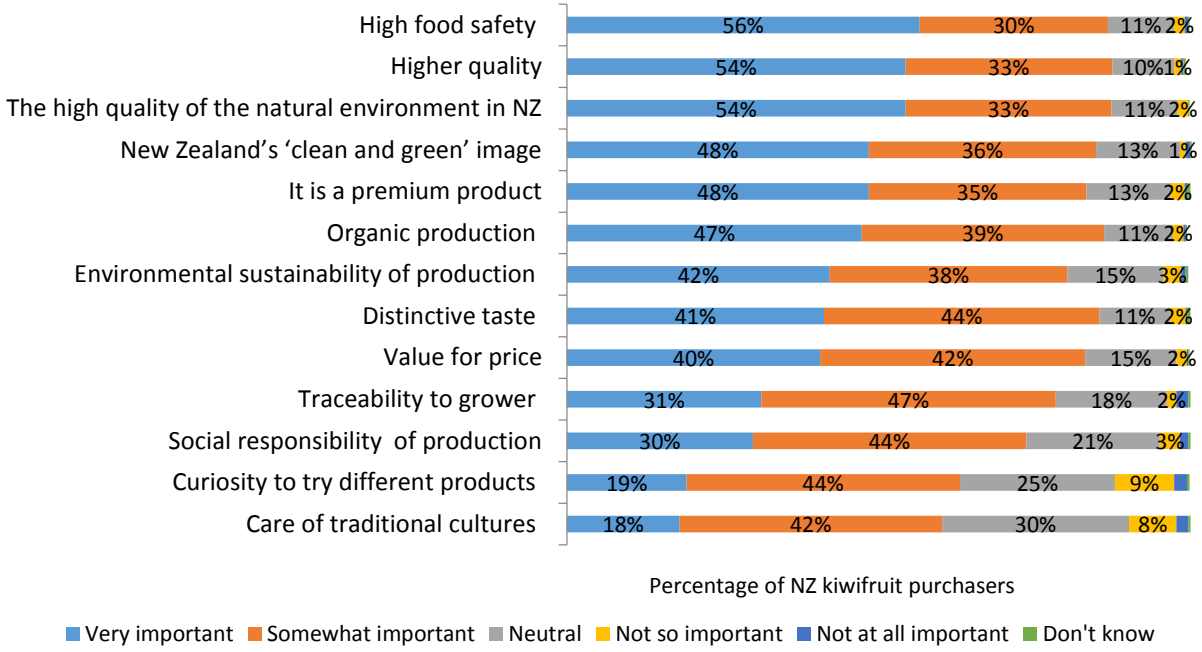
As presented in Figure 3-13, Zespri was the most frequently purchased kiwifruit brand (55 per cent mostly this brand/often this brand), followed by Jin Yang (33 per cent mostly this brand/often this brand) and Qifeng (33 per cent mostly this brand/often this brand).

Figure 3-13: Frequency of purchase of particular brands of kiwifruit



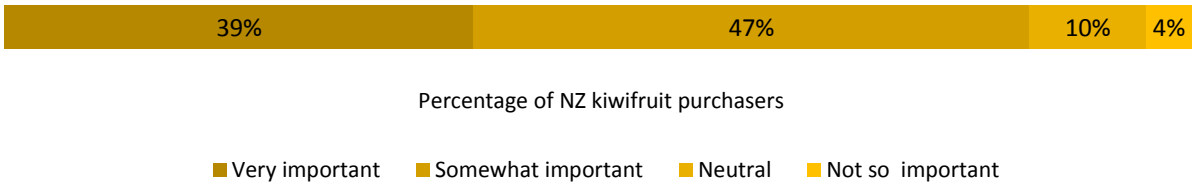
Respondents who had purchased NZ kiwifruit at least monthly (n = 529) were asked to indicate which of reasons were important to them in their choice of purchasing NZ kiwifruit. Figure 3-14 shows that the most important reason was high food safety (56 per cent very important), followed by higher quality (54 per cent very important) and the high quality of the natural environment in NZ (54 per cent very important).

Figure 3-14: Importance of reasons in choice to purchase New Zealand kiwifruit



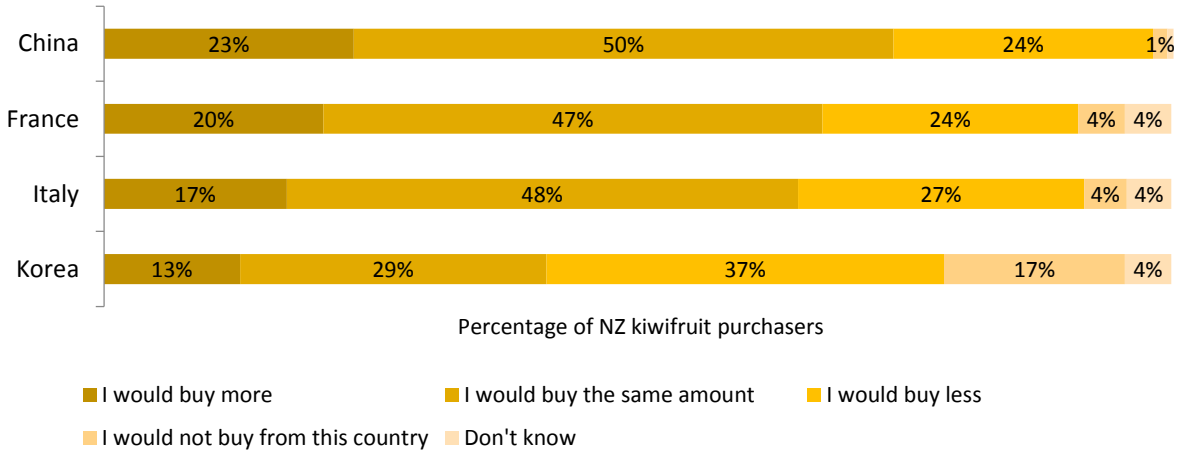
Regarding Zespri kiwifruit, participants who had purchased NZ Kiwifruit at least monthly were asked to indicate how important it was to them that Zespri kiwifruit are grown in NZ as opposed to another country. Results are presented in Figure 3-15, with significant number of participants indicating that Zespri kiwifruit being grown in NZ is either very important (39 per cent) or somewhat important (47 per cent).

Figure 3-15: Importance of Zespri kiwifruit being grown in New Zealand rather than another country



Similarly, participants who purchased NZ kiwifruit were asked to indicate if they would buy the same amount of Zespri kiwifruit if it was grown in any of a series of countries. Results are presented in Figure 3-16. About three quarters of participants indicated that they would purchase the same amount or more if Zespri kiwifruit was grown in China (23 per cent 'I would buy more', 50 per cent 'I would buy the same amount'). And about half indicated they would buy the same or more if grown in France.

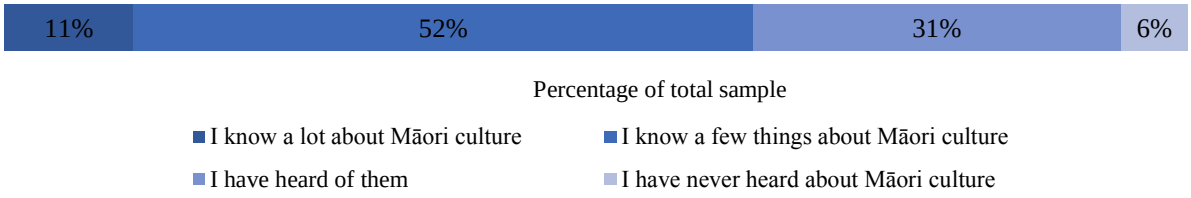
Figure 3-16: Intended amount of kiwifruit purchases if Zespri kiwifruit were grown in a different country than New Zealand



3.4 Māori culture and enterprise

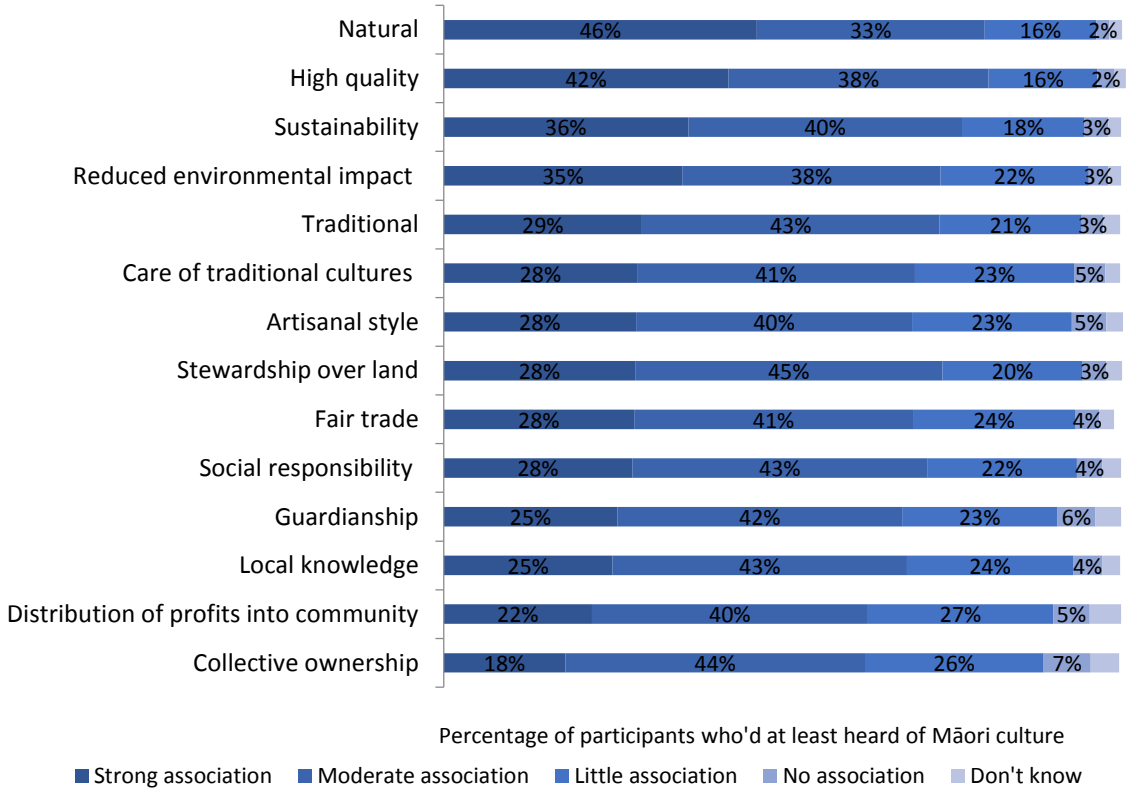
The survey examined participants' knowledge of and associations with Māori culture, generally and specifically in relation to kiwifruit production. Participants were initially asked to approximate their knowledge of Māori culture, as shown in Figure 3-17. This shows that most participants had heard of Māori culture (52 per cent), followed by those who selected the option that they knew a few things about Māori culture (31 per cent).

Figure 3-17: Knowledge of Māori culture



Following this, participants who had at least heard of Māori culture (n = 698) were asked to indicate to what extent they associated a series of attributes with kiwifruit produced from a Māori enterprise. Results are shown in Figure 3-18. These show that the strongest associated attribute was 'natural' (79 per cent strong/moderate association), followed by 'high quality' (80 per cent strong/moderate association) and 'sustainability' (76 per cent strong/moderate association).

Figure 3-18: Attributes associated with kiwifruit produced from a Māori enterprise



3.5 Attitudes to kiwifruit production practices and personal health

Participants were asked to indicate their agreement with a range of statements in relation to kiwifruit production practices and personal health. This included statements regarding participants' views on the economic, environmental and social impact of kiwifruit production. Additionally, participants were asked about their perception of health benefits. Results are shown in Figure 3-19. In terms of personal health, the most commonly agreed statement was that 'I eat kiwifruit mainly for the health benefits' (82 per cent agree/partly agree), followed by 'kiwifruit is one of my favourite types of fruit' (79 per cent agree/partly agree).

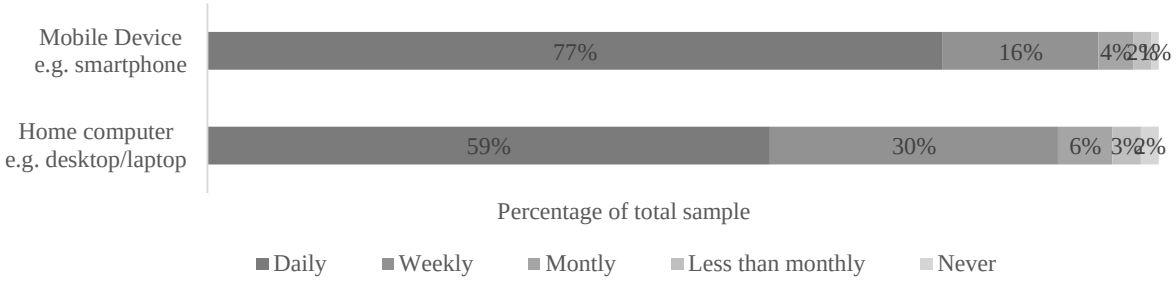
In terms of production practices, most respondents thought that 'the quality of kiwifruit is directly related to the quality of the natural environment where it is grown' (80 per cent agree/partly agree). And most participants also agreed that the 'food safety of kiwifruit is directly related to the quality of the natural environment where it is grown' (79 per cent agree/partly agree), 'the health benefits for kiwifruit are directly related to quality of the natural environment where it is grown' (78 per cent agree/partly agree), and 'I trust the quality claims made by Zespri' (78 per cent agree/partly agree).

Figure 3-19: Attitudes relating to kiwifruit production practices

3.6 Digital media and smart technology use for kiwifruit

The survey asked participants to describe the ways in which they used various forms of digital media and smart technology when searching for information about and/or purchasing kiwifruit. Initially, participants were asked to indicate how often they accessed the Internet using mobile devices (e.g. smartphone) or home computers (e.g. desktop/laptop). Results are presented in Figure 3-20, most participants accessed the Internet using both mobile devices and home computers at least weekly (83 per cent and 89 per cent respectively). Participants rate of daily access was significantly higher for mobile devices than for home computers.

Figure 3-20: Frequency of access the Internet using mobile devices and home computer



Following this, participants were asked to indicate if they use particular digital media sources via mobile devices or home computers for the purposes of kiwifruit selection or to find out how a kiwifruit product is produced. Table 3-1 shows that overall, participants tended to use digital media sources more to inform kiwifruit choices than for production information. In addition, participants used their mobile devices more frequently for both purposes. Digital media sources that had the most overall use in relation to kiwifruit products included WeChat, and Baidu.

Table 3-1: Use of online information sources to inform kiwifruit choices and/or information regarding how a kiwifruit product is produced

	Inform Choices		How Produced	
	Home Computer	Mobile Device	Home Computer	Mobile Device
WeChat	16%	48%	16%	34%
Taobao	27%	43%	21%	28%
Tmall	29%	43%	21%	31%
Baidu	34%	38%	31%	35%
Jingdong (JD)	26%	37%	21%	26%
Weibo	20%	32%	16%	26%
Food blogs	20%	26%	17%	21%
Alibaba	19%	25%	19%	19%
Retailer websites	23%	24%	21%	23%
Forums	22%	23%	21%	21%
QQ Zone	17%	23%	14%	20%
Youku	22%	23%	22%	19%
Food company web pages	26%	20%	22%	21%
LinkedIn	16%	11%	14%	14%

Percentage of total sample

Participants were also asked if a range of sources influenced them when making for kiwifruit product choices or searching for production information. Table 3.-2 shows that health professionals are the greatest influence informing product choices (55 per cent) and production information (42 per cent).

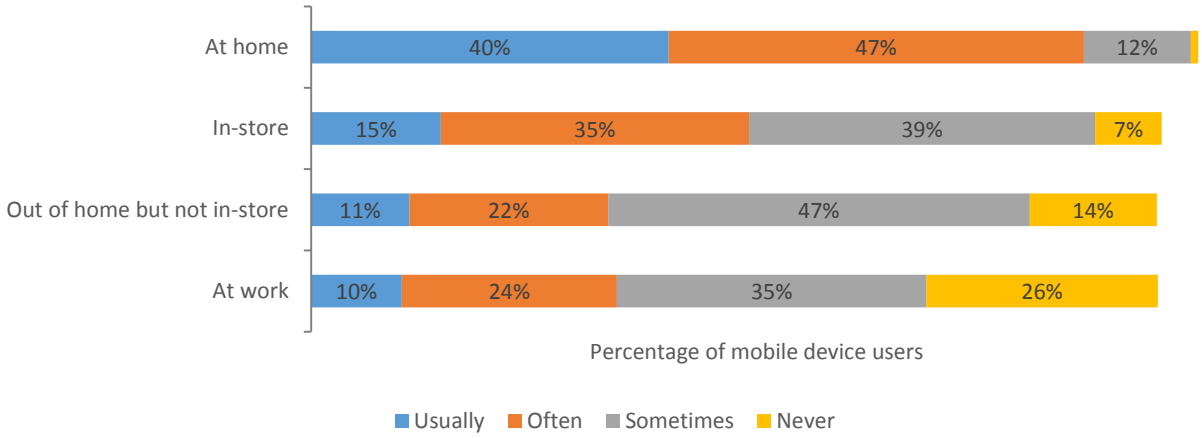
Table 3-2: Influences on inform choices and knowledge of production processes when searching for information about kiwifruit products

	Inform Choices	How Produced
Health professionals	55%	42%
Celebrity chefs	37%	27%
International bodies (e.g. World Health Organization)	37%	41%
Non-government organizations (e.g. Greenpeace)	30%	33%
Industry marketing boards	29%	29%
Sports celebrities	29%	20%
Government information	28%	36%
Other celebrities	27%	23%

Percentage of total sample

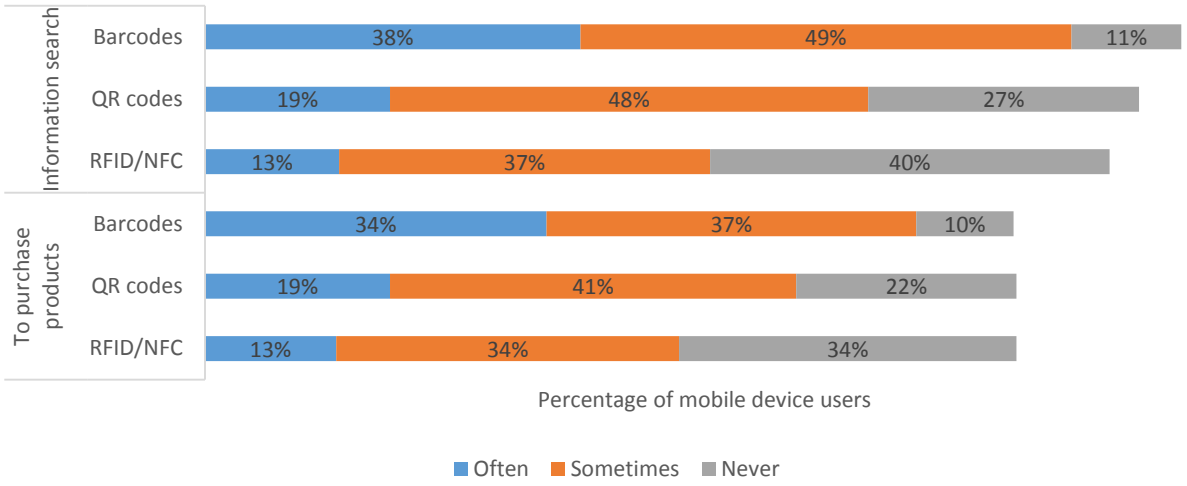
The survey also asked participants who had used a mobile device (n = 708) to indicate where they usually did this. Figure 3-21 shows a significant number of respondents use their mobile device at home (87 per cent always/often) to search for kiwifruit products or product information, followed by in-store (50 per cent always/often).

Figure 3-21: Frequency and place of use of mobile device to search for kiwifruit products or product information



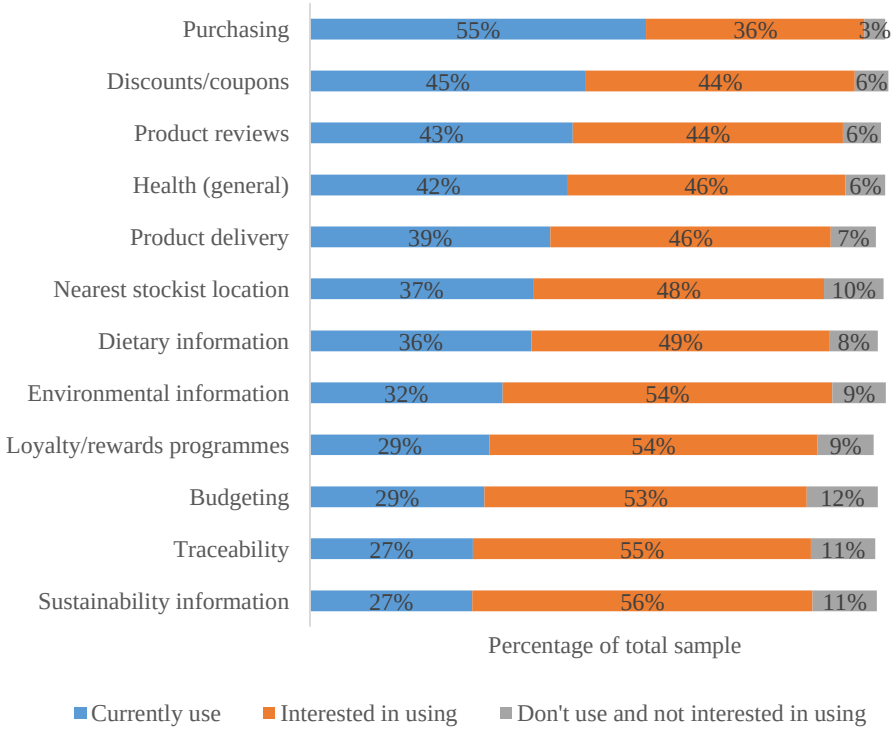
Participants were asked to indicate the frequency at which they had used a series of smartphone-interactive technologies (barcodes, QR codes, RFID/NFC) for the purposes of finding information about or purchasing kiwifruit products. Results are presented in Figure 3-22**.** Barcodes were the most frequently used interactive technology for both information searching (87 per cent often/sometimes) and purchasing (71 per cent often/sometimes).

Figure 3-22: Frequency of use of smartphone technologies for searching for product information or purchasing kiwifruit products



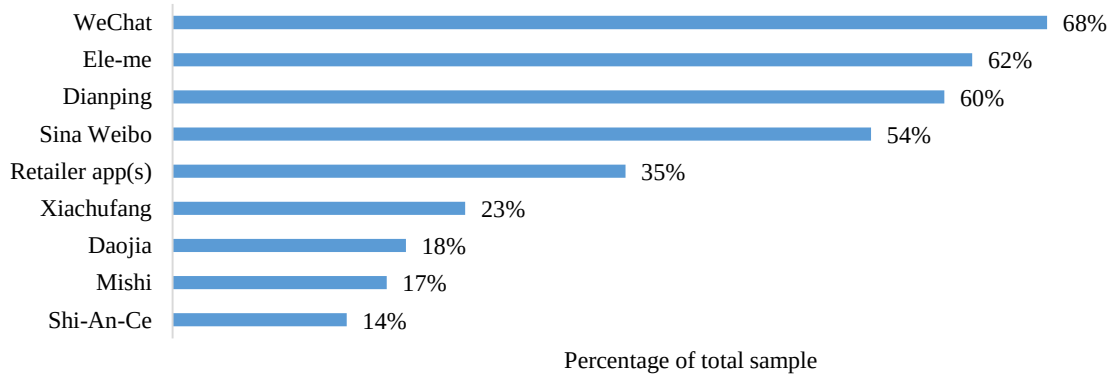
Participants were asked to indicate to the extent to which they had used mobile apps in relation to kiwifruit products for a range of reasons, stating whether they currently use these apps, are interested in using them, or don't use them and are not interested in using them. These results are shown in Figure 3-23. Overall, the most commonly stated reason for using mobile apps was purchasing (55 per cent currently use, 36 per cent interested in use), followed by discounts/coupons (45 per cent currently use, 44 per cent interested in use), and product reviews (43 per cent currently use, 44 per cent interested in use).

Figure 3-23: Use of mobile apps in relation to kiwifruit



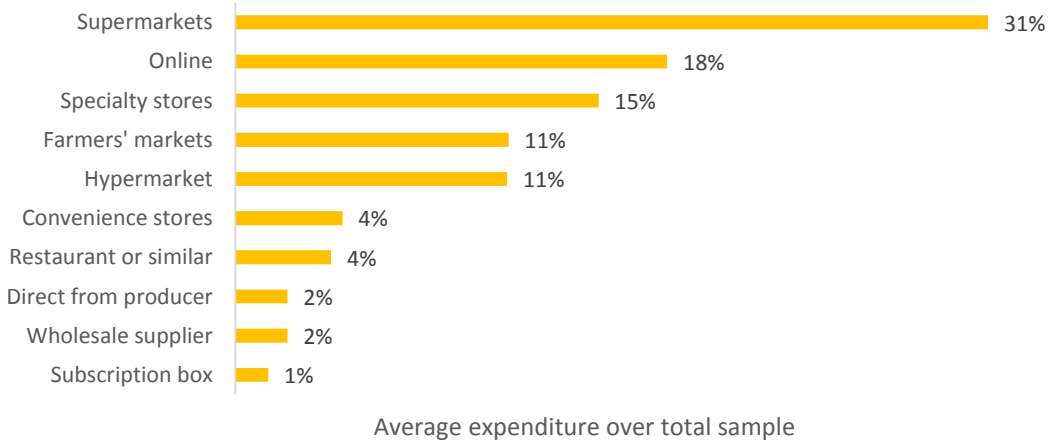
Participants were also asked to indicate which apps they used on their mobile device. In general, these provided apps (see the list) allow consumers to searching product information, writing comments/reviews for products, and/or purchasing products online. Figure 3-24 shows that the most used apps on mobile device included WeChat (68 per cent), followed by El-me (62 per cent) and Dianping (60 per cent).

Figure 3-24: Use of apps with mobile device



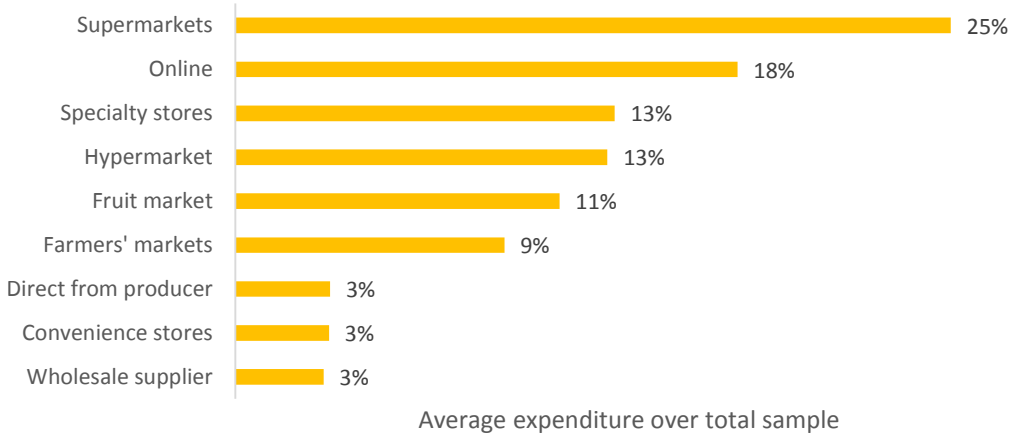
The survey also contained a series of questions designed to elicit where and how participants' purchase kiwifruit. Firstly, participants were asked to indicate their percentage of purchases across a series of retailer types for their usual food and beverage shopping. Results presented in Figure 3-25 show that average expenditure is highest at supermarkets (31 per cent), followed by online (18 per cent) and then specialty stores (15 per cent).

Figure 3-25: Average percentage of food and beverage purchases by retailer type



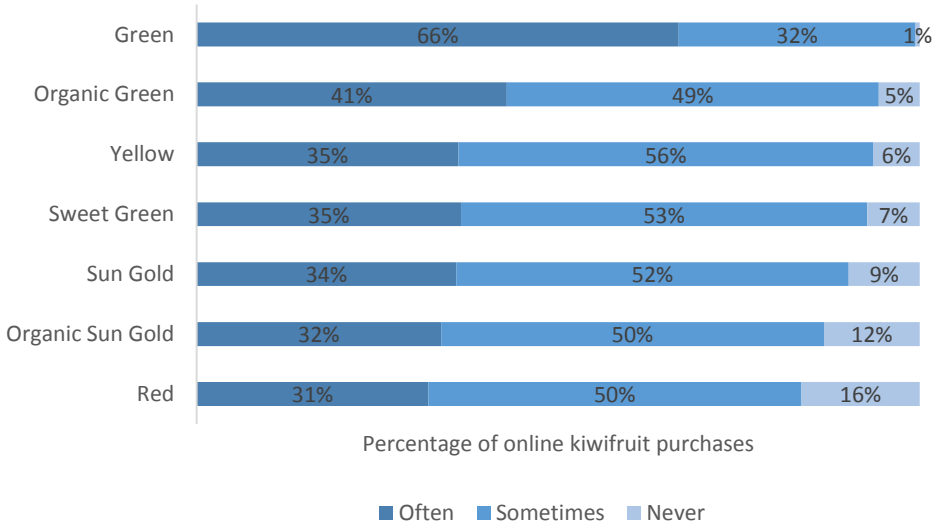
Following this, participants were asked to indicate the percentage of usual kiwifruit purchases across a series of retailer types. Figure 3-26 shows that supermarkets have the highest average purchases (25 per cent) followed by online (18 per cent).

Figure 3-26: Average percentage of wine purchases by retailer type



Participants who purchased kiwifruit online (n = 537) were also asked to indicate the frequency at which they purchased particular types of kiwifruit products online. These results are shown in Figure 3-27. Overall, the variety of kiwifruit most frequently purchased online was Green (71 per cent often/sometimes), followed by Organic Green (66 per cent often/sometimes) and Yellow (67 per cent often/ sometimes).

Figure 3-27: Frequency of online purchases of types of kiwifruit products

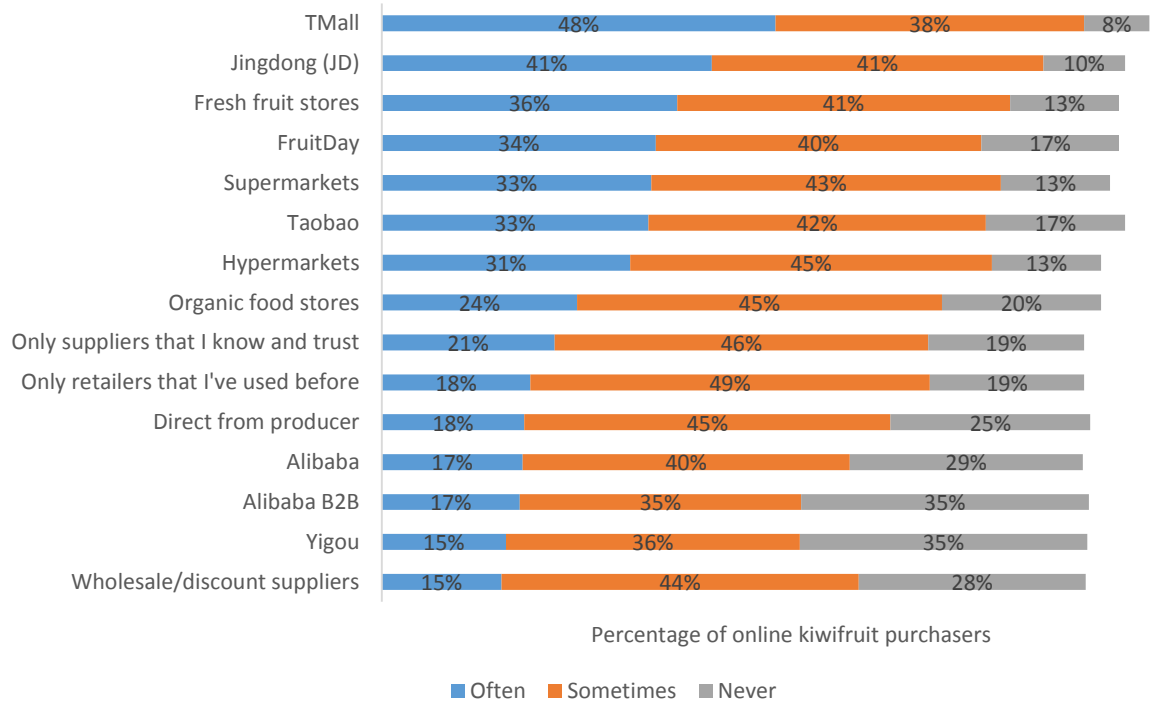


Participants were then asked to indicate their main reason for shopping online for kiwifruit products. Results are presented in Figure 3-28. The most commonly stated reason was a greater variety of products (26 per cent), followed by the convenience of home delivery (19 per cent).

Figure 3-28: Main reasons for shopping online for kiwifruit products

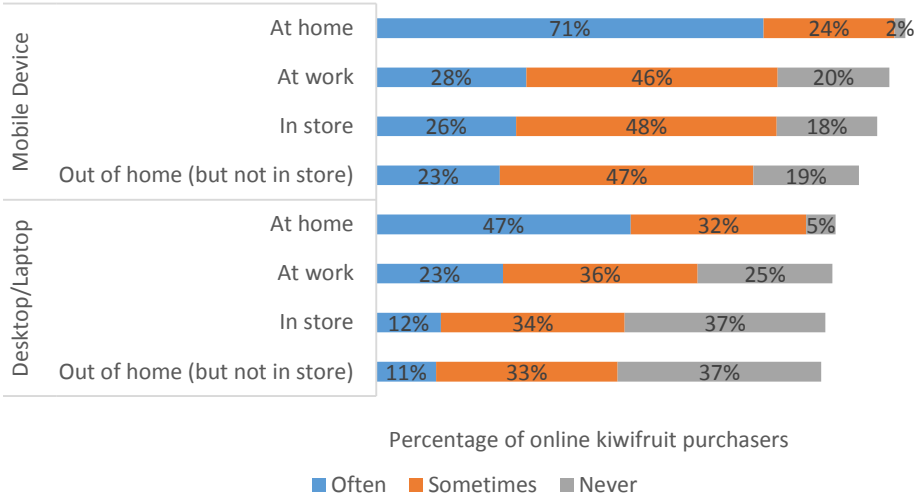
Participants who purchase kiwifruit online were then asked to indicate which online retail channels they purchased from. Results shown in Figure 3-29 show that the most frequently used source was TMall (86 per cent, often/sometimes), followed by Jingdong (JD) (82 per cent, often/sometimes), and fresh fruit stores (77 per cent, often/sometimes).

Figure 3-29: Online channel retailer choices for kiwifruit purchases



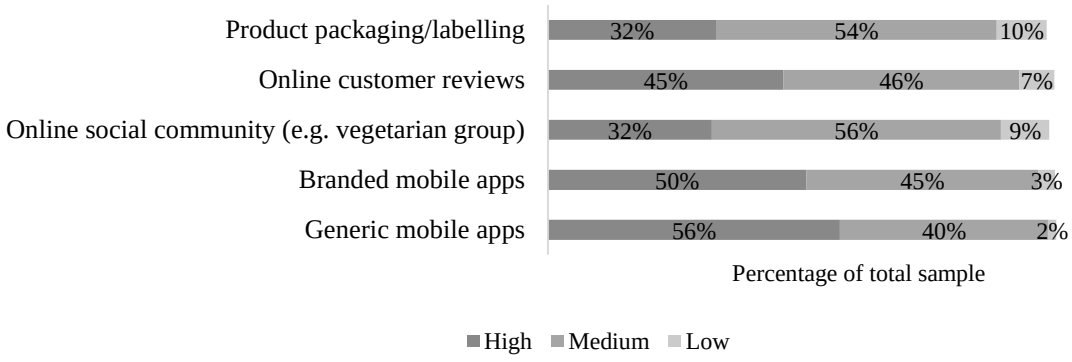
Following this, participants were asked to indicate the frequency at which and in which location(s) they used home computers (desktop/laptop) or mobile devices for making kiwifruit purchases online. Results shown in Figure 3-30 reveal that most online purchases occurred at home on a mobile device (95 per cent often/sometimes).

Figure 3-30: Frequency and location of use of home computer(s) and/or mobile device(s) for purchasing kiwifruit products online



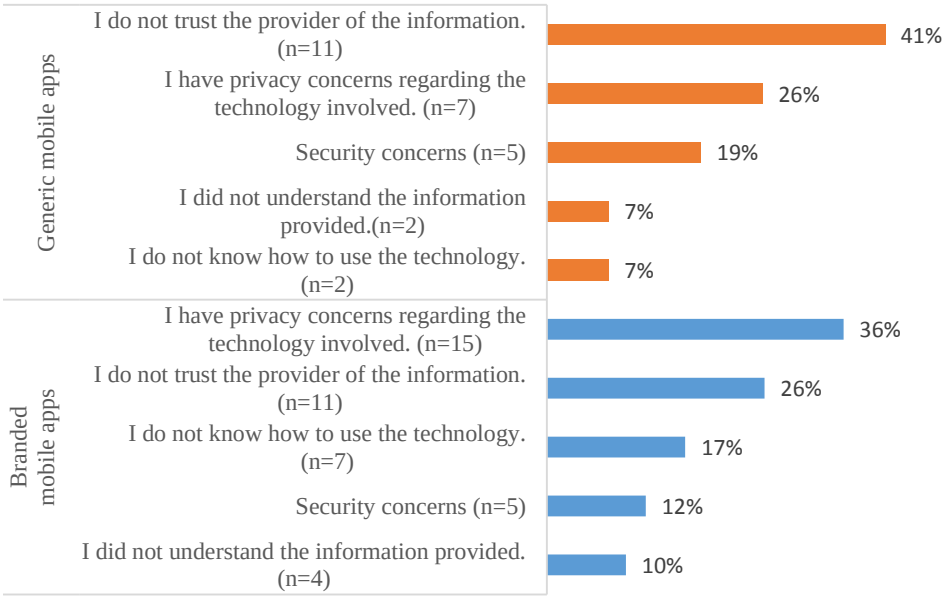
The next set of questions asked participants to consider trusted sources for either kiwifruit product information or kiwifruit product purchasing. Firstly, participants were asked to indicate the extent to which they trusted a series of sources when looking for information regarding kiwifruit products. Results are presented in Figure 3-31. The most trusted source of kiwifruit product information was generic mobile apps (96 per cent, high trust/medium trust), followed by branded mobile apps (95 per cent, high trust/medium trust) and online customer reviews (91 per cent, high trust/medium trust).

Figure 3-31: Level of trust in sources of kiwifruit product information



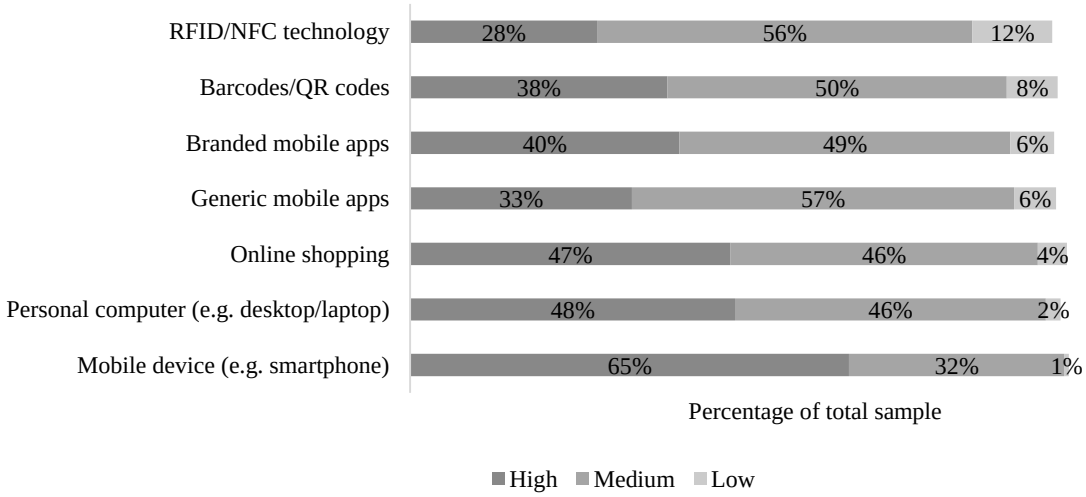
For participants, who had indicated that they had a low level of trust in generic mobile apps/branded mobile apps, participants were then asked to indicate the reasons why they have low trust in kiwifruit product information from these two sources. These results are presented in Figure 3-32. Twenty seven participants indicated they did not trust generic mobile apps for searching kiwifruit production information. The most commonly stated reason was 'I do not trust the provider of the information' (41 per cent), followed by 'I have privacy concerns regarding the technology involved' (26 per cent). In addition, forty-two participants indicated that they did not trust branded mobile apps. The most commonly stated reason was 'I have privacy concerns regarding the technology involved' (36 per cent), followed by 'I do not trust the provider of the information' (26 per cent).

Figure 3-32: Main reasons for low trust in kiwifruit product information searching



Similarly, participants were asked to indicate the extent to which they trusted a range of sources for kiwifruit product purchasing. Results are presented in Figure 3-33 that mobile devices were indicated as the most trusted source (97 per cent high/medium), followed by personal computers (94 per cent high/medium) and online shopping (93 per cent high/medium).

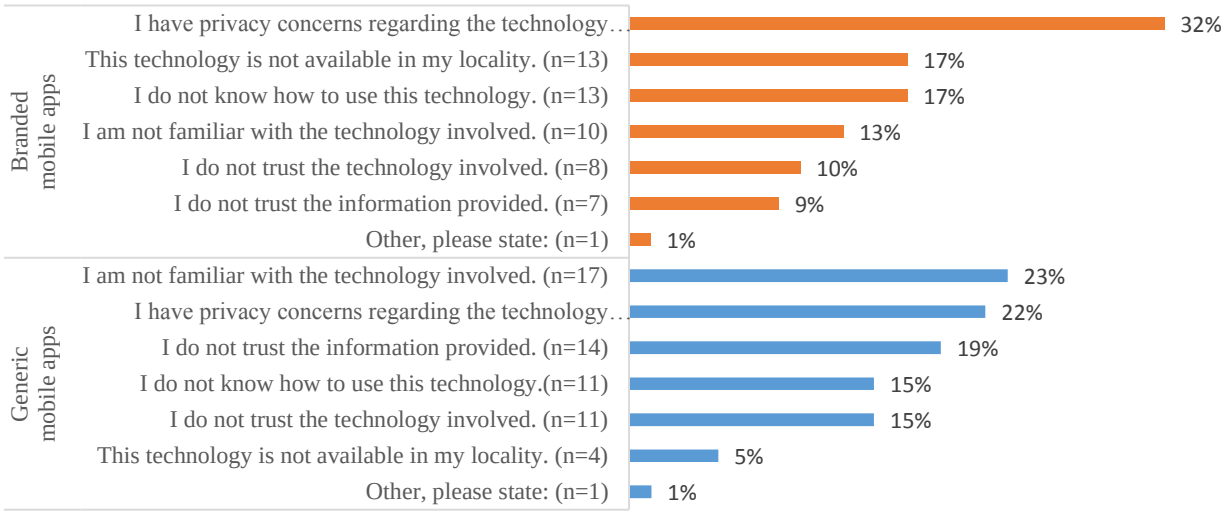
Figure 3-33: Level of trust in sources for kiwifruit product purchasing



For participants who had indicated they had a low level of trust in branded mobile apps or generic mobile apps for kiwifruit product purchasing, participants then were asked to indicate the reasons why they had a low level of trust in these two sources. Figure 3-34 shows that 52 participants had a low level of trust in branded mobile apps. The most common indicated reason was 'I have privacy concerns regarding the technology' (32 per cent), followed by 'this technology is not available in my locality' (17 per cent) and 'I

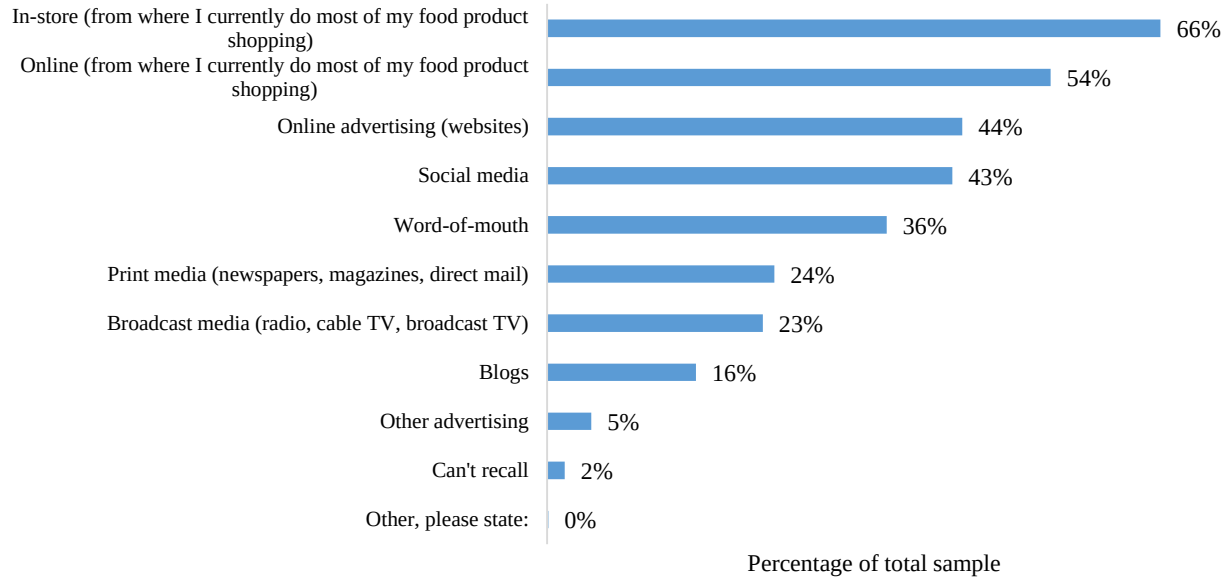
do not know how to use this technology' (17 per cent). Figure 3-34 also shows that 74 participants had low level of trust in generic mobile apps in relation to kiwifruit purchasing. The most commonly indicated reason was 'I am not familiar with the technology involved' (23 per cent), followed by 'I have privacy concerns regarding the technology involved' (22 per cent).

Figure 3-34: Main reasons for low trust in kiwifruit products purchasing



Finally, participants were asked to indicate how they usually found out or became aware of new kiwifruit products. Results are presented in Figure 3-35. The most common source was 'in-store (from where I currently do most of my food product shopping)' (66 per cent), followed by 'online (from where I currently do most of my food product shopping)' (54 per cent) and then 'online advertising (websites)' (44 per cent).

Figure 3-35: Sources of information about or awareness of new kiwifruit products



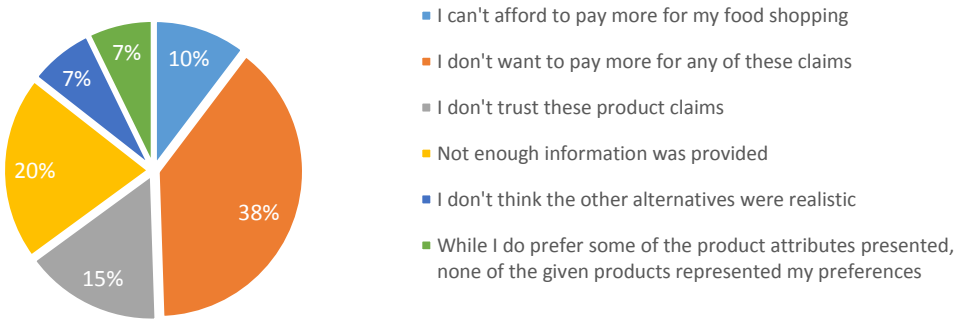
Chapter 4
Choice Experiment Analysis

This chapter presents the results of the choice experiment described in Chapter 2 designed to examine the influence of kiwifruit attributes on consumers' kiwifruit choices. The attributes included in the choice experiment used to describe kiwifruit products were mainly focused around production practices inherent in the individual elements that comprise the Zespri sustainability approach and included:

- Water use and pollution minimisation
- Integrated pest and disease management
- Organic
- Waste minimisation
- GHG emissions minimisation
- Social responsibility
- Country where kiwifruit is grown
- Variety
- Price per kg

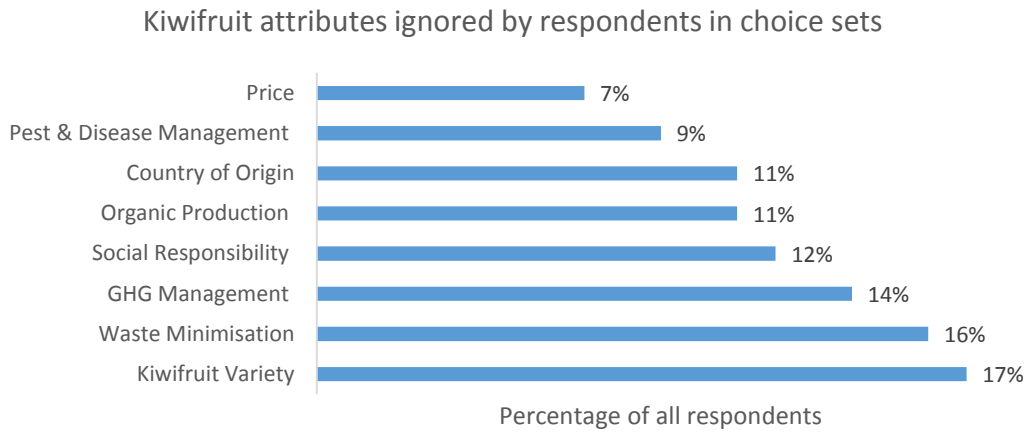
Alternative kiwifruit products described by differing combinations of these attributes were presented to consumers who then indicated their preferred kiwifruit alternative in each scenario. The attributes associated with a respondents chosen kiwifruit alternative, and those from the non-chosen alternatives, were analysed using a Mixed Logit Error Components (MXLEC) model (see Appendix 2 for technical details). This type of model constitutes a standard contemporary methodology. When making choices, respondents may select the 'none of these' option in a choice set. This is usually a truthful indication of their *unwillingness to pay* for the kiwifruit and associated attributes presented to them in a particular choice set. One in six respondents chose the 'none of these' option in at least one choice set, with this option chosen 297 times in total (4 per cent of all choices (7,425) across the sample). Respondents who chose this option were asked a follow up question to ascertain their reasons (Figure 4-1).

Figure 4-1: Reasons for choosing the "none of these' option in a kiwifruit choice set



An underpinning statistical assumption is that all the information that a respondent sees in a choice set has a role to play in determining their choice of kiwifruit option. If respondents ignore some of the attributes when they select their preferred option, this assumption is weakened and requires further examination. Following each choice task, respondents were asked to indicate which, if any, of the kiwifruit attributes being considered did they ignore (Figure 4-2). We can see that each outcome is ignored to some degree. We test for any effect of this behavioral information analytically and find no improvement over the current model specification (Table 4.1).

Figure 4-2: Kiwifruit attributes ignored when selecting preferred kiwifruit options



By conventional econometric standards the model performs well (Table 4-1). All kiwifruit attributes are statistically significant, meaning that they are important factors in a consumer's choice of kiwifruit option. The model predicts how respondents choose a particular kiwifruit option based on the outcomes and costs associated with that option. The parameter estimates tell us how an attribute relates to the overall utility of consumers from the benefits they perceive from each attribute. The model generates a distribution for each random parameter (normal) with the mean and standard deviation of the distribution reported. A larger magnitude of the standard deviation of the distribution indicates a relatively larger degree of preference differences across respondents for that kiwifruit attribute outcome. For example, respondents have the most diverse preferences for selecting a kiwifruit option from Chile (s.d. =1.945), meaning that some respondents will not want a Chilean kiwifruit while others have strong positive preference for Chilean kiwifruit. Estimated parameters indicate that on average respondents are more likely to choose a kiwifruit option that is produced in NZ, while they are less likely to choose kiwifruit options imposing greater prices.

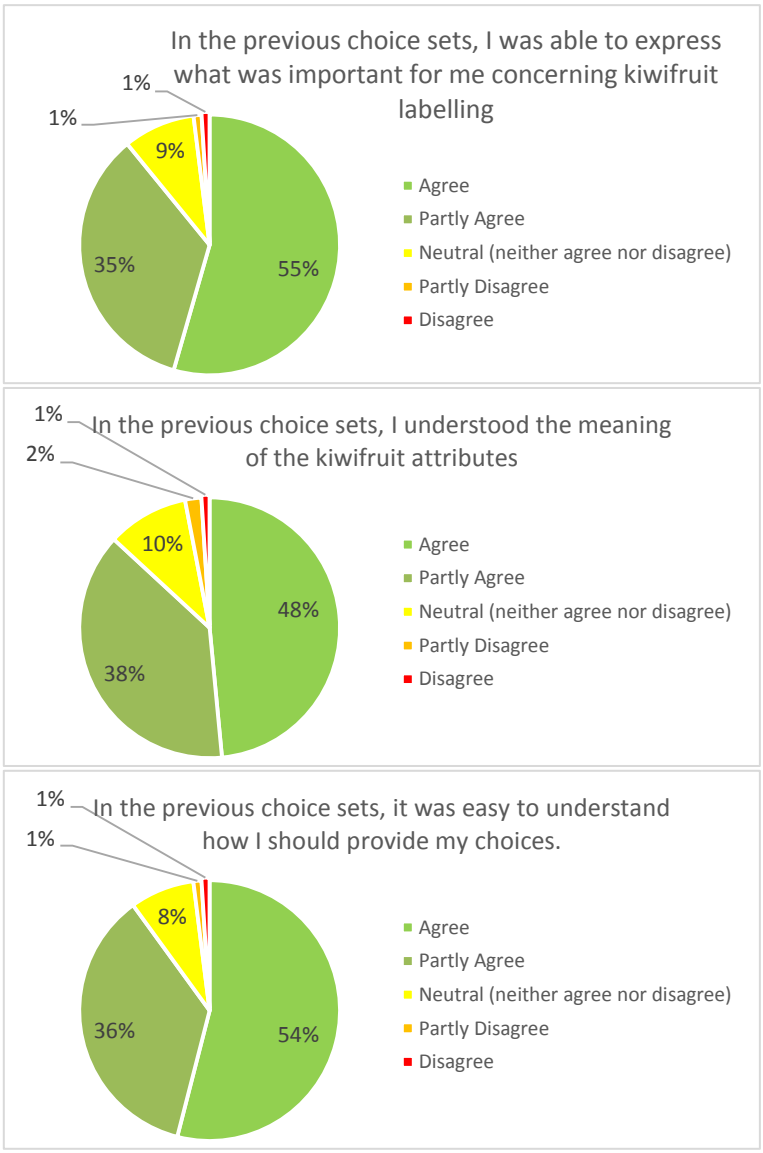
Table 4-1: Mixed Logic Error Component model of kiwifruit choices

	Parameter mean estimates[1]		Standard deviation of random parameters	
Random parameters in utility function				
Water Management	0.455***	(0.039)	0.197*	(0.112)
Pest & Disease Management	0.401***	(0.040)	0.426***	(0.065)
GHG Management	0.319***	(0.042)	0.334***	(0.070)
Social Responsibility	0.461***	(0.048)	0.558***	(0.061)
Organic	0.552***	(0.042)	0.317***	(0.079)
Waste minimisation	0.401***	(0.038)	0.107	(0.171)
Country-of Origin				
China	0.496***	(0.087)	0.461***	(0.142)
Italy	0.458***	(0.104)	0.923***	(0.103)
Greece	0.289***	(0.064)	0.660***	(0.088)
Chile	0.745***	(0.080)	1.945***	(0.207)
NZ	1.233***	(0.125)	1.265***	(0.113)
Price per kg	0.011***	(0.001)	0.011***	(0.001)
Opt-out 'none of these'	5.628***	(0.661)	4.011***	(0.411)
Green variety	0.174***	(0.013)	1.077***	(0.049)
Red variety	0.154***	(0.051)	0.695***	(0.051)
Latent Random Effects				
Standard Deviation	4.216***	(0.464)		
Model Fit Statistics				
Log Likelihood function	7,633			
Log Likelihood chi^2 stat (25 df)	5,319***			
McFadden Pseudo R^2	0.26			
Number of observations	7,425			

***, **,* denote statistical significance at the 1 per cent, 5 per cent and 10 per cent levels respectively for the null hypothesis that a parameter estimate is not significantly different from zero.
Standard errors in brackets.
[1] Parameter mean estimates indicate the estimated average value in the model, for each different parameter.

Debriefing questions following the choice tasks demonstrate that, overall, respondents were able to express what was important to them in kiwifruit labelling, that they understood the meaning of the kiwifruit attributes, and were able to complete the choice task (Figure 4-3).

Figure 4-3: Kiwifruit choice task debriefing: ability to express importance, understanding of attributes meaning, understanding of choice task exercise



4.1 Consumer willingness-to-pay for credence attributes

Applying model estimates (Table 4-1) and equation 1.10 (See Appendix 2 Statistical Method) probabilities generates estimates of respondents WTP for attributes of kiwifruit (Table 4-2). WTP is an estimate of how much money a respondent would be willing to give up for a change in the relevant kiwifruit attribute, and is calculated using the ratio of an attribute parameter and the cost parameter. The report reveals that country-of-origin plays an important role in kiwifruit consumer choices with the highest average marginal WTP being for NZ country-of-origin kiwifruit (¥108/kg), followed by Chile (¥65/kg), and China (¥44/kg). The most preferred production attributes were organic (¥49/kg), followed by social responsibility and water use and pollution minimisation equally (¥40/kg).

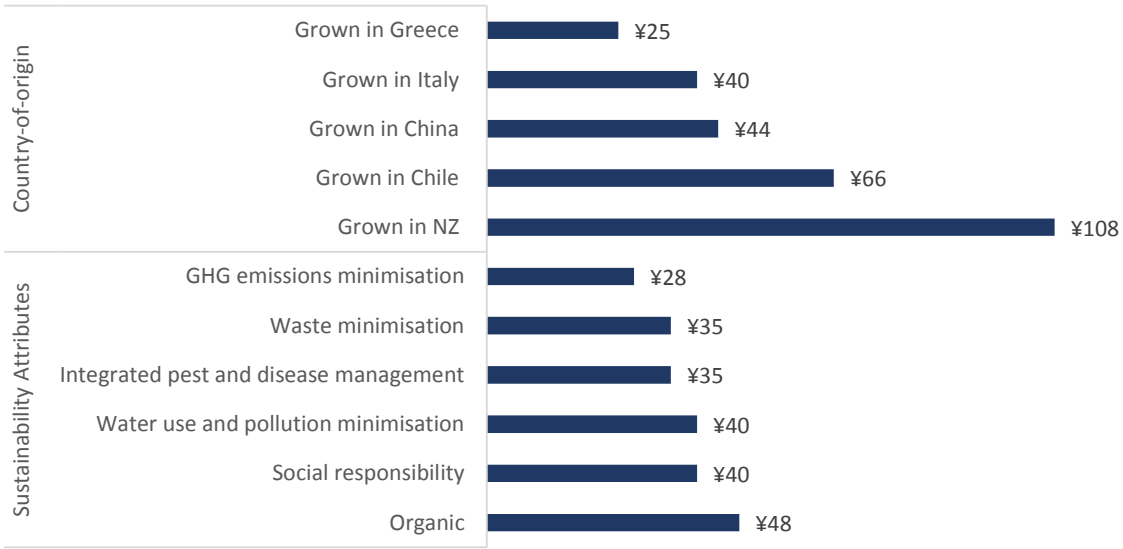
Relative to the average price of a kilogram of kiwifruit, on average, respondents are WTP 123 per cent more for kiwifruit from NZ, followed by Chile (75 per cent), and China (50 per cent). In terms of production attributes, on average, respondents are WTP 50 per cent more for organic production.

Table 4-2: Consumer Willingness-to-pay for Selected Kiwifruit Attributes

Attributes	WTP ¥/kg (2017)
Water use and pollution minimisation	¥40 [45%] (34,45)
Integrated pest and disease management	¥35 [40%] (29,41)
Organic	¥49 [55%] (42,55)
Waste minimisation	¥35 [40%] (29,41)
GHG emissions minimisation	¥28 [32%] (22,34)
Social responsibility	¥40 [46%] (33,47)
Grown in China	¥44 [50%] (32,55)
Grown in NZ	¥108 [123%] (93,124)
Grown in Italy	¥40 [46%] (28,52)
Grown in Greece	¥25 [29%] (17,33)
Grown in Chile	¥65 [75%] (54,77)

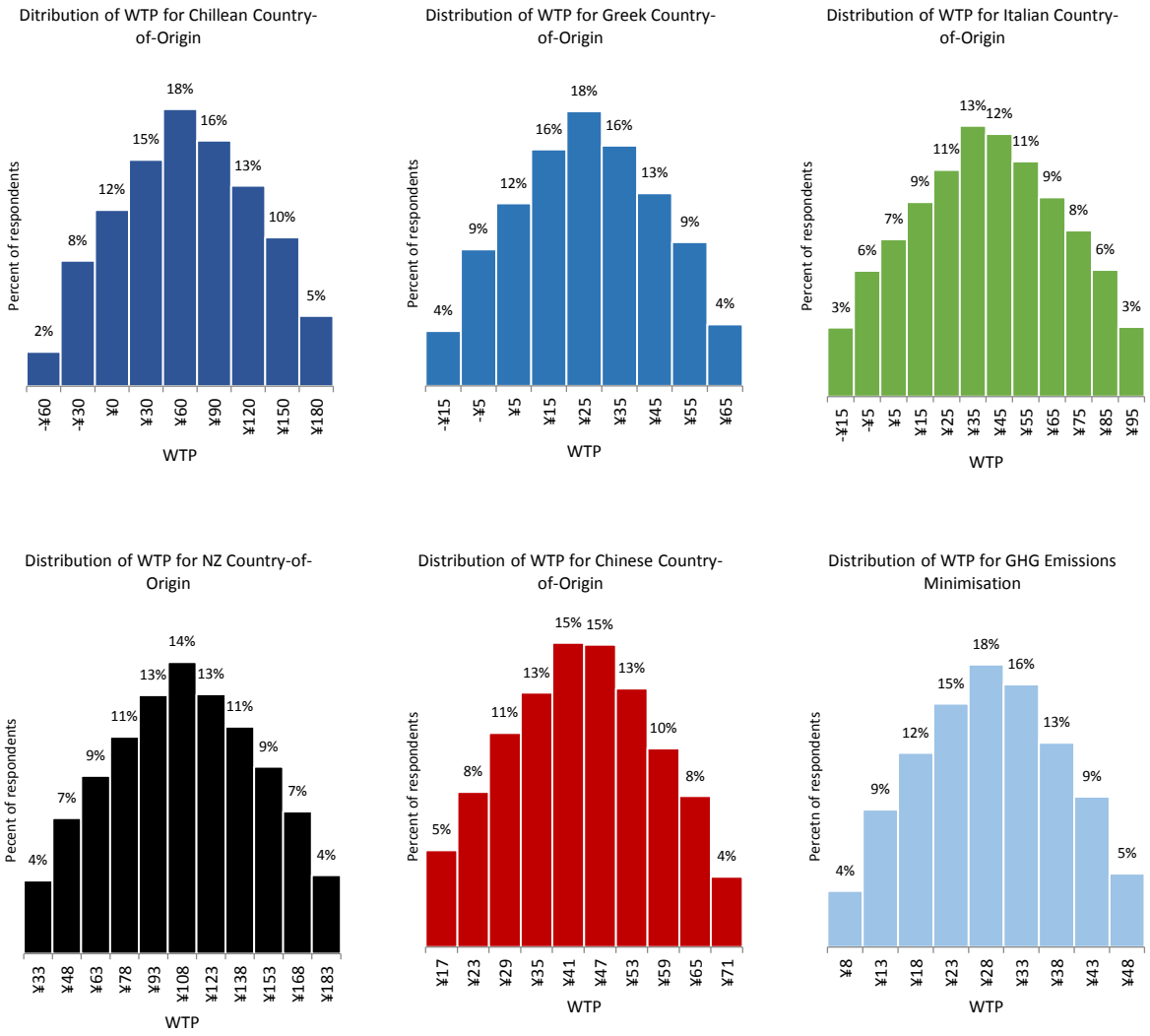
Note: ¥ Average WTP (95 per cent Confidence Interval).
WTP as per cent of average price used in choice experiment in square brackets.

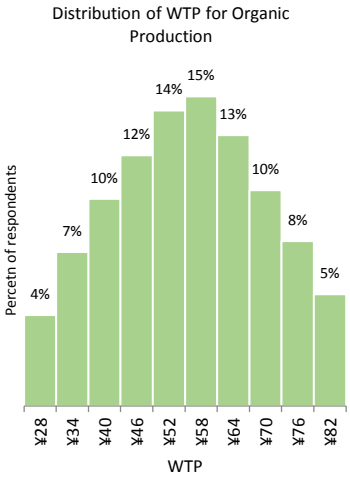
Figure 4-4: Average consumer willingness to pay for selected kiwifruit attributes

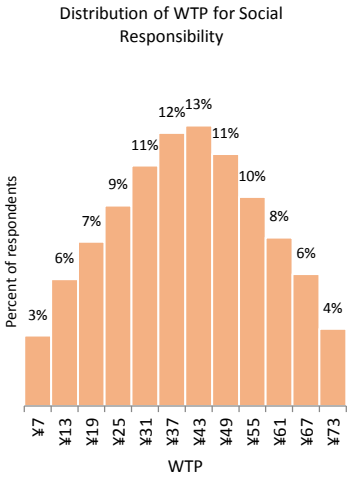


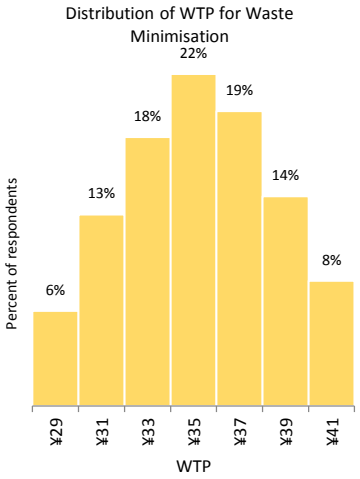
Focusing on the average WTP premiums presented in Table 4-2 and Figure 4-4 can obscure the range of values that are held by different respondents in the survey. Examining the distributions of WTP can help to identify the proportion of consumers who are WTP higher and lower values (Figure4-5). These distributions reveal that for some attributes there is a relatively narrow range of estimates while for others the spread of preferences held across the sample is greater. For example, comparing the distributions of WTP for Greek country-of-origin to that of Chilean reveals that preferences for Greek kiwifruit are more concentrated relative to Chilean. Another example of the importance of looking at the distribution rather than just averages is that, while the average WTP for Chilean kiwifruit is lower than that for NZ, we can see that some consumers are WTP just much for Chilean kiwifruit as for NZ.

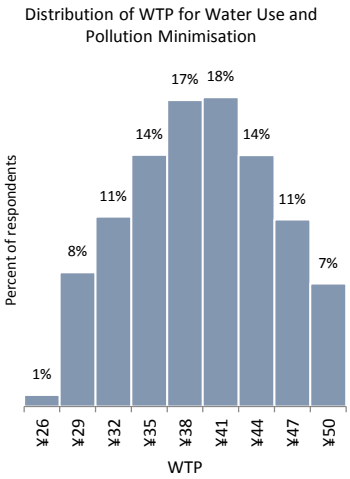
Figure 4-5: Distributions of consumer willingness to pay for selected kiwifruit attributes

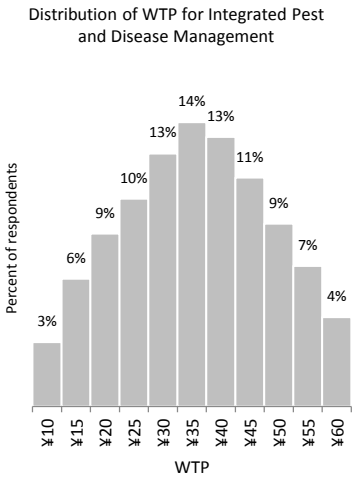



Distribution of WTP for Organic Production
Percetn of respondents
4%
7%
10%
12%
14%
15%
13%
10%
8%
5%
¥28
¥34
¥40
¥46
¥52
¥58
¥64
¥70
¥76
¥82
WTP


Distribution of WTP for Social Responsibility
Percent of respondents
3%
6%
7%
9%
11%
12%
13%
11%
10%
8%
6%
4%
¥7
¥13
¥19
¥25
¥31
¥37
¥43
¥49
¥55
¥61
¥67
¥73
WTP


Distribution of WTP for Waste Minimisation
Percent of respondents
6%
13%
18%
22%
19%
14%
8%
¥29
¥31
¥33
¥35
¥37
¥39
¥41
WTP


Distribution of WTP for Water Use and Pollution Minimisation
Percent of respondents
1%
8%
11%
14%
17%
18%
14%
11%
7%
¥26
¥29
¥32
¥35
¥38
¥41
¥44
¥47
¥50
WTP


Distribution of WTP for Integrated Pest and Disease Management
Percent of respondents
3%
6%
9%
10%
13%
14%
13%
11%
9%
7%
4%
¥10
¥15
¥20
¥25
¥30
¥35
¥40
¥45
¥50
¥55
¥60
WTP

Chapter 5
Conclusions

New Zealand is the third largest kiwifruit producing country in the world, accounting for more than 60 per cent of fruit export earnings in 2017. China, is the largest kiwifruit producing and consuming country internationally, as well as NZ's second-largest export destination for kiwifruit by value, with export volumes and values increasing significantly between 2015 and 2016. Shanghai is the main destination for NZ's kiwifruit exports to China, with more than 50 per cent of shipments sent to Shanghai.

This research presents the results from a survey of 740 Shanghai kiwifruit consumers to examine consumer preferences and behaviour in purchasing and consumption kiwifruit and their knowledge of NZ and its Māori culture, and use of digital media and technologies especially relating to finding information about kiwifruit products and production, as well as purchasing kiwifruit. The research also estimates consumer WTP for attributes associated with kiwifruit.

Chinese consumer kiwifruit purchasing and consumption habits

The research shows that most participants consumed kiwifruit at least two to five times per week, with the most common method of consumption being raw, just as they are. The research also demonstrates participants' average consumption on the three varieties of kiwifruit: Green, Yellow and Red. The most frequent average consumption amount was between one to four kiwifruit per week, with a significant number of respondents consuming much higher amounts, with about one quarter respondents consuming at least 8 kiwifruit per week.

In addition, the results show that the Green variety of kiwifruit was the most frequently purchased variety. Average prices paid per kg ranged from 37 to 41 Yuan over the three varieties when purchased for personal consumption. The most frequent usual price paid for personal consumption was 14 to 27 Yuan/kg of Green or Yellow and 27 to 40 Yuan/kg for Red. About two out of every five participants spent more than 40 Yuan/kg for personal consumption. The prices paid for kiwifruit given as gifts were higher, ranging from 41 to 46 Yuan/kg on average, with more respondents paying higher prices across varieties compared to personal consumption.

Chinese consumer attitudes to kiwifruit product characteristics

The research reports the findings of Chinese consumer attitudes in relation to kiwifruit in general and NZ kiwifruit. Firstly, participants stated that the most important attributes when buying kiwifruit was flavour, followed by nutritional value and the presence of a quality certificate. Participants also indicated that the environmental effects of production, provenance attributes (such as where it is grown and place of purchase), as well as social responsibility of production were also important to them when buying kiwifruit.

While China was ranked the most commonly identified country for kiwifruit, NZ was ranked first for producing high quality kiwifruit (above Chile, China and Italy). NZ labelled kiwifruit was purchased frequently by over half of participants, with 29 per cent of participants purchased NZ-labelled kiwifruit weekly and 39 per cent monthly. In particular, Zespri was identified as the most frequently purchased kiwifruit brand among a selection of 12 brands.

Participants indicated that the most important attribute of NZ kiwifruit was high food safety, followed by higher quality and then the high quality of the natural environment of NZ. Environmental and social attributes, such as NZ's "clean and green" image; environmental sustainability of production; social responsibility of production, organic production and traceability to grower, were also very important to consumers.

Participants stated that having Zespri kiwifruit grown in NZ was important to them, but most participants indicated that they would purchase at least the same amount of Zespri kiwifruit if they were grown in another countries, such as China, France and Italy.

Chinese consumer knowledge of Māori culture and enterprise

The research presents participants' knowledge and perception of Māori culture and enterprise in relation to kiwifruit production. Most participants indicated that they knew a few things about Māori culture. In addition, participants stated that the most associated attributes with kiwifruit produced from a Māori enterprise were natural, high quality and sustainability. Other environmental, social and cultural attributes, such as reduced environmental impact, traditional, care of traditional cultures, social responsibility, were also identified as important attributes with kiwifruit produced from a Māori enterprise.

Chinese consumer attitudes to kiwifruit consumption and production practices

The results of this research show that the majority of participants agreed with 'I eat kiwifruit mainly for the health benefits', followed by the statement 'kiwifruit is one of my favourite types of fruit' and then 'the quality of kiwifruit is directly related to the quality of the natural environment where it is grown'. Most participants also agreed that 'the food safety and the health benefits of kiwifruit are directly related to quality of the natural environment where it is grown'.

Chinese consumer WTP for selected kiwifruit attributes

The choice experiment results reveal that country-of-origin plays an important role in kiwifruit consumer choices with the highest average marginal WTP being for NZ country-of-origin kiwifruit (¥108/kg), followed by Chile (¥65/kg), and China (¥44/kg). The most preferred production attributes were organic (¥49/kg), followed by social responsibility and water use and pollution minimisation equally (¥40/kg).

Relative to the average price of a kilogram of kiwifruit, on average, respondents are WTP 123 per cent more for kiwifruit from NZ, followed by Chile (75 per cent), and China (50 per cent). In terms of production attributes, on average, respondents are WTP 50 per cent more for organic production

Chinese consumer's use of digital media and technology in relation to finding information about and purchasing kiwifruit

This research presents the ways that participants used various forms of digital media and smart technology in relation to finding information about and/or purchasing kiwifruit products. Most participants accessed the Internet using both mobile devices and home computers, with participants using mobile device significantly more for daily access than a home computer. In addition, WeChat, Taobao, Tmall, Baidu, Jingdong(JD) and Weibo were the most overall used online information sources for informing choices and searching information regarding kiwifruit production. Health professionals were identified as the greatest influence on both informing kiwifruit choices and searching for kiwifruit production information.

Participants were also asked to indicate the frequency and place of use of mobile device to search for kiwifruit products or product information, with participants most frequently using their mobile device at home to search for information about or purchasing kiwifruit products. A range of smartphone interactive technologies (such as barcodes, QR codes, RFID/NFC) were used for these purposes, with barcodes being used most frequently. In addition, the most frequent use of mobile apps by participants was purchasing followed by obtaining discounts/coupons, and then product reviews. Specific apps used most frequently on participants' mobile device were WeChat, followed by Ele-me, and then Dianping. These apps allow consumers to search kiwifruit products information, write products reviews and/or purchase kiwifruit products online.

A majority of the participants stated that they purchased kiwifruit online with an average of 18 per cent of kiwifruit expenditure online. Green variety of kiwifruit was the most purchased kiwifruit online, followed

by Organic Green and Yellow. The main reason that participants used online shopping for kiwifruit products was to access a greater variety of products, followed by convenience of home delivery.

The findings of the research show participants' level of trust in a number of digital media sources and smart technology. Participants indicated that they mainly used TMall, Jingdong (JD) and fresh fruit stores for making kiwifruit purchases online. Participants mostly used their mobile device over home computers at home for the purpose of purchasing kiwifruit products online.

Participants had the highest trust in generic mobile apps to obtain information online for kiwifruit information sources, followed by personal computers and online customer review. A small number of participants indicated that they had a low-level trust in generic mobile apps or branded mobile apps for searching product information. The most commonly stated reasons were that 'I do not trust the provider of the information' and 'I have privacy concerns regarding the technology involved'.

In terms of purchasing kiwifruit products online, participants had the highest trust in mobile device, (e.g. smartphone) followed by personal computer (e.g. desktop/laptop) and online shopping. A small number of participants indicated that they had low trust in branded mobile apps or generic mobile apps for kiwifruit products purchasing. The main reasons were that 'I have privacy concerns regarding the technology involved' and 'I am not familiar with the technology involved'.

Finally, participants indicated that they usually found out or become aware of new kiwifruit products 'in-store (from where I did most of my food product shopping)', followed by 'online (from where I currently do most of my food product shopping)' and 'online advertising (websites)'.

While the findings reported in this research are helpful in describing the overall characteristics of the average Shanghai kiwifruit consumer, greater depth of understanding will be possible with further analysis of responses to allow better scrutiny across potential segments of the market. Possible consumer segments include high vs. low consumption, type of consumption, type of variety consumed, high vs. low expenditure and NZ kiwifruit purchasers, amongst others.

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Appendix 1
Demographics

Figure A.1. Gender

Figure A.2. Age

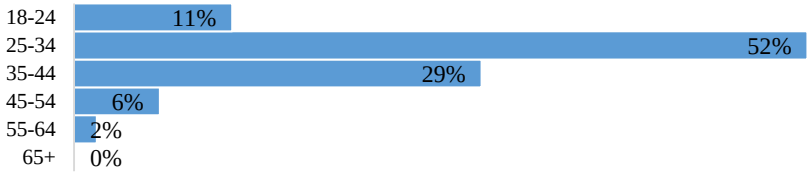


Figure A.3. Type of area

Figure A.4. Household make-up

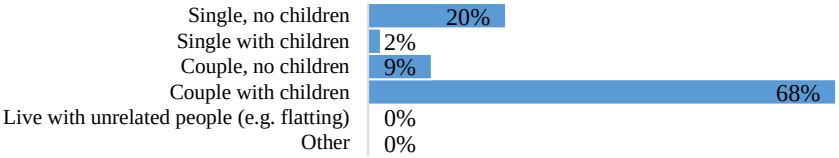


Figure A.5. Highest level of education

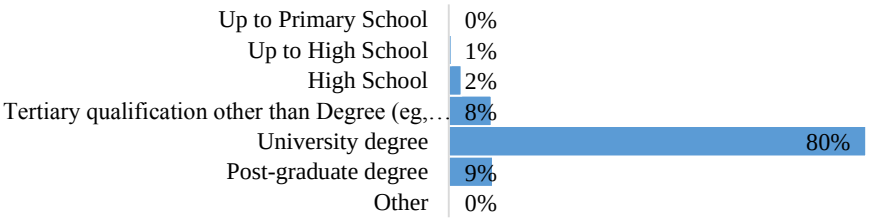
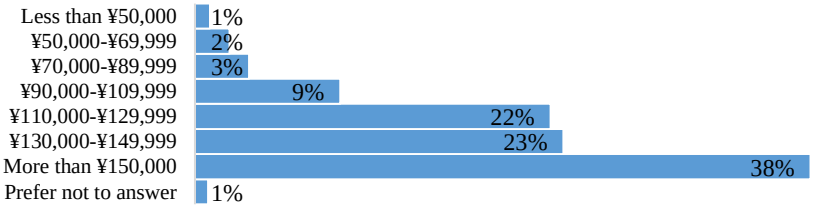


Figure A.6. Gross annual household income (CHN ¥)



Appendix 2
Statistical Method

This appendix provides technical details of statistical analysis of choice data. The appendix includes a brief description of the theoretical foundations of choice analysis followed by statistical probability estimation approaches, focusing on contemporary models applied in this report. Lastly, the method used in generating monetary estimates is described.

B.1 Conceptual Framework

In Choice Experiments (CEs), researchers are interested of what influences, on average, the survey respondents' decisions to choose one alternative over others. These influences are driven by people's preferences towards the attributes but also the individual circumstances such as their demographics or perceptions of the choice task (e.g., the level of difficulty or understanding) (Hensher et al. 2015).

Each alternative in a choice set is described by attributes that differ in their levels, both across the alternatives and across the choice sets. The levels can be measured either qualitatively (e.g., poor and good) or quantitatively (e.g., kilometres). This concept is based on the characteristics theory of value (Lancaster 1966) stating that these attributes, when combined, provide people a level of utility[1] U hence providing a starting point for measuring preferences in CE (Hanley et al. 2013; Hensher et al. 2015). The alternative chosen, by assumption, is the one that maximises people's utility[2] providing the behavioural rule underlying choice analysis:

$$U_j > U_i \qquad (0.1)$$

where the individual n chooses the alternative j if this provides higher utility than alternative i. A cornerstone of this framework is Random Utility Theory, dated back to early research on choice making (e.g., Thurstone 1927) and related probability estimation. This theory postulates that utility can be decomposed into systematic (explainable or observed) utility V and a stochastic (unobserved) utility ε (Hensher et al. 2015; Lancsar and Savage 2004).

$$U_{nj} = V_{nj} + \varepsilon_{nj} \qquad (0.2)$$

where j belongs to a set of J alternatives. The importance of this decomposition is the concept of utility only partly being observable to the researcher, and remaining unobserved sources of utility can be treated as random (Hensher et al. 2015). The observed component includes information of the attributes as a linear function of them and their preference weights (coefficient estimates).

$$V_{nsj} = \sum_{k=1}^{K} \beta_k x_{nsjk} \qquad (0.3)$$

with k attributes in vector x for a choice set s. Essentially, the estimated parameter β shows "the effect on utility of a change in the level of each attribute" (Hanley et al. 2013, p. 65). This change can be specified as linear across the attribute levels, or as non-linear using either dummy coding or effect coding approaches. The latter coding approach has a benefit of not confounding with an alternative specific constant (ASC) when included in the model (Hensher et al. 2015).

[1]Related terminology used in psychology discipline is *the level of satisfaction* (Hensher et al. 2015).
[2]In choice analysis, utility is considered as *ordinal utility* where the relative values of utility are measured (Hensher et al. 2015).

B.2 Statistical Modelling of Choice Probabilities

The statistical analysis aims to explain as much as possible of the observed utility using the data obtained from the CE and other relevant survey data. In order to do so, the behavioural rule (eq. 1.1) and the utility function (eq. 1.2) are combined (Hensher et al. 2015; Lancsar and Savage 2004) to estimate the probability of selecting an alternative *j*:

$$\Pr_{nsj} = \Pr\left(U_{nsj} > U_{nsi}\right) = \Pr\left(V_{nsj} + \varepsilon_{nsj} > V_{nsi} + \varepsilon_{nsi}\right) = \Pr\left(\varepsilon_{nsi} - \varepsilon_{nsj} < V_{nsj} - V_{nsi}\right) \forall j \neq i \qquad (0.4)$$

where the probability of selecting alternative *j* states that differences in the random part of utility are smaller than differences in the observed part. A standard approach to estimate this probability is a conditional logit, or multinomial logit (MNL) model (McFadden 1974). This model can be derived from the above equations (1.2 and 1.3) by assuming that the unobserved component is independently and identically distributed (IID) following the Extreme Value type 1 distribution (see e.g. Hensher et al. 2015; Train, 2003). Although the MNL model provides a "workhorse" approach in CE, it includes a range of major limitations (see e.g. Fiebig et al. 2010; Greene and Hensher 2007; Hensher et al. 2015):

- Restrictive assumption of the IID error components
- Systematic, or homogenous, preferences allowing no heterogeneity across the sample
- Restrictive substitution patterns, namely the existence of independence of irrelevant alternatives property where introduction (or reduction) of a new alternative would not impact on the relativity of the other alternatives
- The fixed scale parameter obscures potential source of variation

Some or all of these assumptions are often not realised in collected data. These restrictive limitations can be relaxed in contemporary choice models. In particular, the random parameter logit (RPL) model (aka, the mixed logit model) has emerged in empirical application allowing preference estimates to vary across respondents (Fiebig, et al. 2010; Hensher et al. 2015; Revelt and Train, 1998). This is done by specifying a known distribution of variation to be parameter means. The RPL model probability of choosing alternative *j* can be written as:

$$\Pr_{nsj} = \frac{\exp(\beta_n' x_{nsj})}{\sum_J \exp(\beta_n' x_{nsj})} \qquad (0.5)$$

where, in the basic specification, $\beta_n = \beta + \eta_n$ with η being a specific variation around the mean for *k* attributes in vector *x* (Fiebig, et al. 2010; Hensher et al. 2015). Typical distributional assumptions for the random parameters include normal, triangular and lognormal distributions, amongst others. The normal distribution captures both positive and negative preferences (i.e., *utility* and *disutility*) (Revelt and Train, 1998). The lognormal function can be used in cases where the researcher wants to ensure the parameter has a certain sign (positive or negative), a disadvantage is the resultant long tail of estimate distributions (Hensher et al. 2015). The triangular distribution provides an alternative functional form, where the spread can be constrained (i.e., the mean parameter is free whereas spread is fixed equal to mean) to ensure behaviourally plausible signs in estimation (Hensher et al. 2015). Further specifications used in modelling include parameters associated with individual specific characteristics (e.g, income) that can influence the heterogeneity around the mean, or allowing correlation across the random parameters. The heterogeneity in mean, for example, captures whether individual specific characteristics influence the location of an observation on the random distribution (Hensher et al. 2015). In this study, the frequency of visits to rivers, streams and lakes was used to explain such variance.

Another way to write this probability function (in eq. 1.4) (Hensher et al. 2015) involves an integral of the estimated likelihood over the population:

$$L_{njs} = \int_{\beta} \Pr_{nsj}(\beta) f(\beta|\theta) d\beta \qquad (0.6)$$

In this specification, the parameter θ is now the probability density function conditional to the distributional assumption of β. As this integral has no closed form solution, the approximation of the probabilities requires a simulation process (Hensher et al. 2015; Train, 2003). In this process for data *X*, *R* number of draws are taken from the random distributions (i.e. the assumption made by the researcher) followed by averaging probabilities from these draws; furthermore these simulated draws are used to compute the expected likelihood functions:

$$L_{nsj} = E(\Pr_{nsj}) \approx \frac{1}{R} \sum_{R} f(\beta^{(r)}|X) \qquad (0.7)$$

where the $E(\Pr_{nsj})$ is maximised through Maximum Likelihood Estimation. This specification (in eq. 1.6) can be found in Hensher et al. (2015). In practice, a popular simulation method is the Halton sequence which is considered a systematic method to draw parameters from distributions compared to for example, pseudo-random type approaches (Hensher et al. 2015).

B.3 Econometric Extensions

Common variations of the RPL model include specification of an additional error component (EC) in the unobserved part of the model. This EC extension captures the unobserved variance that is alternative-specific (Greene and Hensher 2007) hence relating to substitution patterns between the alternatives (Hensher et al. 2015). Empirically, one way to explain significant EC in a model is SQ-bias depicted in the stochastic part of utility if the EC is defined to capture correlation between the non-SQ alternatives (Scarpa et al., 2005).

Another extension which has gained increasing attention in recent CE literature, is the Generalized Mixed Logit (GMXL) model (Czajkowski et al. 2014; Hensher et al. 2015; Juutinen et al. 2012; Kragt 2013; Phillips 2014). This model aims to capture remaining unobserved components in utility as a source of choice variability by allowing estimation of the scale heterogeneity alongside the preference heterogeneity (Fiebig et al. 2010; Hensher et al. 2015). This scale parameter is (inversely) related to the error variance, and in convenient applications such as MNL or RPL, this is normalised to one to allow identification (Fiebig et al. 2010; Louviere and Eagle 2006). However, it is possible that the level of error variance differs between or within individuals, due to reasons such as behavioural outcomes, individual characteristics or contextual factors (Louviere and Eagle 2006).

Recent GMXL application builds on model specifications presented in Fiebig et al. (2010), stating that β_n (in eq. 1.4) becomes:

$$\beta_n = \sigma_n \beta + \gamma \eta_n + (1-\gamma)\sigma_n \eta_n \qquad (0.8)$$

where σ is the scale factor (typically = 1) and $\gamma \in \{0,1\}$ is a weighting parameter indicating variance in the residual component. In the case the scale factor equals 1, this reduces to the RPL model. The importance of the weighting parameter is the impact on the scaling effect on the overall utility function (population means) versus the individual preference weights (individual means): when γ parameter approaches zero the scale heterogeneity affects both means, whereas when this approaches one the scale heterogeneity affects only the population means (Hensher et al. 2015; Juutinen et al. 2015). Interpretation of these parameters includes

- If γ is close to zero, and statistically significant, this supports the model specification with the variance of residual taste heterogeneity increases with scale (Juutinen et al. 2012); and
- If γ is not statistically significant from one, this suggests that the unobserved residual taste heterogeneity is independent of the scale effect, that is the individual-level parameter estimates differ in means but not variances around the mean (Kragt, 2013)

The scale factor specification (eq. 1.7) can also be extended to respondent specific characteristics associated with the unobserved scale heterogeneity (Hensher et al. 2015; Juutinen et al. 2015):

$$\sigma_n = \exp\{\overline{\sigma} + \tau\omega_n\} \qquad (0.9)$$

where $\overline{\sigma}$ *is* the mean parameter in the error variance; and ω is unobserved scale heterogeneity (normally distributed) captured with coefficient τ (Hensher et al. 2015; Juutinen et al. 2015; Kragt, 2013). Juutinen et al. (2012), for example, in context of natural park management found that respondents' education level and the time spent in the park explained the scale heterogeneity ($\tau > 0$, p-value < 0.01). In this study, the respondents indicated levels of choice task understanding and difficulty were used to explain scale heterogeneity.

B.4 Estimation of Monetary Values

Typically the final step of interest in the CE application is the estimation of monetary values of respondent preferences for the attributes considered in utility functions. These are commonly referred to as marginal willingness-to-pay (WTP). WTP estimation is based on the marginal rate of substitution expressed in dollar terms providing a trade-off between some attribute k and the cost involved (Hensher et al. 2015) and is calculated using the ratio of an attribute parameter and the cost parameter. WTP can take into account interaction effects, if statistically significant, such as with the respondent demographics. WTP of attribute *j* by respondent *i* is calculated as the ratio of the estimated model parameters accommodating the influence of the random component (Cicia et al. 2013) as:

$$WTP_i^j = -\left(\frac{\beta_j + \varepsilon_{ij}}{\beta_{price} + \varepsilon_{ip}}\right) \qquad (0.10)$$

The estimated mode parameters can also be used to estimate compensating surplus (CS) as a result of policy or quality change in a combination of attributes, using (Hanemann, 1984):

$$\mathbf{CS} = \frac{-1}{\beta cost}\left[\ln\sum_{j=1}^{J}\exp\left\{V_j^0\right\} - \ln\sum_{j=1}^{J}\exp\left\{V_j^1\right\}\right] \qquad (0.11)$$

which calculates the difference in utilities before the policy or quality change (V_0) and after the policy or quality change (V_1) (Hanley et al. 2013; Lancsar and Savage 2004). Similar to WTP, the monetary estimation of this change is possible by using the estimate for the monetary attribute $\beta_{cost.}$. Lastly, there are some challenges associated with the empirical estimation of the WTP in the RPL based models. One approach is to use a fixed cost, which simplifies the WTP estimation (Daly et al. 2012) but which may not be as behaviourally a plausible consideration as allowing heterogeneous preferences towards the cost attribute (Bliemer and Rose, 2013; Daziano and Achtnicht, 2014). Conceptually, the estimated cost parameter is a proxy for the marginal utility of income for respondents and economic theory suggests individuals will respondent differently to varying income levels. The use of a random cost parameter however, presents complications in deriving population distribution moments from the ratio of two random parameters.

Appendix 3
Questionnaire

OLW Shanghai Kiwifruit

Start of Block: Intro and Screening Questions

FRUIT ATTRIBUTES SURVEY

Welcome to this survey about consumer preferences for fruit attributes.

The survey is an on-line questionnaire that takes about 10 – 15 minutes. You do not have to participate. You have the right to decline to answer any question or stop the survey at any time. If you do stop the survey before the end, the information you have provided will be destroyed.

The Agribusiness and Economics Research Unit at Lincoln University in New Zealand are conducting this survey. Data will be held on a secure server on the University campus. The survey does not collect identifying information, and your responses cannot be linked to you. The survey has been reviewed and approved by the Lincoln University Human Ethics Committee. The lead researcher is Dr Peter Tait, and his manager is Prof Caroline Saunders. If you have any questions or concerns about the research, you may contact them at:

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Completion of the survey will be taken as your consent to participate in this research. If you complete the survey, you will not be able to withdraw your information at a later date. If at any time you wish to withdraw from the survey simply close your browser window.

To begin the survey, begin by clicking on the >> button below.

Yours sincerely,
Dr. Peter Tait

Which city do you live in?

- ❍ Hangzhou
- ❍ Beijing
- ❍ Shanghai
- ❍ Dongguan
- ❍ Wuhan
- ❍ Other, please specify: _____

How often do you purchase **Kiwifruit**?

- ❍ Daily
- ❍ Weekly
- ❍ Fortnightly
- ❍ Monthly
- ❍ Less than once a month
- ❍ Never

How much do you know about the following countries?

	Nothing	A little	A fair amount	A lot
Greece	❍	❍	❍	❍
New Zealand	❍	❍	❍	❍
Chile	❍	❍	❍	❍
France	❍	❍	❍	❍
Italy	❍	❍	❍	❍

End of Block: Intro and Screening Questions

Start of Block: Screened Out

Thank you for your participation. Unfortunately we need respondents who meet particular criteria for food consumption and shopping. As you do not meet this criteria, you do not have to answer any more questions. Thank you for your time. Click >> to be returned to the research company website (this may take a few moments).

End of Block: Screened Out

Start of Block: Product Questions

How often do you eat Kiwifruit?

- ❍ Once a day or more
- ❍ 2-5 times a week
- ❍ Once a week
- ❍ Once every two weeks
- ❍ Once per month or less

How **many** kiwifruit do you eat?

*Please move the slider along to indicate your **average consumption per week** of the following varieties.*

	0 2 4 6 8 10 12 14 16 18 20
Green	
Yellow	
Red	

In what ways do you eat kiwifruit?

	Always	Often	Sometimes	Never
Raw, just as they are	❍	❍	❍	❍
Raw, as part of a home prepared dish	❍	❍	❍	❍
Cooked, as part of a home prepared dish	❍	❍	❍	❍
As a home prepared drink	❍	❍	❍	❍
Dried	❍	❍	❍	❍
As a prepared processed product	❍	❍	❍	❍

How often do you buy Kiwifruit to give as a **gift**?

- ❍ Daily
- ❍ Weekly
- ❍ Monthly
- ❍ Once
- ❍ Never

Which varieties of Kiwifruit do you purchase for **gifts**?

	Only this type	Often	Sometimes	Rarely	Never this type
Green	❍	❍	❍	❍	❍
Yellow	❍	❍	❍	❍	❍
Red	❍	❍	❍	❍	❍

How much do you **spend** on Kiwifruit for **personal consumption**?

Please move the slider along to indicate how much you usually spend per kg of the following varieties (¥/kg)

	1 14 27 40 53 66 79 92 105 118 130
Green	
Yellow	
Red	

How much do you **spend** on Kiwifruit for **gifts**?

Please move the slider along to indicate how much you usually spend per kg of the following varieties (¥/kg)

	1 14 27 40 53 66 79 92 105 118 130
Green	
Yellow	
Red	

When buying kiwifruit, how important to you are the following factors?

	Veryimportant	Somewhat important	Neutral	Not so important	Not at all important	Don't know
Flavour	❍	❍	❍	❍	❍	❍
Color and shape	❍	❍	❍	❍	❍	❍
Sales price	❍	❍	❍	❍	❍	❍
Place of purchase	❍	❍	❍	❍	❍	❍
Nutritional value	❍	❍	❍	❍	❍	❍
Where it is grown	❍	❍	❍	❍	❍	❍
Variety	❍	❍	❍	❍	❍	❍
Brand	❍	❍	❍	❍	❍	❍
Quality certificate	❍	❍	❍	❍	❍	❍
Sales promotion	❍	❍	❍	❍	❍	❍
Wrapping	❍	❍	❍	❍	❍	❍
Advertising	❍	❍	❍	❍	❍	❍
Environmental effects of production	❍	❍	❍	❍	❍	❍
Social responsibility of production	❍	❍	❍	❍	❍	❍

Have you **seen** kiwifruit being sold with the following country of origin?

Please select all that apply

	Seen	Not seen
China	❍	❍
New Zealand	❍	❍
France	❍	❍
Greece	❍	❍
Italy	❍	❍
Chile	❍	❍

How often have you **purchased** kiwifruit with the following country of origin?

Please select all that apply

	Daily	Weekly	Monthly	Once	Never
China	❍	❍	❍	❍	❍
New Zealand	❍	❍	❍	❍	❍
France	❍	❍	❍	❍	❍
Greece	❍	❍	❍	❍	❍
Italy	❍	❍	❍	❍	❍
Chile	❍	❍	❍	❍	❍

Which countries do you think produce the highest quality kiwifruit?

Please rank the following countries by clicking and dragging them into the box, you can move a country up or down the list

Quality (1=best)
_____ China
_____ New Zealand
_____ France
_____ Greece
_____ Italy
_____ Chile

How often do you buy the following **brands** of kiwifruit?

	Mostly this brand	Often this brand	Sometimes this brand	Never this brand	I don't know this brand
Zespri	❍	❍	❍	❍	❍
Chichi	❍	❍	❍	❍	❍
Jingold	❍	❍	❍	❍	❍
Sweeki	❍	❍	❍	❍	❍
Solemio	❍	❍	❍	❍	❍
Zeus	❍	❍	❍	❍	❍
Neofine	❍	❍	❍	❍	❍
Qifeng	❍	❍	❍	❍	❍
Zhouzhi	❍	❍	❍	❍	❍
Jin Yang	❍	❍	❍	❍	❍
Tingo	❍	❍	❍	❍	❍
Xiyu Minnong	❍	❍	❍	❍	❍

Why did you purchase New Zealand Kiwifruit?

Please indicate how important the following **reasons** have in your choice to purchase **New Zealand Kiwifruit**?

	Very important	Somewhat important	Neutral	Not so important	Not at all important	Don't know
Distinctive taste	❍	❍	❍	❍	❍	❍
Higher quality	❍	❍	❍	❍	❍	❍
Value for price	❍	❍	❍	❍	❍	❍
Curiosity to try different products	❍	❍	❍	❍	❍	❍
Environmental sustainability of production	❍	❍	❍	❍	❍	❍
It is a premium product	❍	❍	❍	❍	❍	❍
High food safety	❍	❍	❍	❍	❍	❍
Social responsibility of production	❍	❍	❍	❍	❍	❍
Traceability to grower	❍	❍	❍	❍	❍	❍
Organic production	❍	❍	❍	❍	❍	❍
New Zealand's 'clean and green' image	❍	❍	❍	❍	❍	❍
Care of traditional cultures	❍	❍	❍	❍	❍	❍
The high quality of the natural environment in NZ	❍	❍	❍	❍	❍	❍
Other, please state	❍	❍	❍	❍	❍	❍

How important is it to you that **Zespri** kiwifruit is **grown in New Zealand**, rather than in another country?

- ❍ Very important
- ❍ Somewhat important
- ❍ Neutral
- ❍ Not so important
- ❍ Not at all important
- ❍ I didn't know Zespri is a NZ brand
- ❍ Don't know

Would you buy the same amount of **Zespri** kiwifruit if it were grown in the following countries?

	I would buy more	I would buy the same amount	I would buy less	I would not buy from this country	Don't know
China	❍	❍	❍	❍	❍
Italy	❍	❍	❍	❍	❍
France	❍	❍	❍	❍	❍
Korea	❍	❍	❍	❍	❍

How much do you know about New Zealand's indigenous culture, Māori?

- ❍ I know a lot about Māori culture
- ❍ I know a few things about Māori culture
- ❍ I have heard of them
- ❍ I have never heard about Māori culture

What would you associate with kiwifruit produced from a Māori enterprise?

	Strong association	Moderate association	Little association	No association	Don't know
Reduced environmental impact	❍	❍	❍	❍	❍
Social responsibility	❍	❍	❍	❍	❍
High quality	❍	❍	❍	❍	❍
Collective ownership	❍	❍	❍	❍	❍
Stewardship over land	❍	❍	❍	❍	❍
Distribution of profits into community	❍	❍	❍	❍	❍
Sustainability	❍	❍	❍	❍	❍
Local knowledge	❍	❍	❍	❍	❍
Guardianship	❍	❍	❍	❍	❍
Artisanal style	❍	❍	❍	❍	❍
Care of traditional cultures	❍	❍	❍	❍	❍
Traditional	❍	❍	❍	❍	❍
Fair trade	❍	❍	❍	❍	❍
Natural	❍	❍	❍	❍	❍
Other, please state	❍	❍	❍	❍	❍

Please indicate your level of agreement with the following statements.						
	Agree	Partly agree	Neutral (neither agree nor disagree)	Partly disagree	Disagree	Don't know
Kiwifruit production is an important sector in the Chinese economy	❍	❍	❍	❍	❍	❍
When deciding which kiwifruit to buy I care only about the taste	❍	❍	❍	❍	❍	❍
I would like to have more information about sustainably produced kiwifruit	❍	❍	❍	❍	❍	❍
Kiwifruit is one of my favourite types of fruit	❍	❍	❍	❍	❍	❍
I eat kiwifruit mainly for the health benefits	❍	❍	❍	❍	❍	❍
Compared to my friends, I eat a lot of fruit	❍	❍	❍	❍	❍	❍
The environmental impact of kiwifruit production is well managed	❍	❍	❍	❍	❍	❍
Kiwifruit production processes have low human health impacts	❍	❍	❍	❍	❍	❍
I try to lead a healthy lifestyle as much as posible	❍	❍	❍	❍	❍	❍
It is very important for me to know where the kiwifruit I buy is produced	❍	❍	❍	❍	❍	❍
Sustainable kiwifruit labelling certification is a guarantee of high product quality	❍	❍	❍	❍	❍	❍
I am worried about the long term effects of pesticides and additives in conventional modern kiwifruit production	❍	❍	❍	❍	❍	❍
I feel that purchasing sustainable products helps protect the environment	❍	❍	❍	❍	❍	❍
The quality of kiwifruit is directly related to the quality of the natural environment where it is gown	❍	❍	❍	❍	❍	❍
The health benefits of kiwifruit are directly related to quality of the natural environment where it is gown	❍	❍	❍	❍	❍	❍
The food safety of kiwifruit are directly related to quality of the natural environment where it is gown	❍	❍	❍	❍	❍	❍
I trust the quality claims made by Chinese brands	❍	❍	❍	❍	❍	❍
I trust the quality claims made by Zespri	❍	❍	❍	❍	❍	❍
I could be interested in buying kiwifruit with a sustainability label (showing environmental, economic and social aspects)	❍	❍	❍	❍	❍	❍
	Agree	Partly agree	Neutral (neither agree nor disagree)	Partly disagree	Disagree	Don't know
Kiwifruit production is an important sector in the Chinese economy	❍	❍	❍	❍	❍	❍

When deciding which kiwifruit to buy I care only about the taste	❍	❍	❍	❍	❍	❍
I would like to have more information about sustainably produced kiwifruit	❍	❍	❍	❍	❍	❍
Kiwifruit is one of my favourite types of fruit	❍	❍	❍	❍	❍	❍
I eat kiwifruit mainly for the health benefits	❍	❍	❍	❍	❍	❍
Compared to my friends, I eat a lot of fruit	❍	❍	❍	❍	❍	❍
The environmental impact of kiwifruit production is well managed	❍	❍	❍	❍	❍	❍
Kiwifruit production processes have low human health impacts	❍	❍	❍	❍	❍	❍
I try to lead a healthy lifestyle as much as posible	❍	❍	❍	❍	❍	❍
It is very important for me to know where the kiwifruit I buy is produced	❍	❍	❍	❍	❍	❍
Sustainable kiwifruit labelling certification is a guarantee of high product quality	❍	❍	❍	❍	❍	❍
I am worried about the long term effects of pesticides and additives in conventional modern kiwifruit production	❍	❍	❍	❍	❍	❍
I feel that purchasing sustainable products helps protect the environment	❍	❍	❍	❍	❍	❍
The quality of kiwifruit is directly related to the quality of the natural environment where it is gown	❍	❍	❍	❍	❍	❍
The health benefits of kiwifruit are directly related to quality of the natural environment where it is gown	❍	❍	❍	❍	❍	❍
The food safety of kiwifruit are directly related to quality of the natural environment where it is gown	❍	❍	❍	❍	❍	❍
I trust the quality claims made by Chinese brands	❍	❍	❍	❍	❍	❍
I trust the quality claims made by Zespri	❍	❍	❍	❍	❍	❍
I could be interested in buying kiwifruit with a sustainability label (showing environmental, economic and social aspects)	❍	❍	❍	❍	❍	❍

End of Block: Product Questions

Start of Block: Choice Experiment: Personal Consumption at home

Comparing kiwifruit

In the next set of questions, please imagine you are purchasing kiwifruit from your usual retailer for **usual personal consumption**.

You will be shown a series of kiwifruit choice sets, each displaying three different kiwifruits. Each kiwifruit is labelled with information describing how the kiwifruit was produced and the price per kilogram. The kiwifruit differ based on the information presented otherwise they are the same.

Kiwifruit attributes for you to consider in the next questions Water use and pollution minimisation certification. The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises water use and pollution of freshwater resources.
Integrated pest and disease management certification The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises use of agrichemicals, and uses integrated pest management tools including natural biological controls. All kiwifruit are tested for agrichemical residues
Certified Organic Kiwifruit are 100% grown organically, are GE free, and no synthetic fertilisers or pesticides are used
Waste minimisation certification The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises fruit waste in production system. All packaging is 100% recyclable, made from renewable sources. Minimise waste to landfill.
Greenhouse Gas Emissions minimisation certification The kiwifruit has been officially certified by an Environmental Agency who guarantees that the production of this kiwifruit employs a management system that minimises GHG emissions in production and in transport of fruit to market.
Social responsibility The kiwifruit has been produced by orchards that are community owned and operated. Socially responsible growers and suppliers actively include public interest into decision making.
Country where the kiwifruit is grown This attribute displays the country where the kiwifruit was grown
Variety Green, Yellow, or Red

For each question, please choose which kiwifruit you would most likely purchase. This includes keeping in mind how the price would fit in your usual grocery budget.

Please click the > button to continue.

[Choice Experiment]

Group 1/10

In the next set of questions, imagine that you are buying kiwifruit from an average retailer for personal consumption.

Which three kiwi you prefer? Please use the button to mark your choice.

More information

	Product one	Product two	Product three
Variety	Green heart	Yellow heart	Heart
Water and pollution are minimized	Certification		Certification
Integrated pest management		Certification	
organic	Certification		Certification
Waste minimization		Certification	Certification
Greenhouse gas emissions are minimized	Certification		Certification
Social responsibility		Community ownership and management	
Kiwi planting country	Greece		Italy
Yuan / kg Kiwi	**60 yuan / kg**	**40 yuan / kg**	**120 yuan / kg**
select	○	○	○

neither ○

>>

Start of Block: Post CE Questions

In the previous choice sets which, if any, of the kiwifruit attributes did you ignore when making your choices?

- ❑ I used all the available information and didn't intentionally ignore any product attributes

OR

Please select all the product attributes that you didn't consider at all when making your choices

- ❑ Water use and pollution minimisation
- ❑ Integrated pest and disease management
- ❑ Organic production
- ❑ Waste minimisation
- ❑ Greenhouse gas minimisation
- ❑ Social responsibility
- ❑ Country of origin
- ❑ Price

In the previous choice sets, it was easy to **understand** how I should provide my choices.

- ❍ Agree
- ❍ Partly agree
- ❍ Neutral (neither agree nor disagree)
- ❍ Partly disagree
- ❍ Disagree

In the previous choice sets, I was able to **express what was important for me** concerning kiwifruit labelling.

- ❍ Agree
- ❍ Partly agree
- ❍ Neutral (neither agree nor disagree)
- ❍ Partly disagree
- ❍ Disagree

In the previous choice sets, I **understood the meaning** of the labelling alternatives.

- ❍ Agree
- ❍ Partly agree
- ❍ Neutral (neither agree nor disagree)
- ❍ Partly disagree
- ❍ Disagree

In the previous choice sets, how did you find **expressing which type of kiwifruit labelling information** was important to you?

- ❍ Very easy
- ❍ Fairly easy
- ❍ Neither easy nor difficult
- ❍ A little difficult
- ❍ Very difficult

In the previous kiwifruit choice sets, did you chose the "**None of these**" option in most or all the choice sets?

- ❍ Yes
- ❍ No

Please indicate the main reason for doing so

- ❍ I can't afford to pay more for my food shopping
- ❍ I don't want to pay more for any of these claims
- ❍ I don't trust these product claims
- ❍ Not enough information was provided
- ❍ I don't think the other alternatives were realistic
- ❍ I would not buy any of the given alternatives
- ❍ While I do prefer some of the product attributes presented, none of the given products represented my preferences
- ❍ Other reason, please specify _____

End of Block: Post CE Questions

Start of Block: Technology Questions

The next set of questions are about the use of technology for kiwifruit product shopping.

How often do you access the Internet using the following devices?

	Daily	Weekly	Monthly	Less than monthly	Never
Mobile Device, e.g. smartphone	❍	❍	❍	❍	❍
Home computer e.g. desktop/laptop	❍	❍	❍	❍	❍

Do you use any of the following to search for **kiwifruit preparation inspiration** or to find out **how a kiwifruit product is produced**?

Please select all that apply.

	Inspiration		**How Produced**	
	Mobile Device	Home computer	Mobile Device	Desktop/Laptop
eibo	❑	❑	❑	❑
Taobao	❑	❑	❑	❑
WeChat	❑	❑	❑	❑
Alibaba	❑	❑	❑	❑
Jingdong (JD)	❑	❑	❑	❑
TMall	❑	❑	❑	❑
Food company web sites	❑	❑	❑	❑
Food blogs	❑	❑	❑	❑
QQ Zone	❑	❑	❑	❑
Forums	❑	❑	❑	❑
Baidu	❑	❑	❑	❑
Retailer web sites	❑	❑	❑	❑
Youku	❑	❑	❑	❑
LinkedIn	❑	❑	❑	❑

When searching for **kiwifruit preparation inspiration** or **how a kiwifruit product is produced**, are you influenced by any of the following?

Please select all that apply.

	Inspiration	**How Produced**
Celebrity chefs	❑	❑
Sports celebrities	❑	❑
Other celebrities	❑	❑
Health professionals	❑	❑
Government information	❑	❑
Industry marketing boards	❑	❑
Non-government organisations (e.g. Greenpeace)	❑	❑
International bodies (e.g. World Health Organisation)	❑	❑

When **using your mobile device** to search for inspiration or product information about kiwifruit, where do you usually do this?

	Usually	Often	Sometimes	Never
At home	❍	❍	❍	❍
In-store	❍	❍	❍	❍
Out of home but not in-store	❍	❍	❍	❍
At work	❍	❍	❍	❍

Have you ever used any of the following technologies in conjunction with your **smartphone** to search for kiwifruit-related **information** and/or make kiwifruit product **purchases**?

	Information search			**To purchase products**		
	Often	Sometimes	Never	Often	Sometimes	Never
Barcodes	❍	❍	❍	❍	❍	❍
QR codes	❍	❍	❍	❍	❍	❍
RFID/NFC	❍	❍	❍	❍	❍	❍

Do you currently, or would be interested in, **using mobile apps** in relation to kiwifruit for the following reasons?

	Currently use	**Interested in using**	**Don't use and not interested in using**
Health (general)	❍	❍	❍
Dietary information	❍	❍	❍
Sustainability information	❍	❍	❍
Environmental information	❍	❍	❍
Budgeting	❍	❍	❍
Nearest stockist location	❍	❍	❍
Product reviews	❍	❍	❍
Traceability	❍	❍	❍
Loyalty/rewards programmes	❍	❍	❍
Discounts/coupons	❍	❍	❍
Product delivery	❍	❍	❍
Purchasing	❍	❍	❍

Do you currently use any of the following apps on your mobile device?

Please select all that apply.

	Yes
微信 WeChat	❑
下厨房 Xiachufang	❑
新浪微博 Sina Weibo	❑
Shi-An-Ce	❑
大众点评 Dianping	❑
觅食 Mishi	❑
Ele-me	❑
到家 Daojia	❑
Retailer app(s)	❑

What percentage of your usual **food and beverages** purchases are made at the following retailers:

_____ Supermarkets
_____ Specialty stores
_____ Farmers' markets
_____ Online
_____ Restaurant or similar
_____ Subscription box
_____ Direct from producer
_____ Wholesale supplier
_____ Hypermarket
_____ Convenience stores

What percentage of your usual **kiwifruit** purchases are made at the following retailers:
_____ Supermarkets
_____ Specialty stores
_____ Farmers' markets
_____ Online
_____ Direct from producer
_____ Wholesale supplier
_____ Hypermarket
_____ Fruit market
_____ Convenience stores

What kinds of kiwifruit products do you buy online?

Please select all that apply.

	Often	**Sometimes**	**Never**
Green	❍	❍	❍
Sweet Green	❍	❍	❍
Organic Green	❍	❍	❍
Sun Gold	❍	❍	❍
Organic Sun Gold	❍	❍	❍
Yellow	❍	❍	❍
Red	❍	❍	❍
All/multiple types	❍	❍	❍

What is your **main reason** for shopping online for kiwifruit products?

- ❍ Prices are generally lower online.
- ❍ I have access to special offers and promotions online.
- ❍ Products are generally higher quality online.
- ❍ There is a greater variety of products available online.
- ❍ I like the convenience of having products delivered to my home.
- ❍ I like being able to order products from overseas that are better or not available domestically.
- ❍ I like being able to avoid having to go to the store by shopping online.

When making kiwifruit purchases online, which of the following do you use?

Please select all that apply.

	Often	Sometimes	Never
Wholesale/discount suppliers	❍	❍	❍
Direct from producer	❍	❍	❍
Supermarkets	❍	❍	❍
Fresh fruit stores	❍	❍	❍
Organic food stores	❍	❍	❍
Hypermarkets	❍	❍	❍
Only suppliers that I know and trust	❍	❍	❍
Only retailers that I've used before	❍	❍	❍
Yigou	❍	❍	❍
Jingdong (JD)	❍	❍	❍
FruitDay	❍	❍	❍
Alibaba	❍	❍	❍
Alibaba B2B	❍	❍	❍
Taobao	❍	❍	❍
TMall	❍	❍	❍

When making kiwifruit purchases online, which device(s) do you use and where?

Please select all that apply.

	Mobile Device			**Desktop/Laptop**		
	Often	Sometimes	Never	Often	Sometimes	Never
At home	❍	❍	❍	❍	❍	❍
At work	❍	❍	❍	❍	❍	❍
In store	❍	❍	❍	❍	❍	❍
Out of home (but not in store)	❍	❍	❍	❍	❍	❍

When looking for **information regarding kiwifruit products, w**hat level of **trust** do you have in the following:

	High	**Medium**	**Low**
Generic mobile apps	❍	❍	❍
Branded mobile apps	❍	❍	❍
Online social community (e.g. vegetarian group)	❍	❍	❍
Online customer reviews	❍	❍	❍
Product packaging/labelling	❍	❍	❍

Why do you not trust **generic mobile apps** for kiwifruit product information searching?

Please select all that apply.

- ❑ I do not trust the provider of the information.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use the technology.
- ❑ I did not understand the information provided.
- ❑ Security concerns
- ❑ Other, please state: _____

Why do you not trust **branded mobile apps** for kiwifruit product information searching?

Please select all that apply.

- ❑ I do not trust the provider of the information.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use the technology.
- ❑ I did not understand the information provided.
- ❑ Security concerns
- ❑ Other, please state: _____

Why do you not trust online social communities for kiwifruit product information searching?

Please select all that apply.

- ❑ I do not trust the provider of the information.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use the technology.
- ❑ I did not understand the information provided.
- ❑ Other, please state: _____

Why do you not trust online customer reviews for kiwifruit product information searching?

Please select all that apply.

- ❑ I do not trust the provider of the information.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use the technology.
- ❑ I did not understand the information provided.
- ❑ Other, please state: _____

Why do you not trust product packaging/labelling for kiwifruit product information searching?

Please select all that apply.

- ❑ I do not trust the provider of the information.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use the technology.
- ❑ I did not understand the information provided.
- ❑ Other, please state: _____

When **purchasing kiwifruit** products, what level of **trust** do you have in the following:

	High	**Medium**	**Low**
Mobile device (e.g. smartphone)	❍	❍	❍
Personal computer (e.g. desktop/laptop)	❍	❍	❍
Online shopping	❍	❍	❍
Generic mobile apps	❍	❍	❍
Branded mobile apps	❍	❍	❍
Barcodes/QR codes	❍	❍	❍
RFID/NFC technology	❍	❍	❍

Why do you not trust **mobile devices** for kiwifruit product purchasing?

Please select all that apply.

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

Why do you not trust **personal computers** for kiwifruit product purchasing?

Please select all that apply.

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

Why do you not trust **online shopping** for kiwifruit product purchasing?

Please select all that apply.

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

Why do you not trust **generic mobile apps** for kiwifruit product purchasing?

Please select all that apply.

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

Why do you not trust **branded mobile apps** for kiwifruit product purchasing?

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

Why do you not trust barcodes/QR codes for kiwifruit product purchasing?

Please select all that apply.

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

Why do you not trust RFID/NFC technology for kiwifruit product purchasing?

Please select all that apply.

- ❑ I do not trust the technology involved.
- ❑ I have privacy concerns regarding the technology involved.
- ❑ I do not know how to use this technology.
- ❑ This technology is not available in my locality.
- ❑ I am not familiar with the technology involved.
- ❑ I do not trust the information provided.
- ❑ Other, please state: _____

How do you usually find out or become aware of new kiwifruit products?

Please select all that apply.

- ❑ In-store (from where I currently do most of my food product shopping)
- ❑ Online (from where I currently do most of my food product shopping)
- ❑ Word-of-mouth
- ❑ Online advertising (websites)
- ❑ Social media
- ❑ Blogs
- ❑ Print media (newspapers, magazines, direct mail)
- ❑ Broadcast media (radio, cable TV, broadcast TV)
- ❑ Other advertising
- ❑ Can't recall
- ❑ Other, please state: _____

End of Block: Technology Questions

Start of Block: Demographics

Demographics

The following questions will help us to compare our survey with the general population. Please remember that this is an anonymous survey, and that you cannot be identified from any information you provide.

Gender

- ❍ Male
- ❍ Female
- ❍ Diverse

Age

- ❍ 18-24
- ❍ 25-34
- ❍ 35-44
- ❍ 45-54
- ❍ 55-64
- ❍ 65+

What type of area do you live in?

- ❍ Urban
- ❍ Suburban
- ❍ Rural

Please indicate which of the following best describes your household make-up:

- ❍ Single, no children
- ❍ Single with children
- ❍ Couple, no children
- ❍ Couple with children
- ❍ Live with unrelated people (e.g. flatting)
- ❍ Other _____

What is your highest level of education?

- ❍ Up to Primary School
- ❍ Up to High School
- ❍ High School
- ❍ Tertiary qualification other than Degree (eg, diploma, vocational etc)
- ❍ University degree
- ❍ Post-graduate degree
- ❍ Other _____

Please indicate your total household income before taxes over the past 12 months:

- ❍ Less than ¥50,000
- ❍ ¥50,000-¥69,999
- ❍ ¥70,000-¥89,999
- ❍ ¥90,000-¥109,999
- ❍ ¥110,000-¥129,999
- ❍ ¥130,000-¥149,999
- ❍ ¥150,000 above
- ❍ I do not want to answer it

That was the last question of the survey!

Thank you very much for your participation.

Click >> to be returned to the research company website (this may take a few moments).

End of Block: Demographics

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