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Introduction

It gives me great pleasure to introduce, after a short interval, the fourth ICL Journal, Working Papers from ICL Graduate Business School.

For the first time we have a large number of contributions from our Master's students and we are extremely proud of them. As you would expect from graduates of a Master of Business Informatics, the topics are reasonably technical, but it's reassuring to see them rooted in current contexts, in particular Covid-19 and the changes it has visited on our lives.

ICL is predominantly a teaching institution, but we revel in our research capability, recently among students as well staff, and our students' research is genuinely applied. As a boutique university-level school, ICL presents a microcosm of tertiary academic practice: advanced teaching underpinned by research.

ICL has recently had a Master of Management approved, and we may expect future journal articles to reflect less technical subjects. In particular we look forward to research that investigates the contexts of Māori business and leadership methods. We are delighted to see already in this journal a paper that looks into the influence of WeChat on promoting Tikanga Māori.

I would like to take this opportunity to thank our Research Advisory Board for their guidance, our Research Ethics Committee for their excellent police work, and most of all our wonderful academic team led by Academic Director Markus Klose and, in our research leadership, Research Professor Michèle Akoorie and Applied Project Co-ordinator Dr Zarqa Shaheen.

Ewen Mackenzie-Bowie
Chairman
ICL Education Group

1 – The impact of online shopping on consumers’ habits in the supermarket industry in New Zealand: Pre- and post-COVID-19

Nan Hao and Prof Michèle Akoorie
ICL Graduate Business School

Abstract

The COVID-19 global pandemic was the most defining event of the year 2020. This serious pandemic affected the whole world, with New Zealand setting up an alert system and experiencing two periods where people were required to be in lockdown. The first lockdown began on 25th March nationwide, where the government adopted a four-stage alert system to prevent the spread of infection. This was a staggered system that increased in intensity from Level 1 (minimal) to Level 4 (severe). As the disease spread, the country was consequently put into Alert Level 4, where most businesses and schools were closed and it was suggested that people stay at home. Later, the whole country experienced a reduction down from Levels 4, to 3, then to 2. The whole country was in lockdown until 8th June when it was subsequently moved down to Level 1. The second lockdown was announced on 12th August for two weeks; Auckland went into Alert Level 3, and the rest of the country was put into Level 2.

E-commerce is not a new concept; it is widely used nowadays to provide products and services to customers using the internet. Both the consumers and businesses have adapted to buying and selling their items and services globally. However, there has been a boom in online shopping due to the serious external situation, especially those who sold essential products and those with online capability. The supermarket industry fared well in this regard as they are defined as an essential business and they provide an online store service to the customer. Some customer's shopping habits have shifted from in-store to online shopping with a click-and-collect or delivery service. Consumers’ shopping habits and channels were influenced by the pandemic, so retailers needed to accommodate the customers' demands, and convey the best end-to-end service to drive sales and keep customers loyal. A structured questionnaire was distributed to online volunteers via the Survey Monkey website; 192 surveys were then collected. The data was then analyzed using the Statistical Package of Excel and SPSS.

The results show that most of the consumers chose shopping online for groceries by click-and-collect or delivery service during the COVID-19 pandemic, with the customers choosing the most reliable store vendor. The delivery service, efficiency, and cost were the biggest concerns for the customers. Moreover, we found that women were more likely to choose online shopping than men. Also, people over the age of 55 years old often adopt online shopping for their requirements. After the lockdown period ended, people were more likely to continue choosing click-and-collect services instead of shopping in-store. The study indicated that online advertisements or promotional activities had an impact on consumers' decision-making. The research clarifies some findings relating to the NZ supermarket industry which is useful to drive digital transformation in their company, such as digital marketing and customer relationship management.

Key words: Covid-19 pandemic, impact of online shopping, supermarket industry, digital transformation, customer relationship management.

Introduction

With the development of technology, many traditional businesses such as high-street shops, groceries, supermarkets, gift shops and new format retailers, have been attracted to the revolution of online shopping. The internet has created a global platform for transactions between retailers and customers (Delafrooz et al., 2010). In addition, convenient access and relatively low internet subscription prices have encouraged more customers to shop online (Cole, 2000). Online shopping is a part of e-commerce and has developed throughout the world. Chaffey (2009) claimed that e-commerce refers to the process of customers buying goods and services, while retailers sell their goods and services over the internet. E-commerce users can benefit from the advantage of shopping online; searching the information relating to the products and services before buying the merchandise or the service helps them recognize their needs. Furthermore, the customers are attracted by the information from an online advertisement or other social media communication platform, where the consumer can then compare different information and choose the desired purchase options. This scenario has led to pressure to improve the quality of service, the innovation of the product, and change in the business model for retailers.

Retailers strive to get more competitive benefits through using customer relationship management systems to trace customer data and analyze it to improve service satisfaction. Based on the data analysis, planning can go into

a new marketing strategy to keep existing customers and attract new ones, thereby improving the penetration of the market. Also, they can adopt mergers and acquisitions to improve competitiveness (Anderson et al., 2007). Most companies realize that customer relationship management is a significant tool to use to create and develop valued customers (Rogers, 2005). Most of them chose to utilize the data and information management systems to create a customer-centric strategy (Anderson et al., 2007).

The global pandemic has influenced people's daily lives, their working style, the country's economy, GDP, and ecosystem; it will have implications for a long time to come. The NZ government set the alert levels and specified the public health and social measures to guide people to fight against the disease. During the lockdown time, the Ministry of Business Innovation and Employment (MBIE) announced that people were only able to buy essential goods online which included food, beverages, health, sanitary items and toiletries. As the situation rapidly changed, the announcement to 'Stay home, stay safe' was broadcast on TV and radio. The message was widely disseminated through websites and sign-in boards. There were some requirements to follow, such as making sure there was a two-meter gap between people during the first lockdown, and wearing masks in public was a must during the second lockdown (New Zealand Government, 2020).

People were advised to stay at home with their families, spending time online for interaction, shopping, playing games, watching TV, studying and working at home. We saw people change their shopping behaviours to suit this time in isolation; customers were changing what they bought, when they bought and how. A consumer psychologist, Marsden (2020), who works at the University of Arts, London, pointed out that pandemic buying action can be divided into three distinct fundamental psychological sections to meet individuals' demands. These demands include: autonomy (the need to feel in control); relationship with the family (the need to do something to bring an advantage to families), and capability (the need to be smart when shopping). However, during the pandemic there was a lot of uncertainty and some contradictory information which influenced peoples' behaviour. When individuals received a lot of information from different perspectives, the instinct was usually to over-compensate rather than under-prepare. Moreover, group-think also has an impact on peoples' behaviour. When customers see other people buying essential items such as toilet paper and nappies, they follow suit to make sure they are not left behind, then subsequently a scarcity of products is created.

Only essential services were kept open, such as supermarkets, pharmacies, clinics and petrol stations. Meanwhile, non-essential businesses were required to close. A limited range of shopping options became a normal way of life.

The retailer has had to meet this huge challenge to adapt to this situation. Online capability trends in the supermarket industry were pushed by the pandemic. The customer shifted their way of shopping and their habits, and as a result, the retailer faced a challenge in delivering customer service, logistics and keeping the supply chain flowing.

Following this introduction, the remainder of the paper is structured in the following way. First, we give an overview of “Digital New Zealand” and online shopping in New Zealand with particular reference to the New Zealand supermarket industry. Secondly, we examine the extant literature with regard to theories of retail change. Thirdly, we describe the methods used to address the research questions identified and the hypotheses developed to answer the research questions. Next, we show the results of our study and finally we develop some conclusions.

Digital New Zealand

According to Statistics NZ (2020), the population was 5.04 million people at the time; there were around 6.49 million mobile connections in January 2020, which means there are nearly 136 percent using mobile subscriptions in the population. There were more than 4.47 million internet users in NZ in January 2020 making the penetration rate of the internet at 93 percent. Also, the total number of active mobile internet users was around 3.75 million, which was equivalent to 79 percent of the total population.

According to the World Bank Global Financial Inclusion Data (2019) nearly 99 percent of the population aged 15+ had an account with a financial institution in NZ. The number of people purchasing or paying bills online was 80 percent. Through this information, we found that the hardware and software were already available for people to surf online and see how much the evolution of shopping or peoples’ lifestyles have changed. Around 84 percent of people search online for goods or services to buy; of these approximately 70 percent of consumers visit online retail stores on the website using any type of digital device; after that about 70 percent of consumers purchase products or services online via any other kinds of devices (Global Web Index, 2018). Around 50 percent of internet users choose to purchase via laptop or desktop computer, compared to 36 percent selecting mobile devices. Based on the index of total NZ online retail sales, the line graph turned out to be a rollercoaster with obviously unusual trends peaking in April, May, and August which matched the lockdown times (Statistics NZ, 2020).

Online shopping overview in NZ

According to Statistics New Zealand (2019), more than 95 percent of New Zealanders used the internet every day and 91 percent of them used the internet for their own personal purposes or needs. Internet use is comprised of different distinct user groups, such as Millennial, Generations X, Y, Z and Baby Boomers. Despite the influences of their age group, more than 80 percent of people stated that the internet plays an important role in their life and that it is the first and most convenient place to search to find resources. During the COVID-19 pandemic, NZ experienced two periods of lockdown time when customers had to stay away from the physical stores, which led to the e-commerce boom. NZ Post's (2019) research found that people spent one dollar out of every four via online shopping and even some people who had never shopped online changed their purchasing method. Until June 30th, the sales of online shopping increased approximately 30 percent compared to the same period in 2019. No matter what kind of business was being run, online patterns played a significant role in the business model which can support the brick-and-mortar store sales or provide more variety of services to the consumers. As another channel, e-commerce can enhance the company's competitive ability to gain sustainable growth in the market.

Online shopping has experienced dramatic development in the past five years in NZ. The retail industry has faced both challenges and opportunities, the consumers mixing their purchasing process search for products on different platforms, comparing prices and services, offering coupons, reviewing social media comments on the product, and making a final decision on where and how to buy them. For instance, New Zealanders are becoming progressively more digital in daily life. Over two-thirds of purchases were made online in 2016, rising from 37 percent in comparison to 2006, with researchers predicting that number will increase to 83 percent by the year 2026 (Nielsen New Zealand Connected Consumer Report, 2018). The COVID-19 global impact and government policy has pushed up surges in retail e-commerce. The online channel provides more opportunities and suggestions, and even better pricing, without boundary limitations for the consumer. It also delivers more chances to the retailer, such as being able to trace the customer's data, improving the penetration rate of the customer, and creating novel interaction channels with the customer. It is no doubt that the digital transformation of businesses is becoming an important emergency strategy to deal with the trends.

Supermarkets in NZ

According to NZ Post's latest e-commerce report (2018), the spending on online shopping was around \$4.2 billion which was an increase of 16 percent, while the brick-and-mortar store only grew by 2 percent. Also, spending on online shopping accounts for 8.9 percent throughout the whole country's retail spending. Chain supermarkets such as Countdown, PAK 'n SAVE, New World, and Farro Fresh began to provide an online store for the consumers. Online grocery shops in New Zealand have experienced stable growth in the past ten years in terms of customer engagement. Moreover, online customers prefer to choose food and beverages in larger package size categories (AC Nielsen, 2011). But New Zealand experienced lockdown twice in 2020, so this situation allowed people to stay at home and away from physical stores; external circumstances encouraged more people to use online shopping, and also change their lifestyle, and consequently their styles of work, study and entertainment.

During the lockdown period, the supermarket remained open as a necessary business to provide services to the consumer. The companies realized the importance of online shopping so some of them built their own online service team to answer consumers' enquiries, package the products, deliver the items, solve refunding items and provide other services to meet the expectations of the customer. According to Statistics New Zealand (2020), the customers spend on food and groceries rapidly increased by \$376 million (17 percent) in March, which is the largest rise since credit cards were first used in 2002. Due to the impact of COVID-19, customers' shopping habits have shifted, with many preferring shopping online instead of the traditional way of shopping in-store. Moreover, the list of shopping items has changed, with people preferring to stock up on food and other essential items. Another example was The Warehouse, who announced that it was closing some 'dark stores' to cut the cost of labour, because the majority of the items were non-food and seasonal which means the turnover rate was much lower than the food stock. Also, the bigger warehouses usually need more inventory to make the shelves full which costs a lot to stock. Online stores can solve this problem by minimizing the stock and maximizing the display. This is not only a challenge for the supermarket and retail industries but also provides some opportunities for them to rethink their business models, adopt digital transformation in the organization, analyze customer data and re-set the marketing strategy to address the customers' expectations. This brief overview leads to the development of the following research questions:

- What has been the impact of online shopping on consumer habits in the supermarket industry in NZ after COVID-19?

- What has been the impact of online shopping on supermarket marketing strategy?

There are two main intended outcomes of this study. First, to find out about the consumers' shopping habits during the pandemic, either in-store, online or omni-channel, categorize customers by age/gender, then find the main benefits and their concerns about shopping online. Second, to investigate the impact of COVID-19 on the supermarket industry. Does the business have to adopt an online channel to deliver services to the consumer? This study subsequently provides suggestions to the supermarket industry and retail industry in NZ.

Why is retailing changing?

Expressed simply, retailing can be regarded as a process of providing products and services to consumers through multiple channels of distribution to gain profit. Retailers meet the demands of the supply chain; also known as end-users. While shopping usually refers to the customer's act of acquiring goods and services that they need regularly, (including food and non-food items), for the consumers, the counterpart in the supply chain is retailing (McGoldrick, 2002). Generally, the studies on retailing and shopping use the terms interchangeably, though there are some differences and similarities between them and their various functions. It is no doubt that there is a close relationship between them that is both interdependent and differentiated; shopping is the consumer's activities, but retailing is the business system. A formalized system is required to support, engage and stimulate the customers' shopping action when implementing retail (Maclaran, et al., 2009). Through the study of retailing and shopping theory, it is clear that the latter's study is theoretically more advanced than the former. Shopping research encompasses all kinds of industries and disciplines, especially psychology, social anthropology and human geography. The research produced on the subject of shopping is utilized to dig deeply into the reason why the consumer chooses the particular products and brands, how they create their own individual identities, and thereby enhance their role and status in society (Pioch, 2000). Also, the study explains how the customers discover their place within mainstream society and other social patterns. There are three important driving factors of the study on shopping discovered by previous generations, which include:

Consumers' behaviour becomes a significant unit of the marketing industry. The researchers explore and understand a wide range of behavioural dimensions such as the various influences and impact of patterns of consumption, the dynamic interaction between the same brand and other factors.

The second driver is the postmodern marketing development. Shopping has a wide scope, essentially giving more purpose and meaning to daily life. The postmodern perspective is that the act of shopping plays a significant role for individuals in contemporary society.

The third factor is based on the practitioner. There is a general economic term that describes shopping as big business and due to the importance of that, a new research industry emerges in "professionalization in shopping research" (Luomala, 2001). The consultants focus on explaining the process of shopping according to the evidence based on both the retailers' and consumers' perspective. In the beginning they concentrate on providing the principality of decision-making to the retail industry, including retail, product and brand management. This kind of research discovered that customer behaviour and shopping experience theories on retailing were influenced by store layout, product adjacency, the background music and colour of the decor in the store.

According to Figure.NZ (2020), there are more than 1454 supermarket and grocery stores in Auckland, which accounts for approximately 38 percent of the country's total. Canterbury, Wellington and Waikato however, have 429, 417 and 345 stores respectively, representing 11 percent, 10 percent, and 9 percent of the total respectively. Collectively, these four areas occupy around 70 percent of the entire number in the supermarket and grocery industry. Back in 1929, the first Woolworths store was opened in Cuba Street, Wellington, operated by Woolworths, Australia. Countdown's first grocery store was opened in the suburb of Otahuhu in Auckland in 1958. In 1981, the first Countdown supermarket was opened in Northlands, Christchurch, and in the same year, the company of Woolworths NZ was founded – there were more than 180 stores in NZ until 2018. In 1996, Woolworths introduced online shopping as a pilot site through a small group of customers. During that time, the company had a key collaborative role with the bank service to meet consumers' expectations for doing business via the internet (www.countdown.co.nz). Countdown is a full-service supermarket chain in New Zealand and a subsidiary of Woolworths NZ, which is also a subsidiary of Australia's Woolworths Limited. At the beginning of 2020, the company began to strategize their online team support, building a logistics service team to improve customer satisfaction with the last leg of the service – delivery.

Problem statement

The problem statement is that there has been an impact on online shopping on supermarket consumer habits. Further, there has been an influence on supermarket marketing strategy. This problem reflects the issues of online shopping and other social media changing customer behaviour and shopping

channels. As a result, supermarkets need to shift their marketing strategy to suit the customers' new requirements to build core competition capability in the retail industry.

- There are two influences from online shopping on the NZ supermarket industry. The direct impact is coping with the trends of integrating online with offline purchasing, discovering why the customer is or is not shopping online, and providing the consumer with an extraordinary experience to enhance the competitive capability of the company.
- The other indirect impact is through online shopping analysis of the supermarket industry, where other local retail shops can get some ideas from that to drive more integration of online sources with offline sources. As a result, the sale of local products was enhanced, preventing economic leakage and keeping market share.

Hypotheses

Through the literature review, two different perspectives are prevalent: retail change theories, and an online shopping model for business. We have more knowledge now of the evolution of retail and how these theories relate to reasons of convenience for online shopping. Looking back at NZ's supermarket history, digital technology has now been enabled. Nowadays, supermarkets can use that technology in their business, to provide their own website with shopping catalogues for people to browse. On the other hand, with the development of digital technology, more and more people are turning to online shopping in supermarkets. When people shop online at supermarkets, they can book orders, pay online, choose deliveries to their home or click-and-collect. As a result, people's shopping habits have changed.

In these cases of digitization in the supermarket industry taken from the customer's perspective, these business models have been identified. However, in NZ with the scenario of COVID-19 lockdowns, including the economic situation and population structure, a unique situation has arisen to produce a diversity of shopping experience. The impact of digital acceptance in online shopping from different age groups and different generations has not been investigated. Based on those hypotheses these were formulated as:

Hypotheses H₀: Women are more likely to use shopping online than men.

Hypotheses H₂: Older persons from 55 years are also accepting the need to use online shopping methods.

Methods used

In line with the research questions, the hypotheses, and the literature review, we have adopted a positivist strategy in this research. The methodological assumptions are based on epistemology and use explanatory research (causal research) as this paper's approach to deducting the research questions. This research focuses on acceptance by the customers of the supermarket industry in NZ and the trend of consumers' shopping habits which have been influenced by restrictions due to the COVID-19 pandemic. Under this category, based on a quantitative research design we adopted the quantitative and deductive methods in this research and used Survey Monkey software. Facebook and WeChat were used to hand out questionnaires to potential respondents. The primary data collected by questionnaires based on convenience sampling is a non-probability sampling method. Data collection was used to evaluate the propositions or hypotheses relating to the existing theory.

This paper targets a sample population from customers in NZ who usually shop in the supermarket either in-store or online. The research question is about the COVID-19 pandemic, and its impact on online shopping on consumer habits in the supermarket. The two hypotheses of this research are related to the number of people from the age of 55 plus who shop online, comparing the data between male and female consumers, so primary data can be taken from the customer viewpoint as needed.

As a result, the digital survey was chosen to collect the data by questionnaire because it is convenient and efficient. The population sample is based on the latest Statistics NZ census and using a professional formula for calculation, the sample size is 235 surveys, which would be appropriate to analyze this data. According to the Statistics NZ (2020), the population is 5,093,219, choosing the variable as the confidence level 90 percent and a margin of error of 6 percent, using the sample size the formula was calculated:

$$\text{Necessary Sample Size} = (Z\text{-score})^2 * \text{StdDev} * (1 - \text{StdDev}) / (\text{margin of error})^2$$

For the primary data, based on the questionnaire, a non-probability convenience sampling method was conducted to recruit the sample from the community, using a social media platform to post the Survey Monkey questionnaire and send emails to participants. The digital survey with 235 questionnaires to collect raw data from the convenience sample was sent out to the respondents to fill in then return within one month. The structured questionnaire was distributed to people who volunteered, with the feedback rate hopefully being around 80 percent. The data collection was used to evaluate the hypotheses relating to the existing theory.

The survey consisted of 6 multi-choice questions and 21 questions with a several-point (Should this read "...several-point Likert scale..." instead of "serval-point"? Please check) Likert scale response and 1 open question. The aim was to conduct the digital survey with 235 volunteers. Participation in this research is anonymous, entirely voluntary and needs around 10 minutes to finish. The research utilizes the Survey Monkey website as a tool to design and collect questionnaires which have been tested and validated. To suit our research objectives, we use Likert Scale Response Anchors which is a tool commonly used in survey research. When respondents face a Likert questionnaire item, they indicate their level of agreement or disagreement based on an asymmetric agree/disagree scale. Also, a graphic rating scale is adopted which is known as a continuous rating scale. The respondents can mark at any point on the scale what they feel is appropriate. The structured questionnaire was distributed and 205 questionnaires returned; 192 were used in the analysis. The digital survey was carried out in Auckland, New Zealand.

Findings

The digital survey results show that consumers' shopping behaviour was highly influenced during the COVID-19 pandemic, based on this special lockdown time, most of the people chose online shopping instead of brick-and-mortar shops. However, after COVID-19, not all consumers continued the lockdown way of online shopping; some of them came back to shopping in-store, while others chose both channels for shopping. The findings show that there are a lot of online shopping benefits for the customer, such as more convenience, safety, a competitive price, promotional coupons, and availability as well. Also, the pandemic has pushed the e-commerce boom, especially the supermarket industry, due to the support of government policy deeming them an essential business. Meanwhile, the results also state there are some concerns from the consumer such as delivery time efficiency, cost, and quality issues. Furthermore, the shopping experience, both online and in-store plays a very crucial role for the consumer and business.

The result of this research provides us with the facts of the online shopping influence on the customer and the business. The results show that shopping in the supermarket or online store is not an isolated scenario for the customer, they also like to receive promotions and get activity information from the market through the online channel. Furthermore, based on the numerical data analysis of the shopping habits of gender, more women prefer shopping online. Another interesting fact is that online shopping has influenced older people over 55 years of age to choose e-commerce. In addition, there was one more situation that appeared; some people played a role as paid helpers for

older or disabled people who needed shopping done. However, there is another fact which shows that some of the people prefer to research online and then shop in-store, while others prefer just to shop online. Both of the results state that online shopping or e-commerce channels play a significant role in the shopping process which will be the mainstream platform in the future of the retail industry.

There are some unexpected results from the research, such as there were respondents who accepted orders online but preferred to choose a click-and-pick up service instead of delivery due to the cost involved, time, and quality issues during the COVID-19 pandemic. While most people went back to in-store shopping after COVID-19, compared to other research in the e-commerce or online shopping industry, the development of digitization in different countries is varied. This should be based on a holistic view of the business strategy, that shopping online is only one process in the retail life cycle – from the manufacturer to the supply chain, to the marketing plan, to the shopping channel, then customer experience until delivery (logistics system). The whole process has been influenced and shifted by digitization. The stage of digitization in the supermarket or retail industry in NZ is experiencing disruption due to the impact of the pandemic. The delivery service issues reflect the logistical problem which should see businesses planning to build more branches in NZ. The NZ Post report stated that the courier service has been extended, therefore more branches need to be built to improve efficiency and offer a wider range of locations. Based on the results, there are some more questions that need to be asked of the respondents. Such as: What do you think was the difference between the ways of shopping during COVID-19 and after? What are your suggestions for an improved online shopping experience?

This study focused on the impact of online shopping on the supermarket customer during the COVID-19 pandemic and is based on a digital survey with quantitative data for analysis. Ideally, both quantitative and qualitative methods should be integrated into the implementation of this research as this can help with insight into making conclusions. Also, the research should include a wider example of customers, business staff from different processes within the business and other affected individuals.

Data analysis and results

Participants' demographics

Table 1. Participants' demographics

	Categories	Participants	Percentage	Total
Gender	Male	88	46%	192
	Female	104	54%	192
Age range (yrs)	18-24	4	2%	192
	25-34	105	55%	192
	35-44	46	24%	192
	45-54	21	11%	192
	55+	15	8%	192
Occupation	Professional	22	12%	192
	Employed	122	64%	192
	Unemployed	10	5%	192
	Student	19	10%	192
	Others	19	10%	192

As shown in Table 1, most of the participants were aged from 25-34, 35-44 years old which represents 55 percent and 24 percent respectively. For this research, our target samples are people who shop online in the supermarket; the result for females is 54 percent and for males 46 percent. This indicates more females chose online shopping channels for the household during the pandemic. Most participants were employed and professional, followed by the others with the lowest percentage being the unemployed. This indicates that online shopping penetration is very high in NZ. Statistics NZ (2020) reported that the internet penetration of New Zealanders represents 93 percent and e-commerce activity penetration is approximately 70 percent.

To test the validity of our first hypothesis:

Hypotheses H_0 : Women are more likely to use shopping online than men,

We used a chi-square test with one sample to carry out whether consumers' gender is related to the chosen shopping channel. Table 4 delivers a summary of chi-square tests results. All tests suit the assumptions of Field (2013) in terms of expected frequency segments of more than 5 and the minimum

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

expected segments being not less than 1, using the formula, and Degrees of freedom=1, the results of $\chi^2=0.65$, $p=0.42$. The results

indicated that the relationship between gender and the shopping channel is statistically important and the variables are independent of each other (sig. = 0.42 > 0.05 => H0 is accepted). The results indicated that the variables are independent (sig. = 0.06 > 0.05 => Hypotheses H₀: is accepted).

Table 4. Relationship between adoption of online or in-store shopping method with customers' gender perspective

Observed	Online Obs/Exp	In-store Obs/Exp	Total	Row %
Male	67(64.61)	19(21.39)	86	45.50
Female	75(77.39)	28(25.61)	103	54.50
Total	142	47	189	
Column %	75.13	24.87		
Chi-Square				
	X2	0.65		
	P	0.42		
	Df	1		

Table 5. Consumers' gender

Observed	Yes	No	Total	Row %
Male	71(75.11)	14(9.89)	85	44.97
Female	96(91.89)	8(12.11)	104	55.03
Total	142	47	189	
Column %	88.36	11.64		
Chi-Square value				
	X2	3.50		
	P	0.06		
	Df	1		

In order to evaluate the second hypothesis, it is important to analyze the data related to the respondents' ages, gender and the shopping channel. Therefore, the following table includes these variables (Table 6) which is comprised of the previous table's content but with various perspectives of the research question.

Table 6. Shopping channel based on ages

Category	18-24		25-34		35-44		45-54		55+		Total
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	
Online store	3	2.11%	95	66.90%	29	20.42%	8	5.63%	7	4.93%	142
Supermarket	1	2.13%	8	17.02%	17	36.17%	13	27.66%	8	17.02%	47
Total	4		103		46		21		15		189

Source: Authors

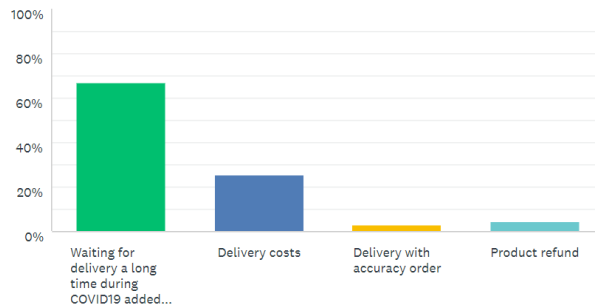
A pivot table is a statistical table which can summarize the data and provide extensive results. This summary may include averages, sums or other data, and via groups of them, the pivot table can deliver more meaningful data to analyze. The pivot table provides techniques for data processing. So, combining the variables of the shopping channel with different age groups it provides us with another perspective. Respondents from 25-34 years of age represent 67 percent preferring to choose shopping online, while people over 55+ years account for only 4.9 percent. On the other hand, 36 percent of the respondents from the 35-44 age group choose shopping in-store, with older people representing 17 percent. People from the 25-44 age group are the majority target group of customers for the supermarket industry because there were 149 respondents in this scope representing 79 percent of all respondents. It showed that people over 55+ years old chose the online shopping channel but they only had a small market share, so Hypothesis H2₀: It is consequently confirmed that older people from 55 years up are accepting the need to use online shopping methods.

The wealth of data that we collected from participants relating to online shopping concerns and digital transformation yielded some interesting results. We found that the biggest concerns that participants had about shopping online during COVID-19 was the length of time that they had to wait for a delivery.

Figure 1. Online shopping concerns

What are your biggest concerns about shopping online?

Answered: 187 Skipped: 5



Source: Authors

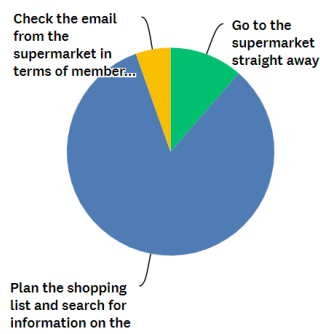
Concern about the length of the delivery time and concern about the delivery cost (26 percent of respondents) was expressed by 67 percent of respondents.

The most concerns about shopping online were the waiting time and delivery cost. (The previous sentence is a repetition of the one just prior to it. Remove one and join the sentence to the previous paragraph) Consumers preferred to choose a reliable store vendor for their online shopping. This indicates that brand supermarkets tend to have their own physical and online store, which delivers a more reliable and trusted service to consumers.

Figure 2

When you plan to shop in a supermarket, which kind of scenario would you choose?

Answered: 184 Skipped: 8



Source: Authors

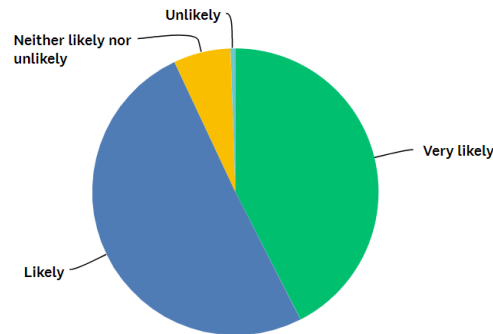
Figure 2 illustrated that 83 percent of the respondents preferred to plan their shopping list and search for information in online stores, followed by going to the physical store, while 11 percent of the respondents chose to go to the supermarket straight away. Only 6 percent of them chose to check email from

the supermarket in terms of member's cards, then download coupons and shop online. One conclusion to come out of our thinking, is that people like online shopping channels, but they prefer to regard it as a supplementary channel.

Figure 3. Shopping channels after COVID-19

I might consider more online shopping for my grocery in the future due to the COVID19 pandemic influence.

Answered: 186 Skipped: 6



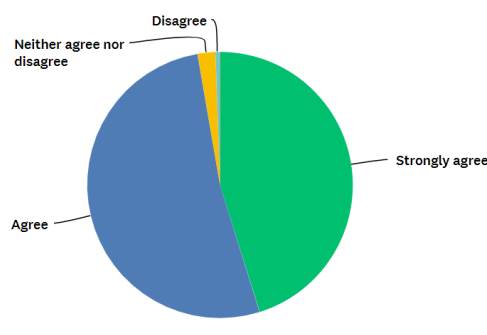
Source: Authors

This figure demonstrated that more than 93 percent of the volunteers might consider more online shopping for groceries in the future due to the pandemic's influence.

Figure 4. Digital transformation trend

I think it's a challenge and opportunity for the supermarket industry to using digital transformation in retail. Online shopping can support physical store sales and profits

Answered: 186 Skipped: 6



Source: Authors

Figure 4 showed that nearly 98 percent of the respondents think that it is a challenge and opportunity for the supermarket to use digital transformation in business. Finally, according to the respondents' suggestions, we found that people wanted to use online shopping in terms of its convenience, but in fact, the delivery service made them wait for nearly two weeks, and sometimes the

quality of the product was not like the pictures in the advertising. As a result, after COVID-19, people chose to search online information, then shop in-store or use the click- and-collect method. The majority of the customer's suggestions related to improving the logistics system and delivery service.

This research focused on the COVID-19 impact on online shopping on the consumer's habits in the supermarket industry in NZ. The research considered the factors that influence the customers' decision to shop online or in-store during the COVID-19 pandemic. It was found that most of the consumers shifted their channel for shopping groceries during the lockdowns based on online shopping advantages. In addition, consumers' shopping habits such as doing research, checking promotions and getting coupons had an impact on the supermarket marketing strategy. This also pushed the business to implement digital transformation.

Conclusions

Who was influenced by the COVID-19 pandemic and how did this change their shopping behaviour?

The findings indicate that the consumer's shopping habits have been influenced, and e-commerce was pushed by the COVID-19 pandemic. Women were more likely to choose shopping online than men, and some older people chose shopping online as their main shopping channel. Hence our initial research hypotheses were verified. People chose online shopping for its benefits as it is safer (in terms of potential viral transmission) than face-to-face shopping in-store, more convenient, usually with a better price, promotional activities, and better information is provided about availability. The supermarket or retail industry should plan digital marketing, create more interactions with the customer to drive sales through online channels, email, and other forms of social media. Customer relationship management systems are being adopted in the supermarket business, using information technology to customize demands and deliver the best service to consumers.

However, based on risk aversion and the safety perspective, there are some concerns for the consumer such as delivery costs, delivery service, time and quality, which influenced the consumer's decision-making. This indicates that the supermarket and retail industries should plan new business models, focusing on improving the logistics system to build a better environment. There are some solutions to solve this kind of problem which were cited in the literature review, such as using outsourcing, or building a business' own logistics system. But for the NZ supermarket industry or business, the external

situation is different. For example, the NZ Post courier, which is the largest logistics and delivery company in NZ, dominates the majority share for delivery. Before lockdown, Countdown, New World and PAK 'n SAVE had already built a new team for their online service channel. So, based on the NZ supermarket industry perspective, they came up with the challenge and opportunity to create their own strategy in terms of the internal and external factors that contribute to driving business success. However, the size of their online service channel (which would have been developed based on assumptions pre-lockdown of customer demand) did not prove able to cope with the heavier demand during the lockdown period and consequently came under pressure. This was revealed in the customer responses regarding their concerns over waiting times for delivery.

The pandemic situation fluctuated throughout the world, and NZ has already experienced lockdown twice for the residents. (This number has changed – haven't we now had 4 lockdowns? You need to say something like – “The pandemic situation has fluctuated throughout the world. To date there has been four lockdowns ranging from 3 days to 6 weeks.” Or however long it was) During this research, another interesting phenomenon occurred: some people helped the elderly or neighbours to do shopping for payment and some consumers choose omni-channel shopping. This indicates that there is a demand for the market that needs help with shopping. It is not a new concept, as for example, there are some volunteers that are sent to pick up children from school in the community, but it is a free service. Also, with the shift to online shopping, the marketing advertisements should be rescheduled to marketing channels such as social media and television.

Research limitations

This research methodology is based on epistemology and using the quantitative method to collect data using a digital survey. The questionnaires were collected (205), which was more than expected. There are some benefits of using a quantitative approach, such as easy to collect data and analysis, saves time, and easy to focus on the target question. However, there are some limitations of this research since this study only uses one method to collect data. The results were based on commonality of the consumers, such as customer intentions of online shopping, customer shopping experiences, and concerns. The results represent the general consumers' perspective and proved that women are more likely to shop online rather than men, and older people generally tended to accept the online shopping process. These results are useful for the retail industry to review their target customer group. However, to gain deeper insights, more data should be collected to support the analysis,

such as face-to-face interviewing based on different perceptions: consumers, retailers, managers, staff, and other people involved in the industry.

Future developments in the retail space include Artificial Intelligence (AI) with virtual and augmented realities which appeared just a few years ago but was adopted in the retail landscape. Another model of the Internet of Things (IOT) demonstrates a new framework that will improve a combination of the digital world with the physical world and shift the consumer's retail experiences (Balaji & Roy, 2017; Nguyen & Simkin, 2017; Woodside & Sood, 2017). In particular, there are digital tools connecting the consumers' technology proxies with the retailers, such as the customer's refrigerator that can automatically order groceries by itself (Vermesan & Bacquet, 2019; Woodside & Sood, 2017). These developments suggest that the consumers shopping environments and experiences will be changed, and consumers shopping habits will be influenced.

The results of the research indicate that the supermarket industry provides an online store service to the consumer and uses customer relationship management to deliver a personalized service to them. But how to make the best of digitization of the business for consumers, staff, and the company should be considered. There are many more research avenues related to the study of the impact of COVID-19 on consumers' shopping habits. This study examines the importance of digitization of both the supermarket and retail industry to deliver the best end-to-end experience to the customer. This paper also provides some useful information for the supermarket industry to further develop its operations using online channels.

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2 – The impact of Chinese social media WeChat on promoting Tikanga Māori in the Aotearoa-New Zealand tourism industry: Targeting the Chinese market

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Abstract

This research describes the impact of Chinese social media WeChat for promoting Tikanga Māori in Aotearoa-New Zealand tourism industry targeting the Chinese market. Drawing on a quantitative methodology and methods using questionnaire, twenty questions were posed to 200 participants. Data collected was analyzed through EXCEL and SPSS using the Pearson Correlation, noted relationship between questionnaire to research questions. Findings revealed half Chinese respondents, have heard and interested in Tikanga Māori. There is moderate positive relationship between tourism interest. WeChat usage habits with COVID-19 related tourism intention with Chinese tourist attitude towards Tikanga Māori was articulated as moderate. WeChat Moment is a suitable marketing method as contents shared with images and videos may be more effective for WeChat marketing. This research identified some promotional strategies employed to improve knowledge sharing of Aotearoa-New Zealand tourism industry. This calls stakeholders to respond to aspects outlined to aid Tikanga Māori in Aotearoa-New Zealand for potential Chinese tourists.

Key words: Aotearoa-New Zealand tourism, Chinese market, Tikanga Māori, WeChat

Introduction

Pepeha

E nga mana e reo nga hau e wha
Tena koutou, Tena koutou katoa
Ko WuDangShan te Maunga
Ko ChangJiang te Awa
Ko SiChuan Airline te Waka
Ko China te Iwi
Ko HuBei te Hapu

Ko ICL Graduate Business School Te Kura

Ko Fu LuiHui toku ingoa

No reira tena koutou, tena koutou, tena koutou katoa

我的名字叫付刘卉 (Fu LiuHui) , 是新西兰ICL商学院的学生。我是乘坐四川航空公司的航班从中国的湖北省来到新西兰的。我的家乡有武当山 (WuDangShan) 和长江 (ChangJiang) 。

My pepeha outlines my whakapapa (kinship system) and karanga (call) as an introduction in order to position my stance as the researcher for this applied project. My interest in the Māori culture generated from past experiences within the tourism field. As a Chinese learner I seek further knowledge in the realm of business information technology. Being present in Aotearoa- New Zealand at this time and space, it is important for me to honor Māori protocols upholding the essence of Te Tiriti o Waitangi. I extend this korero (talk) within this mahi (work) as a way to uphold respect of learning and knowledge gained within the context of Aotearoa-New Zealand.

Aotearoa-New Zealand and Te Tiriti o Waitangi

Aotearoa-New Zealand is geographically situated in Oceania, islands in the South Pacific, southeast of Australia its closest neighbor. It has an area of 270,467 km² (104,427 sq. mi.). There are two main islands the North Island (Te-Ika-a-Maui) and the South Island (Te Wai Pounamu), separated by the Cook Strait. Aotearoa-New Zealand shares maritime borders with Australia, the island nations of Fiji and Tonga (Te Ara, 1966; Ministry of Education, 2007). The current population of 5 million in March 2020 (Stats NZ, 2019). The COVID-19 pandemic has caused unusual international travel and migration patterns in recent months with people returning from overseas (Stats NZ, 2019).

A respectful starting point is that we acknowledge the founding document of Aotearoa-New Zealand signed by rangatiratanga (Māori chiefs) and the British Crown in 6th February, 1840, Te Tiriti o Waitangi - ngā mātāpono o te tiriti (Ministry of Culture and Heritage, 2021). The Waitangi Tribunal was established by the Treaty of Waitangi Act 1975, a law that refers to the principles of the treaty which are partnership, participation and protection. Through this law and a 1989 government statement, a contemporary meaning to New Zealand society has been outlined (Te Ara, 1966). Within the context of business and information technology such principles are important to uphold to develop affirmative relationships between people, places and things. For this research the principles of protection of Māori interests, partnership- the partners have a duty to act reasonably and in good faith within any business

venture like tourism and participation of Māori to retain rangatiratanga (governance) over their resources and taonga (treasure) according to Tikanga Māori is paramount (Te Ara, 1966).

Te Tiriti o Waitangi affects life of all New Zealanders in many ways. Historically, through the illegal land confiscation by the settlers, Māori land and taonga have been taken from them as indigenous people of Aotearoa. The Treaty of Waitangi gives Māori the right to own their land which has resulted in larger settlements in terms of funds and land. Many iwi (tribe) are using this for business and have become important employers in the country such as Wakatu Corporate and many others. The Te Tiriti o Waitangi plays an important role in businesses in New Zealand because it gives Māori the same right as the Pakeha (non-Māori) in terms of doing business (Mautuge.wordpress.com, 2015). Special consideration to what tourism is about and how this is carried out to uphold and share Tikanga Māori was an essential subject to seek some understanding.

Background

The global economy has been affected by the COVID-19 epidemic, and all industries are in economic crisis. The most serious impact is in the tourism industry, and Aotearoa-New Zealand as a major tourist country has been affected. International tourism has been an essential part of New Zealand's tourism industry, has brought continuous income to the industry. Due to the impact of COVID-19, many domestic tourism-related organizations have been forced to cease businesses (Bartik, Bertrand, Cullen, Glaeser, Luca & Stanton, 2020). Tikanga Māori is an essential element of Aotearoa -New Zealand's tourism products and services. However, for various reasons tourists are not satisfied with the experience of Māori cultural tourism. This has influenced the development of Tikanga Māori, which needs to be shared. Historically in the 1990s, studies have recognized the huge potential of heritage tourism in New Zealand's tourism industry. Hall, Mitchell and Keelan (1992) assert that the development of international tourism must fully accept Māori cultural values and heritage worldviews, connecting Māori with the world. The definition of Māori identity has a powerful connection for the tourism policies in Aotearoa-New Zealand. Thus, it is essential to promote the diversified development of the Aotearoa-New Zealand tourism industry through the view and understanding of Tikanga Māori (Amoamo, 2014). Māori-related tourism is unique to Aotearoa-New Zealand, thus should be operated centric on Māori people instead of an imitated-Western mode (Zygodlo, McIntosh, Matunga, Fairweather & Simmons, 2003; Tahana, Grant, Simmons and Fairweather, 2000). This means there should be a suitable business model that maintains the value of Tikanga Māori to develop Māori related businesses.

The research of Gnoth and Zins (2013) concluded that most European visitors are older, while those from Asia and other countries are relatively younger. This proportion is equal in gender with the average stay time of more than 20 days occurs for tourists. Social media has become an essential part of young people's lives affecting everyone's daily life in many aspects, even the majority of people use multiple social media at the same time (Duffett, 2017). According to Rasul, Zaman and Hoque (2020), social media is a positive marketing tool in communication with customers online and people have begun to use social media to create travel plans. Thus, it has great significance to the economic growth of the tourism industry.

There are many effective implementations of social media applications in the industry (Hsien-Cheng, Han, Lyu, Ho, Xu, Hsieh & Zhang, 2020). Supporting this notion, research affirms that pictures and videos obtained by customers through social media, sharing from friends have strengthened their trust in social media (Öz, 2015). This is a positive factor for providers in the tourism industry. An important focus for the tourism industry has been the potential to provide sustainable employment and empowerment for Māori (Puriri and McIntosh, 2019). While earlier research has sought to identify the need for Māori control, authenticity and ownership concerning tourism, few studies have engaged an indigenous paradigm to consider how this may be achieved.

The importance to consider how Māori values and principles are able to facilitate Kaupapa (Māori methods) driven Māori tourism business is paramount. By use of Kaupapa Māori methodology, a collection of Hui (meetings) examined a whanau (Māori family) tourism business development concentrating on the cruise industry. The research fills a significant gap in knowledge as the whanau unit is argued to be the core of socio-economic development for Māori. Tikanga Māori tourism has been quoted by Tribal Tours co-owner Nadine ToeToe that 'It's been a long tangi (funeral)' (Crop, 2020). ToeToe states that life since the global pandemic has 'stolen' 5,000 visitors that her whanau normally hosted annually. However, ToeToe echoes with zest that 'we are have warrior blood running in our veins, so we're never going to give up' (p1). It is estimated that there are 14,000 people employed in Māori tourism and a fifth of Māori small and medium businesses are involved in the sector (Crop, 2020).

Scope of Research and Purpose

The significance of Tikanga Māori and language is for revitalization of Te Reo Māori in Aotearoa-New Zealand. As a coda to this, how this is used and known, shared with others nationally and internationally speaks to honoring indigenous ways of doing within the knowledge making process (Curtis,

Jones, Tipene-Leach, Walker, Loring, Paine & Reid, 2019; Toso, 2019). In the process of decolonizing indigenous knowledge from a learners' perspective, a clear search for reasons how people react to Tikanga Māori within the tourist industry needs to be researched appropriately. As social media is the conch in this millennium, it is important to find out how people make conscious decisions about traveling to shores afar. Aotearoa-New Zealand is a context where many tourists visit to rest, to experience another way of being. By using social media as a vehicle to collect knowledge about what and how Tikanga Māori is conceptualized and reconceptualized is of interest for this research. The hope is to support the recovery to assist future endeavors and usher in a new beginning with the best momentum (Perich, 2020). This research also adds to current literature and supports policies of how the Te Tiriti o Waitangi is actioned within the business realm of tourism (Collins, 2005). Collins explains how Te Tiriti o Waitangi is used within business where he contends that many business clients would initially say it was irrelevant. He continues to outline in detail specific features linking to Article I, II and Article III about how the principles of the treaty may be practices within business in Aotearoa-New Zealand.

Research Questions

The research questions that directed this study are:

Question 1: What is the situation of Tikanga Māori in the New Zealand tourism industry?

Question 2: Do Chinese tourists' choices to visit New Zealand relate to Tikanga Māori?

Question 3: How should New Zealand tourism advertise Tikanga Māori to Chinese tourists?

Literature Review

An interrogation of literary interpretations of the impact of social media WeChat in promoting Tikanga Māori in tourism and associated notions of what influences upon decision making processes for people who travel abroad articulate is the directive of this review. What is presented is literature that gives sway to the use of a social media platform as a potential communication tool with the significance of sharing knowledge to prospective travelers who wish to visit to Aotearoa-New Zealand.

Tikanga Māori in Aotearoa-New Zealand tourism industry

Tikanga are Māori customary practices. The concept is derived from the Māori word 'tika' which means 'right' or 'correct' so, to act in accordance

with tikanga is to behave culturally appropriate way (Ministry of Education, 2007; Learning Media, 2015). One of the purposes of the Treaty of Waitangi is to guarantee Māori autonomy over their own businesses. Aotearoa-New Zealand has undergone extensive economic reforms since 1987, the government strongly supports the development of products and services based on Māori cultural heritage (Amoamo, 2014; Nationonline, n.d). Since Māori began involvement in the tourism industry of Aotearoa-New Zealand around 1850, Māori have attracted a large number of tourists through products and services related to Tikanga Māori, and positive contributions to tourism (Zapalska & Brozik, 2017).

Māori related tourism has contributed more than \$200 million to Aotearoa-New Zealand's economy in a year (Puriri & McIntosh, 2019). Studies have recognized the huge potential of heritage tourism in Aotearoa-New Zealand. Hall, Mitchell and Keelan (1992) outlined that development of international tourism must fully accept Māori's cultural values and heritage views, and connect Māori with the world. Māori-related tourism is a special form, should be operated centric to Māori people instead of a copy-West mode (Zygodlo, McIntosh, Matunga, Fairweather & Simmons, 2003; Tahana, Grant, Simmons & Fairweather, 2000). Thus, a suitable business model that values Tikanga Māori to develop Māori related businesses is needed. Although the business is run by Māori, it is not Māori tourism if it does not contain any Māori cultural things (Fisher, 2008). The previous study by Gnoth and Zins (2013) state that Tikanga Māori is unique and precious, and Māori cultural experience is also an important component of tourism in Aotearoa-New Zealand, which needs further research.

Māori have also formulated many new economic policies try to reinvent their identity, and readjust the leading role of Tikanga Māori in Aotearoa-New Zealand's tourism industry which presents a positive effect on both the tourist experience and development of Tikanga Māori related tourism industry (Ringham, Simmonds & Johnston, 2016). The reinvention of Māori identity highlights the importance of tangata whenua/indigenous people (Puriri & McIntosh, 2019). However, Amoamo (2014) found that the majority of Māori tourism providers assert that representation of Māori needs to have a modern image, which should be a "breathing culture", reflecting the diversity and richness of Māori tribal culture. Fisher (2008) posits that most studies only focus on the product related to Māori including products supply and tourist purchases. Although many Māori related tourism products have been launched on the market, the overall understanding and recognition of Māori by tourists is very low, and oversea visitors do not come to Aotearoa-New Zealand for Māori (Fisher, 2008). Wilson, Horn, Sampson, Doherty, Becken and Hart (2006) contend the need for more overseas promotion of Tikanga Māori,

because many tourists are not aware of the participatory nature of Māori cultural experience.

Māori tourism providers need to understand the preferences of tourists, find a balance to increase the value of the services provided (Wilson et al, 2006). Tourist attractions need to provide more information in the form of pictures, videos, and diversified languages. This suggests that increasing the participation of tourists is supportive of helping visitors understand and link the stories related to Tikanga Māori (Howison, Higgins-Desbiolles & Sun, 2017). Ryan (2002) found that Asian visitors are interested in Māori performances, and they are curious about Tikanga Māori. For Aotearoa-New Zealand tourism, the Asian market is currently the essential research objective which has great prospects. It is reported that the Chinese market is the fastest-growing tourism market for Aotearoa-New Zealand (NZ Māori Tourism, 2019).

Factors in tourism industry

Culture, history, landscapes and traditional activities

Culture connects and defines people, it includes many factors such as common habits, customs, traditions, history, and geographic location (Te Hau, 2016). The content of culture involves its manifestation and how people use local natural and economic resources (Gnoth & Zins, 2013). By committing to local traditions, culture, art, food, and architecture, satisfying the common interests of both locals and visitors, the tourism industry could achieve a balanced development (Te Hau, 2016). The 2011 World Tourism Day celebrations defined cultural and heritage values as experiences of different lifestyles, discovery of new customs and food, and visits to cultural sites is needed (Te Hau, 2016). Whether it is traditional culture and historical attractions, or popular modern culture, it is an important market for the tourism industry (Richards, 2014). The survey by World Tourism Organization (UNWTO, 2018) affirms that 47% of international visitors are cultural tourists, and more than 80% of cultural tourism also includes contemporary culture such as movies and fashion. For example, in 2015, the impact of *The Hobbit* and *The Lord of the Rings* brought Aotearoa-New Zealand nearly \$40 million in international consumption and an annual increase of 200,000 tourists (Bealing & Kriebel, 2017).

Te Hau (2016) states that cultural heritage is an important part of Aotearoa-New Zealand's economy. Research by Gnoth and Zins (2013), contends as a unique tourist destination, Māori dance performances and Māori food are most popular among tourists. Zapalska and & Brozik (2017) also state that

traditional food is still the most noteworthy factor in tourism products and services for Māori tourism providers. The UNWTO (2017) asserts that food tourism has great potential to stimulate economic growth and positive contribution to the local tourism value chain. The study also found some purposeful cultural tourists also show strong interest in other themes such as plants and animals in Aotearoa-New Zealand (Gnoth & Zins, 2013). Cultural tourism has shown to be a central advocate for Tikanga Māori significant within Aotearoa-New Zealand.

Richards (2014) affirms that the continuous development of technology and mobile devices makes cultural tourists more independent to explore tourist destinations. This has presented opportunities and challenges. According to Testa, Galati, Schifani, Di Trapani and Migliore (2019), culinary tourism has emerged in the tourism industry in recent years allowing tourists to experience different local cultures and traditional food resources. Culinary tourism reflects the traditional values that relate to the new trends, including healthy lifestyles and respect for culture and traditions. Testa et al. (2019) suggests that tourism providers should focus on the relationship between local food and territory and the culture contained, for marketing and promotion purposes.

Lin, Xinshan & Williams (2020) raised an important assertion about the rapid development of digitalization in the hospitality industry noting that the influence of decision-journey behaviors of searching, selecting, and booking hotels is a vital aspect to consider as an important form of communication and business ventures. This research contends the need to understand customers, and perhaps tourists' attitudes towards using social media to seek information is a point of interest. They continue to outline that WeChat is the most successful social media in China receiving over 970 million users globally. It is thus crucial for international groups to strengthen the customer brand loyalty in obtaining long-term development by 'deeply excavating WeChat' effects in the online marketing activities (Lin, Xinshan & Williams, 2020). Although this research is about the hospitality industry, perhaps for this research, some aspects of this study is significant to consider.

Sports tourism held in Aotearoa-New Zealand have had a positive impact on international tourists, which government support as an important tool for tourism marketing (Hudson, 2012; Nishio, 2013). An example as Calabrò (2014) outlines, Māori *All Black* a well-known globally as Aotearoa-New Zealand's iconic national sport. Tourism Minister Stuart Nash said that once the international tourism industry recovers, the *All-black* experience will be a world-class tourist destination, and every Aotearoa-New Zealander who is passionate about sports and cultural history should work for this together (Beehive.govt.nz, 2020). This brand label of the *All-black's reputation* is

another factor that entices potential tourists to consider visiting Aotearoa-New Zealand.

General traditional activity in tourism

Experiencing traditional Tikanga Māori such as dance - *kapa haka*, and more Māori element activities such as hiking, white water rafting, cultural tours have been popular in recent years (Tourism New Zealand, 2020). Within the last ten years, there has been a surge of interest of *kapa haka* groups, schools touring outside Aotearoa-New Zealand to visit international centuries to perform *kapa haka*. With this, more advertising of Tikanga Māori is shared with the global community. Richards (2018) asserts development of cultural tourism a space of research over the past decade, has identified major trends and research areas. This is re-affirmed by the UNWTO as a major feature of global tourism consumption which accounts for 39% of tourism arrivals. The reasons why people are visiting places outside their own countries is growing and reasons are cultural motivations, heritage conservation, cultural tourism economics, meeting family, and the relationship with creative economic ventures. The major research trends incorporate the development and shift from tangible to intangible heritage with more attention for indigenous and other minority groups geographical expansion to research into cultural tourism as business ventures. This research concludes with numerous suggestions for future research directions, for example the development of trans-modern cultures and the impacts of new technologies (Richards, 2018).

Other researchers whose work connects to indigenous Tikanga Māori research is vast. Cram affirms that Kaupapa Māori in health research is developing and changing in order to support neo modern conceptualizations. This point is an important consideration for remembering when research about Tikanga Māori. There is a specific format to follow when dealing with business and tourism and in many contexts dealing with people in Aotearoa-New Zealand in research as well as advocacy of taonga used within the tourism industry (Cram, 2017). Kaupapa Māori in research methodologies and methods are about culturally responsive and inclusive practices. Kaupapa Māori is the Māori way of doing research and upholding Tikanga Māori (Ministry of Education, 2007; Smith, 2005).

This echoes in Smith's stance of following cultural protocols in research as well as in the context of Tikanga Māori. She continues to advocate for a decolonizing position when in concerning Tikanga Māori protocols and culture (Smith, 2005). This is an important feature to consider when delving into the importance of Tikanga Māori in Aotearoa-New Zealand tourism. It is clear to ascertain that research is a vital part of understanding the grounding

conceptualizations of the importance of indigenous understandings of Tikanga Māori to highlight research methodologies. This articulates Te Tiriti o Waitangi principles of participation of Te Ao Māori (world views) and protection, celebrating tangata whenua historical and contemporary involvement in celebrating Tikanga Māori.

WeChat and Tourism

WeChat is the most popular multipurpose social media which already had one billion active users each month in China 2018 (Montag, Becker & Gan, 2018). According to Meeker (2014), over 60% of users open WeChat application more than 10 times per day, and more than 60% of users check "WeChat Moments" each time when they open WeChat. "WeChat Moments" is a WeChat platform that allows you to share the most interesting experiences in life with your WeChat friends. In the latest version of Moments, the addition of music to the contents, which brings more fun to sharing (WeChat, 2019) is available. The previous study by Zhang (2015) states that WeChat is a real name registration, and WeChat marketing is a new and unique e-commerce marketing mode, which is widely used in China. Using WeChat marketing can provide consumers with three-dimensional product promotion which business owners are able to directly communicate with consumers in current time, greatly improving the marketing effect (Zhang, 2015).

There are few studies found regarding any aspect of WeChat and Māori tourism. Some aspects of the WeChat affect the tourism industry have been identified. Firstly, the numbers of studies have suggested that WeChat could be a potential data collection channel for tourism research. For example, the study done by Skavronskaya, Moyle, Scott and Schaffer (2020) suggested WeChat could be an important social media platform for tourism experiences. This research contends that WeChat could be a useful channel to collect the memorable tourism experience. Ma, Hardy and Ooi (2020) studied the Chinese travelers in Tasmania and found that WeChat could be potential tools for qualitative data collection, as well as enhance the researcher's wellbeing. Secondly, the most related studies for this research are the role of WeChat in the Chinese example. The studied by Chiu, Lin and Silverman (2012) looked at Chinese customers decision-making journey and found that in general, Chinese customers have the same decision-making journey as their peers in other countries. However, their study did not involve WeChat and the study focus was not on tourist.

Guo, Zhang, Kang and Hu (2017) suggested that the Chinese online users' buying behaviors and purchase decision have been impacted by WeChat. The results showed a high level of willingness in search for information of

products, news of products, along with previous customer experiences through WeChat (Guo, Zhang, Kang, & Hu, 2017). Štetić, Šimičević and Milićević (2017) stated that WeChat played a crucial role in consumer behavior for different areas. Choo and Petrick (2014) researched the social interactions on various social media, suggested that Chinese tourist decision making has been well studied. For tourists' decision-making processes will be affected by the social value from the social media platform.

Li (2020) highlighted that although the contacts in WeChat are not all friends, most of them are friends and relatives. A survey of students by Ráthonyi (2013) showed that more than 80% of travel-related information is from relatives and friends. Jiang, Rao, Balaji and Xu (2020) point out that travel related posts on WeChat moments is an electronic word-of-mouth communication mode, studies the factors that affect the impact of electronic word-of-mouth communication on consumers' tourism decision-making. Results outlined that richness of electronic word-of-mouth communication content and ease of using platform have a positive impact on electronic word-of-mouth communication. Research on WeChat users is developing and noted as an important platform to advertise tourism.

Social Media and Tourism

From the perspective of tourism business operators, Domínguez-Navarro and Rosario (2019) state that people's lives are increasingly inseparable from social media, the impact of social media on tourism is growing. Social media marketing model helps to delve into the internal environment of potential consumers to generate useful data which benefits creating contextual information for businesses (Buhalis & Foerste, 2015). Social media provides many opportunities for the tourism industry, it influences consumer's decisions to the directions, a positive impact on the tourism industry (Rasul, Zaman & Hoque, 2020).

Rasul, Zaman and Hoque (2020) ascertain that in most nations in the Asia-Pacific region, development of the tourism industry is closely related to social media marketing. For example, a marketing concept named SoCoMo creates opportunities among consumer information through social and locations, greatly fills the gap between the individual consumer needs and service providers (Buhalis & Foerste, 2015). From the perspective of tourist, the previous study has shown that more than 80% of travelers use social media as a reference for travel plans (Torres, 2010). Social media is equivalent to the evaluation platform of consumer experience which provides opportunities for customers who do not know each other but have the same needs to talk, is also an experience of word of mouth communication (Öz, 2015).

Word of mouth is an effective marketing method for businesses, especially online word of mouth (Xue & Zhou, 2010). Ráthonyi (2013) stated the similar opinion the social media provides tourists with opportunities to express and share experiences and comments, provide reference for other tourists, and even change the original plan of tourists. Alghizzawi, Salloum and Habes (2018) have affirmed the positive role of social media in tourism marketing, and recommended that social media be used to provide tourists with sufficient information to guide purchase decisions. An overall understanding within the literature is the recognition of Tikanga Māori for overseas visitors is low (Fisher, 2008). WeChat users perhaps have little knowledge about Tikanga Māori in Aotearoa-New Zealand. This is the gap in the literature that this research seeks to address.

Methodology

This research used a quantitative approach and summoned positivism to the philosophical stance of the natural scientist and entails working with an observable social reality to produce law-like generalizations. It outlines unambiguous and accurate knowledge. The quantitative results that generated from data using questionnaire was analyzed through SPSS and Excel. This emphasizes the positivist focus on strictly scientific empiricist method designed to yield pure data and facts uninfluenced by human interpretation or bias (Saunders, Lewis & Thornhill, 2019). The deductive approach to theory development was used. Deductive reasoning occurs when the conclusion is derived logically from a set of theory-derived premises. The conclusion being true when all the premises are true (Ketokivi & Mantere, 2010). This means that data collected was be used to evaluate propositions and hypotheses related to an existing theory. This research used the descriptive method to collate data. Questions were posed directly linking to the three research questions. This means that this research project utilizes description and is likely to be a precursor to explanation (Saunders, Lewis & Thornhill, 2019).

Data Collection

This research used primary data to meet the purpose of the topic. The primary data was collected by online questionnaires that included 20 questions created by the researcher, translated into Mandarin and English, uploaded to the WeChat platform. Translating questions into other languages and associated instructions into another language requires care if the target questionnaire is to be decoded and answered by respondents. Usunier et al. (2017) articulates when translating the source questionnaire attention needs to be paid to the lexical meaning-the precise meaning of individual words used, idiomatic

meaning which is the meanings of a group of words that are natural to a native speaker and not deducible from those of the individual words.

Questions is a general term to include all methods of data collection in which each participant is asked to respond to the same set of questions in a predetermined order (De Vaus, 2014). The number of categories determines the accuracy of responses is dependent on the type of questionnaire (Fink, 2015). A criteria 5 rating scale was used to grade responses from 'strongly agree to strongly disagree. Rating questions are often used to collect opinion data and should not be confused with scales or scale items that measure concepts which are a coherent set of questions or scale items regarded as indicators of a construct or concept (Bruner, 2013). The detailed questions asked respondents for their thoughts about Tikanga Māori culture. Reasons on decisions were made, a range of factors were asked of participants to respond to explanations of decisions made. Travel related content in WeChat Moment was integrated into the questionnaire. The systematic sampling method was called upon for this research. The actual sample size was 200.

Validity and Reliability

In ensuring the validity and reliability of the research process, three phases were used. Firstly, the research allowed participants to answer the questions in Chinese (Mandarin). In doing so, participants could deliver their answers clearly without hesitation. The questions were written in Chinese (Mandarin) and also in English. Secondly, participants were encouraged to respond in Mandarin and all questions were clarified for meaning. Content validity is about the extent to which the measurement device-questions in the questionnaire, provides adequate coverage of the investigative questions (Saunders, Lewis & Thornhill, 2019). For this research, the decision to seek content validity was to delve into the carefully chosen words in English as well as Mandarin for the question content. Testing the reliability of the questionnaire was carried out by researcher. This was by referring back to the initial research questions to checkpoint the linkage of the 20 questions created. This is affirmed after data collection to re-test for internal consistency and comparing data collected with other data from a variety of sources (Mitchell, 1996; Saunders, Lewis & Thornhill, 2019).

Data Analysis

The aim of data analysis was to discover usable information from the collected data to meet the purpose of the topic. The collected data is quantitative, Excel spreadsheet to analyze quantitative data. Excel is an all-in-one tool, and it is

able to protect important data and files by encryption. SPSS was used to analyze using Pearson correlation analysis which displays tendencies of comparisons of respondent's answers to the questions posed and to show percentages pie graphs. Secondary data from previous research was used in support from literature. This displays how participants have responded to questionnaire specifically outlining the number of responses per question noted. A data matrix was used for clarification of responses linking to assigned questions.

When undertaking any form of research that involves human respondents, ethical matters are inevitably considered (Guillemin & Gillam, 2004). Negotiating access and gaining cognitive access to intended respondents will ultimately be determined by whether they decide to be involved in the research following a request to do so (Groves, Singer & Corning, 2000). Prior to data collection, the study complied with all requirements of the ICL Graduate Business School Ethics Committee (IGBSEC). Approval was gained by IGBSEC on the 27th November 2020.

Given that this research was conducted online through a social media platform from overseas respondents, all measures taken into consideration complied with ICL Graduate Business School Ethical Approval Committee's procedures (IGBSEAC) were administered. The researcher ensured that the participants' rights and privacy were protected by gaining informed consent, outlining the research is voluntary. The minimizing of harm to the respondents is prioritized on agreement. Participants were informed that with-drawl from the research at any time during research process and no reason for their actions was an option. Participants were given a participant information sheet (PIS) that outlined specific information about the research. Participants voluntarily signed the Consent Forms (CF) and understood the research intentions and their rights. Anonymity was assured.

Findings

The following information outlines the findings of this quantitative research. All figures -pie graphs and correlation tables are at end of this article. The results outline responses to the 20 questions of the questionnaire with linkage to the research questions posed.

(Figure 1) No mater why the percentage for the answer "Natural" is 17.79%, the chart shows there is over 60% of respondents stated that they have heard about Māori and Tikanga Māori in Aotearoa - New Zealand. Approximately 23% said they do not know anything about Māori and Tikanga Māori, including 13.46% for "Disagree", 9.62% for "Strong disagree". (Figure

2) The result shows that more than half of the answers ("Strongly agree"= 23.59%, "Agree"=30.77%) are interested in Tikanga Māori in Aotearoa New Zealand. Nearly 30% of people answered "Neutral" which means not disagree. The total number of people not interested in Tikanga Māori is 16.35%, including 6.73% of those who said strongly disagree.

(Figure 3) This displays the largest number of WeChat users who think the local history is one of the factors to consider when choosing a tourist destination includes 41.25% for "Agree" and 37.50% for "Strongly agree". Only less than 6% of answers chose "Disagree" (3.37%) and "Strongly disagree"(2.40%). (Figure 4) Only 3.36% of respondents did not consider the local food as part of decision-making for travel. Less than 1.5% of them strongly disagree with the local food factor. More than 80% ("Strongly agree"=47.6%, "Agree"=36.54) of people answered local food is one of the factors to consider when deciding a tourist destination.

(Figure 5) The result shows almost all the respondents think the local landscape is important when choosing a tourist destination, except 0.96% of them strongly disagree. (Figure 6) Approximately 65% of people consider the local featured sports when they are choosing a tourist destination, and the majority of them strongly agreed. There are only 8.65% answered as disagree (2.4% for "Strong disagree" and 6.25% for "Disagree"). (Figure 7) The percentage of people who gave a positive answer for Q7 is more than 74%, including 40.87% for "Strongly agree" and 33.65% for "Agree". Conversely, the total proportion of the negative answer is only 4.33% (Disagree) and 0.96% (Strongly disagree).

(Figure 8) Only 1 respondent (0.48%) is not a WeChat user. (Figure 9) Although most respondents are WeChat users, not all of them have a habit of browsing WeChat Moment. The result showed that there are about 1.9% ("Strongly disagree"=0.48%, "Disagree"=1.44%) of them do not browse WeChat Moment. The percentage of those who like browsing WeChat Moment is over 87%, including 57.69% of people who answered "Strongly agree".

(Figure 10) It shows over 90% of WeChat users do not deny that there are travel-related sharing contents in their WeChat Moment, including 46.15% of people who answered "Strongly agree", and 31.25% said "Agree". (Figure 11) This shows that less than 7% of respondents said they would not like to share travel-related content in their WeChat Moment. Conversely, there are more than 83% of them like to share travel-related content with their WeChat friends, including some people who answered "Strongly agree" which is 45.67%. (Figure 12) Similar to Q10 and Q11, over 90% of WeChat users including 42.31% for "Strongly disagree" do not deny that they have been

moved by travel-related contents shared in WeChat Moment.

Less than 5% of them insist that they have not been moved by travel-related content shared in WeChat Moment. (Figure 13) About 69% of respondents say that the travel-related contents in WeChat affect their travel decisions ("Strongly agree"=27.40%, "Agree"=40.87%). More than 20% of people answered "Natural", and around 8% chose negative answers including 1.44% for "Strongly disagree" and 6.73% for "Disagree".

(Figure 14) Only a small number of respondents do not want to see the travel-related contents in WeChat which is around 3% ("Strongly disagree"=0.48%, "Disagree"=2.88%). More than 75% of people state that they wished to see some travel-related contents in WeChat, especially about 30% "Strongly agree". (Figure 15) Over 80% of WeChat users think that image is more attractive as the promotional content, majority (42.79%) of them chose "Strongly agree". There was 2.4% ("Strongly disagree"=0.48%, "Disagree"=1.92%) of respondents do not agree with that the image is more attractive. (Figure 16) The chart shows that about 2.88% of respondents including 0.48% for "Strongly disagree" and 2.40% for "Disagree" do not think that the video is more attractive to them.

The largest number of people ("Strongly agree"=37.98%, "Agree"=39.90%) are showing that they think that conversely. (Figure 17) Approximately 48% of people like the promotion in text, but at the same time, the figure for those who think that the form of text is just "Natural" reaches more than 40%. Over 11% ("Strongly disagree"=3.37%, "Disagree"=8.17%) of respondents gave negative answers to Q17.

(Figure 18) More than 90% of people agreed that they have a good impression of Aotearoa New Zealand. The total percentage of those who do not think Aotearoa New Zealand is a good image for them is 5.29%. (Figure 19) In 208 of respondents, about 43% of them ("Strongly agree"=18.27%, "Agree"=25.48%) state that they had a plan of traveling to New Zealand before the COVID-19 pandemic. On the contrary, more than 23% ("Strongly disagree"=3.85%, "Disagree"=19.71%) of answers show that they have not planned to go to Aotearoa New Zealand. (Figure 20) The result shows that about 9% of the people said that they do not intend to go to New Zealand after COVID-19, but there is the bigger data shows that people would like to travel to New Zealand after the COVID-19 which is around 64% ("Strongly agree"=26.44%, "Agree"=37.98%). The proportion for "Natural" is 26.44% which means there is a possibility that they will go in the future.

Correlation

The study ran the Pearson Correlation Analysis between the Chinese tourist attitude towards Tikanga Māori and various variables relate to their travel interest, WeChat using habit and COVID-19 related travel intention. The correlation analysis includes three main parts, which are attitudes towards Tikanga Māori and travel interest, attitude towards Tikanga Māori and WeChat using habit and attitude towards Tikanga Māori and COVID-19 related travel intention. The correlation coefficient (R-value) and P-Value listed in the following tables.

Correlation analysis for travel interest and attitude towards to Tikanga Māori

The researcher used a range of factors for participants to consider when choosing a tourist destination to investigate their interest in tourism. This included the local history, the local food, the local landscape, the local featured sport and local culture. The results were used to analyze the possible correlation between tourists' interest in tourism and their attitudes towards Tikanga Māori. The answer to the research Question 3 (How should New Zealand tourism advertise Tikanga Māori to Chinese tourists?) was be found.

Figure 21. The table shows the correlation between participant's attitude towards to Tikanga Māori and the factors participants were interested in when they are choosing a tourist destination. Among the five factors for choosing the tourist destination, both history factors $r=0.470$, $p<0.001$ and local culture $r=0.477$, $p<0.001$ have a moderate positive relationship, and both factors are showing statistically significant at 99% level. The other three factors, local food, local landscape and featured sport have weak to moderate relationship, which are $r=0.295$, $p<0.001$, $r=0.298$, $p<0.001$ and $r=0.370$, $p<0.001$. They are all statistically significant at 99% level.

Correlation analysis for WeChat using habit and the attitude towards to Tikanga Māori

Through the analysis of the correlation between people who are interested in Tikanga Māori and people who want to see travel-related content on WeChat, the attempt was to find answers to the research Questions 2 (Do Chinese tourists' choices to visit New Zealand related to Tikanga Māori?) and Questions 3 (How should New Zealand tourism advertise Tikanga Māori to Chinese tourists?).

Figure 22: The table shows the correlation between participant's attitude towards to Tikanga Māori and their WeChat using habit. There are three main parts regarding the WeChat using habit, WeChat moment, tourism information and content format. For the WeChat moment using habit, the correlation result showed there is a weak to moderate relationship. The interested in Tikanga Māori in New Zealand and the habit of browsing WeChat Moment have correlation of $r=0.144$, $p<0.05$ which statistically significant at 95% level. The interested in Tikanga Māori in New Zealand and existing sharing travel contents in WeChat Moment have weak to moderate relationship, $r=0.289$, $p<0.001$. This was the same as the interested in Tikanga Māori in New Zealand and moved by travel related contents shared in WeChat Moment, which $r=0.271$, $p<0.001$. Both are statistically significant at 99% level. For the interested in Tikanga Māori in New Zealand and the willingness to share travel-related content in WeChat Moment showed a weak to moderate relationship, which $r=0.283$, $p<0.001$. This result is statistically significant at 99% level.

Regarding the interested in Tikanga Māori in New Zealand and the travel related content in WeChat affecting the travel decisions, the correlation analysis showed a positive, 99% level statistically significant result, which $r=0.306$, $p<0.001$. The relationship between two variables is positive but weak to moderate. Similarly, for the interested in Tikanga Māori in New Zealand and desiring to see the travel related contents in WeChat has a positive, weak to moderate relationship, $r=0.356$, $p<0.001$. For the three types of WeChat content format, the correlation results all showed a positive, weak to moderate relationship. For the form of image, form of video and form of text, the correlation results are $r=0.300$, $p<0.001$, $r=0.325$, $p<0.001$ and $r=0.353$, $p<0.001$, respectively. All the results are statistically significant at 99% level.

Correlation analysis for COVID-19 related travel intention

By analyzing the correlation between COVID-19 related travel intention and the attitude towards to Tikanga Māori, this strengthened the answers to Question 2 (Do Chinese tourists' choices to visit New Zealand related to Tikanga Māori?) and Questions 3 (How should New Zealand tourism advertise Tikanga Māori to Chinese tourists?). Regarding to COVID-19 related travel intention, the interested in Tikanga Māori in New Zealand and good impression of New Zealand is showing a positive moderate relationship $r=0.512$, $p<0.001$. The result is statistically significant at 99% level. Two variables, which the interested in Tikanga Māori in New Zealand and planned travel to New Zealand but affect by COVID-19 also is showing a positive moderate relationship $r=0.492$, $p<0.001$. The result is statistically significant

at 99% level. Lastly, for the after COVID-19 travel intentions to New Zealand, the interested in Tikanga Māori in New Zealand and intention travel to New Zealand also showed a positive moderate relationship. The results are statistically significant at 99% level.

Discussion

Since the Treaty of Waitangi, the Māori began to be involved in the tourism industry of Aotearoa-New Zealand has attracted many oversea tourists. Tikanga Māori is a significant part of Aotearoa-New Zealand tourism industry. The result of questionnaire provides an answer for the first research Question which is ‘What is the situation of Tikanga Māori in the New Zealand tourism industry?’ In reference to figure 1, shows that there is over 60% of respondents state that they have heard about Māori in Aotearoa-New Zealand. Figure 2 displays that more than half of the answers are interested in Tikanga Māori in Aotearoa-New Zealand. This outlines that popularity of Tikanga Māori in Aotearoa-New Zealand tourism industry occupies a very large proportion. This is consistent with the situation of Tikanga Māori in Aotearoa-New Zealand tourism industry from previous studies.

Previous research has affirmed that culture, history, local food, landscape, and sports are all positive factors affecting the development of the tourism industry (Testa, Galati, Schifani, Di Trapani & Migliore, 2019). This research has formulated a questionnaire survey on the above factors, the results show when choosing a tourist destination, only less than 6% of answers think the local history is not the factor to consider. 3.36% of respondents do not consider the local food; almost all the respondents think that the local landscape is important except 0.96% of them. Approximately 65% of people do consider the local featured sports with more than 74% of people care about the local culture such as artworks, performance, carving and tattoo. Tikanga Māori is the most important cultural feature of Aotearoa-New Zealand, such as Māori dance performance and Māori food, which is the most important part of New Zealand’s tourism industry (Gnoth & Zins, 2013).

Rugby is New Zealand’s iconic national sport, the *All Blacks* are well-known and attractive throughout the world, and the *All Blacks* represent the integration of rugby and Māori, Māori nationality and New Zealand Society (Calabrò, 2014). Therefore, it can be said that New Zealand has all the factors that travelers attach importance to. By analyzing the correlation between Q2 (I am interested in Māori culture in New Zealand) and other questions, it was found that there was a correlation between the Chinese tourist attitude towards to Tikanga Māori and travel interest.

Although local food, local landscape and featured sport have weak to moderate relationship, which are $r=0.295$, $p<0.001$, $r=0.298$, $p<0.001$ and $r=0.370$, $p<0.001$, both history factors ($r=0.470$, $p<0.001$) and local culture ($r=0.477$, $p<0.001$) have a moderate positive relationship. The opinions stated by previous studies are consistent with the results of this research questionnaire. Together with the results of the correlation analysis, I could give a positive answer to the research Q2 (Do Chinese tourists' choices to visit New Zealand related to Tikanga Māori?).

The literature shows that WeChat has a large number of users in China, and WeChat marketing is a new and unique e-commerce marketing mode, which is widely used in China. Users are allowed to post more specific, visualized and three-dimensional contents on WeChat. There are not many that have researched in this area about travel related posts on WeChat been done, and shows a positive impact of business marketing. The finding (Figure 8) shows the similar result as the literature, which is only 1 respondent (0.48%) among all the respondents is not a WeChat user, only less than 2% of them do not use WeChat Moment. It shows over 90% of WeChat users do not deny that there are travel-related sharing contents in their WeChat Moment, and less than 7% of respondents said they would not like to share travel-related content in their WeChat Moment.

Correlation analysis for WeChat using habit and the attitude towards to Tikanga Māori all showed a weak but positive relationship. WeChat could be the answer for research Q3 (How should New Zealand tourism advertise Tikanga Māori to Chinese tourists?). To be specific, for how to use WeChat for Tikanga Māori marketing, few designed questions for questionnaire survey in the form of WeChat sharing content was divided into image contents, video contents and text contents. The result show that over 80% of WeChat users agree with that image is attractive as the promotional content; a largest number of people (77.88%) like video contents; about 47% of respondents like text contents. It can be seen that the form of images and videos might be more effective for WeChat marketing.

The data illustrated a range of responses from Chinese WeChat users that related to their thoughts, attitudes, understandings about Tikanga Māori in Aotearoa-New Zealand tourism industry. In addition, the findings revealed that the impact this has on use of WeChat as an effective social media platform to share knowledge about Māori tourism in Aotearoa-New Zealand was highlighted. Using WeChat as a marketing vehicle for tourism is developing positively and more research is necessary to obtain a transparent understanding of current marketing trends available. Cultural tourism is developing well internationally but needs further consideration within

Aotearoa-New Zealand tourism context due to the COVID-19 context. Advertising and marketing of culture, people, places and things need further consideration as this is in a restricted state within Aotearoa New-Zealand. These aspects have been discussed.

The research contents are to contribute to the Tikanga Māori sharing and recovery of New Zealand tourism. The aim of the research was to find out the impact of Tikanga Māori on Aotearoa-New Zealand tourism, and identify promotional strategies of using Chinese Social Media WeChat to improve the Aotearoa-New Zealand tourism industry.

The three research questions were:

Question 1: What is the situation of Tikanga Māori in the New Zealand tourism industry? Question 2: Do Chinese tourists' choices to visit New Zealand relate to Tikanga Māori? Question 3: How should New Zealand tourism advertise Tikanga Māori to Chinese tourists?

To answer these three research questions, this research used a quantitative methodology and methods. A questionnaire was used to collect primary data by Chinese Social Media WeChat. There were 20 questions in the questionnaire for the targets which are 200 Chinese respondents living in China. The 20 questions which related to the three research questions involve three aspects including tourism interest, WeChat usage habits and COVID-19 related tourism intention. Then the research conducted a correlation analysis between those three aspects and the attitude of respondents towards to Tikanga Māori.

The research result has answered all the research questions. Firstly, for question one, the results displayed that Tikanga Māori is a significant part of Aotearoa-New Zealand tourism industry, over half of Chinese respondent state that they have heard and are interested in Tikanga Māori in Aotearoa-New Zealand. This is the situation of Tikanga Māori in Aotearoa-New Zealand currently and answers question one respectfully. Secondly, the literature shows that there are some factors influencing tourists' decision-making, such as the culture, history, local food, landscape and featured sports.

The research results assert that there is a moderate positive relationship between local culture, history factors and the Chinese tourist attitude towards to Tikanga Māori. Another focus is that there is a weak but positive moderate relationship between other factors and the Chinese tourist attitude towards to Tikanga Māori. Therefore, the research result provided a positive answer to the research question two. Finally, for research question three, the results show that WeChat is a suitable marketing method, and "WeChat Moment" is a widely used marketing platform. More specifically, "WeChat Moment" contents

shared with images and videos might be more effective for WeChat marketing.

The results are discussed accordingly as to what this shows about respondent's answers to the given 20 questions. The correlation analysis is discussed as to what this means for each answer noted by participants. All 20 questions were related to the main research questions. In order to unpack the main questions, the Chinese (Mandarin) language was used to communicate with research respondents and researcher transcribed scripts into English. It was important that aspects of Chinese (Mandarin) were used where possible with English translation. The use of translation provided the essence of what was being answered. In the researcher's view superfluous utterances have been removed from script. Each question has been discussed and elaborated. It is evident to contend that through findings correlation analysis for travel interest and the attitude towards Tikanga Māori is developing well for Chinese potential tourist. Correlation analysis for WeChat using habit and the attitude toward Tikanga Māori is developing as more users are educated via this social media site by others and marketing mechanisms. The use of WeChat Moment is increasing but still at a beginning level of use. This research has answered all three main questions.

Implications of Study

Through noting the data, it is evident that Tikanga Māori in Aotearoa-New Zealand seems to be known by tourists, in this case specifically the Chinese market. The effective social media mechanism of WeChat may be an effective method to also collect data pertaining to tourists who remain in Aotearoa-New Zealand during COVID-19 restrictions. This could be a tentative marketing target to pursue within Aotearoa-New Zealand to view if Chinese tourists in Aotearoa-New Zealand considerations for future travel nationally would result with the same understandings and choices made by the research respondents. For this research, the findings claim many aspects that are important for any tourism industry nationally and internationally to consider. WeChat usage is a power tool for communication at various levels and contexts. This study has shown that for the Chinese market, travel to Aotearoa-New Zealand is a purposeful direction to consider especially due to the uniqueness of Tikanga Māori.

Limitations and recommendations

There are some limitations in this research. Firstly, there are only 200 Chinese respondents contented to answer the research questionnaire. This is a minimum part of China's 1.4 billion population. Therefore, the sample size represented 0.05% of the total population. Secondly, the demographics are unknown. That is due to the randomness of the questionnaire platform. The gender, age, region and income with other demographics were not asked in the

questionnaire. This research did not seek to learn about demographics. Therefore, more detailed surveys may be carried out in the future, such as by region and age group, and combined with the classification data of Chinese tourists to Aotearoa-New Zealand in the past. Thirdly, this research focused on the promotion of Māori related tourism information by sharing content in WeChat Moment. This is only one kind of method of the WeChat marketing system. Future research may focus more on the functions and methods of WeChat marketing.

Another limitation is the target of the questionnaire are Chinese who are living in China, but there are many Chinese people living in Aotearoa-New Zealand. According to the 2018 census, Chinese counted the largest Asian ethnic group which has more than 230,000 population in Aotearoa-New Zealand (Stats NZ, 2019). Due to the COVID-19 pandemic, people are not able to travel overseas which allows a space to develop domestic tourism in Aotearoa-New Zealand currently. For the Aotearoa-New Zealand tourism industry, in this case, the domestic travel needs to be vigorously developed. Therefore, future research may concentrate on Chinese people who living in Aotearoa-New Zealand as the survey target to develop the domestic tourism.

The method of this questionnaire was creating 20 questions for respondents. Future research, could concentrate by changing the method of questionnaire appropriately, such as reducing the number of questions, then interview specific people using a mixed methods approach. Possible questions could be:

Where and why do you usually go for holidays?

Where and why do you plan to go if you have time?

What would you like to suggest for Māori related tourist attraction and business owners?

Finally, the research objective of this thesis was to use Chinese Social Media and Chinese tourist as respondents in order to reflect the public's attitude towards Social Media and tourism. The same method could be carried out in other countries in the future, such as Korean tourists and Korean public Social Media KakaoTalk.

Concluding Remarks -Poroporoake

As an emerging researcher, this study has signaled a personal commitment and conviction to the importance of Tikanga Māori in Aotearoa-New Zealand Tourism Industry. All potential tourists in China should be given opportunities to access quality Tikanga Māori Tourism in Aotearoa-New Zealand. This study provides a platform to continue to explore the ways in which tourists in

China as well as in other countries in the world, the effective and efficiency of using WeChat as a mechanism to make decisions of travel to Aotearoa-New Zealand shores to experience Tikanga Māori. As the first of its kind, this research aims to raise more awareness of Tikanga Māori in Aotearoa-New Zealand Tourism Industry. It brings to the fore, an important message regarding the role of WeChat and its influence on information sharing and decision-making aspects for Chinese users when considering travel focuses to visit Aotearoa-New Zealand. What is presented can inform potential tourist from different contexts globally who frequent the WeChat social media platform and guide policy derivatives in Aotearoa-New Zealand in the tourism industry.

This research has identified areas for improvement accepting that Tikanga Māori in Aotearoa-New Zealand is a taonga and necessary to celebrate through experiencing being in this space and time. Equally, establishing and maintaining relationships with potential tourist that communicate via WeChat as a vehicle to obtain and share knowledge about exploring and navigating options of travelling to Aotearoa-New Zealand. This ensures all stakeholders can learn and work together to enhance quality opportunities for tourism nationally and internationally.

This study karangas (calls) for all Chinese potential tourists to reconsider the ways in which they engage with Tikanga Māori in Aotearoa-New Zealand in order to optimize the benefits of visiting, experiencing the taongas that Aotearoa as a nation can provide in this COVID era respectfully. An opportunity to experience a Noho Marae reaffirmed for me the importance of Tikanga Māori and the importance of celebrating a taonga that needs to be shared. This is an essential part of understanding the complexities of the richness of tangata whenua lived experiences. This needs to be shared with others nationally and internationally especially within the tourism industry in Aotearoa-New Zealand.

No reira tena koutou, tena koutou, tena koutou katoa.

Ngā Mihi Nui.

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APPENDICES

Appendix 1: Glossary

Aotearoa	Long white cloud
hangarau	Technology
iwi	Tribe
kaiako	Teacher
kaupapa	Māori methods and methodologies
kawa	Protocol, the way of doing things in Māori
kapa haka	Action dance and song
karanga	The act of calling visitors onto a marae or sacred space
korero	Talk, discussion, conversation
Māori	Normal person
Marae	Meeting house, church, temple
mihi	Speak, speech
Noho Marae	To stay in Marae
Noreira	Feel well
Nga hae fa	The four winds

Pakeha
 Pepeha
 Poroporoake
 rangatiratanga
 tauira
 taonga
 tangi
 Tangata whenua

Te Poutama Tapoi Māori

Te Ao Māori
 Te Tiriti o Waitanga
 Te Reo Māori
 Te-Ika-a-Maui
 Te Wai Pounamu

Tikanga Māori

tika
 Whakapapa

Whanaungatanga

Whanau

non-Māori, white man
 Introduction in Māori language
 Farewell, evaluation
 Governance
 student
 Treasure
 Funeral, to cry, tears
 Person of the land, indigenous
 people
 The Poutama lattice of Māori
 tourism, cultural framework
 Māori world views
 The Treaty of Waitangi
 Māori language
 North Island-the fish of Maui
 South Island-the water of make of
 Pounamu which is Jade (the waka)
 The correct way of doing things in
 Māori, Māori culture
 Right, correct
 genealogical connectedness,
 kinship system
 Māori for kinship system or
 lineage information
 Family

Figures:

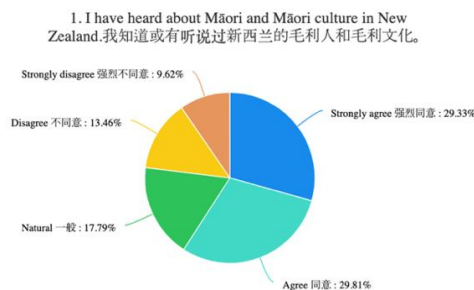


Figure 1. Findings outline Q1

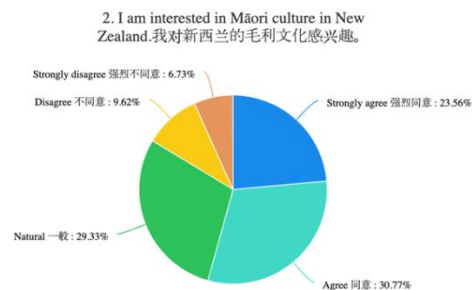


Figure 2. Findings outline Q2

3. When I am choosing a tourist destination, the local history is one of the factors to consider.当我选择旅游目的地时,当地的历史是考虑的因素之一。

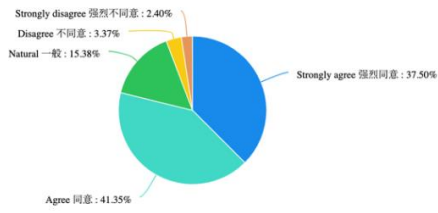


Figure 3.Findings outline Q3

4. When I am choosing a tourist destination, the local food is one of the factors to consider.当我选择旅游目的地时,当地的美食是考虑的因素之一。

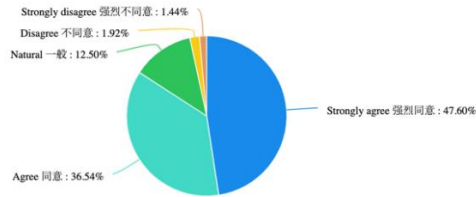


Figure 4.Findings outline Q4

5. When I am choosing a tourist destination, the local landscape is one of the factors to consider.当我选择旅游目的地时,当地的特色风景是考虑的因素之一。

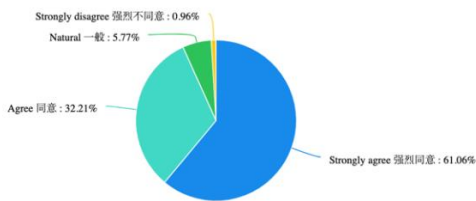


Figure 5.Findings outline Q5

6. When I am choosing a tourist destination, the local featured sports is one of the factors to consider.当我选择旅游目的地时,当地的特色运动项目是考虑的因素之一。

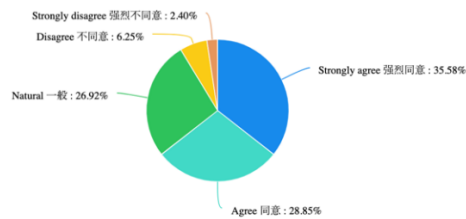


Figure 6.Findings outline Q6

7. When I am choosing a tourist destination, the local culture (eg: artworks, performance, carvings and tattoo, etc.) are some of the factors to consider.当我选择旅游目的地时,当地的特色文化(例如:艺术品、歌舞、图腾和纹身等)是考虑的因素之一。

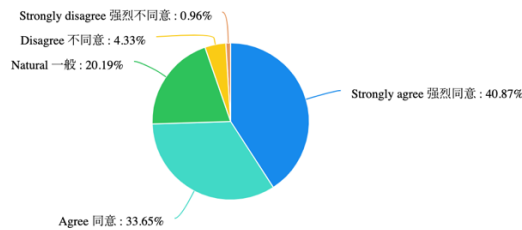


Figure 7.Findings outline Q7

8. I am a WeChat user.我是微信用户。

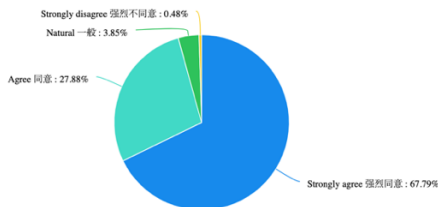


Figure 8.Findings outline Q8

9. I have a habit of browsing WeChat Moment.我有看微信朋友圈的习惯。

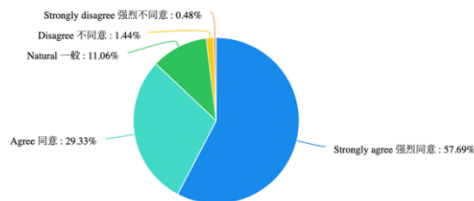


Figure 9.Findings outline Q9

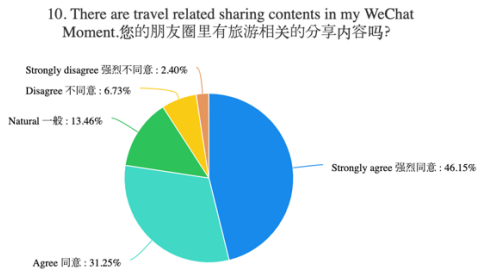


Figure 10. Findings outline Q10

12. I have been moved by travel related contents shared in WeChat Moment. 我曾经为微信朋友圈里分享的旅游相关内容心动过。

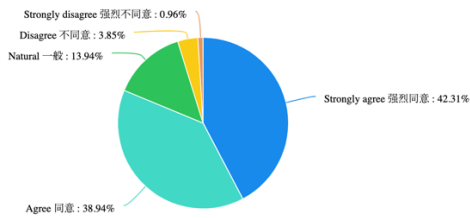


Figure 12. Findings outline Q12

14. I want to see the travel related contents in WeChat. 我希望在微信里看到旅游相关的内容。

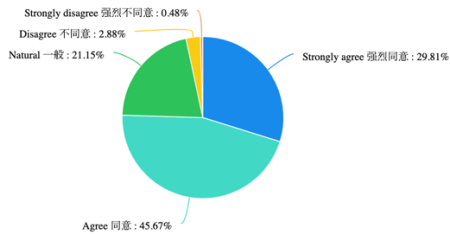


Figure 14. Findings outline Q14

16. In WeChat, the promotional content presented in the form of video are more attractive to me. 在微信里，以视频形式呈现的宣传内容更吸引我。

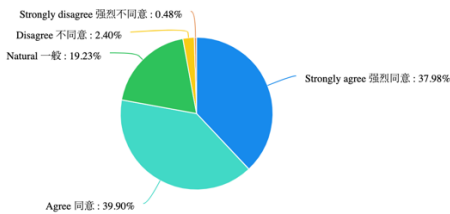


Figure 16. Findings outline Q16

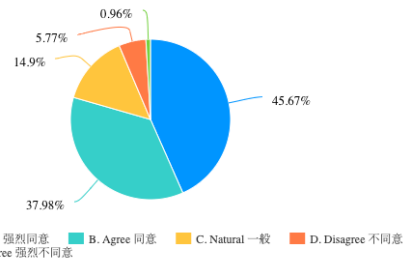


Figure 11. Findings outline Q11

13. The travel related contents in WeChat affect my travel decisions. 微信里旅游相关内容会影响我的旅行决定。

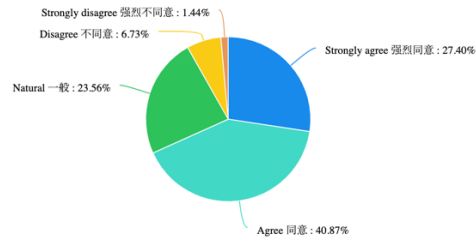


Figure 13. Findings outline Q13

15. In WeChat, the promotional content presented in the form of image are more attractive to me. 在微信里，以图片形式呈现的宣传内容更吸引我。

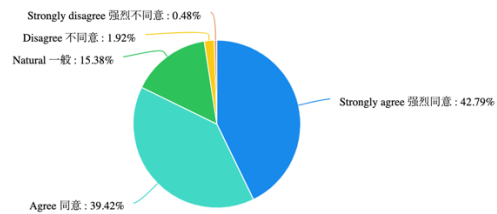


Figure 15. Findings outline Q15

17. In WeChat, the promotional content presented in the form of text are more attractive to me. 在微信里，以文字形式呈现的宣传内容更吸引我。

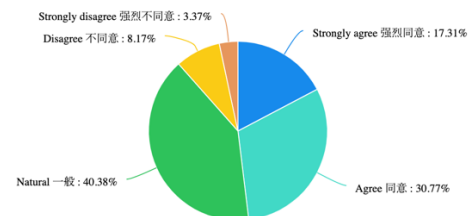


Figure 17. Findings outline Q17

18. I have a good impression of New Zealand.我对新西兰的印象很好。

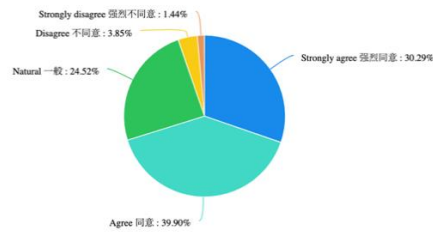


Figure 18.Findings outline Q18

19. I have planned to travel to New Zealand but unable to due to the COVID-19 pandemic.我曾经有过新西兰旅游的计划但因新冠疫情未能实现。

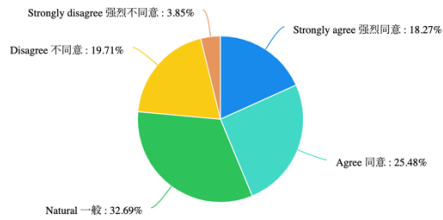


Figure 19.Findings outline Q19

20. I would like to travel to New Zealand after the COVID-19 pandemic.我愿意在新冠疫情结束之后去新西兰旅游。

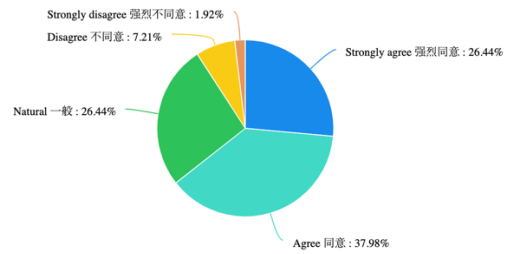


Figure 20.Findings outline Q20

Figures for Correlation

Pearson Correlation Sig. (2-tailed)

Figure 21

Questions	Attitude towards to Tikanga Māori	
Q3 History factor When I am choosing a tourist destination, the local history is one of the factors to consider.	0.470**	0.000
Q4 Local food When I am choosing a tourist destination, the local food is one of the factors to consider.	0.295**	0.000
Q5 Local landscape When I am choosing a tourist destination, the local landscape is one of the factors to consider.	0.298**	0.000
Q6 Featured sport When I am choosing a tourist destination, the local featured sport is one of the factors to consider.	0.370**	0.000
Q7 Local culture When I am choosing a tourist destination, the local culture (eg: artworks, performance, carvings and tattoo, etc.) are some of the factors to consider.	0.477**	0.000

Figure 21. Correlation analysis for travel interest and the attitude towards to Tikanga Māori

Figure 22

Pearson Correlation Sig. (2-tailed)

Questions	Attitude towards to Tikanga Māori	
Q9 WeChat Moment I have a habit of browsing WeChat Moment.	0.144**	0.038
Q10 Sharing Content There is travel-related sharing content in my WeChat Moment.	0.289**	0.000
Q11 I would like to share travel-related content in my WeChat Moment.	0.283**	0.000
Q12 Travel Motivation I have been moved by travel-related content shared in WeChat Moment.	0.271**	0.000
Q13 Travel Content The travel-related content in WeChat affects my travel decisions.	0.306**	0.000
Q14 Desire of Content I want to see the travel-related content in WeChat.	0.356**	0.000
Q15 Image Content In WeChat, the promotional content presented in the form of image is more attractive to me.	0.300**	0.000
Q16 Video Content In WeChat, the promotional content presented in the form of video is more attractive to me.	0.325**	0.000
Q17 Text Content In WeChat, the promotional content presented in the form of text is more attractive to me.	0.353**	0.000

* $p < 0.05$ ** $p < 0.01$

Figure 22. Correlation analysis for WeChat using habit and the attitude towards to Tikanga Māori

Figure 23. Pearson Correlation Sig. (2-tailed)

Questions	Attitude towards to Tikanga Māori	
Q18 Good impression I have a good impression of New Zealand.	0.512**	0.000
Q19 Planned travel to NZ I have planned to travel to New Zealand but unable to due to the COVID-19 pandemic.	0.492**	0.000
Q20 After COVID-19 travel I would like to travel to New Zealand after the pandemic.	0.495**	0.000

Figure 23.Correlation analysis for COVID-19 related travel intention

Figure 24: Sample Size Equation

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

$$\frac{200}{1000000000} = \frac{1}{5000000}$$

3 – The impact of big data on the online education industry in China

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Abstract

With the development of society and the progress of science and technology, people's demands for education and training are increasing. Online education has become one of the important ways for people to meet their demands for education and training. Online education is the product of the combination of education and the internet. Relying on the development of internet technology, especially the wide use of Big Data, the development of the online education industry is being promoted. This research topic is as follows: Explore the impact of Big Data on the online education industry in China, and look at the ways and effects it is having on the online education industry. In order to find out the practical use of Big Data in the field of online education, the researchers used the qualitative research method and interviewed six online education providers. The research revealed that Big Data can help manage and operate online education products and businesses with promotion, maintenance, and prediction, and has a positive impact on this industry as well as society.

1.1 Introduction

With the popularity of the internet and development of emerging technologies, more and more industries are shifting from offline to online operations, and online education is also undergoing reform and innovation (Ferguson, 2012). With the diversified development of online education, the competition between traditional education enterprises and online education companies is increasingly fierce. It is therefore worth studying how to make rational use of emerging technologies to obtain the greatest advantages. In recent years, educational Big Data, learning analysis and educational data-mining have become hot topics in the online education industry. With the rapid development of communication technology and internet technology, the amount of data information possessed by human beings has reached an unprecedented level. The data obtained by people through various channels can not only be widely applied in all walks of life, but can also be cross-used between different industries to optimise its value.

In modern society, the concept of lifelong learning is becoming more and more popular. From birth through to old age, different educational methods have been generated (Anshari et al., 2016). Now we are in an era of lifelong learning, and more and more educational institutions are beginning to provide targeted products to meet people's different learning purposes. At the same time, with the development and popularity of the internet, many offline traditional institutions began to transform to an online education model. The combination of the internet and the education industry has accelerated the development of the online education industry (Dishon, 2017; Palvia et al., 2018).

The growth of the online education industry has broken down time and space barriers to enable people to learn and has provided more job opportunities. In order to better understand the online education industry, employees need to master the industry dynamics, and also understand the current situation and development trend of the industry. In addition, the rise and importance of Big Data also makes the combination of the two inevitable. The use of Big Data can accurately analyse users' behaviours and habits, provide data guidance for decision making and judgment, and make operations more targeted according to data analysis results (Gudivada et al., 2015). As a result, the impact of Big Data on online education is a valuable study.

1.2 Background

Big Data is changing people's lives and the way they understand the world (Mayer-Schönberger & Cukier, 2014). In recent years, more and more online education and a massive number of open online courses have emerged, which has also made Big Data in the field of education more widely used. Big Data will bring an education revolution in students' learning, teachers' teaching, education policy-making, and other aspects (Chen et al., 2020). At the same time, Big Data brings new ideas and perspectives to the innovation of educational theory and application. In education, especially school education, online teaching becomes the most significant indicator of improvement (Zhou et al., 2020). Usually, this data refers to test scores, however, it can also include attendance rates, the graduation rate, and other information. For specific classroom teaching, data is able to illustrate the teaching effect, such as the correct rate of homework, performance rate, the number of questions answered, the length of the course duration, the frequency of interaction with the teacher, and so on (Picciano, 2012). This specific data becomes Big Data after special collection, classification, sorting, statistics and analysis. Big Data technology allows schools, universities and online education platforms to analyse everything from students' learning behaviour to test scores and career plans. Much of that data has been stored for statistics and analysis by government agencies, such as national education statistics centres.

Big Data makes it possible to share excellent education resources globally, and its development is also the technical basis for the global distribution of education resources. It also promotes the development of global educational equity and personalised education. Control over the learning process becomes more scientific and objective. Through students in different stages of the learning process, targeted analysis and control achieves the purpose of improving the quality of teaching. In this information explosion of the internet era, educational information has been vigorously developed, and has accumulated a large number of systematic education-related data resources, such as all kinds of network courses, and high-quality video courses. Thus, the research question of this study is derived: How does Big Data help online education providers' businesses?

1.3 The use of Big Data on online education

In the education industry, the use of Big Data is mainly reflected in three aspects:

1.3.1 Personalized education

Big Data has become an important driving force for teaching reform. The personalised education of students is also of great significance. Not only can teachers carry out targeted teaching for students, but also schools can implement personalised management. Through Big Data analysis of students' learning status and the learning effect, teachers can create a personalised teaching environment for students, so as to ensure that students can fully improve their strengths and reduce their shortcomings (Zeide, 2017).

Traditional education relies heavily on teachers, and the workload of those teachers is also large. However, in the era of Big Data, the use and development of multimedia, marking systems, attendance systems and other advanced technologies make teaching more flexible (Anshari et al., 2016). Teachers can not only use a variety of auxiliary teaching equipment to innovate teaching methods, but also can apply a variety of intelligent systems to reduce the workload, so as to be more focused on teaching.

Teaching students in accordance with their aptitudes has always been the aim of education, which is more obvious in the era of Big Data. There are obvious differences in each student's learning and cognitive styles (Dishon, 2017). In the learning process, these differences will affect the physical and mental development of students to some extent. Therefore, it is more important to pay attention to the changes in students, and to respect their personal dignity and individual differences in education. Personalised education analyses and processes the learning data of students, customises the best teaching plan according to the differences of individual data of students, implements personalised education, and cultivates the ability to comprehensively develop them (Shi & Xie, 2020).

1.3.2 Revolution in education

Big Data is a huge impetus for current educational reform (Sin & Muthu, 2015). The application of Big Data technology in online education can promote the comprehensive understanding and interaction among students, teachers and administrators, which is a breakthrough in online education (Luna et al., 2019). For students, Big Data records the learning process of students, makes their learning more visual, promotes students' self-evaluation, and promotes exploration and internalisation of knowledge (Reidenber & Schaub, 2018). For teachers, Big Data provides direction for their teaching, optimises the teaching process and improves the teaching effect. For managers, Big Data improves the management ability of online education's interactive platform. Through Big Data analysis, students' learning dynamics

can be timely, mastered to provide targeted management and education for students.

With the advent of Big Data, massive online learning resources provide students with rich learning resources and extensive learning opportunities, making the students' learning process more transparent and visual (Johnson et al., 2017). The application level of Big Data in online education is increasing. At present, the key to the application of Big Data in online education is the change in people's concept of it. It is necessary to use the data as a base without getting lost in it, to ensure the authenticity and rationality of the data, to unify the data standard, and apply it flexibly according to the actual situation, so as to adapt to the continuous development and change of education (Dubey & Gunasekaran, 2015).

1.3.3 Accurate evaluation and teaching

With the use of Big Data technology, teachers can easily obtain effective data on students' learning from massive amounts of data, without being fooled by the large quantity of data. In the process of learning, the system will automatically record the learning data of students, and the teacher will accurately intervene and adjust the students' learning according to the teaching materials and the actual situation of students. This is done according to the students' knowledge and skills, until the expected results are produced (Morabito, 2015). Precision teaching mainly consists of three stages, namely: accurate data mining, accurate positioning of students, and accurate prediction. Precision mining mainly uses Big Data mining technology to collect and analyse specific data (Peng, 2017). Accurate positioning is used to determine the learning bottlenecks of students according to their data. Data prediction is used to customise more targeted teaching guides for students according to the results of data analysis, to avoid the risk of students' learning failure and to improve their learning level (Weber, 2016).

1.4 The development and current situation of online education in China

Due to different national conditions, online education in China came into being relatively late, but it has developed rapidly. In recent years, the online education industry has been developing rapidly in China, and Big Data has been supported by the government. China's online education industry began to develop slowly at the end of the 20th century, and experienced three stages: distance education, the shift of education institutions from offline to online, and the massive expansion of online education by internet companies. Since the advent of web-based courses in 2000, the Ministry of Education in China approved 68 pilot schools for distance learning. The year 2013 has been

referred to as the first year of online education in China and, since then, many companies have launched new online education products, and some educational institutions have gone from offline to online. Many internet companies that did not previously focus on education have started to operate online education businesses. Since then, online education has grown rapidly in China.

Due to the uneven distribution of education resources in China, high-quality educational resources are often concentrated in big cities, so there is a great demand for high-quality educational resources in small cities (Zhou, 2018). The rise of online education meets these educational needs. Therefore, when online education has been developed in China, it has received a lot of attention. Since 2012, the market size of the Chinese online education industry and the growth rate of the number of users have achieved over 20%. In 2019, the number of users of Chinese online education is about to exceed 100 million, which shows its rapid development (Shen, 2019). Although the online education market is in a positive state in terms of speed of development, potential and capital, there are still some problems, such as low completion rate of courses, difficulty of guaranteeing course quality, and the lack of an effective course certification system.

1.5 Negative use of Big Data on online education

In 2012, Bulletin Board System (BBS) on the world economy mentioned many new opportunities and possibilities brought by Big Data in the fields of the economy, education, the environment, and others. Some people think that there are still some serious problems with Big Data, such as that the current equipment and technology are relatively backward, and only with the improvement of these infrastructures can Big Data continue to develop (Jagadish et al., 2014). Big Data also poses a threat to users' privacy, because it can continuously monitor people's online activities (Kuner et al., 2012). Some substandard institutions may use data fraudulently, which will also damage the results of data analysis (Kaisler et al., 2013). These existing problems may bring some negative effects to the combination of Big Data and online education.

2. Methodology

The purpose of this research is to explore Big Data's influence on China's online education industry. To achieve this, qualitative methodology was employed to investigate six managers from the Chinese online education industry, analysing and summarising their and their firms' experience, and their views on the questions, to achieve the purpose of the research.

2.1 Method

An in-depth interview technique was used to collect data. There were six participants in this interview, from three different companies respectively, and they hold the positions of managers of operations, technology and marketing departments in the companies. Since the basis of this research is China's online education industry, participants are all online education practitioners from China, so the interview process is conducted in Chinese. Due to the limitations of distance, the researchers could not communicate with participants face-to-face, so WeChat is used (which is the most popular social application used in China) to talk to participants. WeChat includes video and audio functions, and the researcher recorded the interview through the built-in recording function of iPhone.

2.2 Interview questions

The interview questions were about the participants' own company, business or project and about the entire online education industry.

Interview Questions

<u>Question Types</u>	<u>Interview Questions</u>
Business question	<ol style="list-style-type: none">1. Why did you decide to use Big Data technology?2. What are the data sources?3. What tools do you use to analyse Big Data?4. How does Big Data help your business improve?5. Is there any significant change in business after using Big Data?

	6. Do you think these changes are positive or negative for your business? Why?
	7. Are there potential risks in using Big Data? If yes, please give an example.
Overall industry question	1. Do you think using Big Data is necessary in the online education industry?
	2. What are the most important parts of online education industry (such as user experience, course quality)?
	3. How can Big Data help improve the important parts?

2.3 Sampling criteria

The target population is a group of department leaders who work for an online education product company and have worked on, or are currently working on, a Big Data project. In this way, the researcher can better analyse the impact of Big Data on online education from the perspectives of different departments. The three Chinese online education companies were selected. The first company is called Fun Dubbing; participant A and participant E are from this company. Their online education product aims to help students improve their spoken English through English movies and animation dubbing. The company uses Big Data technology to analyse user preferences, provide users with more interesting content and improve the overall data of the product. Participants B and D are from the second company, Ape Question Bank; their product is to provide training for the exams of China's civil servants and the exams of state-owned enterprises. Big Data technology is also used to analyse users' daily scores and improve the company's products. Xue Ba Jun is the third company; its product provides students with the content of high school entrance examinations, college entrance examinations and other level exams. Through Big Data analysis, the company collects data of students who have performed well, analyses problem-solving ideas and shares them with other students.

Participants C and E are from this company.

The research sampling consisted of employees from different departments of the three companies. The researcher selected a non-random, purposeful sample from the research population. Although this type of sample was selected based on the subjective opinions of the researcher, it is considered the more representative of the participants. But Hibberts et al., 2012 argue that this approach can be interpreted as network sampling, in which researchers focus on their own purposes and select eligible participants in their network. These can be colleagues, friends, recommendations from friends, or anyone who can connect with the researchers. Using this method, the researcher can find similar people in the sample, and select participants more in line with the ongoing research project, which is an effective and reliable method. All participants in the research met the criteria set and answered one or more of the following questions in the affirmative:

- Are they working in the online education industry now?
- Did they ever work in the online education industry?
- Are they currently participating in Big Data projects?
- Have they ever participated in a Big Data project?
- Do they have a basic understanding of Big Data technology?
- Are they deeply involved in online education?
- Do they know the users of online education?
- Do they have their own views and opinions on the implementation of Big Data technology?

The research was based on a sample of six participants selected from the research population. First, these participants were in the online education industry. Second, these participants had experience with Big Data projects.

2.4 Ethics

Prior to the interview, the participant information sheet (PIS), the participant consent form (PCF), and the organisation consent form (OCF) were sent to the participants and their company leaders via email, and had it explained to them. Firstly, the participants and their company leaders were informed about the aims of the study. The researcher did not ask many questions about some data and situations involving trade secrets. Secondly, the researcher fully explained

to participants that if they did not want to answer a certain question, they could refuse to answer, and the questions answered by participants would appear as data in this research. To protect the participants' privacy, the researcher did not disclose the participants or the companies involved. Finally, participants were told that the interview would be recorded and stored for a year. The interview would not begin until participants and their company leaders had fully understood the interview and had agreed to accept the interview invitation, and had signed the PIC, PCF and OCF.

After the interview, the video or audio interview material was converted into a document format for easy re-reading, recording and analysis. In order to ensure the academic rigour of the research, another student from China was invited to translate the Chinese documents into English to avoid personal bias.

2.5 Data analysis

This research used the thematic coding analysis which is a qualitative data analysis method. This method can classify the interview document through different themes, and establish different thought frames according to different themes (Gibbs, 2007).

3. Findings

3.1 Interview findings

In the first part of the interview, some questions about the use of Big Data by participants' companies were asked. This allowed them to start the interview with what they were most familiar with, talking about their work and what they think.

In the second part of the interview, the researcher and participants discussed their views about the online education industry and Big Data and carried out a more in-depth and detailed discussion on this topic. For confidentiality, participants' names are replaced by participant A, B, C, D, E and F.

3.2 The reasons for using Big Data

As an emerging technology, Big Data can be used to predict and plan the development needs and directions of enterprises. Every company has different reasons for using Big Data. When this question was asked, participant A proposed,

The competitive advantage of Big Data among competitors, and the amount and accuracy of data owned by the company can be taken as the core competitiveness.

Participant B suggested,

The talent selection has been more effective with the use of Big Data and the company can make decisions based on the data available.

Participant C believed,

The use of Big Data can also open up new business models. If the data is rich and accurate enough, it can be transformed from a content provider to an advertiser and become a third-party data source.

Participant D's company used to be a traditional offline education company. They switched their business model to online education last year. Therefore, participant D thought,

Our company lacks Internet thinking (decide things based on data) and prefers empirical methodology (decide things based on teachers' experience). Big Data can make up for our weakness and conduct operations based on data.

Participant E said,

The ultimate purpose of using big data analysis is to improve the final score of students, because we all promised students a certain score before entering the school. If we fail to meet the promise, there may be some economic losses, such as refund of fees. Reducing refund fees is our ultimate goal. Big data analysis can help us reduce these losses and thus improve corporate profits.

Participant F thought,

We use big data technology. Besides obeying the trend of the times, as the head of the company, I also hope that big data technology can help us reduce costs, adjust products according to the data and predict the future direction.

Beside these ideas, all interviewees put forward the idea that using Big Data analysis can optimise products, improve students' grades, improve users' experience and customer satisfaction. Four of the six participants said that Big Data is the trend of social progress and is now the foundation of the whole internet industry. The use of Big Data can more accurately target user groups, accurately release information, reduce user costs, and ultimately achieve the purpose of improving the company's profits.

3.3 Data sources

In the internet era, all online content can become a data source. The researcher asked interviewees about data sources used by their companies. All companies used data sources purchased from third-parties. For example, interviewee A said,

According to the characteristics of our product, we buy the corresponding data from the third-party companies. For example, Tencent has the most social data, while Alibaba has the most transaction data.

These sources come from internet giants or specialised data agencies, which have different kinds of data sources depending on the type of product they have.

Other companies can come up with their own data requirements based on the type of product and buy from these big companies. All participants' companies also collected data from their own products, including regular data (number of users, retention, daily online marketplaces, etc.) and user data (student grades, personal information, etc.). Half of the participants' companies had a shared database, either with their peers or with their special partners. Only participant B's company regularly sends users online questionnaires to get feedback. He said,

We will regularly send users online questionnaire, ask their opinion about our products. To be honest, people don't want to waste their time on giving feedback, but it is effective, we can intuitively understand the user's experience.

Companies obtain different data sources according to different requirements. For example, if the company has promotion needs, it needs to get third-party data; for product optimisation it needs to get internal product data.

3.4 Data analysis tools

Besides data storage and screening, the most important technology of Big Data is analysis. At present, there are many Big Data analysis tools that can be directly used in the market. Some of the tools are open-source processing frameworks that can write different data analysis formulas according to their own data requirements. Some can directly import the data and generate a visual report. So, how will these companies choose their own tools? Four of the six interviewees said that they would use mature data analysis tools but, for security reasons, they also had certain requirements.

In the case of data confidentiality, data analysis can be selected according to

their proficiency in software and their personal preference. Half of the participants' companies use independently developed tools as reflected in participant F's point of view,

Although the cost is relatively high, I think that our own servers and data analysis tools can guarantee the security of data on hardware devices considering the loss cost by data breach in the future.

3.5 The use of Big Data

Big Data plays different roles in different educational areas. First, all participants believe that the use of Big Data has brought about an education revolution for their companies. In this way, the traditional cramming style of teaching is abandoned. Keeping in view the analysis of students' advantages and disadvantages, more targeted training is given to students, which provides a more efficient way of learning (Jang, 2009). The traditional teaching method is to give all students the same knowledge; the teacher cannot possibly know all the students, but now, the data can. As student performance improves, so does parent satisfaction, and some parents will promote the school by word-of-mouth, which is very important to the company. Five of the six participants used Big Data to promote their products accurately. By analysing the data sources, they selected the users with the highest conversion rate and promoted the products to these users, which improved the conversion rate and reduced the cost of acquiring users. Four interviewees modified the product and improved the data of the product according to the results given by Big Data, so that it can maintain a high level. Half the participants shared their teachers' data to help them identify their problems and improve. At the same time, they use Big Data to predict the scope and topics of the exam, and provide more effective simulation of the exam questions, so as to improve students' test scores. In addition, one third of participants use Big Data to predict the development direction of the whole industry, the destination of landing projects and so on. Participant A's company products operate on multiple platforms, and they also use Big Data analysis to find out their usage and popularity. He said,

Our products in different platform, to provide users with a variety of choices. We can't wait for all platforms are ready unified update, it will waste of time. So, we use Big Data, select the most popular platform to update step by step.

This allows users to always receive the latest version, which saves time. Saving time ultimately means saving money.

3.6 Views on online education

The companies interviewed for this research are running different kinds of educational content. All participants agreed that online education, as a category in the internet industry, must experience Big Data, which is inevitable. When it is asked what the core competency of online education is, they offered a different view. One third of participants agreed that the courses are the same and the user experience is the most important thing for online education. In the discussion about online education, each participant gave his or her own unique interesting views and opinions. Two participants believed that traditional teaching methods would eventually be eliminated and must be changed. Participant A pointed out that,

The problems of LBS (Location Based Service) and housing price made it impossible for offline courses to be maintained and could only be transferred to online, which was one of the reasons for the forced transfer of traditional education to online.

Participant B questioned the traditional educational experience. She believed,

Sometimes, the analysis and judgement made by teachers based on experience may not be correct. Big Data can give us more scientific and objective conclusions. What science tells us is that the universal human knowledge, what we see or hear, sometimes is wrong.

Participant C put forward a very interesting point,

Traditional education is a motherly teaching style, teachers teach students what they want to learn. And online education should be fatherly education, through data analysis, teaches according to students' shortcomings of guidance and teaching. The education industry should do both "addition" and "subtraction". "Addition" is to continuously increase its content and provide students with choices, while subtraction is to reduce its excessive service and provide students with the most useful content.

In addition, participant E offered a new perspective on the teacher level. He said,

The quality of teachers and courses that are taught in elite small classes on Internet should be doubted. Because teachers faced fewer students, encountered fewer problems. The more students a teacher teaches, the better he or she will be.

Even if the course is of average quality, users are willing to pay as long as the

experience is enjoyable. But others disagreed. They believed that the course quality and teacher level are the most important, which is the core competitiveness between enterprises. Because the teacher's time is limited, these resources cannot be duplicated or regenerated. In addition, teacher level determines student performance, and then determines user retention, satisfaction and income.

3.7 Views on Big Data

Big Data is the most mainstream tool at the present stage. The whole internet industry is in the throes of digitisation. The Big Data era is disruptive to all industries. This is a view shared by all participants. They offered different views on the risks of Big Data. Five of the six participants agreed that data security was the main risk of using Big Data, and the consequences of a data breach could be very serious. This may affect the competitive advantage of the product. If the payment information of users is stolen, users may also sustain a financial loss. Therefore, companies that use Big Data need to pay attention to their own data security to prevent a data breach (Wang, 2016). Two participants believe that there is a certain risk of data fraud, but the risk is low. First, China has regulations on the quality of data, and not every company can fake it at will. In addition, the general behaviour of data fraud occurs in the performance department, in order to achieve performance indicators to falsify, which can be avoided from the organisational structure. Participant A offers a new perspective, saying,

One of the risks of using Big Data is that many enterprises will rely too much on data. Big Data is just a tool and module for companies, which cannot be over-mythologized and over-relied on. If only having numbers is meaningless, learn to use them.

This view is also indirectly supported by the views put forward by participants D and F, who believe that the use of Big Data is a gradual process, many things becoming better and better through slow adjustment and change. Using Big Data will not bring about change overnight.

3.8 Big Data supporting online education providers' businesses.

Through interviews with participants, it is found that Big Data can help online education companies in many ways, not limited to product update, optimisation and maintenance. Then, according to the interview, the findings of the study divided the help of Big Data to online education into three different stages: the promotion stage, the maintenance stage, and the prediction stage.

3.8.1 Promotion stage

Companies need to promote the product at this stage, improve the exposure of the product, let more users know about the product and develop an interest in it. The ultimate goal is to get users to pay for the product, so the company receives revenue.

The traditional advertising promotion method is to cooperate with the advertising platform. For the traditional advertising platform, participant C said,

The platform displays the advertisements on other channels and settle the accounts with the platform according to CPM (Cost per Mille) or CPC (Cost per Click). To increase the click-through rate, the platform has launched a new activity. Users can get some game coins or coupons as long as they click on the advertisement.

As a result, users click on it for other purposes rather than interest, and they have low value and low conversion rates. But since there are no other marketing channels, many companies received a limited effect from this type of promotion.

Big Data can well solve this problem, and also change the status quo of the advertising platform monopoly of the promotion industry. First of all, enterprises can analyse the demand for data sources according to the characteristics of their products, such as the age group of users, education background, whether they have records of purchasing similar products and so on. Based on these requirements, the company can purchase the corresponding data from the third-party data provider. Participant E said,

In this way, enterprises can promote their products to these potential users in a more targeted way. The selected users will have a higher conversion rate, and if they have purchased similar products, they will have a higher willingness to pay, which can ultimately achieve the purpose of reducing the cost of acquiring users and increasing revenue.

In addition, the current advertising platform is also using Big Data. They will match the advertiser with the user data of the channel. A high degree of matching means a high degree of coincidence of users, and the effect of playing advertising in this channel will be better.

Therefore, Big Data not only solves the problem that the advertising platform monopolises the promotion industry, but it also provides two different paths for the company to achieve the promotion purpose and forces the advertising platform to improve its service quality.

3.8.2 Maintenance stage

In this stage, enterprises carry out the maintenance of the product, including updates, optimisation and so on. Big Data can also provide the most help at this stage.

- Optimise products:

Enterprises can set statistics on every button or page, including the click-through rate, page views and so on. Participant A said,

Collect and analyse these data and remove the pages with high skipping rate. Continuously improve and optimize the product can improve the users' online time and retention.

- Help students improve their grades:

Enterprises can analyse the advantages and disadvantages of each student according to their personal data, including attendance rates, accuracy of homework, content of browsing and other data. This can provide students with more effective courses and content based on their weaknesses. Participant A said,

According to the barrel principle, how much water a bucket can hold depends on the shortest piece of wood in the bucket. A student's grade is determined by his worst subject.

To help students improve their weak points, by identifying and building on his or her strengths, is the best way to improve student performance. At the same time, enterprises can match the combination with the highest degree of tacit understanding according to the data of students and teachers. When the teacher's style is in line with the students' preferences, the students will be more interested in attending classes and can be more focused on improving their learning efficiency.

- Help teachers improve:

Enterprises can rank teachers according to their data in the database. Finding out what each teacher is good at depends on their feedback and the students' learning results. Participant C said,

Teacher level can be ranked according to various data to motivate teachers to improve themselves.

These teachers can spread their experience down to other teachers and improve the faculty and the teaching community around the globe. The

weaknesses can also be analysed, so as to help teachers identify their own problems and improve themselves.

- Personalised content customisation:

Customisation is also an important characteristic of Big Data. It can help enterprises to customise their own display pages according to each user's preferences. Different content can be displayed on the same page according to the user's browsing behaviour and consumption habits. Users can see their favourite content and courses on the interface. This can help businesses improve their users' online time, retention, and payment rates. Participant D pointed out that,

According to data analysis result, we provide users with the most accurate content, they can see the information which they are interested in information in the first time. It can improve the user viscosity and retention.

The maintenance stage is a long-term process for enterprises, and the data is changing every day. The enterprises always need to pay close attention to the data situation, correct any abnormal situation immediately, and keep the product in good condition all the time so as to meet budget targets.

3.8.3 Prediction stage

In the prediction stage, Big Data plays a guiding role for enterprises, because it is able to:

- Predict the scope of exams according to the characteristics of the product.

Some education institutions that provide supplementary training for examinations can find the patterns according to the annual examination questions. For example, participant C said,

The math exam in the college entrance examination have difficulty changes every four years, and the number and range of geometric and algebraic advances can be used as data sources for data analysis.

By analysing the data over the years, enterprises can get the exam range closer to the real exam and provide more accurate simulated exam questions. For educational institutions that focus on exams, accurate predictions can help students more. Students have improved their test scores, parents have improved their satisfaction, and many new students will come.

- Predict the development of the industry:

China's online education industry releases a trend report every year. The data analysis of the past few years has predicted the future direction of the industry. That includes which region has the most users, which region has the most payers, which product category has the most users and so on. Participant D said,

By comparing the number and variation of these data types, enterprises can predict the distribution and preferences of the core users. Enterprises' new projects and landing projects should refer to these rules to avoid launching unpopular projects and reduce losses.

Prediction is one of the characteristics of Big Data. It can not only provide guidance for enterprises, but also provide direction for enterprises to make decisions.

4. Conclusion

To sum up, online education is a new education model based on the internet's technology and platform. This mode of educational innovation not only breaks the limitation of a fixed teaching time and place, but also fundamentally changes the educational concept and perspective (Zhou, 2018). In the process of using online education products, users browse, learn, query and conduct other operations to generate data. After collecting and sorting this data, we can understand the learning characteristics of users, master the learning rules of users, find the problems of users, provide timely reference suggestions, and provide better learning planning for users (Anshari et al., 2016). Big Data can also help online education companies with predictions, not only about exams, but also about the direction of the industry, which can also guide online education companies. It can also help online education companies to improve data and reduce costs in product promotion and user recruitment. Although there are still risks of data fraud and data security in Big Data technology, risks can be reduced by optimising the procurement of data, self-owned servers, and self-developed data analysis software. The positive impact of Big Data on online education is irreplaceable.

The use and development of advanced technologies such as multimedia, marking systems and attendance systems, help make teaching more flexible (Anshari et al., 2016). The study shows that the companies of participants are using Big Data technology to conduct personalised teaching, by monitoring students' network activities, analysing students' data, and customising individual learning plans according to students' needs. It has caused an educational revolution. Big Data is a huge driving force for the current education reform. For students, Big Data records the students' learning process, makes students' learning become more visual, promotes students'

self-evaluation, and promotes students' exploration and internalisation of knowledge (Reidenber & Schaub, 2018). The emergence of Big Data technology has shifted the thinking of education from teaching based on teachers' experience to teaching based on data analysis results. The use of data results provides direction for teachers, optimises the teaching process, and improves teaching results. Big Data has enabled accurate evaluation and teaching.

Big Data in the online education industry in China has brought a revolution in the education industry with personalised education and accurate teaching. The researcher's interviews with online education staff confirmed these views. First, the emergence of Big Data has caused a revolution in the education industry, which has changed from the cramming teaching method of the past to a more targeted teaching method, from a teacher who only provides guidance based on personal experience to the use of data, from a sea of tactical issues, to being able to accurately predict the scope of tests. Secondly, personalised education uses Big Data to analyse students' preferences, strengths and weaknesses. Keeping in view the needs of students, more tactical teaching and more useful courses are selected, providing each student with the best education style and content (Bryndin, 2018). Thirdly, teaching is more accurate. Exam-oriented educational institutions can provide more accurate teaching content and examination scope based on data analysis. Lecture-oriented educational institutions can provide students with more effective learning planning based on their learning needs. Finally, through the research, the researcher also found a new use of Big Data. As an internet product, Big Data also plays an important role in advertising, by improving exposure and user conversion.

4.1 Implications

Enterprises can use Big Data to improve the exposure rate, obtain more customers at a high conversion rate, increase the number of product users, and finally achieve the ultimate goal of increasing revenue. Thus, Big Data can help online education providers develop comprehensively.

In the era of Big Data, educators can get closer to students and understand them. At the same time, Big Data can also be used to analyse the situation of students and classrooms, so that teachers can make timely adjustments to teaching strategies. More importantly, in the era of Big Data, school is no longer the only place to acquire knowledge (Sun, & Chen, 2016). However, in the context of the internet, if an online education platform wants to have more users, it should take the initiative to understand user habits and actively interact with users. If enterprises want to really understand user habits, they need to make full use of Big Data resources.

To put it simply, using Big Data to analyse user behaviour is to collect all kinds of data of users, to have a deeper understanding of users, and to master their preferences and habits. To apply this idea to teaching is to understand the interaction between students and teachers, and then to collect and analyse the data to provide necessary help for teachers' teaching (Zheng, 2018).

Although Big Data has risks and problems such as data breaches and data fraud, these can be avoided or reduced as far as possible through technology and regulations. Big Data can obviously bring positive changes for enterprises. Therefore, it is helpful for the online education industry to use Big Data, and Big Data can have a positive impact on the online education industry. This research can play a guiding role for the new online education companies and their employees, to understand how Big Data is used in online education, and learn how to provide users with better services based on Big Data, to achieve more profits.

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4 – Queries to have in an early childhood teacher education classroom

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Abstract

A number of research studies aim to explore diversity with regard to young children, but very few from the perspective of teacher education. This study contributed to this gap. Within a socio-cultural framework, the author investigated the components of teaching-learning. The research objectives were to ascertain the cultural components of early childhood teacher education programmes and to explore the impacts of these on teaching and learning. Twelve lecturers from three TEOs and three cohorts of student teachers participated via interviews and focus group discussions. A Teaching as Inquiry model was applied as to generate focus, which was the teaching and learning queries for lecturers of early childhood teacher education.

Keywords

Culture, teacher education, teaching queries

Introduction

To have progress in their roles the lecturers of adult learners need reflection. As a lecturer in an early childhood teacher education programme, I believe that reflection on teaching should purposefully include cultural issues. Culture and its impact can be so subtle, that it may often go unnoticed without reflection. Dewey (1934) said, “If the artist does not perfect a new vision in his process of doing, he acts mechanically and repeats some old model fixed like a blueprint in his mind” (p. 50). A fixed blueprint in the lecturer’s mind cannot lead to successful teaching. The diversity adult learners have, needs to be a contributing factor in teaching-learning activities in the classroom (Afrin, 2009). In a rapidly changing society, it is important to look at practices and re-think actions in the classroom (Aitken & Sinnema, 2012). Reflection is thereby seen as a structured process of thinking (Hatton & Smith, 1995) that may help people in solving problems (Collier, 2010; Loughran, 2002). Reflection involves a good degree of thinking, but it starts and ends with practice (Korthagen & Kessels, 1999). Reflection helps teachers to grow, be

resilient, more positive, and focus on solutions rather than problems. It also emphasises professional criticism rather than environmental criticism (Leroux & Thèorêt, 2014).

This paper presents the findings that were derived from the qualitative data gathered for an MPhil study in relation to reflection. Data was gathered from three TEOs in Auckland who offer early childhood teacher education programmes. Four lecturers from each TEO were interviewed. Students were involved in a focus group discussion from each TEO. These two sources of data were then transcribed and scrutinised for repeated themes. These themes were then categorised as findings of the study.

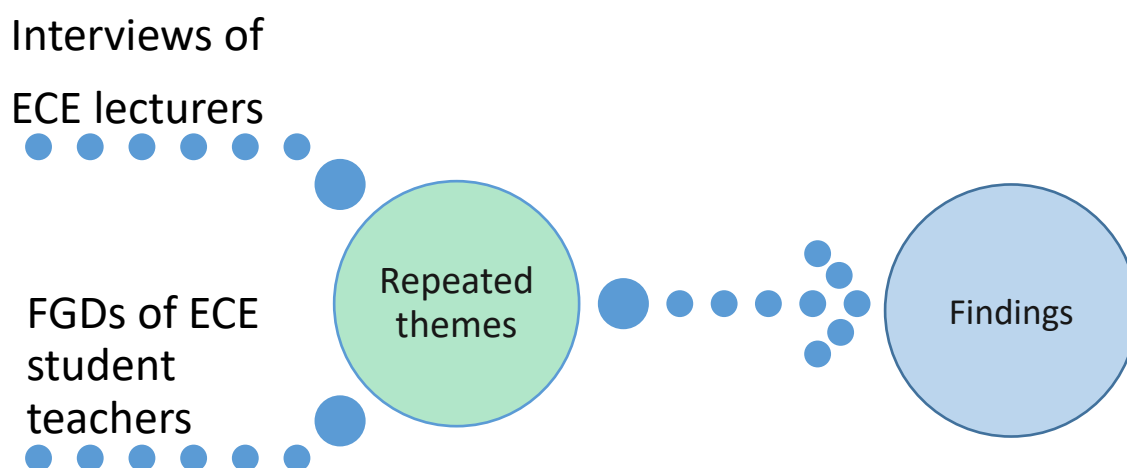


Figure 1.1 Thematic coding

The participants in this study were lecturers and student teachers. In total, 12 lecturers were interviewed with guided questions (see Appendix F) and 16 student teachers participated in focus group discussions (see Appendix G). The invitation was open to all, but interestingly most of the participants were from a specific ethnic background. Eleven out of twelve lecturers and twelve out of sixteen student teachers were either full- or part-European ethnic New Zealanders. This lack of diversity in the participants made me think about the reason for that. I cannot come up with a definitive statement without evidence but can only deduce a few assumptions. The first one is that the Pākehā New Zealanders are more involved with early childhood education teaching and learning and little diversity exists in this field. The second assumption is that the Pākehā are more enthusiastic about research and can spare time to participate in research. The third is that the Pākehā are more comfortable in

having their say or expressing their opinions in the research and education field. The fourth assumption is that the Pākehā participants are more flexible to add extra time to put into research participation with the influences of factors such as, transport, and childcare options. I believe that there is a higher probability of the second and consequent assumptions to be true. I could not ask any participant regarding this observation because I only noticed this disproportionate representation of ethnic diversity once the analysis was completed.

The participating TEOs are all located in Auckland. Early childhood teacher education is one of the programmes for these TEOs. To ensure that the TEOs remain anonymous, I have used three Bangla words to name them in my study. The words I have used to name them do not have any particular significance. They may have metaphoric meanings linked to education, but that depends on personal interpretation. The words have meanings such as window, microscope and mirror. The choices for these names for each TEO was random.

Table 1.1. Names chosen for three TEOs

TEO1	TEO2	TEO3
<i>Janala</i>	<i>Durbeen</i>	<i>Ayna</i>
Polytechnic	University	Polytechnic

The findings from the interviews and FGDs were used to formulate a logical framework of reflection model for the lecturers of early childhood teacher education. The framework will include the three types of queries under Teaching as Inquiry (Aitken & Sinnema, 2008). These are the focus queries, the teaching queries and the learning queries.

Focus queries: The willing learners

A focus query asks who the learners are and what is important to them (Aitken & Sinnema, 2008, 2012). The concept of multiculturalism is significant in formulating a focus query. As it is defined in Chapter Two, multiculturalism refers to the acceptance and allowance of individuals' practices derived from their values (Durie, 2003) and/or the demonstration and use of cultural intelligence while interacting with people (Bennett, 2015). In an early childhood teacher education classroom, there are students from all around the world, with diversity of age, experience and lifestyle. These learners have a lot to share and demonstrate what has been important to them and why. From the findings discussed in Chapter Four, the participants indicated that what is important to the learners are their family, their culture, and their surroundings. The findings of this research encouraged the lecturers to take a deeper look

into this and see if and how the early childhood teacher education contents are made relevant to these learners. The connection between the contents and prior knowledge, experience and the values of individuals is important to locate, especially in a multicultural classroom with a bicultural focus (Jenkin, 2016).

Multicultural learners and biculturalism

An example of very common content of early childhood teacher education in Aotearoa is the bicultural foundation of the nation. Often discussions around biculturalism and multiculturalism go hand-in-hand (Ball, 2012; Jenkin, 2017, 2016; Lang, 2011). An early childhood teacher, Cyrus, in his reflective blog (Taraporvala, 2017) described biculturalism as the first floor and multiculturalism as the second floor for the nation. He gave an example of good practice as the *mihimihi* (traditional Māori way of introducing) and questioned the way immigrant children could express their identity. He asked if these children should be driven to formulate a *mihimihi* blindly following the Māori way, or if they should be encouraged to express their own identity in a way that is more meaningful to them. This dilemma could be applicable to the early childhood teacher education classroom too. Lecturers can create focused queries around this topic and see how their Māori and non-Māori learners perceive the importance of bicultural practices. Previously set out in *The Practising Teacher Criteria* (New Zealand Teachers Council, 2007b), and recently revised in the *Code of Professional Responsibility* (Education Council, 2017), it states that all teachers must demonstrate respect for the heritage and language of both partners of Te Tiriti (a Treaty signed between British Crown and Māori chiefs to cohabit in Aotearoa New Zealand in a way where Māori and Pākehā are seen as equal partners), and demonstrate commitment to *tangata whenua* (indigenous people of the land, Māori) and Te Tiriti partnership in the learning environment. This is not an easy process to be achieved in a classroom where learners are from many different backgrounds, including both domestic and international students. It is helpful for the lecturers to find out what would link the learners' experience to the knowledge of the treaty (Orange, 2013; Williams et al., 2012). One lecturer participant in the study said how working in a bicultural environment where all people were appreciative of it, challenged her usual view towards the treaty.

We kind of took it [biculturalism] for granted. As a Pākehā New Zealander I never thought of it deeply as it never affected us. The big turning point for me when I was lecturing in an institution that really fore fronted the Treaty of Waitangi, te reo Māori and tikanga Māori. ... What was fascinating to see that the students who most readily embraced that and took to that, really enjoyed it and learnt it were (...well the Māori students obviously loved it, but rather than that), often were the immigrant students who came from overseas, students who brought own language and culture with them were very responsive and really valued the opportunities to learn about the Māori worldview. ... It made me realise that those people themselves are probably in a strange situation with an unfamiliar language are being empathetic to Māori. I suppose unless you are brought into a situation where you are not entirely comfortable, you don't know what it feels like. Anyway, I learnt a lot there and now I value using te reo Māori, tikanga Māori at a different level. (Jessica, Int., 27/07/2015).

This example shows that there is always scope for realisation by the lecturers regardless of their ethnic affiliation. Differences in perception towards Te Tiriti between Māori and Pākehā was reported in a research project compiled by Ako Aotearoa, Open Polytechnic and Te Tari Puna o Aotearoa (Williams et al., 2012). The report states that while Māori perceive Te Tiriti as a document that binds the Māori and Pākehā together in the land, many Pākehā sees it as “a document for Māori” (p.4).

Biculturalism and efforts of bringing the Māori pedagogy and beliefs in the world of ECE acted as the foundation for the curriculum document *Te Whāriki* (Te One, 2013). It was developed to give opportunities to every educator to connect to Ako (Pere, 1994) in their own way. If lecturers consider themselves as learners too, they have to realise what biculturalism means to them. An analysis of ourselves and how Te Tiriti relates can help to understand what is important to bring in and share. Biculturalism can be a process of internalizing for the lecturers.

I take inspiration from other cultures, including Māori culture. I do find that having a hybrid personal identity (European and Samoan) helps me to be curious about other cultures. That's how I truly am interested in biculturalism. (Merienne, Int, 29/06/2015)

It is important to have awareness for the lecturers themselves in regard to how they relate to the treaty. This will help them to find ways to empower student teachers to develop links to biculturalism (Hayward, 2012; Jenkin, 2016) regardless of their ethnic orientation. Te Tiriti o Waitangi is prevalent in the early childhood teacher education curriculum. In other words,

practising biculturalism has been significant because of Te Tiriti o Waitangi. Without Te Tiriti in place, there would hardly be any emphasis of te reo Māori or Māori tikanga in mainstream education (Jenkin & Broadley, 2013). Te Tiriti o Waitangi creates a distinct place for all domestic and international students studying early childhood teacher education. In class, the pupils vary from adults growing up with either a meaningful or tokenistic approach towards the values of te ao Māori, to adults who have never heard of Māori and the Treaty previously. The focus query for lecturers can be: To what extent are the learner groups familiar with Te Tiriti o Waitangi and how much does this familiarity vary?

Missing perspectives in the curriculum

The focusing query also considers the missing elements in the curriculum, for example, the absence of male perspectives. Lecturers may need to question if absences as such mean anything to their female and male learners. One of the findings of this study was that the gendered majority are females, which is a common feature of an early childhood teacher education class. There are several pieces of research considering the place of males in ECE (Farquhar, Cablk, Butler, & Ballantyne, 2006; Friedman, 2010; Sumison, 2000). All these researchers stated that inclusion of males in the ECE centre can have a positive impact on children's learning. The participants in this study had little or no experience of males in their classes.

The only time I had males in class was my previous course of studies [a certificate programme on ECE]. It was quite interesting to hear their views. Also, at our work placement, even when the dads come, the children look up to them. They recognise the male voices and they like it. Here [in the current class] we don't have any males. We would like to have though. I think they could bring different perspective that we are missing out. (Ayna Institute, FGD, 07/03/2016).

Lecturers of ECE, who again are mostly females, can think of this limited world absent of male perspectives and put in extra effort to include it. This could happen by inviting male lecturers or male educators as guest speakers. This is an area that student teachers, both males and females, would be interested in knowing more. Focus queries thus will lead the lecturers to discover areas not being covered by the current curriculum.

Another area that participants noticed required attention was the lack of multicultural (multi-ethnic to be particular) perspectives in the handouts and reading materials. Schools in New Zealand are very much westernized,

and to some scholars, very much Eurocentric (Penn, 2010). The ECE sector is quite diverse in practice (Ball, 2012) where centres often use a child's home language in many ways. However, the early childhood teacher education programmes, as observed by several participants in this study, are still very much westernized. Many of the lecturers echoed a similar reflection to Julia as noted below.

I do, for the most part, try to find resources and readings relevant to New Zealand context, because that's where we are educating them to work. Having said that a lot of the literature is European based because that's the most easily accessible stuff. The body of research from other cultures only just recently begun to emerge. (Julia, Int, 18/06/20015).

The lecturer participants said that it is difficult to get course materials incorporating many cultures when looking for a specific concept or content. While getting a collection of multi-cultural resources may be hard, the focus queries help lecturers to be aware of this and to take proactive measures. Becoming a culturally responsive teacher is now beyond celebrating diversity, but now includes reflecting on diversity in terms of social justice and equity (Chen, Nimmo, & Fraser, 2009). This practice was not reflected by several (two out of twelve) lecturer participants who said that they never thought of multicultural resources before. Their ideas and efforts around inclusiveness were only for people to be able to share and express themselves. Respecting all is not sufficient even in ECE as pointed out by several researchers (Boutte, 2008; Chen et al., 2009). Teacher education programmes are surely the first source of having educators with broader ideas of inclusiveness. Few lecturer participants thought contents should be covered for achieving learning outcomes, and the multicultural representation of resources is necessary only when teaching diversity. Focus queries can be developed to see if lecturers can include information that is important to their learners. For example, while teaching partnership a deeper search will lead to finding articles on partnership between Asian parents and parent-teacher relationships involving them (Guo, 2005). All groups of student participants thought the teaching around multiculturalism was limited and not sufficient to work with children and families from various ethnic groups. As teacher education is a practice-based programme (Brennan et al., 2010), it is important to equip student teachers with knowledge to a level that enables them to feel competent. At present, many educators are not proactive with diversity and an expectation of addressing sociocultural issues from an early age (children at the early childhood centres) is identified (Boutte, 2008).

Struggles as students, struggles as teachers

Even though lecturers plan their teaching based on the classroom, focus queries will lead the lecturers beyond the classroom. For example, the socio-economic status of learners and the economic trends and changes of society can limit what is important for students to learn. In early childhood teacher education, as portrayed in this study, many students have financial struggles. This might be true for every discipline of tertiary teaching as the adults spend time studying rather than working and earning money. Research from the UK shows that increasingly students in tertiary education come from families with low socio-economic status (Bowers-Brown, 2006). In New Zealand, participation in tertiary education from all ethnic groups has shown a decreasing trend from 2005 to 2015 (Education Counts, 2017). The Tertiary Education Commission has been responsible for managing equity funding to promote participation for disadvantaged ethnic and cultural groups, such as Māori, Pasifika and learners with disabilities (Tertiary Education Commission, 2017). In this context, linking topics to economy, income and workplace might be relevant in an early childhood teacher education classroom.

Culture in today's globalized world is seen as changing the way of life for many with more production at a lower cost of manpower (Frow & Morris, 2000). It means changing behaviours at workplaces or work practices. The New Zealand ECE sector also went through similar changes due to political decisions made in 2010 to reduce the requirement of qualified staff. Based on the government's change of policy, adjustments have been made to funding criteria with an expected reduction of costs for hiring qualified staff (Meade et al., 2012). Even though qualified staff can play a vital role in young children's learning and education, the changed policy requires early childhood services to have only 50% of the staff members to be qualified (Carr & Mitchell, 2012). However, this change of policy is in line with the research-based prediction that early childhood centres would struggle to meet the requirement of 100% qualified staff (88% participating services thought so in 2006, whereas 19% of the participating services thought so in 2009) (Mitchell, Meagher-Lundberg, Mara, Cubey, & Whitford, 2009). Whatever the rationale was behind this policy change, it has been criticized by educators and researchers (Carr & Mitchell, 2012; Meade et al., 2012), and by associations (New Zealand Kindergarten Inc., 2011) in spite of a budget increase of \$550 million for early childhood education in 2011. An additional increase of \$386 million for operational costs and \$35.5 million for supporting children at risk were included in the 2017 budget (Kaye, 2017). Whether these budget increases will only support the increasing participation in early childhood education sector (Ministry of Education, 2017b), or whether they serve more,

that could be discussed in early childhood teacher education classrooms.

For early childhood lecturers, to understand the socio-economic trends both for society and the sector, and for the individuals in the classroom might be of importance to link topics more to their practicums. The student teacher participants of this study showed high interest in work placements and also having a job on completion of their studies to reduce the financial difficulty they have had as students. These aspects of individuals are from the wider socio-economic-cultural-political systems described as macro-system by Bronfen-brenner (1995). Therefore, lecturers can create focus queries to know what is important for students, not only in terms of individual students, but also in terms of their expectations, predictions and practicality of being able to manage financial hardship.

Cultural components of early childhood teacher education, such as gendered majority, multiculturalism, and socio-economic struggles, can create opportunities to reflect on the learner's previous exposure to a topic, the gaps in the curriculum and the wider socio-economic-political aspects that surround the learners, the lecturers, and the curriculum. Focus queries around these will assist the lecturers in understanding their learners and to find the link between the topics and the learners. The ideas arising from focus queries can enable the lecturers to treasure unique learners in the classroom.

Teaching queries: The wondering lecturers

The other aspect of the Teaching as Inquiry model is teaching queries. Teaching queries are the quests for finding the appropriate strategies to adopt for the teaching-learning activities and experiences.

Complex classroom

In a complex classroom situation with a wide range of diversity in ethnicities, age and experiences, it is neither possible nor desirable to look for a one-size-fits all approach. It is hard to measure cultural sensitivity.

It is one thing to teach about cultural sensitivity and another thing is to be culturally responsive as an individual. I wouldn't know how responsive I am, I don't have a measure of it, you see. (Joanna, Int, 27/07/2015).

The complexity of the early childhood teacher education programmes, including the learners and their range of cultural diversity, were discussed quite often by the participants of this study. The participants generally agreed with the concept of critical multiculturalism (Chan, 2011). Critical multiculturalism refers to the criticism of well-intended strategies for

inclusiveness as how considering other cultures can sometime make the educators categorize these cultures from an essentialist view. Some universal traits were appreciated by all participants in this study. Trust and relationship building are factors identified in this study.

They share unimportant things at the beginning, but later they share more important things. They bring something from their own culture. They say how they are brought up, what they believe and so on. This happens only when the trust is built and it is not built overnight. It is built over time. I am not geared to look at it from a cultural perspective, but more from individual perspective. (Melissa, Int, 18/05/2017).

The idea of valuing individuals in the classroom setting is now popular with researchers and educators from all around the world (Afrin, 2009; Brennan & Cotter, 2008; Eberly et al., 2007; Kantor, Elgas & Fernie, 1993; Thompson, McDonald & Talakai, 2009). Teachers are now encouraged to understand their learners more from a socio-cultural perspective (Fry et al., 2009). It is noted that as the learning gets deeper, both the process and outcomes involved get increasingly complex (Biggs, 1999). It gets harder to find the best approach in this progressively complex scenario of learning in a diverse classroom. However, teaching queries can be used to discuss the human qualities and attributes that make the lecturers more approachable to the students. Building relationships and trust can help lecturers understand and respect the complexity of the process of learning and growing together with their learners. A basic level of teaching query can thus raise questions on how to build a trusting relationship with such a diverse class of early childhood teacher educators together with the unique personality of the lecturer.

Critical approach to diversity

Teaching queries often go beyond the left-liberal approach; an approach where changes are made to progress for equality and a collective responsibility is sought to facilitate the changes to occur (Kuang, 2011). The left-liberal approach sees diversity simply and suggests that relationship-building and inclusion is the key (Hockings, 2010). This approach does not allow us to think about multiculturalism more critically and does not encourage the lecturers to be involved in situations where a dilemma can be dealt with or even recognized. The criticism (Tomalin, 2007) of this approach states that teachers are not equipped with strategies

to deal with the power imbalances and, therefore, often avoid a more critical approach. However, while this study supports the idea of having teaching queries around building trusting relationships, it also raises critical questions such as if the lecturers should take extra responsibility for ensuring cross-cultural interactions in class. Teaching queries can be made around practicing diversity, and whether or not to apply particular strategies in class.

The participants of this study showed differing ideas on group work and the cultural makeup of those groups. Some participants thought it was not useful and also disrespectful to separate groups of pupils that sat together in class, whereas others thought lecturers have a responsibility to separate groups of people to ensure that there are plenty of cross-cultural interactions. This debate can be a teaching query for the lecturers of early childhood teacher education.

Future strategies

Teaching queries should include a search for improvement for future teaching-learning experiences. This query can also be very much multi-dimensional and lecturers can decide on areas for improvement for themselves. The student teachers who participated in this study thought useful knowledge for work or practicum situations was an area that their lecturers could improve on.

...there are so many other aspects of culture that we do not know. In my practicum, I did not feel equipped with cultural knowledge. There were Asian, Indian and so many other children. We were taught to be respectful and inclusive and etc., but nothing more than that. Multiculturalism is a very small part of the course, but in the early childhood centres it is big. I think it would be nice to know about these other cultures. (Janala Institute, FGD, 1/07/2015).

This could be part of the lecturer's query on how to equip their learners better for the field. Early childhood student teachers on practicum, or early educators need to develop intercultural competence in their work. Intercultural competence refers to an individuals' ability to grow a greater awareness of other cultures (Grey, 2013).

Development theories identify six stages of intercultural competence (Bennett, 2015). The first three stages are denial, defence, and minimization where people show ethnocentric attitudes and avoid cultural differences. The other three stages are acceptance, adaptation, and integration where a shift of mind-set is developed to appreciate and

navigate cultural differences. Gaining and maintaining intercultural competence is an ongoing process. Early childhood teacher education classes can be the place for initiating this process. The teaching query includes thoughts on how to initiate the process.

Firstly, it is important for lecturers to identify their own values and beliefs because these are the elements that help them to decide what to ignore and what to act on (Chen et al., 2009). It is also important to understand the diverse learners and the struggles they might be having; struggles to open up, to move around and even converse spontaneously with other people. The diverse learners from other cultures may have oppressive social attitudes to their own cultural identity compared to those in the mainstream (Derman-Sparks, LeeKeenan, & Nimmo, 2015). Teaching queries will lead the lecturers to discover these hidden struggles, and address these skirmishes in the teaching-learning practice.

The transition

In the early childhood teacher education context, one of the queries can also be on how to manage a smoother transition to an academic environment for all types of learners.

Students who came here like many of us are second chance learners. Many of us are not the high achievers in school. (Janala Institute, FGD, 17/98/2015).

While reflecting on future improvements, lecturers might also consider this aspect. A smoother transition for the diverse students they are working with can play a very important role in increasing retention and success rates. While success rates at higher levels may depend on many factors such as intentions, part-time employment, and changing tracks (Scott, 2009), lecturers might need to show inclusive attitudes for learners of different backgrounds. This was the response of one of the lecturer participants in this study.

I would like to continue to listen to my students. Currently I am focusing on this idea that students from Māori and Pasifika students coming within from a specific cultural framework. I still struggle to know how they would have a smoother transition as a faculty student here. (Merienne, Int, 29/06/2015).

Teaching queries (Aitken & Sinnema, 2008) for lecturers can thus vary from initial level queries on how to develop trusting relationships with the students, to critical queries that may affect the comfort zone and power

relationships in class. Teaching queries may also vary from the present practice to future improvements (Benade, 2015). A wide range of teaching queries are there for lecturers to wonder about. The main idea here is for lecturers to reflect about the relationships, the curriculum, the teaching-learning practices, the course materials and the readings in terms of the wide range of diverse learners that they have in class. They have to be the wondering lecturers.

Learning queries: The wider outcomes

Learning queries, are again, part of the reflection model teaching as inquiry. If used in terms of cultural components, learning queries will lead to questions such as what are the impacts of the cultural components that are shared in the classroom. Learning queries will let the lecturers know if they have given their best effort to get a continuously growing outcome. The desired outcome is comprised of benefits for individual learners, the expansion of recognizing contextual surroundings, and the consideration of wider socio-cultural perspectives.

Learners in the context

Learning queries can empower students to share their contextual knowledge. Learning queries can result in inclusion, and can generate a shift from teacher-oriented to learner-oriented andragogy (the method and practice of teaching adult learners). Learning queries can reflect the values and beliefs of a wider population.

There are particular ways of knowing that are associated with for other cultures, for Māori and Pasifika culture. As a white lady, I myself cannot know those ways as I am from another sect. I ask students to help me. ... Also, this practice helps me to be respectful, which is in line with The Treaty of Waitangi principle partnership. (Anna, Int, 30/07/2015).

In the context of early childhood this practice is common where teachers proactively find out what the values, perspectives and needs of the diverse families are to cater for the children adequately (Mitchell et al., 2015). Mitchell et al. also noted that employment of staff from diverse ethnic backgrounds were found to be an influential factor for achieving this. Early childhood teacher education providers seemed to have more conservative staffing than the early childhood services, as reflected in the demographics of participants in this study. However, most lecturers in this study were willing to learn from other cultures.

I suppose that [in my teaching] Western culture is probably dominant as that is who I am. You cannot deny who you are. But I try. I tell them [student teachers] it cannot be just English only anymore. We all come from different places. But now that you are asking, I can see how the course itself overall reflects my culture a lot. I would like to be aware of this I suppose. (Helen, Int, 9/11/2015)

Dominance of European culture was also noted by student teachers too.

Even though I see myself as NZ European, I do not think everything in New Zealand should be dominated by NZ European. In a perfect world, everything should be very diverse and there should be no domination, but that is just an idealistic view. (Durbeen Institute, FGD, 17/08/2015).

Diversity and inclusion should incorporate the philosophy of teaching-learning and assessment in early childhood. An example of assessments being inclusive of Māori culture is the use of portfolio in early childhood (Mahuika, Berryman, & Bishop, 2011). These scholars argued that assessments for Māori students should be appropriate and important to the Māori learners. The paper also notes that in the early childhood sector, portfolios are the most commonly used assessment tool, which are inclusive of Māori ways of sharing individuals' knowledge. This paper supports the use of non-competitive assessments for Māori learners and learners from other minority groups. It says with competitive assessment tools, only European practices are encouraged, and Māori students are disadvantaged. Similar arguments were also made for the rationale behind increasing the use of projects and dissertations in higher education (Fry et al., 2009). This type of assessment tool is in line with the complexity of society. Discovery learning approaches allow students to take responsibility for their learning and create opportunities for them to reflect on their own identity.

Teaching is sharing, but I am always interested to know how they take the learning in their own world and use them in their own way. ... I always inspire them to be who they are. (Merienne, Int, 29/06/2015).

Thus, the learning queries often lead to reflection, not only on teaching-learning, but also the surrounding and social contexts that might have invisible influence on the cultural components in the class.

Professional growth

Learning queries can also be the outcomes linked to expertise achieved in the field by the learners and the lecturers. Lecturers have to ask themselves

questions if they want to continue to be open and receptive of others' opinions and values. Student teachers noted that lecturers may find difficulties at some point of their professional growth.

They [lecturers] are experts in their own field and I can see how to open up to someone who doesn't know a thing about it [early childhood], can be difficult for some of them. (Durbeen Institute, FGD, 17/08/2015).

This can be true for the experienced lecturers who are often engaged in many areas of scholarship. If there is no time allocated for reflection, it is hard to continue to be open to other's opinions. It is assumed that each lecturer has their teaching philosophy, but writing it down creates scope for reflection and allows thought to take place (Luppertz, Himmel, Ouehrani, & Winzker, 2016). Lecturers have to be aware that the traditional focus on teaching is now moving toward the focus on learning. This paradigm shift requires lecturers to have knowledge and reflection on the didactics of higher education as well as the exchange of expertise in teaching.

Outcomes for the community

The purpose of learning queries is to find out results that are desirable, not only for the individuals but also the communities behind the individuals within the class. Lecturers have these queries to ensure that they create not only a sense of belonging, but also a feeling of empowerment for the diverse learners in the classroom. A search for culturally and socially mediated identity is common for learners in higher education (Kasworm, 2005). Learning queries for lecturers will encourage the student teachers to find out their position within the comprehensive socio-economic-political context. Lecturers must be aware of the outcomes the student teachers from the class will gain and further use in the community. These outcomes, resulting from the open sharing between people from a wide range of cultural backgrounds, are the wider outcomes.

The queries that are stated here can be extended to an infinite number. The more I queried, the more I could feel the depth of the upcoming quest, for me and for all conscious individuals who have been influencing the workforce of early childhood education with their teaching.

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5 – The impact of e-commerce live streaming on consumer purchasing behaviour

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Abstract

The popularity of live streaming is due to advances in technology and meeting people's consumption needs during the COVID-19 pandemic. Compared with traditional online shopping, live streaming provides more product display and shopping interaction, which means that consumers can enjoy a better shopping experience without leaving home. Therefore, how to provide consumers with a better shopping experience and promote the development of the live streaming industry to bring higher income has become a hot research topic.

This study aims to understand the impact of live streaming on consumer behaviour. It used the quantitative analysis of data through questionnaires to measure how live broadcast factors affect consumer behaviour.

Results revealed no gender difference in consumers' and recommenders' purchasing power of live broadcast products. However, consumers' purchasing power differs based on their level of education. The time consumers spent in online streaming platforms on the official website and the quality of live broadcasts positively relates to consumers' buying attitudes. People are more likely to buy a product streamed online than in a physical store. It is important to improve the quality of online streaming to motivate customers to watch the videos.

Keywords

E-commerce, live streaming, consumer purchasing behaviour, online shopping, consumer experience

1. Introduction

The emergence of technology enables many businesses to take a step further, using social media as a quick way to reach their consumers. Live streaming is

one of the ways adopted by organizations to satisfy their consumers. Marketers may use social media platforms such as Taobao, Facebook, TikTok and YouTube to do a live stream for their products. A live stream is essential during this time of the pandemic, where people have no opportunity to go to local markets for a face-to-face interaction with the products. Furthermore, consumers get a chance to interact with various products in the comfort of their homes and compare different products before making their purchase.

Marketers benefit from live streaming for various reasons. First, they have the full attention of the consumer where they can explain their products without the worry that the consumer is looking in a nearby shop. Second, through live streaming they have a convincing power over the consumer. However, the reaction of the consumer depends on the products and the presenter during live streaming. Therefore, it is expedient to understand the impact of live streaming on consumer behaviour through a series of questions.

1.1 Research Questions

This study seeks to understand the impact of live streaming on consumer buying behaviour. Specifically, it aims to answer the following questions:

1. Are there any gender differences towards the purchasing power of the consumer on the product on a live stream?
2. Does the period of the live streaming advertisement affect the response of the consumer?
3. Do online streaming platforms affect the time a consumer will spend watching the video?
4. Does the quality of the live stream affect the customer's purchasing attitude?
5. Are there differences in the consumers' level of education on their purchasing power of live streamed products?
6. Do most people consider buying a live streamed product rather than from a physical store?

1.2 Research objectives

This study aims to understand the effect of live streaming on consumer behaviour. The introduction of technology and social media has made many organisations move their presentation to live streaming. The consumer gets to interact with the presenter. Furthermore, live streaming helps the presenter to have the full attention of the consumer. The objective of live streaming is to convince a consumer to buy the product being advertised. However, the ability of the consumer to purchase a product depends on how well the presenter

convinces the consumer in the live stream. Zhang et al. (2019) state that consumers are social beings who are highly sensitive to how the live stream works for them. Furthermore, the availability of high technology demands the presenter to produce a high-quality live stream. Mumuni (2019) adds that, more often than not, consumers' behaviour is affected by the quality of the live stream. Therefore, it is essential to understand the effect of live streaming on the consumer.

1.3 Significance of the study

According to Lisowski, Ramenofsky, and Wingfield (2017), it is unethical for a researcher to research without any purpose. The value of this study will be to add knowledge to the existing literature on the subject and to help readers add more documentation on the relationship between consumers and live streaming. The current 21st-century society is a generation that has seen the advancement of technology and appreciates the use of social media platforms as a means of communication, unlike other generations that valued face-to-face interactions. The study will help other researchers understand a new perspective in the field of marketing. Furthermore, marketers will have a chance to learn what has worked and what did not work when it comes to live streaming, thus helping them to avoid previous mistakes. Through this research, presenters will have a chance to make better decisions and improve their presentations to attract desired consumers. The research results will be of great significance to the planning and marketing improvement of e-commerce live streaming.

1.4 Problem Statement

Scarcity of literature on the subject motivated this research. In the recent past, consumers used to go directly to the local markets to view products. As a result, most of the literature addresses information on the face-to-face consumer-marketer relationship. The idea of using social media platforms to advertise products and to engage consumers is a recent phenomenon. However, very few scholars have taken the time to study how the platforms work for marketers. Moreover, scholars who have tackled the subject of social media and consumer relationships have emphasized how the platform works, and how consumers can decide on which application to use. The issue of the effect of live streaming on the consumer, a subject of great interest to the marketer, has gained little attention. Chen and Lin (2018) argue that marketers have made several live streams on various products without yielding the expected results. The live stream has not increased the purchasing power of the product; neither has it helped the consumer to rate the products highly. With the limited knowledge of live streaming and consumers, marketers

continue to make losses. Therefore, this research intends to add more information to the existing literature to make it favourable for marketers to take a better option.

2. Literature Review

A literature review helps the researcher to acknowledge that they are not the first to research the subject. Furthermore, Gray (2019) comments that it allows the researcher to recognize other scholars who have studied the issue. The most crucial reason for the literature review is to guide the researcher not to repeat research done before by other scholars but to utilize the information of various scholars who have studied the subject.

Online customers start by selecting products that they need and then purchase those with the lowest risk. Perceived uncertainty is the extent to which the customer is unable to tell the outcome of a transaction caused by a lack of information. According to Zimmer, Scheibe, and Stock (2018), retailers tend to hide information and features of products and also give inaccurate information. Hu, Zhang, and Wang (2017) confirm that the retailer may deliver the product, delay the product and sometimes bring low-quality products. Therefore, customers reduce these uncertainties based on the use of ads and live streams, among others.

Wongkitrungrueng and Assarut (2018) add that live stream and visible information help customers to decrease the level of uncertainty. Customers try as much as possible to lower the level of uncertainty because sometimes it can be costly. A customer may buy a non-refundable expensive product. When the product is faulty, it becomes problematic for the consumer to return the product. Such an experience makes the consumer use a platform that will minimise uncertainty. Todd and Melancon (2018) say that live streaming is one of the platforms where the consumer can reduce uncertainty. The platform helps the consumer to identify without a doubt all the features of the desired products, which allows the consumer to make a rational decision.

The mental representation of products affects how consumers process information about them. Bründl, Matt, and Hess, (2017) state that the mental distance of a product influences the psychological process of the consumer, which guides them to make a decision, evaluate products, and consequently affects their behaviour. Consumers decide to buy a psychologically distanced product depending on the recommendations of others (Phonthanukitithaworn & Sellitto, 2017). When consumers participate in a live stream and buy a product, they then get a chance to give their review on it. Lim and Kim (2017) confirm that other consumers use such information to make a purchase.

Consumers consider physical distance and similarity as essential variables in decision-making. A close social range of the consumer to the company with a target product is likely to increase the chances of the consumer buying the company's product on the online market (Park, Kee, & Valenzuela 2009). Live streaming is used to reduce the psychological perception of the consumer, thus giving them a higher purchasing power. When watching a live stream, the mental perception of the consumer reduces the social distance of the consumer to the product. The consumer feels that they are near the product, thus increasing their chances of buying the products.

Live streaming is a real-time recording and broadcasting medium. Over time, the applications of streaming media have become more and more diverse. The content of the live broadcast is no longer limited to the live broadcast of video games. A variety of live broadcast methods have been developed (Spangler, 2016). In addition to common applications such as live sports and other live events, ordinary people also broadcast hot topics, product experiences, talent shows, life sharing, and on-site shopping. With the emergence of new live broadcast applications, the viewing behaviour of the shoppers may change. The rapid development of live broadcast services has changed people's viewing behaviour. For live shopping, live broadcasters create content to generate a real-time interactive experience between creators and consumers, thus forming a difference from most broadcast media formats (Sjoblom & Hamari, 2016).

The online environment enables consumers to fully consider uncertainty when shopping online, thereby overestimating the loss of online shopping. Consumers believe that uncertainty is an important factor leading to whether consumers will buy a product. Sukrat and Papasraton (2015) commented that the uncertainty calculated by consumers would affect their attitude and willingness to purchase products online. Kang, Tang, and Fiore (2014) added that doubtful or even known uncertain knowledge is an important but unfavourable factor that affects consumers' willingness to buy products. According to expected utility theory, consumers make decisions based on the level of available options (Zhang et al., 2019). The theory further points out that consumers cannot make rational decisions when faced with the uncertainty of choice. The increased uncertainty caused by consumers' unwillingness to conduct online transactions reduces consumers' willingness to purchase online products (Bodet & Bernache, 2011). Uncertainty is closely related to consumers' evaluation and purchase intentions of online products. In their research, Terlutter and Moick (2013) stated that customers buy products when they are confident that they are familiar with the physical appearance of the product. Therefore, the live stream provides consumers with this opportunity because it allows them to check the product before actually

purchasing it.

Marketers and advertisers face an increasingly complex and disordered environment (Phillips & Noble, 2007). Advances in technology and the spread of reliable and fast internet connections have created ever-expanding global opportunities for new forms of consumer outreach. These media forms can include video blogs, YouTube broadcasts, Facebook live videos and live broadcasts of various other types of content. As an emerging digital strategy trend, streaming media and video marketing are receiving full attention from the marketing industry. It is estimated that by 2019, companies with millennial consumers and video advertisement spending will exceed \$14 billion per year (Gehlen, 2015). This is mainly because consumers pay more attention to video posts on social media platforms, and the organic coverage of videos is 135% higher than that of static photo posts (Savage, 2016).

The integration of live video into existing social media giants such as Facebook, Twitter, Instagram, and YouTube, illustrates the growing popularity of this form of content. Facebook alone claims to have 8 billion video views every day, and the number of live video views on Facebook is three times that of non-live video (Savage, 2016). In an annual report on the social media marketing industry, Stelzner (2016) reported that 60% of marketers use video, 75% of marketers want to learn more about the use of video in marketing and plan to increase its usage yearly. In addition, as a new content delivery mechanism, marketers are particularly interested in live video; currently, 14% of marketers use live video, 50% of marketers plan to use live video next year, and 50% of marketers want to learn more information about live video (Stelzner, 2016).

The concept of live broadcasting is relatively new, and there is little research on effective broadcasting strategies in academia. This topic pays special attention to the impact of live broadcast factors on consumers. Users of some platforms have reported these effects, but they have never been quantitatively studied in a streaming environment. This is because research in the field of live broadcasting is still in its infancy. This study uses quantitative analysis methods to screen samples. It builds on previous work and focuses on the motivational factors previously found in other virtual communities (Yee, 2016). Therefore, the live broadcast industry may have a better understanding of the factors that can increase viewer and consumer participation in broadcasts, brands, and channels.

Trust is considered to be one of the most powerful factors influencing relationship quality and loyalty and the intention of continuing a relationship. This is because, at the organizational level, trust is an extremely important strategic component of relationship marketing orientation and relationship

exchange. Trust influences intentions and purchase choices in B2B and B2C sales interactions. For example, in the B2C environment, sales literature has established a positive antecedent relationship between trust and consumer purchase intentions, especially in the case of high participation purchases.

Correspondingly, there is sufficient evidence to show that in online streaming sales interactions, customer-oriented behaviour plays a vital role in influencing buyers' perception of trust. Trust is essentially an emotional response to the salesperson, and trust may increase or decrease over time, but it is based on responding to the salesperson's verbal and/or nonverbal cues during the initial sales contact. At the corporate and individual levels, ethical reputation has proven to be a powerful force in establishing and maintaining customer-perceived value. As the sense of morality increases and reputation is established, customer satisfaction, loyalty and retention will increase. In many industries, as long as there is an environment of transparency and communication between the company and its customers, ethical virtues such as trust, commitment, and diligence will have an impact on the quality of organizational relationship marketing results. Nonetheless, the research provides some valuable insights about context and related concepts. Specifically, the customer's evaluation of a salesperson's ethics is based on the interactive sales environment. For example, Babin, Griffin, and Boles (2004) investigated how the structure or background of salesperson-customer interactions in the retail industry generates ethical consumer perceptions related to their treatment, emotional response and purchase intention.

In the B2B and B2C relationship sales environment, salespeople who act in an ethical manner will generate more trust from customers. The perceived trust of the salesperson plays an intermediary role between the salesperson's moral sense and the buyer's behaviour. When the trust relationship exists and is real, an environment conducive to long-term customer relationships is established (Todd and Melancon, 2018).

3. Research methodology

Gray (2019) argues that research methodology is the most significant section of research. It determines the viability of the conclusion made by the researcher, which affects the implementation of the findings. This section will discuss the research design, method of data collection, the sample size, sampling technique, and data analysis.

3.1 Research Design

This research is primarily quantitative. An exploratory research design will be used in collaboration. The purpose of exploratory research is to investigate a problem that is not clearly defined, or the previous research has not clearly explained the hypothesis. The research provides information on the existing phenomenon that can be used for later study. Furthermore, Nilsen, Bowler, and Linnell (2020) say that the research provides a better understanding of the existing problem. The research is used to answer questions like *why* and *how* to explain the relationship between live streaming and consumer behaviour. The research type is flexible, enabling the researchers to state their findings even though they contradict their earlier hypothesis. For the current study, the exploratory research design will be used to generate quantitative data through the use of survey questionnaires.

A survey is a strategy used to gather information from a predefined population. According to Gray (2019), many researchers use a survey as a strategy because it is more convenient and reliable. Researchers can construct a simple questionnaire that can be used to collect information online.

This research will use a quantitative method in order to offer a deeper explanation and provide a more detailed report of the effect of live streaming on consumer behaviour. This method will enable the researchers to collect data that can be analyzed to produce an explanation.

3.2 Data Collection

The research will use a primary method of data collection. The researchers will gather firsthand information, which is relevant and less biased (Gray 2019). The method allows the study to get information directly from consumers who are using online streaming services. The questionnaires will be set in the form of a Likert scale since this makes it easier to operationalise perceptions and personality traits such as consumer behaviour. To collect the data, the participant will be presented with the Likert type questions with a continuum of five expected responses. The questionnaire will comprise twenty questions that would enable the researchers to collect the required data. Participants in this survey are Auckland adults who are the consumers of products on live streaming. The samples will be selected in Auckland city. Because this questionnaire requires all participants (Auckland adults) to be included in the scope of the study, equal probability sampling is used. The probability selected by the researchers can be expressed by the following formula: $P = 1/N$, where P is equal to the probability of participation and, N corresponds to the size of the target population.

Sampling refers to a small-scale representation of the population from which to choose. The safest basis for sample selection is opportunity. When selecting by non-probabilistic methods, the result may cause severe distortion (Giguère, 2006).

The research questions include: "Does the gender of the presenter affect the purchasing power of the consumer on the product in a live stream?" As a result, stratification in probability sampling is used to maintain gender balance. Everyone may be equally selected to participate in the research. However, fixed methods usually involve the use of sampling weights (the reciprocal of the probability of selection or $1/P$) in statistical analysis. The sampling error is usually lower in stratified sampling than in random sampling.

Considering budget and time constraints, the following formula is used to calculate the sample size:

$$n = t^2 \times p(1-p) / m^2$$

where n = required sample size
 t = confidence level at 95% (standard value of 1.96)
 p = estimated prevalence of the variable of interest
 m = margin of error at 5% (standard value of 0.05)

As a result, sample size was determined as approximately 246 ($1.96^2 \times 20\% \times (1-20\%) / 5\%^2$).

The actual sample size is 240 people. Through stratified sampling, 120 men and 120 women were randomly selected in Auckland for questionnaire surveys ("How to Determine the Correct Survey Sample Size," 2020). For consistency in the survey content and allowing no ambiguity, this questionnaire is only in English (considering that the majority of Auckland adults can read and write English).

3.3 Data Analysis

The statistical method used will be regression analysis. This form of analysis is a powerful statistical method, which allows the examination of the relationship between two or more variables. Even though there are many types of regression analysis, the focus is on the examination of the influence of independent variables on the dependent variable in this current case.

Quantitative methods emphasize objective measurement and statistical, mathematical, or numerical analysis of data collected. Quantitative researchers start with a hypothesis and then collect data that can be used to

determine whether there is empirical evidence to support the hypothesis. For hypotheses involving two numerical variables, the expected direction of the relationship will be described. The assumption of categorical variables specifies which category of the independent variable is more likely to report a certain category of the dependent variable (Chiarella & Platen, 2003).

Quantitative analysis requires high-quality data, in which variables should be measured well using deductive logic. It is regarded as "real science", compared with other research methods and is generally considered to provide stronger empirical evidence ("Empirical Evidence – Definition, How to Collect, Types," 2020).

3.4 Ethical Considerations

The researchers will ensure to abide by ethical considerations during the study:

Fair selection of participants: The most relevant feature of the quantitative method is the implementation and protection of fairness and justice when determining the type of sample selection, so that all individuals who meet the selection criteria have an equal opportunity to participate in the research.

Respect for research participants: The exercise will be voluntary for the participants, who will have the right to withdraw from the study at any given time. Participants will not be subjected to any anticipated harm and need to give their informed consent. The research will be free from any discriminative language when framing the questions. Respect for the dignity of research participants is very important. When publishing research results, the requirement of anonymity must be considered, and all precautions must be taken to protect the privacy of research subjects and the confidentiality of personal information, including storing research files in a safe place ("Ethical and Legal Considerations in Quantitative Research – 865 Words | Critical Writing Example," 2020).

The researchers will follow all the guidelines for conducting research, acknowledge and cite any work of other scholars used in the study, and will not manipulate the data that contradicts their earlier statements. They will ensure that they use the correct methods of data collection and analysis. Lastly, the researchers declare that the study is done for educational purposes and have not received any donations from any company or organization ("Ethical Considerations - Research Methodology," 2020).

4. Results

4.1 Data Characteristics

Firstly, the survey questions are shown in Appendix 1: *Table 4-1. Data Characteristics of survey questions.*

Considering that the different statistical procedures are applicable to different types of data, after identifying the data type of each survey features, the measurement level of the variable can be displayed. Each survey question is categorised into the type of scale. Q1, Q4, and Q5 are nominal while Q2 and Q3 are ordinal. Q6-20 uses a Likert scale (1-5).

To illustrate the types of data, we use a bar chart or a pie chart to display a scale.

Likert scale variables have an implicit order for response selection (e.g., 1=*strongly agree*, 2=*agree*, etc.). The median and mode of these variables, frequency tables (maybe even cumulative frequencies) and cross tables are usually used. A bar graph can effectively display the results.

Secondly, the descriptive analysis of variables given in the dataset was conducted.

In Q3-level of education, through frequency analysis, approximately 47.2% of participants have achieved a Bachelor's Degree, which is almost half of the samples. This indicates that this survey considers more of the relative high education group in terms of their attitude and behaviours towards live streaming of E-commerce. See Appendix 2 for details.

As shown in Figure 4-1below, 85.32% of participants have watched the live streaming of E-commerce, as compared to those with no experience of watching live streaming. This indicates that the other questions related to the live streaming would have some reference value. See Appendix 3.

Q4:Have you watched the live streaming of E-commerce?

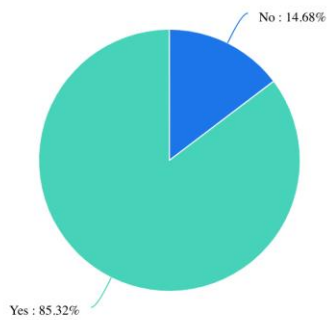


Figure 4-1: Frequency distribution of Q4 variables

Figure 4-2 shows that 65.08% of participants have bought the products introduced by the presenter in the e-commerce live streaming, which is greater than those with no experience of purchasing. This indicates that the other questions related to the purchasing behaviour on live streaming would have some reference value. See Appendix 4.

Q5:Have you bought the products introduced by the presenter in the e-commerce live streaming ?

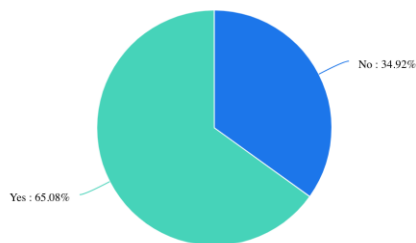


Figure 4-2: Frequency distribution of Q5 variables

Figure 4-3 illustrates that 43.56% of participants strongly agree that online streams are a good source of advertisements indicating that the other questions related to the purchasing behaviour on live streaming would have some reference value. See Appendix 5.

Q6: Online streams are a good source of advertisement

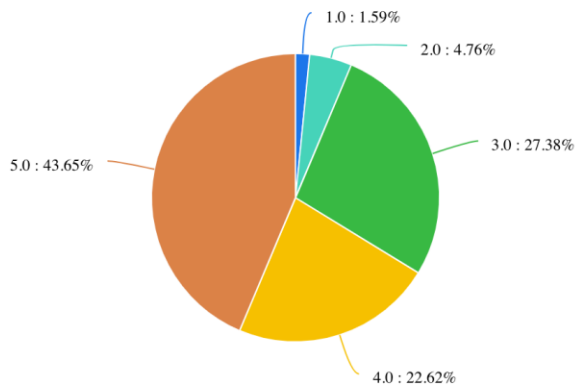
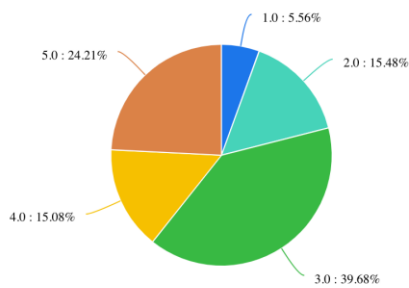


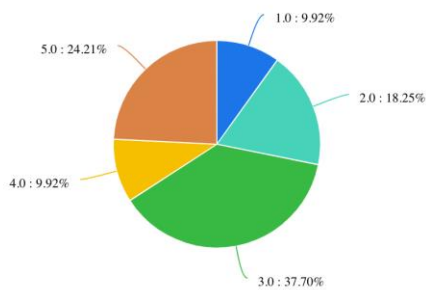
Figure 4-3: Frequency distribution of Q6 variables

Interestingly, in terms of Q7 to Q12, as shown in Figure 4-4, most participants chose the middle level (3) in these attitude questions.

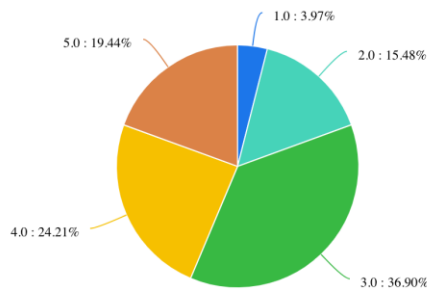
Q7: I rely more on online streaming advertisement than the physical advertisement



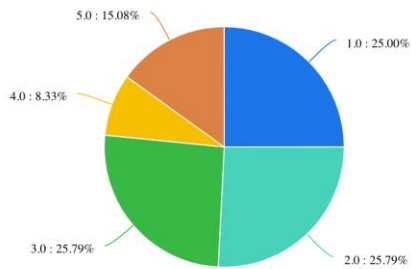
Q8: I prefer seeking information about a product on online streaming platforms



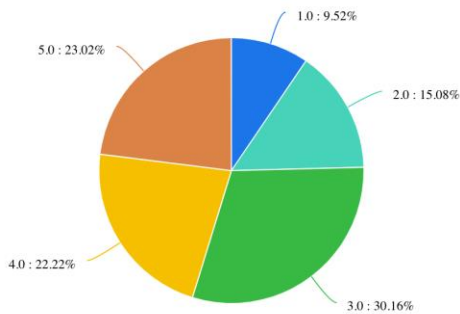
Q9: Online streaming platforms are more likely to advertise realistic products as compared to other platforms



Q10: I visit online platforms that offer streaming services the better part of my day



Q11: I am more likely to see advertisements on online streaming platforms



Q12: After streaming an online advertisement, I visit online shopping stores or physical stores to purchase a product

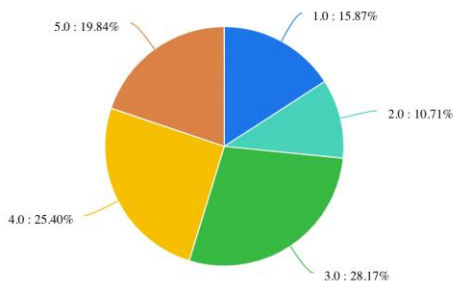


Figure 4-4: Frequency distribution of Q7- Q12 variables

This distribution indicates that most participants hold a neutral attitude towards the live streaming shopping. Their opinions contribute to the normal representations. Most participants are grading in the range of 2.63 to 3.4, based on the averages; they are also indicating they hold a neutral attitude

towards live streaming shopping as shown in Figure 4-5 below.

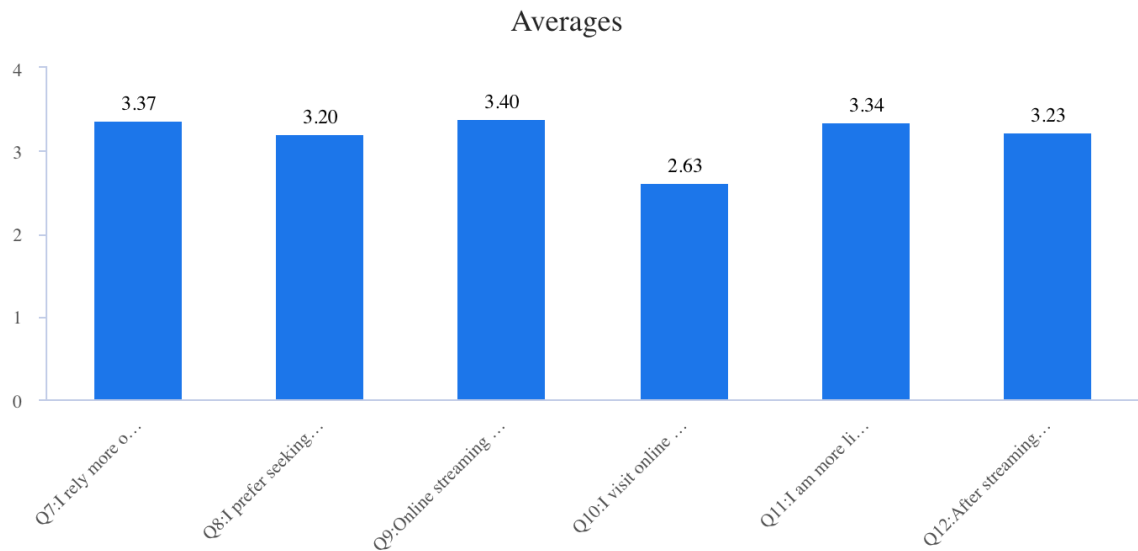


Figure 4-5: Average value of Q7- Q12 variables

On the other hand, this reflects a limitation of the survey analysis in terms of this type of attitude question because most individuals tend to choose the neutral points.

4.2 Test difference for independent samples

The independent sample t-test compares the means between two unrelated groups on the same continuous dependent variable. Here, an independent t-test can be used to understand whether the purchasing power of the consumer on the product of a live stream is different according to gender (i.e., the dependent variable will be "the purchasing power of the consumer on the product on a live stream", and the independent variable will be "gender"; this variable has two groups: "male" and "female").

When choosing to use independent t-tests to analyze data, part of the process involves checking to ensure that the data can actually be analyzed using independent t-tests. This is required because the independent t-test is only used if the data "passes" the six hypotheses required for a valid result. In fact, checking these six hypotheses will increase the analysis time and allow one to think more about the data, but in SPSS Statistics, this is not a difficult task.

First, these six assumptions include:

1. The dependent variable should be measured on a continuous scale (i.e., measured at the interval or ratio level).

2. Independent variables should include two categories, or independent groups. Independent variables that meet this criterion include gender (male or female).
3. It has the independence of observation, which means that there is no relationship between the observations in each group or between the groups themselves.
4. There should be no obvious outliers. The outlier is just a data point in the data and does not follow the usual pattern. The problem with outliers is that they may negatively affect the independent t-test, thereby reducing the validity of the results. Fortunately, when using SPSS statistics to perform an independent t-test on the data, possible outliers can be easily detected.
5. For each group of independent variables, the dependent variable should be approximately normally distributed. The independent t-test only requires approximately normal data because it is "robust" against normality violations, which means that the hypothesis may be subject to some violations and still provides valid results.
6. The variance must be homogeneous, which could be tested by using a Levene's test to assess the equality of variances.
For Q1: "Are there any gender differences towards the purchasing power of the consumer on the product in a live stream?"

Variables used:

Dependent: the purchasing power of the consumer on the product in a live stream (Q5) – (Have you bought the products introduced by the presenter in the e-commerce live streaming?)

Independent: Gender (Q1) -- (Data coding: "Female" as 1; "Male" as 2)
All the assumptions are satisfied.

H0: There are no gender differences towards the purchasing power of the consumer on the product in a live stream.

H1: There are gender differences towards the purchasing power of the consumer on the product on a live stream.

The t-test was used to study Q1: What gender do you identify as? and Q5: Have you bought the products introduced by the presenter in the e-commerce live streaming? Results did not show significance ($p > 0.05$), which means there

is consistency and no gender difference. Since the p-value of t-test is 0.864, H₀ is not rejected under the 5% level of significance, indicating that this report has not enough evidence to conclude that there are differences between males and females towards the purchasing power of the consumer on the product in a live stream.

In addition, comparing the average value in detail between the purchasing power of females and that of males, none of them show significant differences. See Appendix 8- Independent t-test subtotal of Q5 variables under gender difference.

4.3 Test difference for one-sample t-test

The one-sample t-test is used to determine whether a sample is from a population with a specific mean. The overall average is not always known, but it is sometimes assumed. Here, we would like to prove there are gender differences in the purchasing power of the consumer on the product on a live stream. The overall average will be the national situation.

First, these four assumptions were tested:

1. The dependent variable should be measured at the interval or ratio level (i.e., continuous).
2. It has the independence of observation, which means that there is no relationship between the observations in each group or between the groups themselves.
3. There should be no obvious outliers. The outlier is just a data point in the data and does not follow the usual pattern. The problem with outliers is that they may negatively affect the independent t-test, thereby reducing the validity of the results. Fortunately, when using SPSS statistics to perform an independent t-test on the data, possible outliers can be easily detected.
4. For each group of independent variables, the dependent variable should be approximately normally distributed. The independent t-test only needs approximately normal data because it is "robust" against normality violations, which means that the assumptions may be violated in some cases and still provides valid results. The Shapiro-Wilk test can be used to test normality before the SPSS statistical software performs a simple test. All the assumptions tested are satisfied.

For Q1, “Are there any gender differences towards the purchasing power of the consumer on the product in a live stream?”

Except for the above independent t-test, there is another survey question related to this question, which is Q18 (I will focus on an online streaming advertisement and even purchase the product as long as the person in the video is from the opposite gender identity).

H0: People scored ≥ 3 (The opposite gender identity of the online streaming advertisement presenter would encourage the customer to purchase the product).

H1: People scored < 3 (The opposite gender identity of the online streaming advertisement presenter would not encourage the customer to purchase the product).

$\alpha=0.05$

Using a single-sample t-test Q18: *I will focus on an online streaming advertisement and even purchase the product as long as the person in the video is from the opposite gender identity*, whether 1 item is obviously not equal to the number 3.0. It means that at $p<0.05$, the average value is statistically different from the number 3.0. See Appendix 9. The summary shows that the p-value is 0.000, which rejects the null hypothesis since p-value < 0.05 and the mean is 2.579. Thus, it can be concluded that the average score is less than 3, which means that the opposite gender identity of the online streaming advertisement presenter would not encourage the customer to purchase the product.

Blending the results of independent t-test and one-sample t-test analysis, there are no gender differences towards the purchasing power of the consumer on the product in a live stream in terms of customers and presenters.

For Q2, “Does the period of live streaming advertisement affect the response of the consumer?”

Variable used:

The period of live streaming (Q17) – *(The period of a live streaming advertisement would determine whether or not I will purchase the product).*

H0: People scored ≥ 3 (The period of a live streaming advertisement would encourage the customer to purchase the product).

H1: People scored < 3 (The period of a live streaming advertisement would not encourage the customer to purchase the product)

$\alpha=0.05$

The single-sample t-test on Q17: *The period of a live streaming advertisement would determine whether or not I will purchase the product*, is obviously not equal to the number 3.0. It can be seen that the average value is statistically different from the number 3.0. There is 1 item, and their average value will be significantly lower than the number 3.0. See Appendix 10 for details.

The summary shows that the p-value is 0.019, which rejects the null hypothesis since the p-value < 0.05 . The mean is 2.802. Thus, it can be concluded that the average score is less than 3, which indicates that the period of a live streaming advertisement would not encourage the customer to purchase the product.

4.4 Test correlation for independent samples

The Pearson correlation coefficient is a measure of the strength and direction of association that exists between two variables measured on at least an interval scale. A Pearson's correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, r , indicates the degree of relationship. Here, we would like to prove whether there is a relationship between the online streaming platforms and the duration a consumer will watch the video for.

All the assumptions for Pearson correlation are satisfied. Figure 4-6 shows the scatter plot.

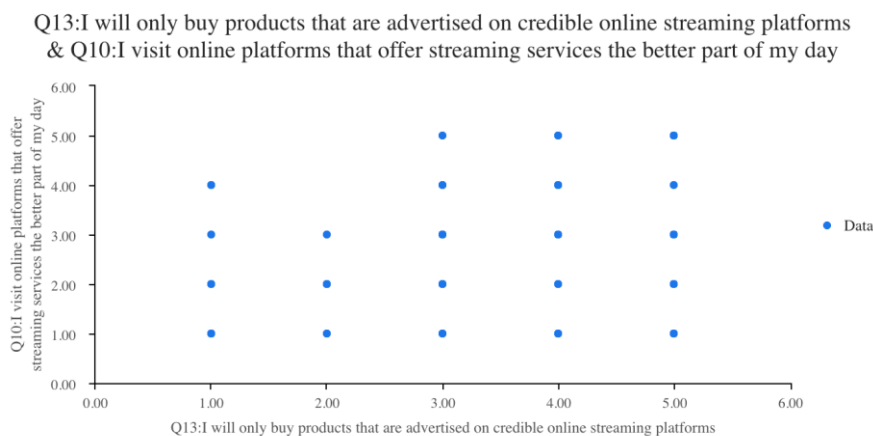


Figure 4-6: Scatter plot of Q13- Q10 variables

For Q3, “Do the online streaming platforms affect how long a consumer will watch the video?”

Variables used:

Dependent (y): the duration a consumer will watch the video (Q10) -- (*I visit online platforms that offer streaming services the better part of my day*)

Independent (x): the online streaming platforms (Q13) -- (*I will only buy products that are advertised on credible online streaming platforms*)

We use relevant analysis to study the correlation between Q10 and Q13. The result shows that the obtained r is 0.226, with a significant level of 0.01 with the p-value that is closed to 0. See Appendix 11 for details.

In addition, the independent variables are not only related to Q13 (*I will only buy products that are advertised on credible online streaming platforms*), but also Q14 (*I will buy products of a given company if they are only streamed on their official website and none other*).

In Figure 4-7, we used multiple independent variables to test the correlation, specifically:

Variables used:

Dependent (y): the duration a consumer will watch the video (Q10)

Independent (x1): whether the online streaming platform is credible (Q13)

Independent (x2): whether the online streaming platform is on an official website (Q14)

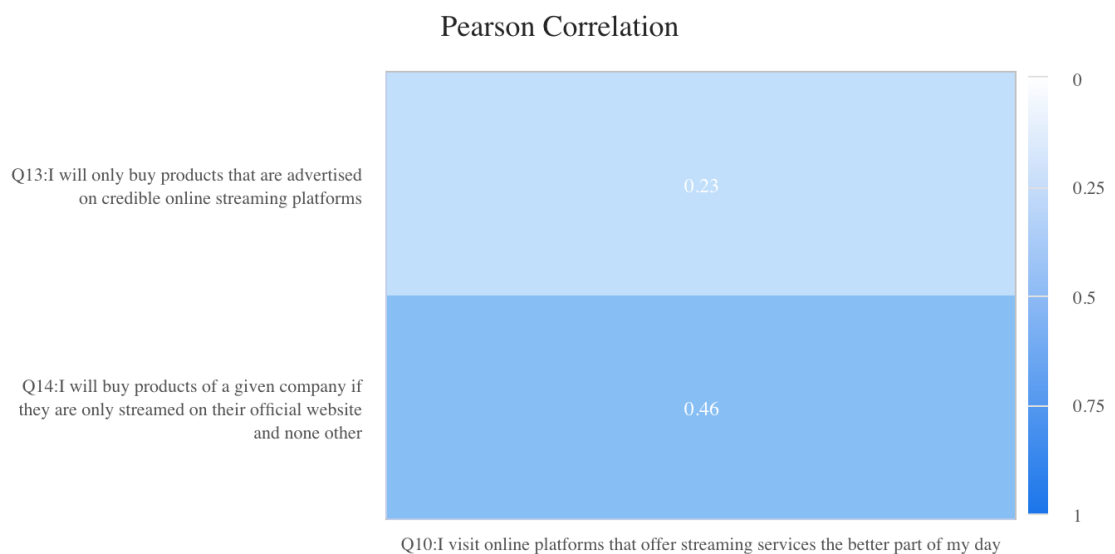


Figure 4-7: Pearson Correlation Analysis of Q13- Q14 variables

In Figure 4-7, Q10, Q13, and Q14 are significantly related based on the

Pearson r indicating the strength of the relationship. The correlation coefficient between Q10 and Q13 is 0.226 (as tested before). Therefore, there is a significant positive correlation between the duration a consumer will watch the video and whether the online streaming platform is credible. The obtained r between Q10 and Q14 is 0.457, indicating a significant positive correlation. Rumsey (2018) states that a +0.5 Pearson correlation is a moderate uphill relationship between 2 variables. Therefore, there is a significant positive correlation between the duration a consumer will watch the video and the online streaming platform (see Appendix 12 for details).

For Q4, “Does the quality of the live stream affect the customer’s purchasing attitude?”

Variables used:

Dependent (y): the quality of the live stream (Q15)

Independent (x): the customer’s purchasing attitude (Q19)

In Figure 4-8, the obtained Pearson correlation coefficient between Q15 and Q19 is 0.55, significant at 0 .01 level, indicating a significant positive moderate relationship.

In addition, the independent variables are not only related to Q19 but also Q16 (*I will buy any product of my preference as long as it has been streamed online*).

In Figure 4-8, we use multiple independent variables to test the correlation, specifically:

Dependent (y): the quality of the live stream (Q15)

Independent (x1): the customer’s purchasing attitude in terms of physical purchasing preference (Q19)

Independent (x2): the customer’s purchasing attitude in terms of streamed online purchasing preference (Q16)

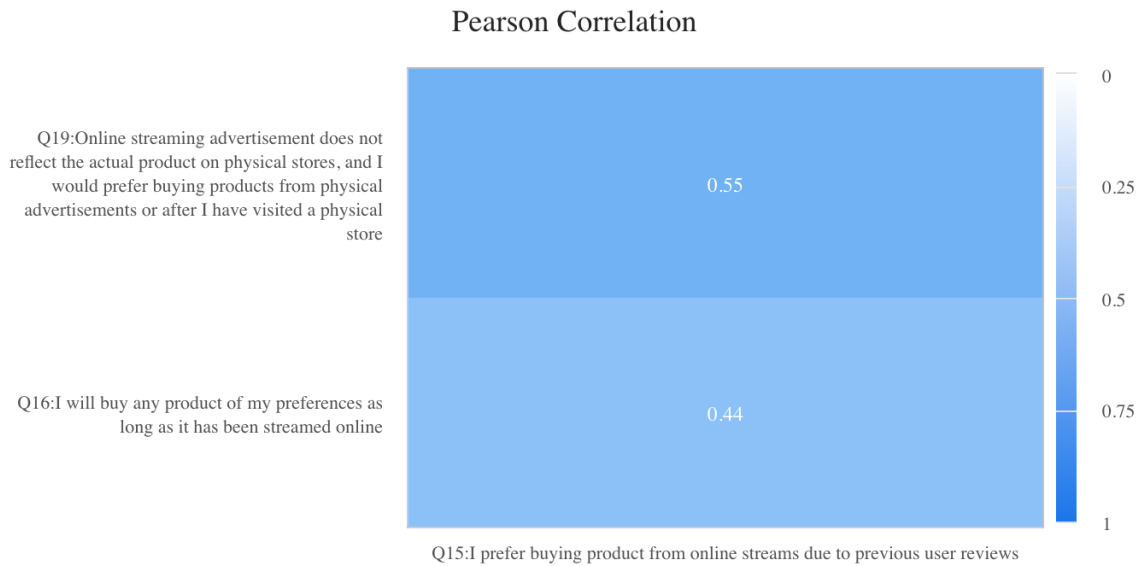


Figure 4-8: Pearson Correlation Analysis of Q19- Q16 variables

In Figure 4-8, the correlation between Q15 and Q16 indicates that the strength of the correlation is moderate ($r= 0.437$), significant at 0.01.

Specific analysis shows that the r value between Q15 and Q19 is 0.551, at a significant level of 0.01, indicating a significant positive correlation between the quality of the live stream (Q15) and the customer’s purchasing attitude in terms of physical purchasing preference (Q19). Therefore, a significant positive correlation exists between the quality of the live stream (Q15) and the customer’s purchasing attitude in terms of streamed online purchasing preference (Q16).

Conclusions and Recommendations

Based on the findings, it can be concluded and recommended that:

- 1) There are no gender differences in the purchasing power of the consumer on a live streamed product in terms of customers and presenters. There is no need to design different live streams to cater for female and male consumers. Instead, offer some more incentive advertisement to attract more consumers.
- 2) Spending more time advertising in live streaming will not affect the response of the consumer. Hence, it would be possible to offer some more incentive advertisements to attract consumers. Ham and Lee (2020) stated that providing an attractive design of an advertisement is an effective way to increase the rate of purchasing. However, the authors also pointed out that this way is only viable in the short term.

Other advertisement improvements require further research.

- 3) There is a positive relationship between the duration a consumer will watch the video and the online streaming platforms. The quality of online streaming platforms will affect the duration a consumer will watch the video. In addition, there is a stronger positive relationship between the duration a consumer will watch the online video on an official website. Therefore, it may be important to increase the quality of online streaming on the official website in order to motivate customers to spend more time watching the video.
- 4) There is a positive relationship between the quality of the live stream and the customer's purchasing attitude. The quality of online streaming will affect the customer's purchasing attitude. Therefore, it may be important to improve the quality of online streaming, such as offering more positive user feedback through promotional activities, to motivate customers to alter their purchasing attitude and put more confidence in online stream purchasing.
- 5) There are levels of education differences towards the purchasing power of the consumer on the product in a live stream. A live stream advertisement should identify and seek the education level of target customer groups and then improve their customer attachments. Specifically, the live stream advertisement could implement some data collection and analysis and categorize them as different educational groups to increase customer awareness and encourage purchase of live streamed products.
- 6) People are more likely to buy a product after it has been streamed online rather than visiting a physical store. This can be explained by the quality of online streaming affecting the customer's purchasing attitude.

Interestingly, this difference is significant at the 1% level suggesting that live stream advertisers should be aware of this huge difference and try to grab this great opportunity to market more products by live stream to gradually attract many customers.

Limitations and Future Directions

In spite of the numerous advantages in using the questionnaire, some limitations still exist:

- *It is considered insufficient to understand certain forms of information, namely changes in emotion, behaviours, feelings, etc., as it only asks for a limited amount of information without explanation. The results only provide numerical descriptions rather than exhaustive narratives, and generally do not describe human feelings in such detail. They provide less detail of behaviour, attitude, and motivation.*

This implies the need for more in-depth qualitative data from interviews and focus groups in future research.

- People's understanding of each question may be different, so they respond according to their own understanding of the question – that is, "good" for someone may be "bad" for others, so there is a certain degree of subjectivity that is not recognised (Meng, Jiang & Wu, 2019).

Future researchers could consider using mixed methods of research to achieve a balanced depth and breadth of results.

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6 – Awareness and intention of using chatbots in education

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Abstract

This study investigated how students are predisposed to engage in chatbot-based solutions that support administrative education-related tasks. Three groups comprising 90 students enrolled in IT programmes of a tertiary institute, participated voluntarily in the survey. From a practical standpoint, this has contributed to demonstrate how different stratum of students might embrace a chatbot-powered solution intended to support processes within the HEIs landscape. The data collected included the student awareness of chatbots, their intention in using them by highlighting the features that confer advantages, and the factors that would deter students from using chatbots. The analysis of the data has not led to solid conclusions but rather the usage is driven purely by compelling conversations based on topics such as reminders, academic lifecycle assistance that students place most importance in. Dialogue richness in the chatbots could better serve the students, but it would be more conclusive if the student gets acquainted with them in a practical setting first.

Keywords

Higher Education Institution (HEI), Conversational agent, Chatbot, Knowledgebase approach, Dialogue richness.

1. Introduction

Chatbots are enlivening the lifeless websites of industries ranging from E-commerce to leisure to Higher Education Institutions (HEIs). This mainstream is the result of the latest advances in natural language processing and the spread of tools that facilitate chatbot implementation. Also, the massification of messaging applications and the increasing reliance on the smartphone have reinforced a pervasive use of digital technologies. The usage of chatbot strategies is becoming popular in streamline administration-and-marking business tasks but less often in teaching. IT technologies, be it infrastructure or services, are pivotal to productivity and economic returns. It is claimed that not looking into enquiries deters school prospects from enrolment (HR Hannover Research, 2014), and a chatbot-based deployment might overcome

such a pitfall by answering them 24/7 so that it yields better incomes.

Administrative Services in education alludes to the setting of the education system whereby a collective group combines human and material resources to execute inherent functions (Clarizia, Colace, Lombardi, Pascale, & Santaniello, 2018). There are applications of chatbots in education ranging from assisting visually-impaired students (Hajare, Bhosale, Nanaware, & Hiremath, 2018) to reducing the lack of engagement and giving encouragement to teacher assistants (Pokatilo, 2016). Since 2005, the strands of chatbot research have striven for them to become a teaching and learning tool in online education. Nevertheless, administrative tasks performed on a day-to-day basis take centre stage with such an influx of chatbots (Bani & Singh, 2017). So far, the benefits of using chatbots have included enabling educators to prioritise resources, direct student instruction resulting in maximising class time, and reduction of classroom orchestrator tasks (Brennan, 2006). Overall, chatbots can perform repetitive automated tasks at a human-impossible scale, and as they become intertwined in people's activities, it is expected to increase the dependency on them.

This research aimed to understand how a disruptive technology like a chatbot comes to be embraced and finding out the potential user awareness of it to deliver educational administrative services.

Five research questions were addressed:

RQ1: Are the students familiar with the concept of chatbots?

RQ2: Are students aware of chatbot-based applications performing school administrative functions?

RQ3: Which features of chatbots would confer advantages to students as users?

RQ4: Which factors influence the students to use chatbots?

RQ5: Which factors deter the students from using chatbots?

2. Literature review

2.1. The ongoing evolution of chatbots

By 1966, the computer programme ELIZA playing the role of a psychotherapist, had been able to conduct human-like conversations (Weizenbaum, 1966), while PARRY followed in 1972 (Cerf, 1973). However, these kinds of programmes were rudimentary in terms of knowledge. In 1994, they were termed ‘chatbots’ for the very first time (Mauldin, 1994). Overall, a chatbot is defined as an Artificial Intelligence (AI) application that answers different questions made by different users. It automates or optimizes business processes while participating in voice and text-based conversations. AI has made chatbots capable of impersonating human interlocutors to perform communication tasks (Gogh & Kovari, 2018).

Molnar and Szuts (2018) state that chatbots are broadly applicable to education with the ongoing advancements of Natural Language Processing (NLP.) They also highlight that as the latest generation wants everything, even education, everywhere, and at any time at their fingertips, they are enthusiastically keen to receive information from chatmates. The uptake of chatbots being used in learning-driven environments dates back to 2008 (De Pietro & Frontera, 2005). By that time, the authors, thriving for progression, had relied on Artificial Intelligence Machine Learning to tutor in e-learning platforms. The rise of low-latency internet and web use spread have made way for different types of chatbots (Bird, Ekart, & Faria, 2018).

2.2. The quest for AI

Language is a feature unique to humans. The context-dependent information and the recursive grammatical resources when used correctly, produce flow-based conversational states that make the chatbot be perceived as humanlike (Go & Sundar, 2019).

Because of the improvements in AI, chatbots also understand what the user is trying to inquire about and can reciprocate with the right answer like a human interlocutor would (Hien, Cuong, Nam, & Nhung, 2018). There are also chatbots that cannot evoke reasoning (Dibitonto, Leszczynska, Tazzi, & Medaglia, 2018), and seem pretty unintelligent sometimes. For instance, LiSA is a virtual assistant unable to understand human pedagogy, but fully understands the user experience through interaction. Besides, LiSA can slightly outdo some peers; it automates tasks by processing natural language inputs and facing multiple requests. Chatbots functionality may resemble intelligence, providing there are three critical dimensions: perception,

machine learning and planning (Følstad & Brandtzæg, 2017).

2.3. The knowledgebase approaches

The chatbot mainstream has moved toward the knowledgebase (KB) approach. In KB, questions are linked to standardized answers. The dialogue scripts are created dynamically depending upon the user questions. Put simply, a user-issued utterance or query, that is interpreted, is searched for in a repository and returns a response that best matches the query (Gapanyuk, et al., 2018).

A knowledgebase processing module solves two main tasks: question answering and active dialogue with the user. The responses are based on knowledgebase data, the user's intent is recognized, and the history of questions and answers are stored in each session (Hettige & Karunananda, 2015).

The Semantic Web provides the Resource Description Framework (RDF). It links and shares data resources through applications, enterprises and communities. This resource allows the creation of a larger ongoing KB (Hallili, 2014). The architectural and design aspects of the chatbot that cover topics on the knowledge domain, response generation, text processing and the machine learning model are reviewed in the implementation of the chatbot. For example; online deep reinforcement learning enhances chatbots open-domain conversational skills that make the chatbots able to learn conversations from real users. Thus, into the scene comes the prospect of censorship: a system that checks whether the chatbot's speech is appropriate otherwise blocks offensive responses and gives a negative reward to "punish" the chatbot (Chai & Liu, 2018).

2.4. Question interpretation and the natural language interpretation

People ask chatbots questions to learn what they would not otherwise be unfamiliar with. The long-standing goal is to hold a conversation in natural language while understanding the intent of the conversational partner to reply to them appropriately. These so-called bot-human dialogues follow certain symmetry that is shaped by elements such as damage control statements which guarantees communication reciprocity or adaptation of responses to the users' preferences.

So far, the conversation systems have roughly drawn two strands, retrieval-based and generation-based systems. The aim is that the more natural and direct the conversations, the better. Conversations unfold in alternating turns.

The degree of turn-taking activity leads to a fully interactive free exchange condition. Given it is claimed a reduction of interactivity disrupts mutual understanding (Lew, Walther, Pang, & Shin, 2018), there are restricted conditions where subjects use a half-duplex channel managed by push-to-talk.

In a collaborative human setting, interlocutors consider each other's perspectives when communicating, and decide to remind one another about salient knowledge and strive for at least an approximate attentional state (Stone, Reeder, Parillo, Long, & Walb, 2018), whereas in the cooperative-behaviour approach adopted by chatbots, there are signals that define and swap the roles of the addressee, bystander, and overhearer (Lio, Yoshikawa, & Ishiguro, 2017). Then, when a response is received, the interlocutors rely on the chatbot's comprehension to interpret the meaning of the question (Spatola & Urbanska, 2018).

Semantically, the classical notion of entailment to enquire/question, captures the standard relation of logical consequence, held by pieces of information alongside the relation of logical dependency (Dušek, 2017). In proof-theoretical terms, through questioning it is inferred that arbitrary information of a given type can even construct formal proof of dependencies. Moreover, in the propositional setting the algorithms that compute these dependencies can be extracted; the type described by the enquiry turns into the type described by the response (Ciardelli, 2018). The enquiry is expected to use language that easily makes the counterpart grasp the intended meaning behind it. In general, the natural language question interpretation approach concentrates on the input of textual information to determine three elements:

- The Expected Answer Type (EAT) – what is being looked for.
- The property to link the entity on which something is being enquired, to the proper answer.
- The Named Entity (NE), or the subject of the given enquiry.

The natural language process attempts to retrieve all possible NEs from the KB by matching the user's question to KB property values. In particular, the task is restricted by those entities for which at least one string stands consistently given a referent (Derczynski, et al., 2014). The properties are determined by matching metadata with the user's question. Then, they are selected following a scoring strategy. A relational graph representing the user's question is concretely constructed which contains the identified properties along with the found resources. Finally, The EAT detection takes place, using their respective domain types alongside the score assigned to the property. Suitable responses come up from each property being mapped with lists of response patterns.

Most recently, the urgency about direct conversations is driving science to exploit Deep Learning techniques in the generative models (Baghaee, 2017). As a result, chatbots are expressing themselves easily, articulately and coherently and contributing to ordinary conversations held between humans and machines (Nair, Johnson, & Sathya, 2018).

2.5. Information Technology (IT) identity

Nature, characteristics and attributes lead people to place the importance of embeddedness of chatbots into individuals' practices. Identities structures can be categorised into three major groups: role, group and person (Burke & Stets, 2009). The set of meanings an individual attaches to the self about information technology (IT) becomes embedded in their daily life due to the degree that the role plays as a medium, determinant, and consequence of identity (Carter, Compeau, Lawrence, & Schmalz, 2017); IT turns out to be part of an individual's self-definition (Stein, Galliers, & Markus, 2013). IT identity has come out to delineate the current understanding of IT as a medium of identity by which people express, maintain, and expand their self-concepts (Carter & Grover, 2015). Consequently, the identities are attached to the social structure and in turn, are developed by interaction with entities such as avatars or chatbots (Stets & Burke, 2000). By 2016, a study had concluded that self-confidence is provoked by using Assistive Technologies, such as a chatbot (Shinoara & Wobbrock, 2016). Two concepts elaborate the causality of this proposition.

Firstly, the expectable use is a concept that symbolises the user's disposition to eagerly use IT classes that lay affective, cognitive and behavioural foundations (Walsha, Gettler-Summa, & Kalika, 2016). The construct is rooted in epistemic knowledge spread according to Burke (1991), who emphasises the internal dynamic influence of the personal behaviour within the self and the reasoned goal-fulfilment purpose. Secondly, IT identity is also depicted by people and robots teaming up so that they can outperform their fellow teams. An emotional attachment to the robot or IT classes is formed (Sangseok & Lionel, 2017).

2.6. Technological Acceptance Model (TAM)

The consent for the chatbot's usage does not happen by chance. Underlying theories elaborate and make understandable the acceptable behaviour for any class of IT. User acceptance follows the chain belief-attitude-intention-behaviour (Davis, Bagozzi, & Warshaw, 1989). The studies on Technological Acceptance Model (TAM) are rooted in two major assumptions:

- Perceived usefulness (PU) means the individual's belief in the usage of the technology to get the job done outstandingly (Adams, Nelson, & Todd, 1992).
- Perceived ease of use (PEOU) that Adams, Nelson and Todd define as the straightforward usage of classes of IT.

By 2017, the eagerness to adopt new technologies had systematically been compiled into the reification of the attitude-like nature based on TAM2 (Venkatesh & Davis, 2000) and the combination of TAM and Theory of Planned Behaviour (TPB) (Momani, Jamous, & Hilles, 2017). Thus, other constructs are underlying:

- Experience
- Integrative use
- Outcome expectations-performance
- Pragmatic quality
- Sensory perceptions

However, not all of them, such as education-based, are related to how people judge naturalness of a chatbot-based conversation partner and their usefulness in streamlining ancillary activities (Morrissey & Kirakowski, 2013).

2.7. Chatbots in education

Chatbots have been fruitful in education settings. For example, the Georgia Tech chatbot that answers questions (Molnar & Szuts, 2018), the Georgia State University chatbot that guides students through the admittance process (Page & Gehlbach, 2017) and FIT-EBot has improved incumbent services as it automatically gives a response to a student enquiry related to the services provided by the HEI on behalf of the academic staff (Hien, Cuong, Nam, & Nhung, 2018).

The aforementioned are some but not limited to the tasks chatbots can perform. Retrieving record data, scheduling meetings, generating reports, and submitting transactions are further examples. The more generalist chatbot is Microsoft's XiaoIce (Zhou, Gao, Li, & Shum, 2018). A Microsoft-calibre research team has been required to build a strong understanding of the world and make it that impressive. However, it is advisable to restrain user ambition, that is, to limit the scope, given that the most successful bots solve specific problems. FAQ Chatbots are the simplest form, being robust when integrated with enterprise systems which allow HEI to better serve the students (Chandel, Razaque, Yang, Yuying, & Yujie, 2018).

3. Methodology

3.1. Participants

Three groups comprising of 90 students, voluntarily participated in this study at a Private Training Establishment (PTE) in New Zealand. The institution offers tertiary programmes, allowing the students to be matriculated as undergraduates (U1) and postgraduates (P1 & P2) in IT-based programmes, which are stratified. Information systems, innovation management, and service computing are subjects within the curriculum that the enrolment follows. The research targeted these students as they are knowledgeable about advance, current and digital technologies where the chatbot topic fits into. However, the underlying concepts such as acceptance and intentionality in user attitudes are rather complicated for layman.

3.2. Research Design

The study context was about students acknowledging chatbot solutions and the likelihood to use them within the educational landscape. An objective reality refers to how chatbots would be accepted and determining whether or not the students are aware of the technology and the benefits it derives. To address the research questions, it was followed by a quantitative study. The strategy was to perform a survey, positing that an IT background and the qualification the students are currently gaining, identifies any correlation between the acknowledgment of chatbot-related topics and the adoption of chatbots.

This explanatory survey leveraged an instrument with patterns and themes over the application of chatbots in education to gather data. The instrument contains elements that would depict the students' knowledge of chatbots alongside the elements that lead students to or deter them from the use of chatbots. The justification of having conducted a survey in this study lies in:

- Surveying the IT qualification seekers provides the researcher with a categorical description. In other words, a view supported by a body of opinion that prevails amongst students that are actually knowledgeable about IT innovations.
- Collecting data from the part-takers without changing the environment setup, enables the researcher to evaluate how knowledgeable the students are and to predict their intention in using chatbots.

Bearing in mind there are constructs that may have been beyond students' understanding, they were made understandable for the participant by using the

simplest few words that manifest what has been asked. Put it another way, the constructs are compiled in readable questions written in plain English for the respondents to comprehend fully. However, a paper-based approach was preferred despite being resource-intensive, because they confer advantages over the internet-mediated ones, in terms of a higher response rate.

On the venue, an introduction of the purpose of the research was made. In order for people to not feel intimidated and lying when asked technical questions, a clip to get the respondents acquainted with a chatbot was played prior to handing out the questionnaire. It was organised, as follow: An Information Sheet stating purpose, confidentiality, participation refusal choice, the consent form clearly derived from filling the questionnaire and some technical definitions. Next, were two sections: the first one to assess the IT background and former IT experience, and a second one with the questions related to the constructs. For fine-tuning, the first release of the questionnaire was assessed by the supervisors who suggested either to refine or eliminate some questions. Neither pre-test nor pilot study took place due to the timeframe.

To deepen the understanding of awareness and intention in using chatbots and guided by the research questions, the researcher operationalised TAM and IT Identity theories into questions. The constructs were proposed to be measured by finite discrete values. As a result, the questionnaire included questions that ask for “Yes,” “No,” “Do not know,” and “Do not care” categories. Likewise, there are questions that ask for wording choices. Each choice depicts a category coded by a number. However, it is irrelevant the number order and the set of data is therefore suitable for observing the mode. The remaining questions collect categorical data on the variables: familiarity with, the likelihood of use and the usefulness of chatbots. There, the choices have been put into definite order:

- "Definitely yes," "Probably yes," "Might or might not," "Probably not," "Definitely not."
- "Extremely helpful," "Very helpful," "Somewhat helpful," "Slightly helpful," "Not at all helpful."
- "Extremely familiar," "Very familiar," "Somewhat familiar," "Slightly familiar," "Not familiar at all."

3.3. Data collection and analysis

Collecting data from people about social practices requires building a trust-centred rapport with participants, protecting their privacy, and promoting the integrity of the research. The respondents were made aware of their

anonymous participation, the purpose of the study, the use of the data and their confidentiality. The survey encompassed the selection of a significant sample of people from the population of interest at one point in time, for providing sufficient statistical power that leads to drawing general conclusions about views of the study population.

The undertaking took two weeks at the campus during the lecturer's time. On the one hand, face-to-face administration guaranteed better response rates. On the other hand, approaching the respondents involved finding out when and where they are available. The researcher distributed the questionnaire in person, however, the respondents read the question and selected a response by themselves without researcher interference. Each questionnaire was named by a cardinal that relates it to a row within a spreadsheet. The data collected was input into the Google Sheet, as quantitative raw data that was subsequently processed and analysed on Microsoft Excel by the creation of tables and charts. The data captured from the questionnaires is transformed into information by quantitative analysis techniques that enabled the researcher to create simple tables, and charts. They showed the frequency distribution which enabled comparisons.

3.4. Results

3.4.1. Profile of respondents

The demographic profile involved information about the student's current programme and IT background, taken as the baseline and the initial set of critical data used for comparison and control. Ross (2018), however, claims the type of education does not yield empirical results when analysing the chatbot adoption stimulus, and the level of education. Ross also states it should be an utter driver of the adoption of chatbots, but this has not been yet theorised.

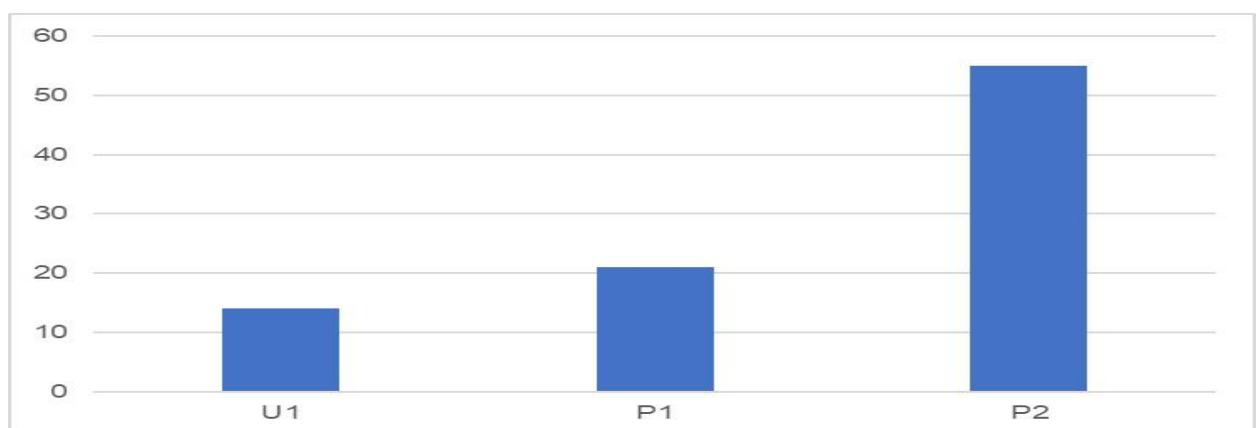


Figure 1. Students enrolled in IT programs

The stratification of the respondent population from three different strata (Figure 1):

- 15.55% are students enrolled in an undergraduate programme U1
- 23.33% are students enrolled in a postgraduate programme P1
- 61.11% are students enrolled in a postgraduate programme P2

As far as the IT background is concerned, the figures for ‘do-not-have-IT-background’ are higher in two out of the three strata (Figure 2). It depicted that only undergraduate students claim to have an IT background.

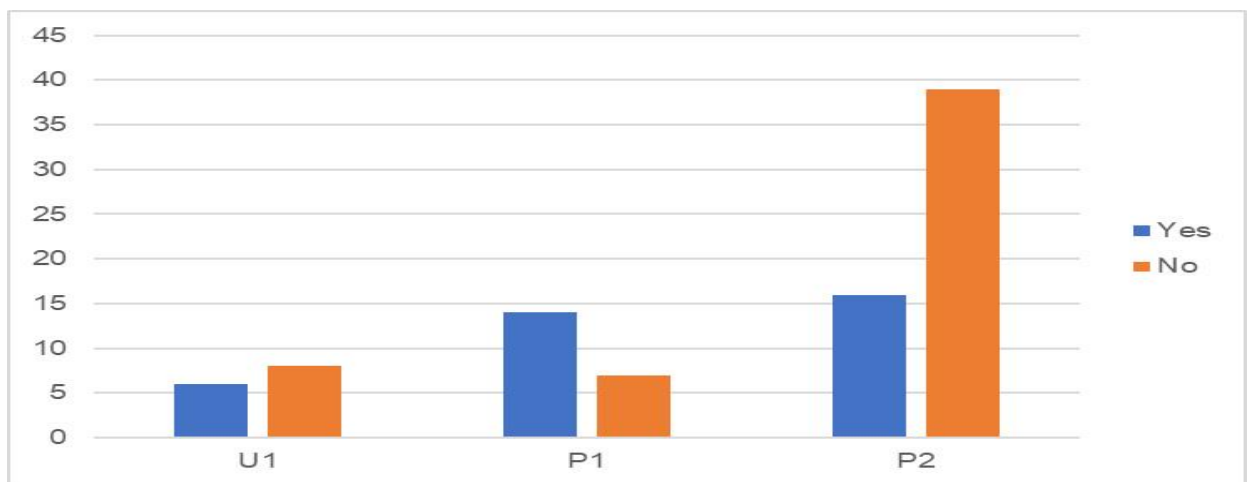


Figure 2. Students' IT background

Turning to the area of study that the respondents came from, most of the students had come from another area, whereas students coming from ‘Computer Science’ recorded the lowest figures (Figure 3).

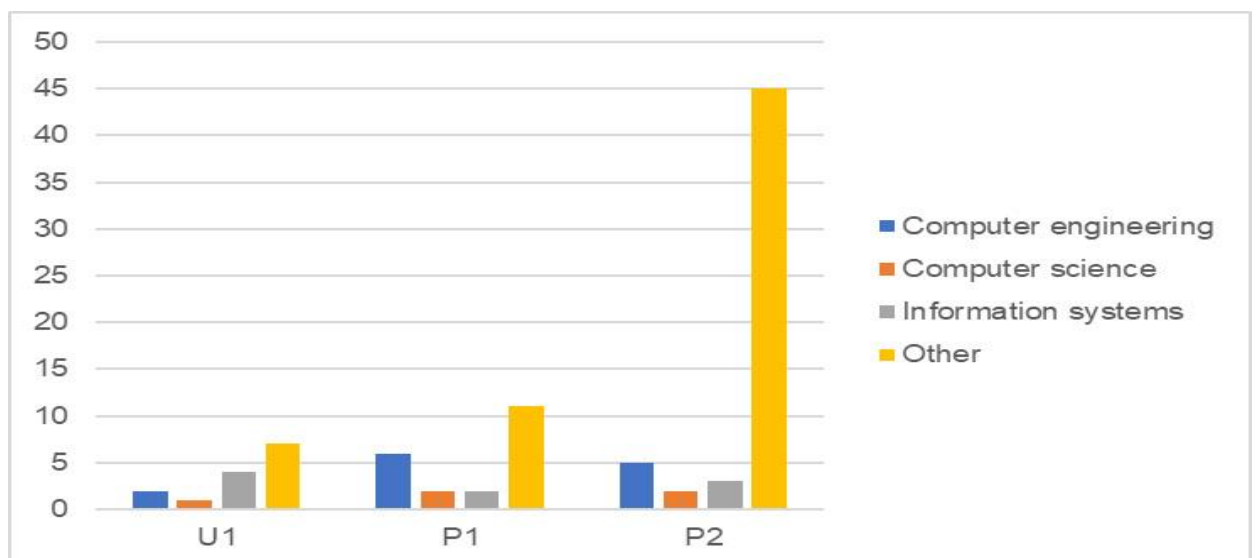


Figure 3. IT area the students come from

3.4.2. Descriptive statistics

Most of the students claim to know they have communicated with a chatbot. However, it is not insignificant the proportion who said they had not (Figure 4).

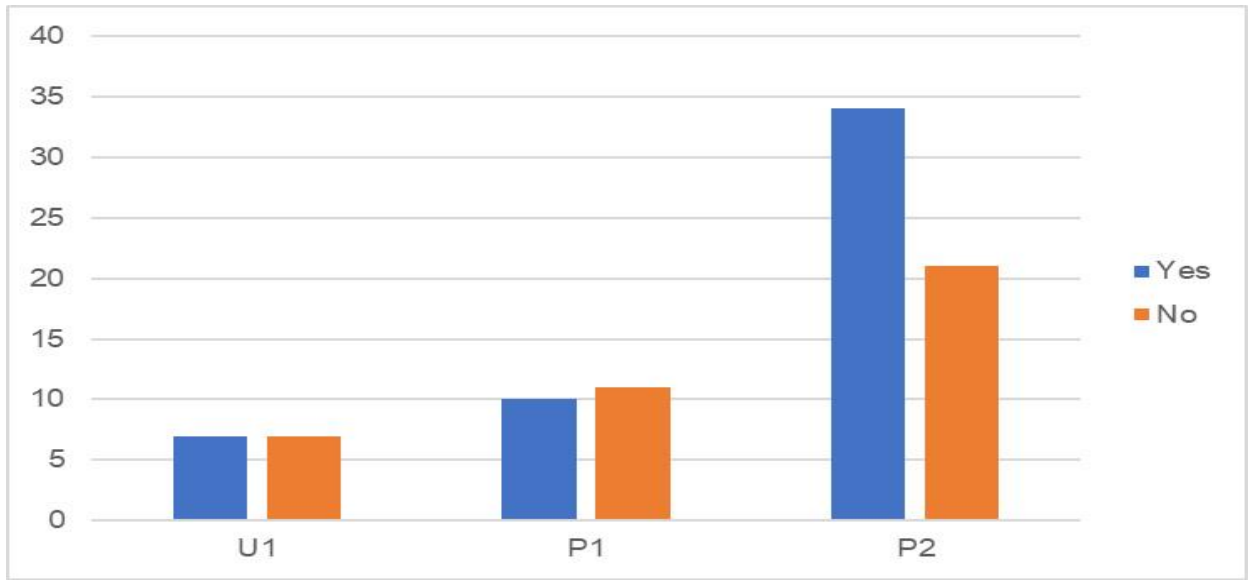


Figure 4. Have you ever knowingly communicated with a chatbot?

The participants were asked whether chatbots should take the form of a human? The answer “No” stands out in two out of the three programmes, however, the answer “Do not care” is also significant as it recorded the same figure as the choice “Yes” in two out of the three strata (Figure 5).

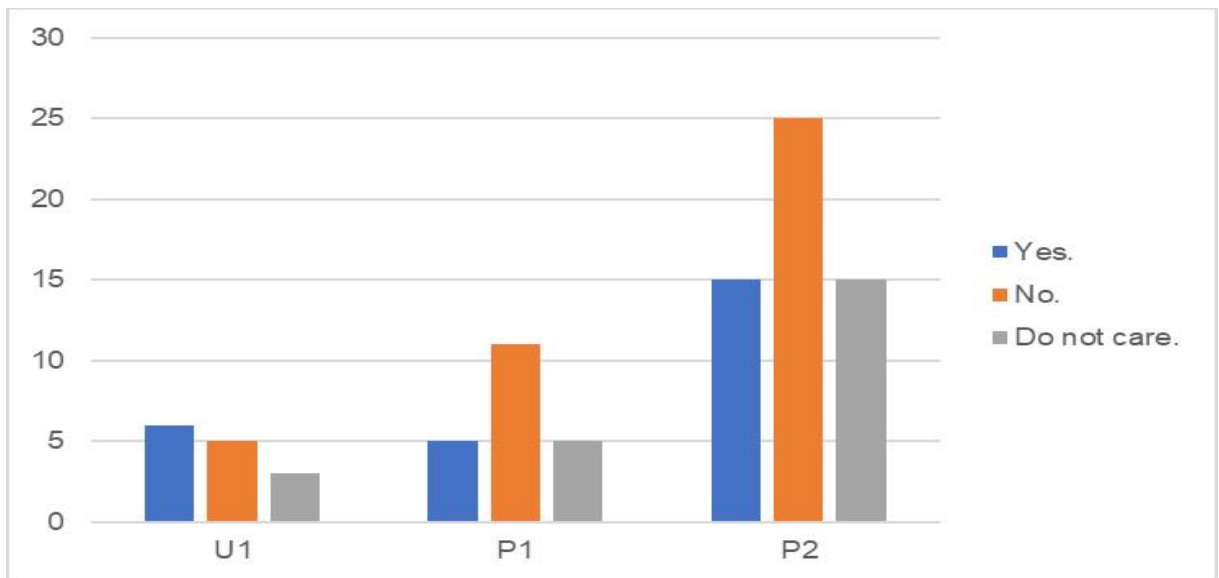


Figure 5. Should chatbots take the form of a human?

Regardless of the stratum, the students believe that a chatbot would be acceptable whenever a human touch is needed. Over 60% of the responses back up that stance (Figure 6).

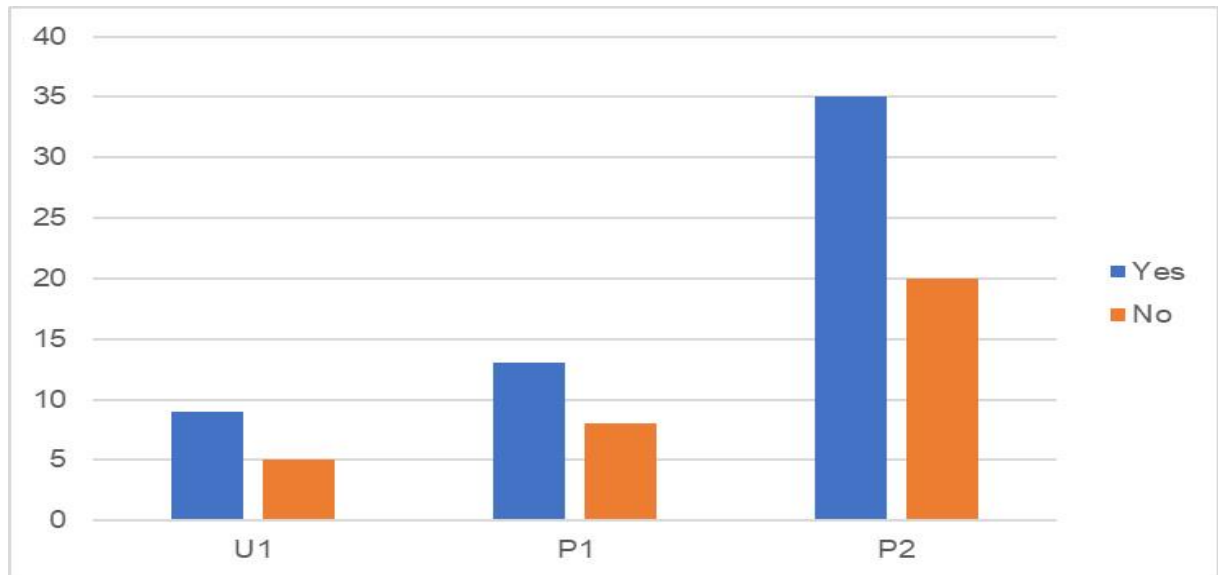


Figure 6. Do you think a chatbot can be suitable when a human touch is needed?

Intending to find out whether a chatbot would make the students feel comfortable when communicating, the number of positive replies outnumbered the neutral and negative answers (Figure 7).

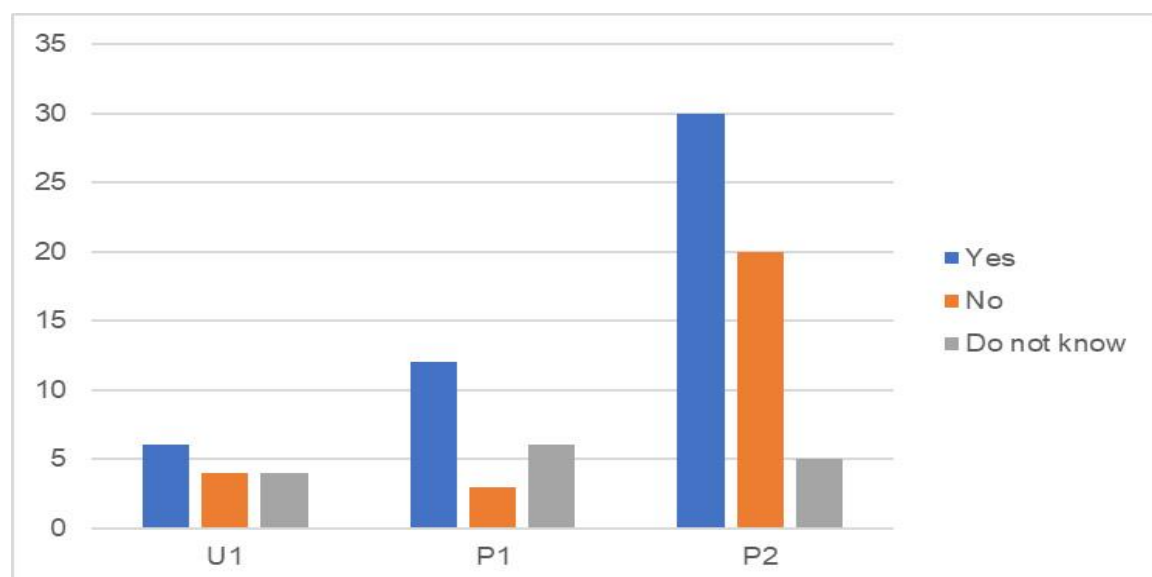


Figure 7. Would you feel comfortable communicating with a chatbot when receiving the same information from a human?

The students were questioned to figure out the extent they were familiar with

the concept of chatbots. It has to be noted that overall, 35 out of the 90 answers claimed to be “Slightly familiar” (Figure 8).

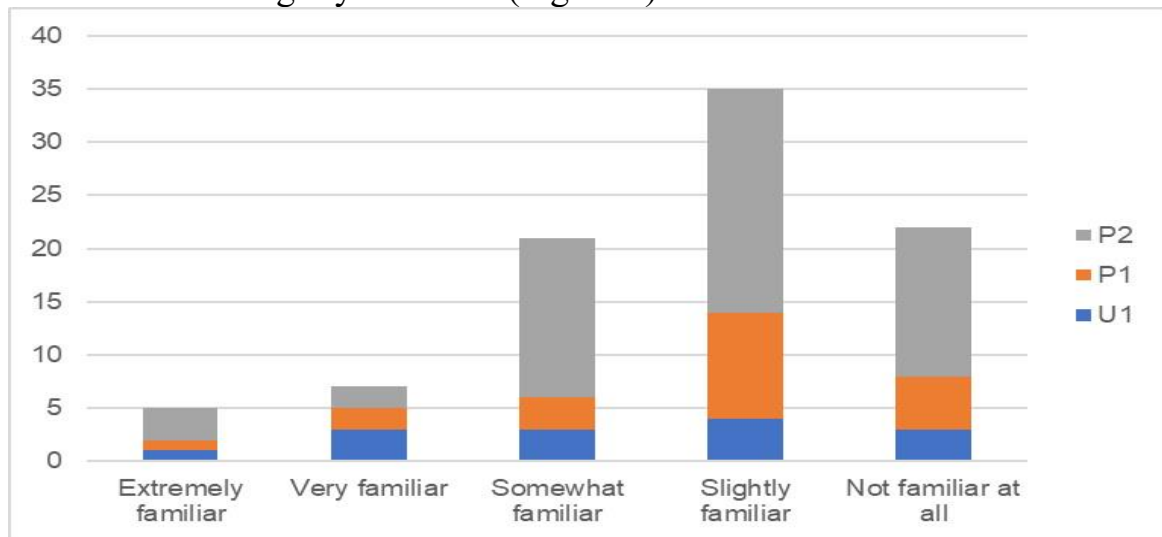


Figure 8. How familiar are you with chatbot technology?

Analysing the stratum yielded a deeper insight (Table 1) in which roughly the same proportion of U1 students (over 20%) chose “Very familiar,” “Somewhat familiar” and “Unfamiliar.” In the P1 stratum, the choice of “Unfamiliar” stood at second place with around 24% of the responses. However, in P2 “Slightly familiar” was followed by “Somewhat familiar.”

Table 1: Cross-tabulation of familiarity with the technology

	Extremely familiar	Very familiar	Somewhat familiar	Slightly familiar	Not familiar at all
U1	7.14 %	21.43 %	21.43 %	28.57 %	21.43 %
P1	4.76 %	9.52 %	14.29 %	47.62 %	23.81 %
P2	5.45 %	3.64 %	27.27 %	38.18 %	25.45 %

The students were also questioned in connection with the functions they did not know chatbots contained. They highlighted answering questions, helping students anytime/anywhere, and suggesting content from other knowledge sources as the popular choices (Figure 9). Furthermore, Table 2 shows the stratum U1 students in regards giving recommendations about learning-material as the fourth choice. As to P1 and P2 students, the same four choices concentrated most of the responses but were arranged in a different order.

Table 2: Cross-tabulation of the functions that chatbots currently retain

	Provide content from other knowledge sources	Give recommendations about learning material	Hold topic specific conversation	Ask students questions	Answer students' questions	Help students 24/7	Provide means of contact with the lecturer	Expand the NLP (Natural Language Processing) knowledge base	Others
U1	16.67 %	16.67 %	8.33 %	8.33 %	16.67 %	16.67 %	7.14 %	5.95 %	3.57 %
P1	20.00 %	11.43 %	10.48 %	5.71 %	15.24 %	18.10 %	9.52 %	7.62 %	1.90 %
P2	14.06 %	15.63 %	10.16 %	3.91 %	19.53 %	16.41 %	10.94 %	6.25 %	3.13 %

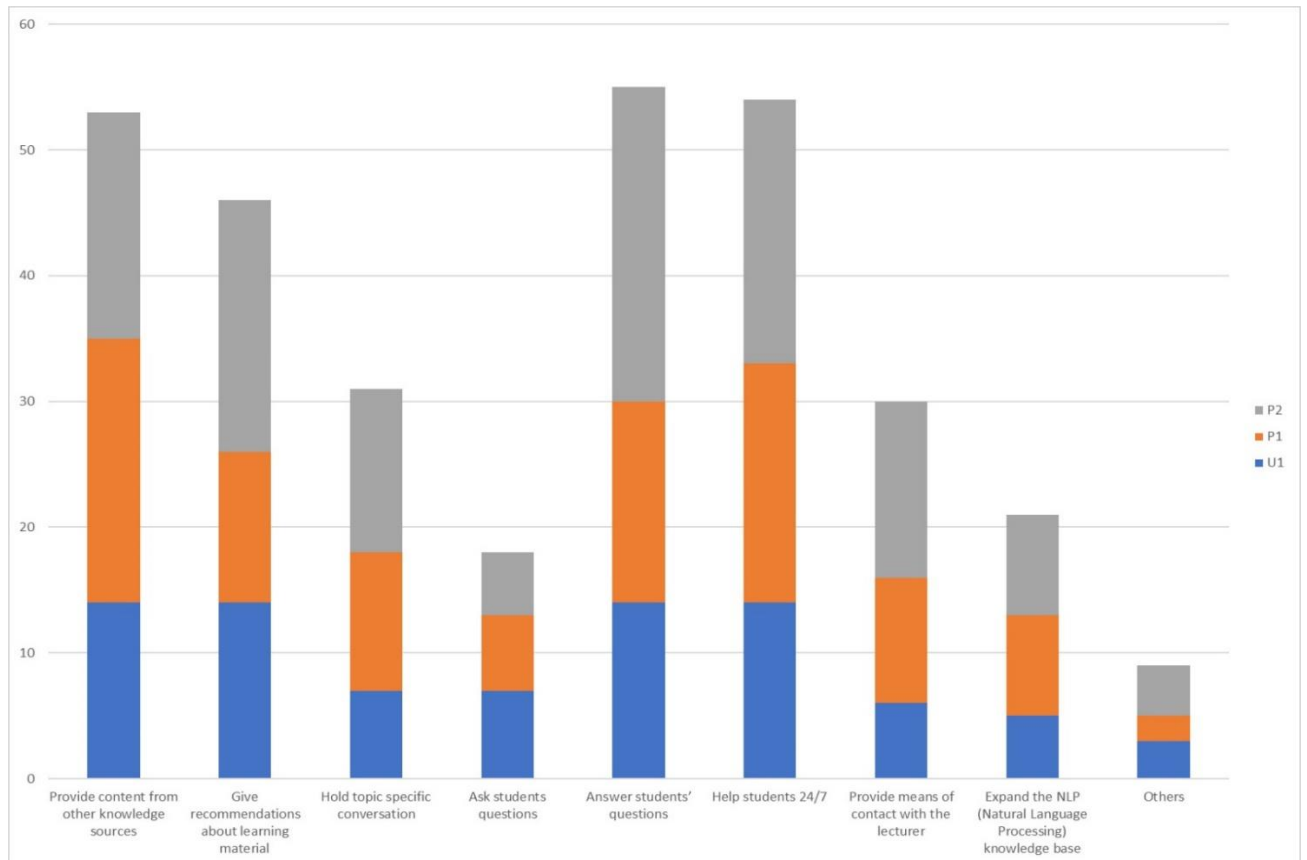


Figure 9: Functions chatbots do contain

They were asked for the functions that chatbots should certainly perform. Table 3 shows the results by stratum. Remarkably, P1 students regard the provision of nudges and reminders, answering questions in real-time and preparing and guiding students throughout services as the three basic functions a chatbot must fulfil. Overall, looking into students' questions immediately and preparing and guiding students throughout services are the most popular choices (Figure 10).

Table 3: Cross-tabulation of the functions which students believe chatbots should certainly perform

	Welcome and congratulate each student personally	Prepare and guide students through school-related services	Drive task completion and provide helpful context	Collect insightful responses and react accordingly	Provide important nudges and reminders	Answer student's questions in real-time	Others
U1	10.39 %	18.18 %	18.18 %	14.29 %	18.18 %	18.18 %	2.60 %
P1	10.47 %	18.60 %	15.12 %	11.63 %	22.09 %	22.09 %	0.00 %
P2	16.22 %	23.65 %	13.51 %	12.84 %	12.16 %	20.95 %	0.68 %

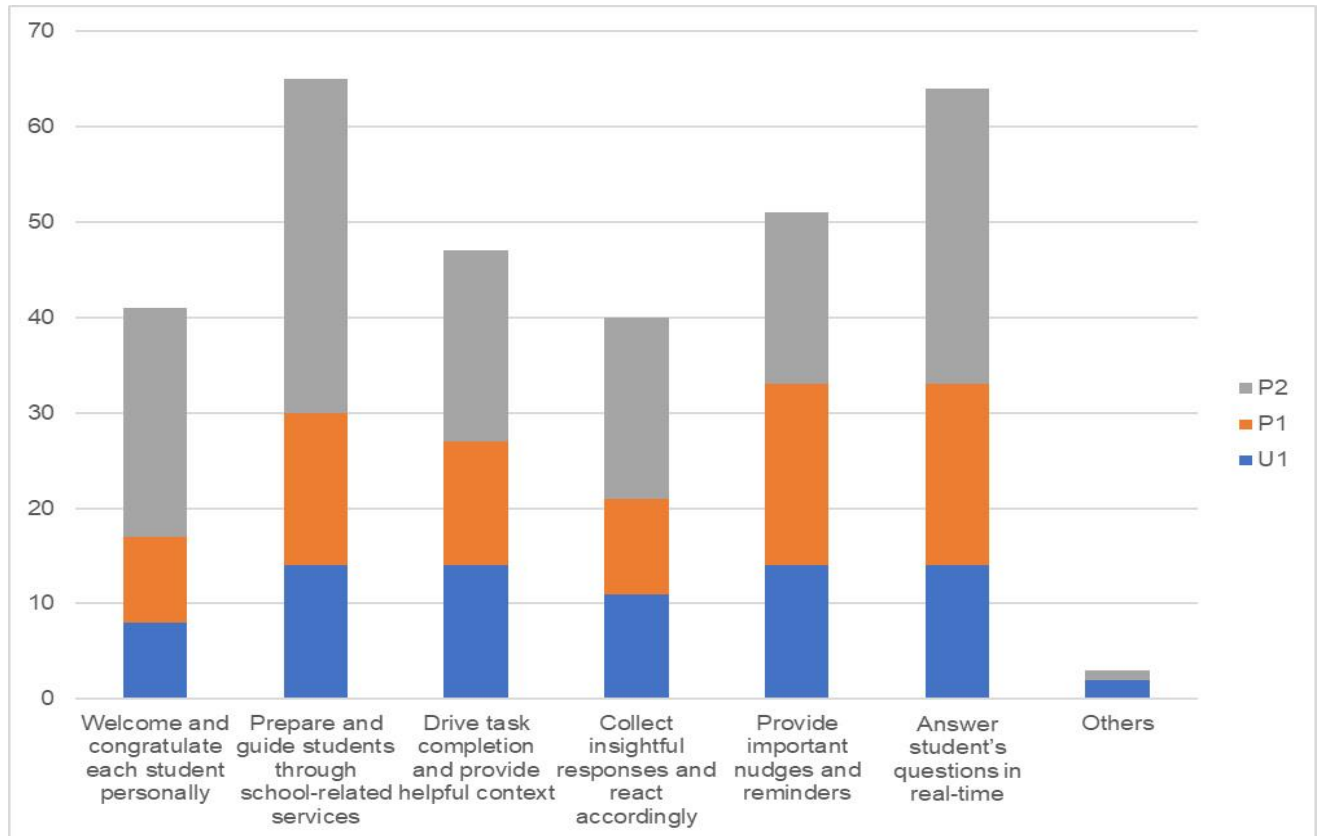


Figure 10: Functions chatbots should certainly perform

The most frequent questions students strive to get answered are related to assignments and exams. They are closely followed by admin questions, timetables, and marking criteria (Figure 11).

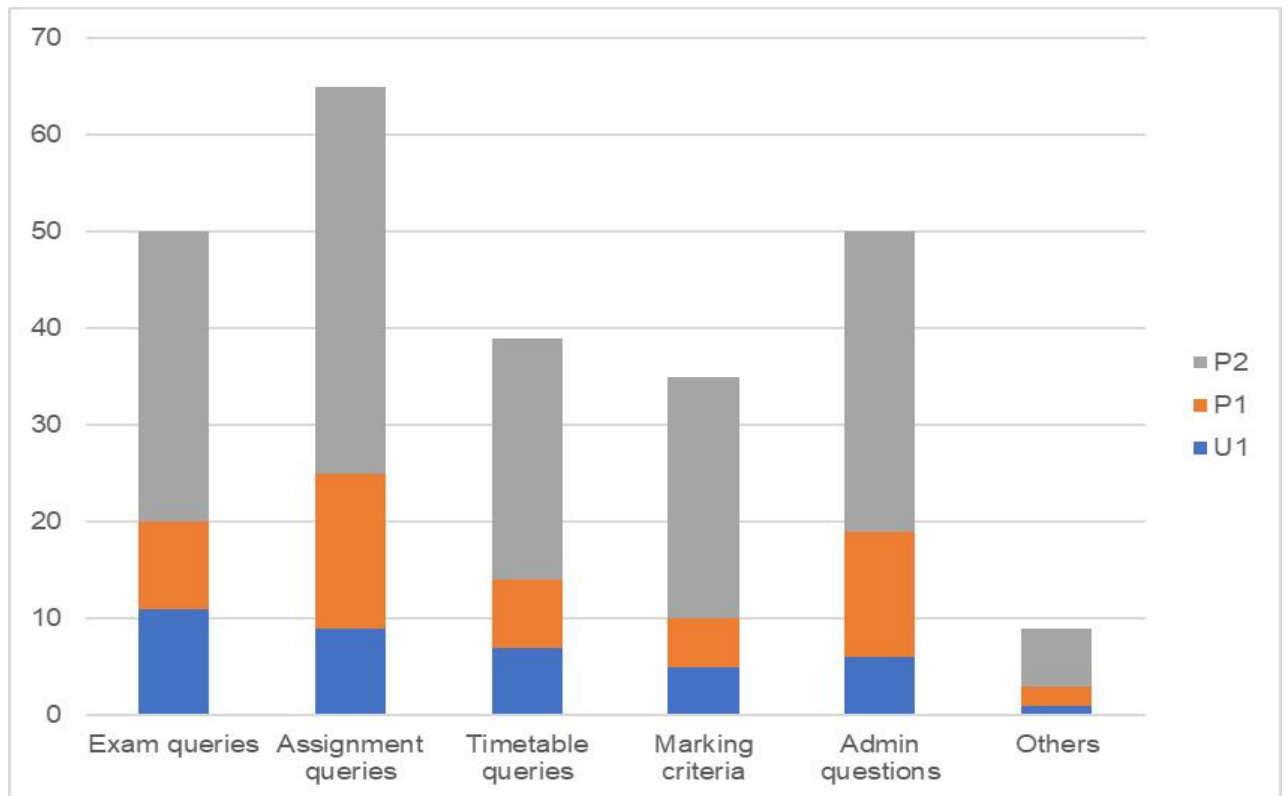


Figure 11: What are the most frequent questions that you need to ask the school?

For entering into the details within each stratum, a cross-tabulation analysis was undertaken (Table 4). It can clearly be seen, that for U1 students, the most frequent question is “Exam queries,” whereas for postgraduate students it is “Assignment queries.”

Table 4: Cross-tabulation analysis of the questions students need to ask the school

	Exam queries	Assignment queries	Timetable queries	Marking criteria	Admin questions	Others
U1	28.21 %	23.08 %	17.95 %	12.82 %	15.38 %	2.56 %
P1	17.31 %	30.77 %	13.46 %	9.62 %	25.00 %	3.85 %
P2	19.11 %	25.48 %	15.92 %	15.92 %	19.75 %	3.82 %

The elements which the students placed most value with chatbots are rooted in straightforwardness; this is closely followed by the accuracy of the responses (Figure 12). Then, dialogue, clarity and acceptable response time followed. Concerning the analysis within stratum (Table 5), the same two choices took central stage in terms of value creation, however it is noted that postgraduate students selected both choices in inverse order than the overall view did, according to the number of answers.

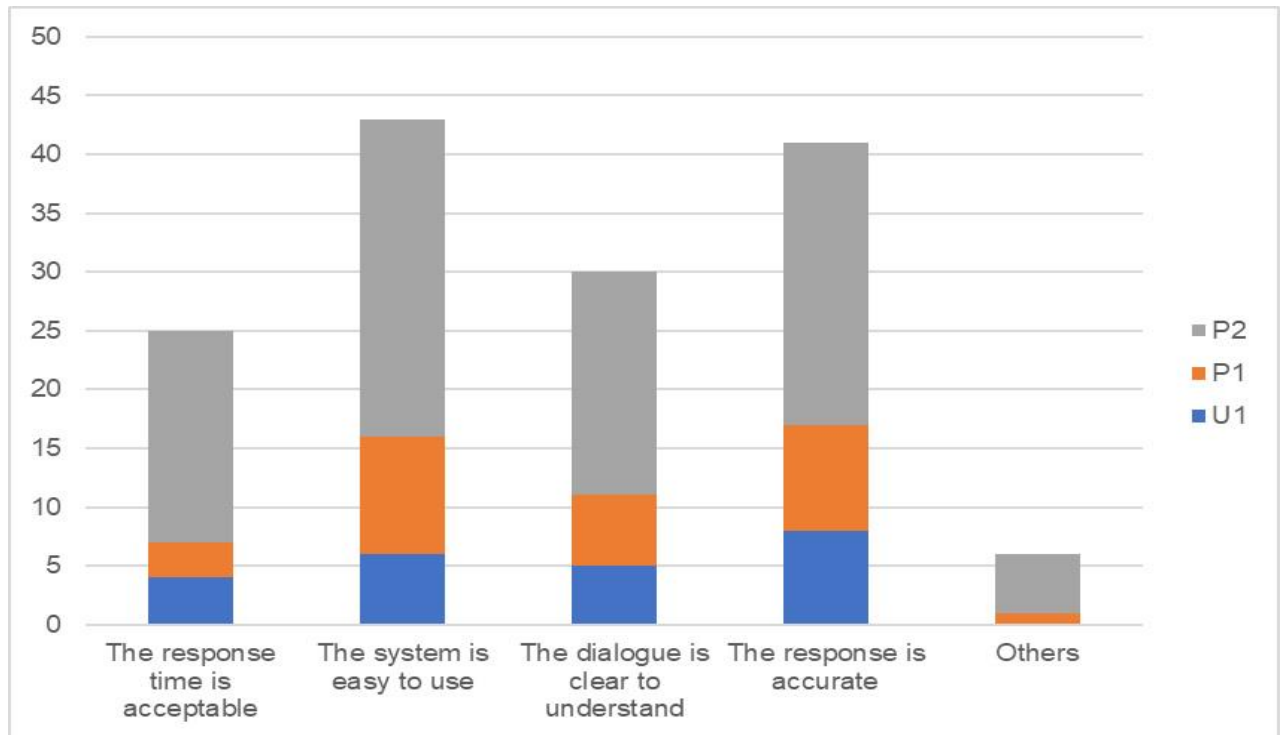


Figure 12: Criteria for a chatbot to create value

Table 5: Criteria for a chatbot to create value by stratum

	The response time is acceptable	The system is easy to use	The dialogue is clear to understand	The response is accurate	Others
U1	17.39 %	26.09 %	21.74 %	34.78 %	0.00 %
P1	10.34 %	34.48 %	20.69 %	31.03 %	3.45 %
P2	19.35 %	29.03 %	20.43 %	25.81 %	5.38 %

Students would not trust chatbots to safeguard/handle sensitive information. Over 50% of the responses do not support the stance (Figure 13).

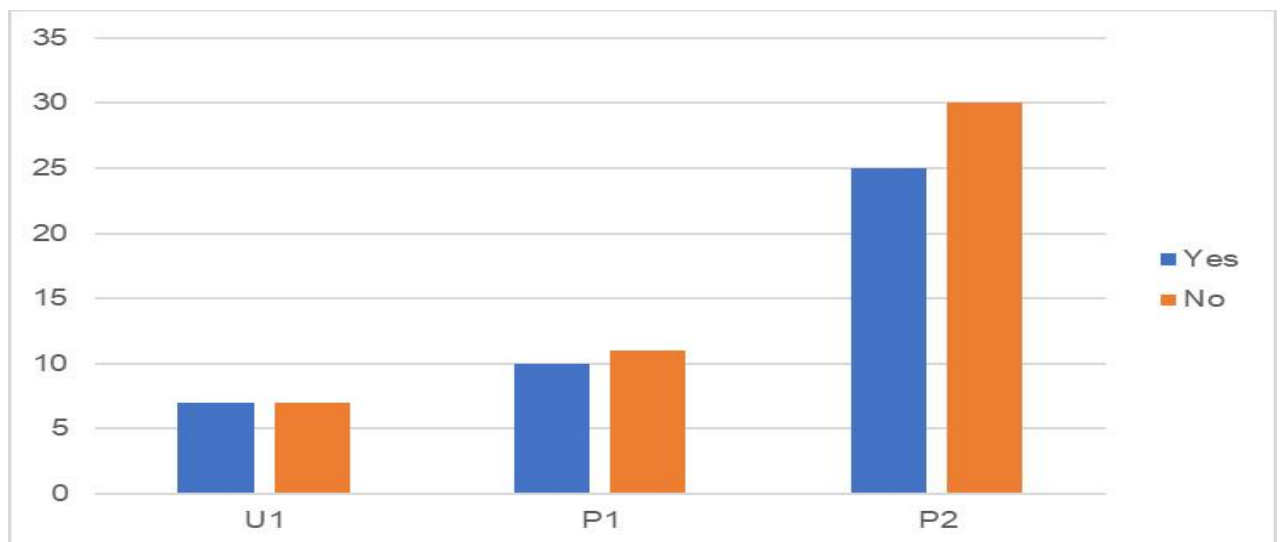


Figure 13: Do you trust a chatbot to handle sensitive information?

Concerning helpfulness, the students widely regard a chatbot would be “Very helpful” and “Somewhat helpful.” “Somewhat helpful” is the conceptual midpoint and was the second-highest figure (Figure 14).

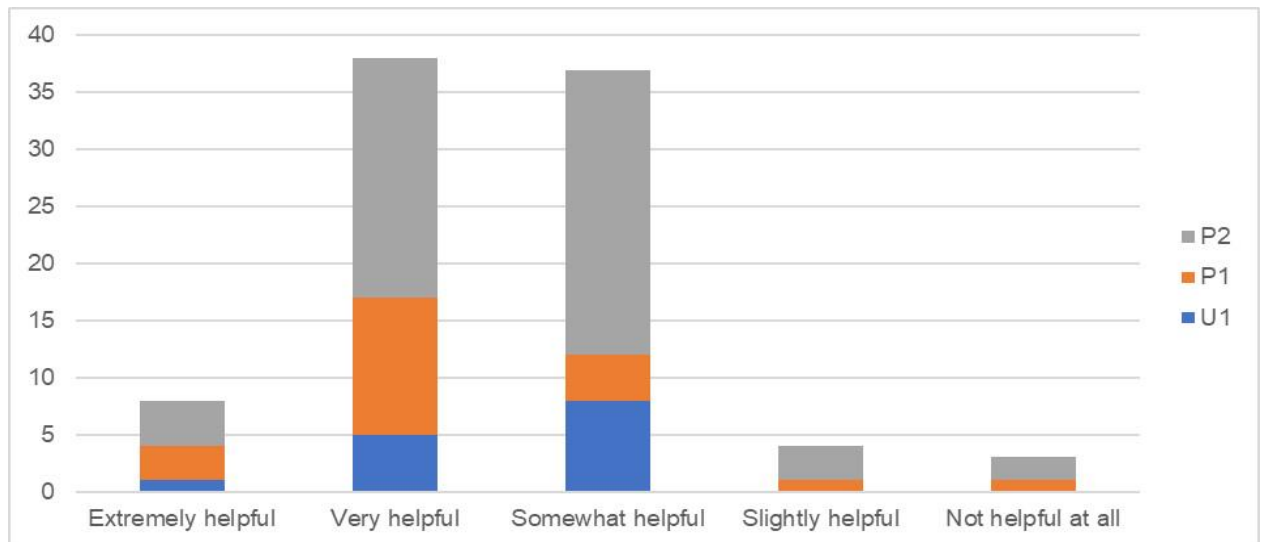


Figure 14: How helpful would you consider a chatbot to be that renders day-to-day school-related services?

Table 6: How helpful would you consider a chatbot to be that renders day-to-day school-related services? (Cross-tabulation analysis)

	Extremely helpful	Very helpful	Somewhat helpful	Slightly helpful	Not helpful at all
U1	7.14 %	35.71 %	57.14 %	0.00 %	0.00 %
P1	14.29 %	57.14 %	19.05 %	4.76 %	4.76 %
P2	7.27 %	38.18 %	45.45 %	5.45 %	3.64 %

As regards to the stratum (Table 6), U1 students reported that the chatbot would be somewhat helpful, but accounted for the highest percentage (57.14%). A similar pattern is observable in P2 students. Nonetheless, as for P1 students, they firmly believe a chatbot would be very helpful.

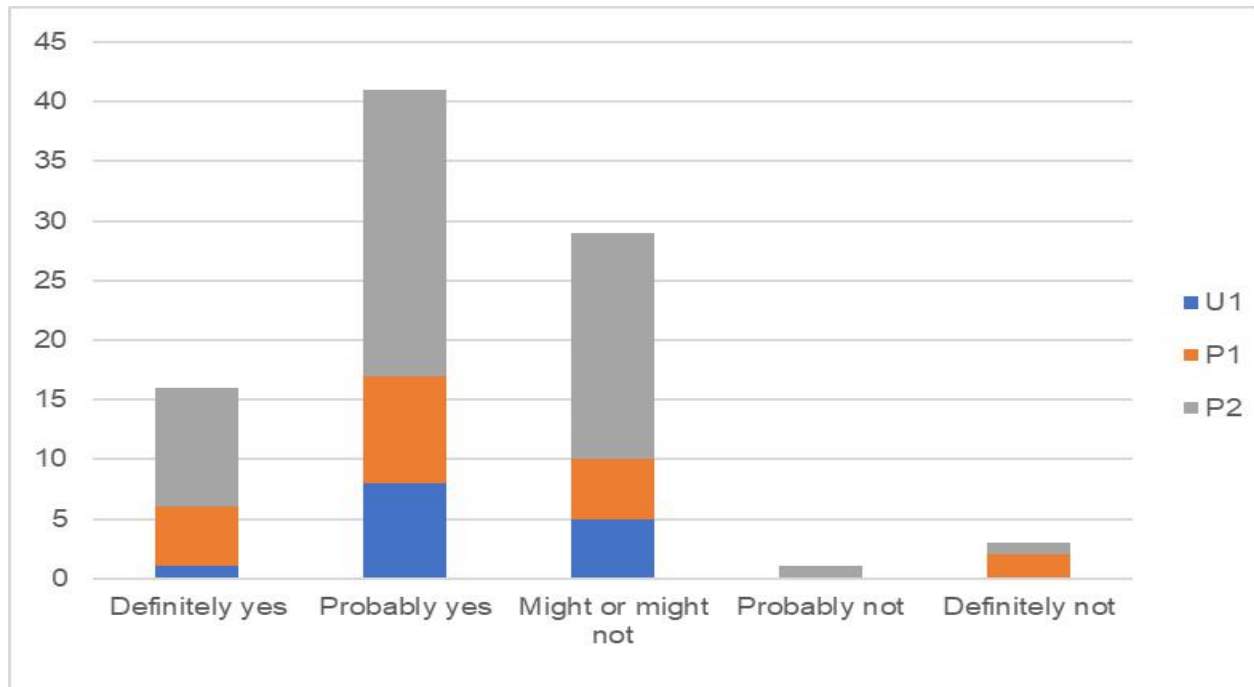


Figure 15: Do you believe you would use the chatbot?

Finally, the keenness to use a chatbot was also discovered. Overall, most of the respondents said they would likely use the chatbot. However, it is not unbelievable that the second most popular choice is “Might or might not” be used.

Table 7: Do you believe you would use the chatbot? (Cross-tabulation analysis)

	Definitely yes	Probably yes	Might or might not	Probably not	Definitely not
U1	7.14 %	57.14 %	35.71 %	0.00 %	0.00 %
P1	23.81 %	42.86 %	23.81 %	0.00 %	9.52 %
P2	18.18 %	43.64 %	34.55 %	1.82 %	1.82 %

4. Discussion and conclusion

This study wanted to show the determinants in the bot-human interaction that would lead to the acceptance of a chatbot delivering school-administrative services. The findings corroborated prior research (Walsha, Gettler-Summa, & Kalika, 2016; Burke, 1991; Sangseok & Lionel, 2017), and in turn, enriches them. They suggest emotional constructs drive the consumption of classes of IT such as chatbots.

4.1. Student awareness

In the past, the chatbot Clippit went unnoticed by the Microsoft Office users (Molnar & Szuts, 2018), this unconsciousness has decreased gradually. Nonetheless, 39 out of the 90 respondents said not to know when communicating with a chatbot (Figure 4). It seems a bit dramatic when analyzing per stratum, since half of the respondents of U1 and P1 said they did not know. Likewise, finding out students' familiarity with chatbots, the choices "Slightly familiar" and "Not familiar at all" revealed a large number of responses (Figure 8 and Table 1). Nonetheless, the results also disclose the students prompt speculations over what the chatbot ought to provide, for example, the fulfilment of providing help 24/7, providing nudges and reminders, giving recommendations about learning-material, and guiding students throughout services. These findings do not antagonize but complement what some authors have highlighted as a key outcome which is not to steer away from the expected use of chatbots: ubiquitous interaction, and conversations taking place smoothly (Stone, Reeder, Parillo, Long, & Walb, 2018; Lio, Yoshikawa, & Ishiguro, 2017; Spatola & Urbanska, 2018).

Striking a balance on consciousness, familiarity and expected features uncover that the strata is vaguely aware of the chatbots. The findings are not empirical, and it is even believed the video played in advance might have raised the awareness.

4.2. Intentions of using chatbots

The foundations of this research went to the importance of integrating chatbots in individuals' practices to facilitate educational services delivery. Earlier, two strands of IT identity have been linked to intention in using chatbots:

- Expectable use – two sets of choices (Figure 9 and 10): the features students do know the chatbots have, and the must-have features they regard fundamental to the delivery of desired outcomes might mirror keen users. They are conditional factors that if fulfilled, the students might lean toward using chatbots. It is not an assertion as the students have not stated they do use chatbots (Figure 15). So, how well they are served would be the building block to support technology usage. Therefore, when it comes to expectable use, it is affirmative that students place a great deal of importance on the chatbot, and if it delivers what is expected.
- Turning to emotional attachment, recent advances in chatbot matters, claim the closer to the human being, the most effective is the intention in using chatbots (Nair, Johnson, & Sathya, 2018; Chai & Liu, 2018). Figure 5 depicted

many students that disagreed chatbots should mimic humans. It might be rooted in the uncanny valley phenomenon that describes the feeling of revulsion people experience whenever something replicates the quality of being alive (Tinwell, Grimshaw, & Williams, 2011). Nevertheless, Figures 6 and 7 depicted a great number of students would feel comfortable speaking to chatbots and said it is acceptable for the chatbot to replace a human touch. However, an aspect that is counterproductive in the adoption rates is the mishandling of sensitive information (Figure 13).

This research also delved into two TAM framework strands:

- Usability – perceived ease of use is a driver for usage; on the contrary difficulty is a deterrent. It is noticeable that an average of 30% of the responses by strata regard an easy-to-use chatbot as essential (Figure 12 and Table 5).
- Perceived usefulness has been measured through a rating scale (Figure 14 and Table 6). When operationalizing the Likert scale to determine the extent to which students regard a chatbot is useful in the educational context, 38 out of 90 students ascertained it would be “Very helpful,” it was closely followed by 37 students suggesting it would be “Somewhat helpful.”

4.3. RQ1: Are the students familiar with the concept of chatbots?

The figures reflected the students are unfamiliar with this concept. Even though the literature claims the user’s readiness to accept new technology is an important matter in the usage of it (Compeau & Higgins, 1995), this research has found an eventual use of chatbots might come without the full knowledge of chatbots in advance. Put another way; these results indicated that not being knowledgeable about chatbots is not correlated with the intention of using them. An aspect that does not deserve to be neglected is the fact that the responses are not uniform. For instance, most of the P2 students said that they knew, and by contrast U1 and P1 said they did not. The majority of P2 students have probably been enrolled for at least two semesters, whereas the others are younger students.

4.4. RQ2: Are students aware of chatbot-based applications performing school administrative functions?

The above answer leads to the conclusion that the students are unaware of these specific types of chatbots. Nonetheless, the students were asked for the tasks they expected a chatbot-powered solution to perform. In this case, they were acutely aware of the feature-richness the chatbot should perform (Figure 10).

It is particularly noteworthy that the students' involvement in subjects like digital transformation and innovation probably made them value-added. As a result, their positive expressions toward chatbots are reflected in a link between educational services needs and conversational functionalities suitability.

4.5. RQ3: Which features of chatbots would confer advantages to students as users?

The findings provide a detailed account of the factors that the students indicated would create value. A chatbot would improve the educational services it delivers:

- Answering exam queries, assignment queries and admin queries (swapping lectures, special activities, and so on)
- Ubiquitousness: answers at any time, from anywhere
- Preparedness and guidance
- Reminders and nudges

4.6. RQ4: Which factors influence the students to use chatbots?

The findings gave no doubt that dependency and expectable use (from IT Identity Theory), and integrative use, perceived usefulness, and pragmatic quality (from Technological Acceptance Model) have a significant effect when it comes to driving students to use chatbots. Also, there are commonalities with reliance on technology studies (Adams, Nelson, & Todd, 1992; Carter, Compeau, Lawrence, & Schmalz, 2017; Merčun & Žumer, 2017; Gonzalez, Ramirez, & Viadel, 2012). They state that the intention to use them depends on the creation of needs that must be fulfilled.

In practical ways, students will probably use a chatbot that:

- Prepares and guides them through school-related services
- Provides them with important nudges and reminders
- Answers their questions in real-time.

However, compelling conversations could also flow from the following subjects:

- Exam queries – the students demand the chatbot get them exam-ready
- Assignment queries – the students demand the chatbot guide them throughout completing their assignments

- Admin questions – the students demand the chatbot be able to answer whatever administrative question they put.

4.7. RQ5: Which factors deter the students from using chatbots?

Basically, chatbots turn monologues into dialogues. They mirror human likeness that must take care of appropriate reactions to cues (because it is human-like whereas a miscue is not), but can neglect belatedly phrasing an answer. However, there are issues that must be tackled, otherwise the dialogue will not work out:

- Unclear dialogue and response inaccuracy (Quarteroni & Manandhar, 2007)
- Difficulty of use (Davis, 1989)
- A sense of insecurity when handling sensitive information (Peras, 2018).

4.8. Contributions of the study

The findings show a potentially higher interaction with chatbots might come into it without the students' full knowledge in the matter in advance. It is important to bear in mind chatbots are not something physical. They, therefore, attach value on what the students are able to do. It is a matter of perception and preferences. Students would be fortunate to have a tool like this as it could deliver engagement which is propelled by the obsessive utilization of smartphones.

For chatbots to go mainstream, the basic premise is to match answers within the context as expected. Despite many people potentially being daunted by these conversational agents, the great emphasis is on making life easier (streamlining educational services), driving adoption rates and increasing user satisfaction.

Although student awareness did not prove to drive intention in using chatbots, there were other factors that have been somewhat consistent with intention in use from the realms of IT identity and TAM. The findings do not collate enough empirical evidence to adopt a stance. Rather, this research has unveiled certainties upon these students but has yet to uncover more definitive facts in chatbot usage.

4.8.1. Managerial implications

Chatbots count amongst the more pioneering cutting-edge technologies, and this study carries several managerial implications. HEIs willing to embrace a chatbot must be extremely thoughtful to understand where they are going to derive the benefits expected. Stepping up to conversational strategies takes more than just investment. Realizing that technology and what people are used to and like changes constantly is key to striving for future-proof technology.

Chatbots can be utilized for many different purposes. An HEI that invests in chatbots is creating value to students. Nowadays, it is advisable for the adoption of the student-as-consumer approach (Bunce, Baird, & Jones, 2017). In the fully digital world, there has become an intense desire for technology, (technology anxiety or craving for technology) (Matos, et al., 2016) whatever it is named, that instigates a shift into the education system where education should adapt to the students and not the other way. A chatbot that is easy to operate/manipulate should, for example, be able to deliver light messages that do not overwhelm students. There are still some drawbacks that hinder the chatbot's fullest potential. In this sense, students have highlighted dialogue clarity and response accuracy as basic requirements. The literature proposes approaches to concealing incoherent responses and produce more coherent and fluent replies (Dibitonto, Leszczynska, Tazzi, & Medaglia, 2018).

4.8.2. Starting point

The design must strive to incorporate the knowledge that consolidates the chatbot and enhances their knowledge base. Following Gartner (2019), Millennials and Gen Xers are said to have used a chatbot in a messaging app. This fact should be an incentive to create compelling conversations based on interactions with students, and the topics may range from reminders to academic lifecycle to assisting in whatever they need. As mentioned earlier, the lack of follow-up enquiries deters prospective students (HR Hannover Research, 2014). The HEIs do their utmost to ensure their homepage has a laid-out portal to all of the content, but it is still not easy to find information there. Enrolled students and prospective students could be better served by the dialogue richness of a chatbot that reinforces the school website.

4.8.3. Limitations

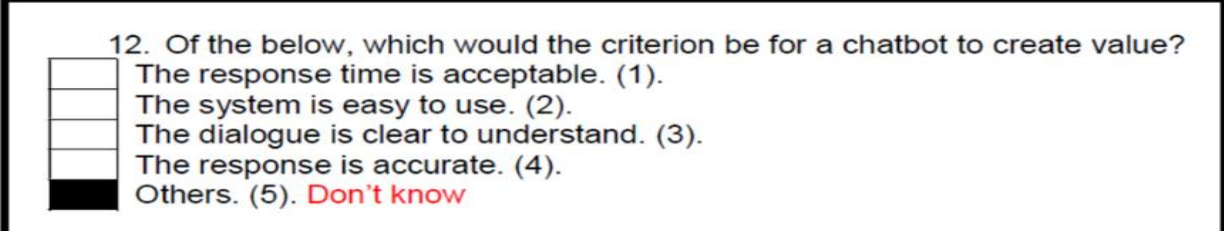
The main flaws in this research are listed below. It does not mean the research is invalid, but when thinking thoroughly of the entire process, the results might open new windows for further research.

4.8.4. *Small studies limitation*

The definition of “small” relies on the research purpose. Nonetheless, when designing studies there is nothing precise about sample size (Hackshaw, 2015). Conducting well-designed small studies requires a careful interpretation, as the advantage in providing results quickly does not normally yield an accurate forecast. A larger confirmatory study might lead to not jumping to hasty conclusions. This study reached 56% of the level of participation of U1 students, and 87.50% and 88.70% of the enrollment of P1 and P2.

4.8.5. *The “Other” category in close-ended items*

Gehlbach (2015) claims that the use of item formats that may yield undesired data is counterproductive in multiple-choice list questions. The questionnaire meant the respondents had to make informed choices, but the “Others” category produced data that rarely provides useful information:



12. Of the below, which would the criterion be for a chatbot to create value?

<input type="checkbox"/>	The response time is acceptable. (1).
<input type="checkbox"/>	The system is easy to use. (2).
<input type="checkbox"/>	The dialogue is clear to understand. (3).
<input type="checkbox"/>	The response is accurate. (4).
<input checked="" type="checkbox"/>	Others. (5). Don't know

Figure 16: Reply made by a P2 student

Unfortunately, as shown in Figure 16, the “Others” answer happened to be pointless unless it would have let the respondents either offer additional information about their choice or provide an alternative answer since the available ones did not suffice.

4.8.6. *Lack of practical setting*

When studying user acceptance of classes of IT, the issue is raised about participants’ ignorance about the phenomena. By 2008, Martignoni, Stanoevska-Slabeva, and Mueller had concluded there is a struggle over evaluating user’s needs and preparedness to use a service before its existence. This research got the participants acquainted with the chatbots by playing video clips, but a practical setting with a beta chatbot would have been more appropriate to evaluate the utilization.

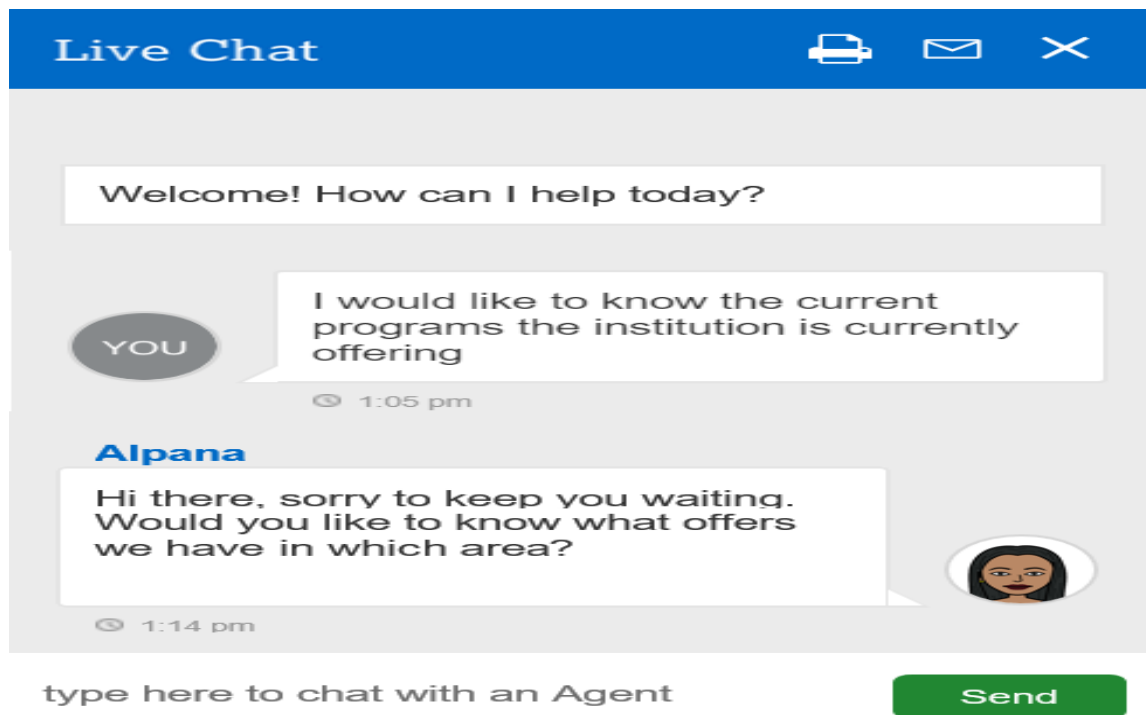


Figure 17: A screenshot of how the chatbot would look

4.8.7. Use of midpoints on the Likert scale

When using Likert scales, it is important to word midpoints appropriately. “Neither Agree nor Disagree” is a midpoint that represents a neutral level of opinion; however, “Undecided” is a questionable category as to whether it is truly a midpoint of opinion, because it could be treated as an absence of opinion (Chyung, Roberts, Swanson, & Hankinson, 2017). This research used three five-point rating scales:

- "Definitely yes," "Probably yes," "Might or might not," "Probably not," "Definitely not."
- "Extremely helpful," "Very helpful," "Somewhat helpful," "Slightly helpful," "Not at all helpful."
- "Extremely familiar," "Very familiar," "Somewhat familiar," "Slightly familiar," "Not familiar at all."

Except for the first scale, the midpoints of the following two might have been taken as a dumping ground.

4.8.9. Future research

It has been noted that there could be other variables that expose intention behaviours including the staff point of view as a counterpart that might endorse the use. Also, in terms of the demographic profile, it is interesting to find out the age of the respondents and the time they have been enrolled in their course of study. In addition, there is no extent to which would be reasonable to assume that similar results would be gathered from other HEIs; therefore, other providers must also be included in a future research endeavour.

It is also undeniable that the attitude towards state-of-the-art technologies changes regarding the generational cohort. Millennials are digital natives; meanwhile, older generations tend to be more technophobic (Steven, 2018). Therefore, the age dispersion could produce surprising results. Finally, evaluating the IT identity and TAM theories and providing a practical setting, the researcher might propose a research model.

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7 – How global equity markets respond to corporate sustainability communications: Empirical evidence from the Dow Jones Sustainability World Index

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Abstract: This paper empirically examines and analyses the impact of Corporate Sustainability (CS) Communication, whereby I argue that the events of the addition and deletion of companies from the Dow Jones Sustainability World Index (DJSWI) provides empirical evidence of whether a company's CS activities affect its market value by impacting its share prices and liquidity, both around announcement days (AD) and effective days (ED). This phenomenon also indicates whether CS activities can generate shareholder values in the short term.

Using an event study methodology on a sample of the top 100 additions and deletions in terms of market capitalization, the following findings were arrived at: Firstly, there is a statistically significant impact on stock price around effective days but not around announcement days. Secondly, stocks are added to the DJSWI, trading volume measured as abnormal turnover ratio increases after the effective day and temporarily for stock inclusion. On the contrary, when stocks are deleted from the DJSWI the trading volume decreases significantly immediately following the effective days. Hence, an effective effect on stock returns and liquidity does exist, exhibiting stronger reactions from investors on negative announcements than on positive news in regards to sustainability. Thirdly, European markets are more sensitive to the events of stock inclusion and exclusion in DJSWI compared to Asia Pacific and North American markets. Overall, results from this study support a temporary negative impact on stock prices and trading volume for stock exclusion after the effective day (ED).

Keywords

corporate sustainability, event study, corporate finance, Dow Jones Sustainability World Index

Introduction

The term corporate sustainability (CS) is not a new concept. From the beginning, it has been challenging to define corporate sustainability in theoretical terms. An integration of definitions leads to concepts of improvement of human welfare and acquisition of natural capital as well as “measuring and reporting an organization’s ecological footprint” (Sharma and Starik, 2002). In this paper, the definition of SAM (Sustainable Asset Management), the investment form in charge of the composition of DJSI, is adopted. “Corporate Sustainability is a business approach that creates long-term shareholder value by embracing opportunities and managing risks derived from economical, environmental, and social development” (RobecoSam). It strengthens the traditional way of management which is to maximize shareholder’s wealth. The companies/managers therefore, may be motivated by responsibility; they may also apply sustainable strategies to maximize future long-term earnings. There are several definitions of corporate sustainability but it can be known as any response of the corporation in terms of strategies and practices to the sustainable development (economical, social, and environmental) of the corporation itself, and the world in general.

After the 2007-2009 financial crisis – which was caused by too much focus on short-term growth and ignoring risk management with proper corporate governance in place – corporate sustainability practices were strengthened worldwide. (Brockett and Rezaee, 2012).

Moreover, the involvement of governments and media, in terms of needs of disclosures of sustainability information in the forms of reports, which covers all businesses, markets, and strategic decisions, are increasing the awareness of sustainable development and corporate sustainability to institutional as well as individual investors. Do investors care about sustainability?

There is a significant amount of research done that confirms that investors do care about sustainability as it is also about the long-term performance stability and risk management of companies (Cheung, A., 2011). More and more investors recognize a connection between corporate and community well-being, use corporate sustainability reporting to strengthen their investment strategies and ask the corporation to show how their sustainability practices link to growing shareholder value (PWC, 2012). Besides which, the investors’ concern about corporate sustainability is evidenced with the Socially Responsible Investing (SRI) Trends published by the Social Investment Forum in the United States. SRI grew by 13 percent annually from 2007 to 2010 and as of 2010, 493 mutual funds trading in the United States were reviewed for sustainable factors in

investment strategies.

Theoretically, if both individual and institutional investors do care about sustainability, it would mean that stock markets might respond to corporate sustainability communication, such as the news that a company is added to (or deleted from) a global leading sustainability index which includes international leading companies incorporating sustainability practices.

The leading global sustainability index for empirical analysis in the paper is the Dow Jones Sustainability World Index, which is utilized for its global scope and recognized worldwide as one of the most important global sustainability indices. The Dow Jones Sustainability World Index (DJSWI) was launched on 8th September 1999 and was the first global index tracking performance systems of leading companies in terms of CS.

It covers the top ten percent of the biggest 2,500 companies in the Dow Jones World Index in terms of economic, environmental and social criteria. The DJSI has some criteria according to which companies are assessed to determine the level of quality of a “company’s strategy and management and its performance in dealing with opportunities and risks deriving from economic, environmental and social developments” (DJSI, 2007).

The main purpose of this study is to empirically examine and analyze the impact of CSC (when companies are added or deleted from the DJSWI) on the stock markets.

The overall ambition is to provide evidence, indicating whether companies’ CS activities have an impact on share price and liquidity, hence affecting the market value of a company, or not. This also indicates whether CS activities can generate shareholder value in the short term, or not.

The main research questions we are considering: (1) Are there any abnormal returns/trading when companies have been added/deleted in/from DJSWI? (2) How do the results vary from region to region?

The objective of the research is to analyze the market reactions to inclusion in and exclusion from DJSWI in terms of both returns and liquidity.

The main hypotheses are as below:

- An addition to the index has a positive impact on the market. The announcement of good news about the organization’s sustainability practices is reflected in the increase in stock prices and trading volumes.
- A deletion from the index has a negative impact on the market. The announcement of bad news about the organization’s sustainability

practices is reflected in lower stock prices and trading volumes.

- Markets react stronger to bad news.

The research paper is structured as follows:

- Section I addresses the background motivation of the research.
- Section II provides theoretical evidence and a literature review of the research which is about corporate sustainability, why Dow Jones Sustainability World Index and studies the impact of corporate sustainability on stock performances.
- Section III discusses the methodology of the event study. Section IV provides results and analysis. Finally, Section V provides concluding remarks and comments.

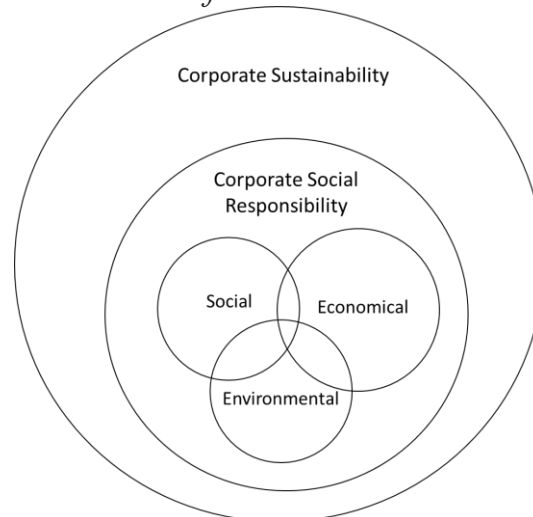
Literature Review and Theoretical Frameworks

1.1. Literature review

1.1.1. Corporate Sustainability (CS) versus Corporate Social Responsibility (CRS)

Literature in management uses both CSR and CS referring to the intention to bring sustainability issues, in terms of social and environmental into the managerial framework, however, no clear distinction between the two terms is stated. Van Marrewijk, M. (2003) proposed three ways to define CS and CSR in literature. The first one was where the term "Corporate Social Responsibility" covers every dimension of a corporation in relation to relationships with and responsibilities to society. The second proposal was taken from Lassi Linnanen and Virgilio Panapanaan of Helsinki University of Technology. In the second proposal, Corporate Sustainability (CS) was considered the ultimate goal, with CSR as an intermediate stage where corporates balance three aspects of sustainability (economic, environmental, and social) as illustrated in Figure 1 below:

Figure 1. Model of CS/CRS and its dimension



Source: Lassi Linnanen and Virgilio Panapanaan of Helsinki University of Technology

The third one considered CS and CSR as synonyms with an essential distinction – “Associate CSR with the communion aspect of people and organizations and CS with the agency principle. Therefore, CSR relates to phenomena such as transparency, stakeholder dialogue, and sustainability reporting, while CS focuses on value creation, environmental management, environmentally friendly production systems, human capital management and so forth.”

1.1.2. DJSWI and CS Assessment

1.1.2.1. Dow Jones Sustainability World Index

The Dow Jones Sustainability World Index (DJSWI) was launched on 8 September 1999 by RobecoSam and was the first global index tracking performance system of leading companies in terms of CS. It covers the top ten percent of the biggest 2,500 companies in the Dow Jones World Index in terms of economic, environmental and social criteria. RobecoSam is an investment company that always believes that resource scarcity, climate change, or an aging population has a direct impact on the shaping of a corporate competitive environment.

Also, by adapting those challenges through innovation, continuously reviewing and upgrading the quality and productivity, a corporate also creates long-term shareholder value. The Corporate Sustainability Assessment (CSA) was built in 1999 to identify top companies in terms of how well-equipped they are in dealing with sustainability opportunities and challenges from around the globe and from the industry as well. The CSA

test is claimed to be one of the best-in-house for deep and integrated analysis.

1.1.2.2. Corporate Sustainability Assessment

RobecoSam built the Corporate Sustainability Assessment (CSA) in 1999 to identify top companies in terms of how well-equipped they are in dealing with sustainability opportunities and challenges from around the globe, and from the industry as well.

The CSA test is claimed to be one of the best-in-house for deep and integrated analysis. Each year, 3,400 of the world's largest publicly traded companies by float-adjusted market capitalization (based on the S&P Global BMI index), participate in the annual CSA.

Based on the GICS industry classification system, RobecoSam built industry-specific questionnaires for 60 RobecoSam industries to cover all kinds of business types.

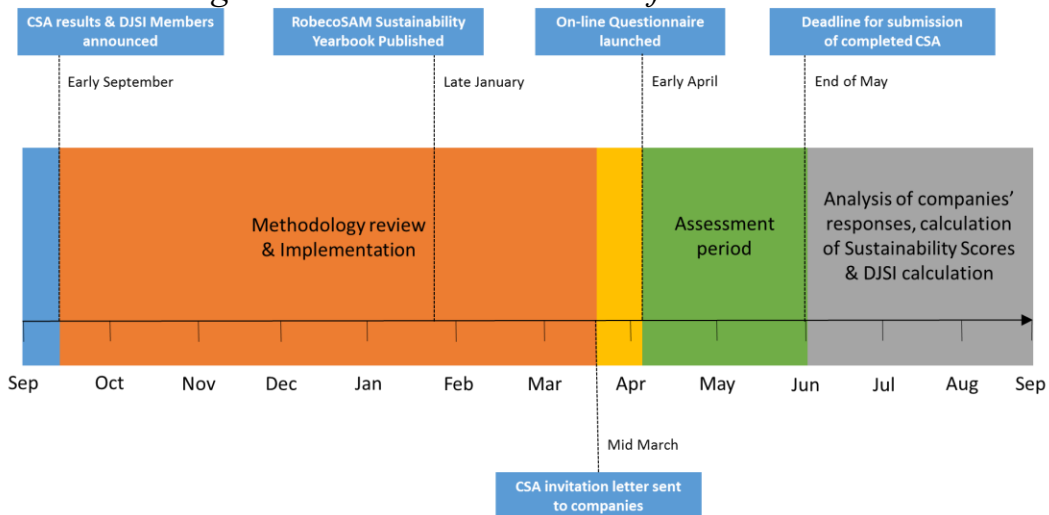
The questionnaire consisting of approximately 80-120 questions which depend on the industry, are on financially relevant economic, environmental and social factors. Companies are evaluated based on a set of financially relevant sustainability criteria covering all three dimensions of CS. The top 10 percent of companies within each industry are chosen for inclusion in the DJSWI. The average response rate of 2011 and 2015 was 53 percent of the total invited companies (assessed companies) and 25 percent of the total invited companies (companies that completed the questionnaire). The details are shown in Table 1 below:

Table 1: Response rate for DJSWI assessment from 2011 to 2015

Year	Number of invited companies	Number of assessed companies		Response Rate	
		Completed Questionnaires	Based on public information	Assessed/Invited	Completed Questionnaire/Invited
2011	2,763	729	714	52%	26%
2012	3,208	790	754	48%	25%
2013	3,300	818	1,013	55%	25%
2014	3,395	830	983	53%	24%
2015	3,470	869	981	53%	25%

Table 1 has shown a low response rate based on the completion of the questionnaire for the annual CSA of DJSWI. More than half of the assessed companies are based on their public information about the sustainability strategy. The results also indicate the level of awareness of the corporation on the importance of their sustainability strategy to develop/and sustain the growth of the company. It is consistent with the finding of PWC on a CS research report 2012 that CEOs are not sure if the investors do care about sustainability and note that some find it perplexing. In addition, the annual timeline of the CSA Process is represented in Figure 2:

Figure 2. The annual timeline of the CSA Process



Source: RobecoSam

1.1.3. Studies of DJSWI

The DJSI has been the focus of a limited amount of academic research. Early literature focused on the structure of the DJSI (Knoepfel, 2001) and the transparency of the DJSI relative to the Dow Jones Global Index (DJGI) (Cerin and Dobers, 2001).

Comparisons between the DJSI, DJGI, and other indices have remained a topic of research over the last decade. For example, Lopez et al. (2007) compared a sample of DJSI firms with other firms in the DJGI to examine the effect of applying sustainability practices on the companies' performance and value creation. They found that there were significant differences between the two samples. In one key finding, they found that there was a short-term economic disadvantage to the DJSI firms concerning the non-DJSI firms.

In another paper, Artiach et al. (2010) presented a case study comparing a group of high-ranking firms in the DJSI with non-DJSI firms and found that DJSI firms are significantly different in size, profitability and level of growth options. They argued that investment in corporate sustainability programmes helped to maintain the firm's competitive position among other firms in the same industry. Consolandi et al. (2009) compared the performance of companies on the DJSI to that of the Surrogate Complementary Index and analyzed whether or not the stock market reacts to inclusion or deletion from the DJSI.

They concluded that “the evaluation of the CSR [corporate social responsibility] performance of a firm is a significant criterion for asset allocation activities” (Consolandi et al., 2009).

There has also been some research exploring the connections between the DJSI and sustainability reporting. Kolk (2004) noted that one-third of sustainability reporters reported on their inclusion in either the DJSI or the FTSE4Good Index.

Willis (2003) explored the role of the most widely-used set of corporate sustainability reporting guidelines, the Global Reporting Initiative, in sustainability indices, including the DJSI. Willis concluded that the “GRI Guidelines can become a valuable tool for SRI [socially responsible investment] managers to obtain the information they need for optimal investment decisions”.

Karlsson and Chakarova (2008) did comprehensive research to address the questions of whether CSR pays off by conducting an event study using the index changes of DJSI from 2002 to 2007 as a proxy of CSR performance. They could not find a significant impact of the event of index changes (measured by the average abnormal returns) on the market value of a company. The explanation for the absence of market reaction could be that investors saw no link between CSR activities and the future cash flows of a company. Moreover, the level of impact of CSR activities on the market value of a company changes over time as well as geographical variation (Chakarova & Karlsson, 2008).

The conclusions of Chakarova & Karlsson (2008) were confirmed by Cheung (2011), Dilling (2008), and Tillmann (2011).

Cheung (2011) found that announcements of index changes in the DJSI from 2002 to 2007 have no significant impact on stock return and risk. Dilling (2008) conducted a sample of index changes in the DJSI from 2002 to 2005 across the time and observed a positive market reaction on index inclusions in 2002 and its lower increase in the years of 2003 to 2005.

However, there is a geographical variation of market reaction found in the study of Dilling, but the significant market reaction was different in different industries. He states, particularly “the share prices of corporations in the consumer product, healthcare, technology, and utility industry react more positively to the DJSWI inclusion announcement than the share prices of corporations in basic material, financial and industrial product industry” (Dilling, 2008).

Tillmann (2011) in his Master’s thesis which studies the price effects of changes in DJSWI and FTSE4Good Index, also observed no statistically positive/negative significant impact for companies being added to/deleted from DJSWI. He also tried to explain the finding on the market reaction by

studying trading volume volatility around the announcement day and found the decrease in trading volume of the deletion cases in 3 trading days from the announcement date of changes.

When composing the sample into industries and countries, Tillman (2011) found significant negative abnormal returns for the Oil & Gas industry upon deletion from the DJSWI and strong reaction to the negative announcement. Therefore, only the study of Cheung (2011) did test the effect on the effective day (day of change) separately while the remaining only investigated the effect on the announcement day and found significant impacts for a sample of US stocks.

Moreover, Cheung (2011) also had an estimation window of almost 1 year (234 trading days) while Chakarova & Karlsson (2008) had a 5-month estimation window. Tillman (2011) had a 2-month and 6-month estimation window respectively.

Table 2 below provides a summary of the main findings of previous similar studies about the relationship between sustainable development and corporate performance.

Table 2: Overview of previous empirical studies on DJSI

Studies	Relationship	Main findings
Charakova & Karlsson, (2008)	No	The absence of a market reaction can be associated with investors' belief that CSR activities do not affect the future cash flows of a corporate. The level of impact also differs between various countries.
Cheung, (2011)	+/-	No impact on the announcement but a significant but temporary increase (decrease) on the day of change of inclusion (exclusion) US stocks. Liquidity deteriorates after the announcement day and bounces back significantly near the day of change.
Consolandi et al., (2008)	+/-	In case of inclusion, positive abnormal returns start before the announcement day (AD) and

		culminate around the day of the effective (ED). In the case of deletion, the cumulated abnormal returns start to diminish shortly after the AD, becoming negative shortly after the ED.
Stekelenburg et al., (2015)	+/-	On the AD, no significant impact on the stock returns for both firms' inclusion in and exclusion from the DJSI Europe. After the ED of change, stocks inclusion/exclusion experience returns increase/decrease.
Tillmann, (2011)	No	No significance was found on the inclusion/exclusion of the DJSWI. However, some strong negative significant results were found on Oil & Gas industry, and from German companies when being deleted from DJSWI.

1.2. Theoretical Frameworks

1.2.1. Market efficiency

The Efficient Market theory was presented by Fama (1970) as a fair game model in which “investors can be confident that a current market price fully reflects all available information about a security, therefore, the expected return based upon this price is consistent with its risk” (Riley & Brown, 2012).

Fama divided the efficient market hypothesis (EMH) into three sub-hypotheses depending on alternative information sets: (1) weak-form EMH, (2) semi-strong form EMH, and (3) strong-form EMH. Table 2 is a summary of assumptions, empirical tests, and implications of three forms of EMH.

The results of an empirical test on the weak-form EMH found no correlation in a short time period (up to 16 trading days). When testing portfolios in different markets, the finding is that the autocorrelation gets stronger for portfolios in small market size stocks. The researchers did stimulation tests considering advanced-decline ratios, short-sales, short-

positions with low and high transaction costs, which suggested that these trading rules would not out-perform a buy-and-hold strategy. In general, most studies supported weak-form EMH but mixed for the other two hypotheses. EMH plays an important role in explaining the existence of abnormal returns for this event study and the differences between different markets.

Table 3: Key concepts of three forms of EMH

	Hypothesis	Empirical tests	Implication
Weak-form EMH	Current prices already reflect all historical market information, such as prices, rate of return, trading volume, and other market-generated information.	(1) Statistical Tests of Independence or test of time-series independence, (2) Tests of Trading Rules or Trading Rules Stimulation.	The existence of abnormal returns above buy-and-hold strategy.
Semi-strong-form EMH	Current prices fully reflect all public information including market information as well as non-market information such as earnings and dividend announcement, stock split, economic and political news.	(1) Return Prediction Studies, (2) Event studies on market-adjustment effects	There are still chances to earn abnormal-returns.
Strong-form EMH	Current prices fully reflect all information from public and private sources.	(1) Test on Corporate Insider Trading, (2) The Value Line Enigma, (3) Performance of Professional Money Manager.	No existence of abnormal returns.

Source: Reilly & Brown (2010). Investment Analysis & Portfolio Management. 10th ed.

1.2.2. Signalling theory and information asymmetry

1.2.2.1. Information asymmetry

Information asymmetry is said to exist when different people get access to different information sources which impact the decision-making process. In reality, not all information is published for investors. Therefore, private information could be used by those who have it and results in abnormal returns by making a better investment decision.

Most economic and finance models of the decision-making process, expected returns, and equilibrium measurement, is based on the assumptions of a perfect market when information asymmetry does not exist, or that information asymmetry is ignored (Stiglitz, 2000).

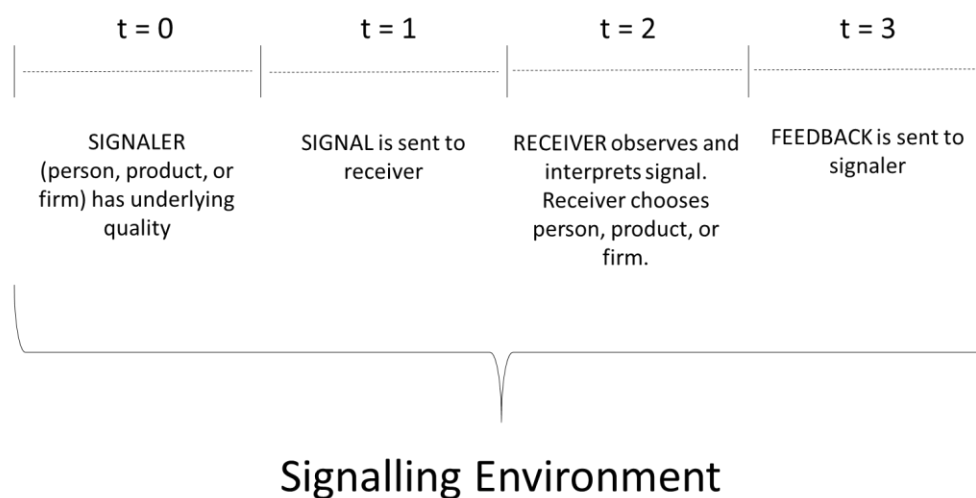
However, some studies recently have been trying to understand how imperfect information could influence decision-making in the marketplace. A stand-out study by Stiglitz (2000) highlighted two broad types of information where asymmetry is critically important. It is when "one party is not fully aware of the characteristics of another party", or when "one party is concerned about another party's behavior or behavioral intention" (Cornelly et al, 2011). All those two kinds of information asymmetry currently exist in the equity market and are important to the study.

1.2.2.2. Signalling theory

While studying the utilization of the labour market to model the signalling function of education, Spence (1973) introduced it to academic dominant. Since then, signalling theory has become the main theory in a variety of literature, including strategic management, entrepreneurship, human resources management and economics as well as finance. The purpose of signalling theory is to describe the behaviour when two parties have access to different information, with one being the sender and one being the receiver. One signal might communicate differently to the market as decided by the sender as well as being interpreted differently by the receivers.

A primary element of signalling theory in terms of the timeline as shown in Figure 3, is concrete-based for an event study.

Figure 3. Signalling Timeline



Note: t = time

Source: Connelly et al. (2001). Signaling Theory: A Review and Assessment. *Journal of Management*. 37(1), 39-67.

From the signalling timeline, some attention should be noticed for this event study.

- If we consider the announcement day (AD) as when $t=0$, then it takes 1 day for the receiver to observe and interpret the signal and another day for feedback receipt.
- Time-lag effect for regions (as the signal is sent from the headquarter of DJSWI in Zurich, Switzerland).
- A gap (typically 5 trading days) between the announcement day (AD) when the news is published and the effective day (ED) when actual changes happen in the index.

2. Methodology

2.1. *Event study methodology*

Having said that, the stock price is the reflection of all predictive information about the prospect of corporations, therefore to investigate the relevance of a particular event for a corporate's future, event study analysis is used by examining its impact on the stock price. In concept, the event study method is a statistical method that analyses the difference between normal and abnormal returns caused by the event, or estimates the abnormal return that differs from the expected return predicted by the model used around the event date.

Event study is the presumption of the market efficiency hypothesis. Brown and Warner (1980) assumed:

"Event studies provide a direct test of market efficiency. Systematically non-zero abnormal security returns which persist after a particular type of event are inconsistent with the hypothesis that security prices adjust quickly to fully reflect new information. To the extent that the event is unanticipated, the magnitude of abnormal performance at the time the event occurs is a measure of the impact of that type of event on the wealth of the firms' claim holders. Any such abnormal performance is consistent with market efficiency, however, since the abnormal returns would only have been attainable by an investor if the occurrence of the event could have been predicted with certainty" (Ibid: 205-206).

The event of interest for this study is the announcement and following implementation in the change of DJSWI which is reviewed and published annually. There is a gap between the announcement day (AD) and the effective day (ED) which is about 5 trading days but may slightly change in years. The details of exact AD and ED for the events are given in Table 4 below:

Table 4: Announcement and Effective Dates of DJSWI from 2011 to 2015

	Announcement (AD)	Effective (ED)
2011	8/9/2011	19/9/2011
2012	13/9/2012	24/9/2012
2013	12/9/2013	23/9/2013
2014	11/9/2014	22/9/2014
2015	10/9/2015	21/9/2015

However, as noted in the mentioned signalling theory discussion, the announcement will be posted on the website from the headquarters in Zurich, Switzerland. So only the European and US stock markets can have access to the information in real-time; the impact of time lag on the announcement day is noted and adjusted according to the next day for the Asia Pacific region.

The details of each event window are shown in Table 5. Both the announcement and effective effect are measured from one day before the actual announcement/effective to one day after to minimize the impact of noises and time lag. For each security, the complete event window runs from 10 days before the announcement day to 10 days after the effective day. The complete event window is divided into 5 sub-windows as shown in Table 5.

However, for the returns, to test more on the post-effective impact, I also expand the post-effective event window to ED+20.

Table 5: Event windows of the study

Pre-announcement	Announcement	Post-announcement	Effective	Post-Effective
AD-10; AD-1	AD-1; AD+1	AD+1; ED-1	ED-1; ED+1	ED; ED+10

The pre-announcement window targets revealing the existence of an anticipation effect before the announcement, while the post-announcement reveals a possible market reaction between AD and ED. The post-effective is an examination of the short-term impact of ED on the stock prices and

trading volume.

The normal (or expected) returns/trading volume of stock is estimated through the estimation window from $t = -290$ to $t = -10$ to calculate β_i (see Model 2) while the announcement day is also labelled Day 0.

2.2. *Normal and abnormal returns/trading volume*

Daily abnormal return of stock i on day t is defined as:

$$(1) \text{AR}_{i,t} = R_{i,t} - E(R_{i,t})$$

Where $R_{i,t}$ indicates the return of stock i on day t , and $E(R_{i,t})$ represents the expected return of stock i on day t which is the expected normal return (in the absence of the event).

The methods to determine the normal returns (or expected returns) are the mean-adjusted return model, market-adjusted return model, market model, and Capital Asset Pricing Model (CAPM) which differ in terms of the benchmark return and estimation windows. This paper uses the CAPM model and 1-year (280 trading day) estimation window.

The CAPM model is defined as:

$$(2) \quad E(R_{i,t}) = \alpha_{i,t} + \beta_{i,t} (R_{m,t} - R_{f,t})$$

α_t and β_t are parameters identified by OLS regression of stock daily excess returns on market risk premium ($R_{m,t} - R_{f,t}$) during -290 day to -10 day.

The market benchmark return $R_{m,t}$ is MSCI World, and the risk-free rate $R_{f,t}$ is the T-bill 1-year rate. Robustness of MSCI Locals and T-bill 3-month rate are also conducted.

Chordia, Subrahmanyam, and Anshuman (2001) find a significant relationship between stock returns and the variability of liquidity, where liquidity is proxied by measures of trading activity such as volume and turnover. In the paper, daily abnormal turnover ratios are calculated as in (3):

$$(3) \quad \text{AVR}_{i,t} = \text{TVR}_{i,t} - E(\text{TVR}_{i,t})$$

Where $\text{TVR}_{i,t}$ indicates the turnover rate of stock i on day t , and $E(\text{TVR}_{i,t})$ represents the expected turnover rate of stock i on day t which is the expected normal turnover rate (in the absence of the event).

The daily expected turnover ratio is given in (4):

$$(4) \quad E(\text{TVR}_{i,t}) = \alpha_t + \beta_t (\text{TVR}_{m,t})$$

α_t and β_t for (4) are also parameters that used OLS regression of stock daily turnover ratio on market turnover ratio during -290 day to -10 day to determine.

For each event window, the average abnormal returns (volume) and cumulative average abnormal returns are given by (5a), (5b), and (6) respectively:

$$(5a) \quad \overline{\text{AR}}_t = \left(\frac{1}{n}\right) \sum_{i=1}^n \text{AR}_{it}$$

Where $\overline{\text{AR}}_t$ = average abnormal returns on day t.

$$(5b) \quad \overline{\text{AVR}}_t = \left(\frac{1}{n}\right) \sum_{i=1}^n \text{AVR}_{it}$$

Where $\overline{\text{AVR}}_t$ = average abnormal turnover rate on day t.

$$(6) \quad \text{CAAR} = \sum \overline{\text{AR}}_t$$

Where CAAR = cumulative average abnormal returns.

The cumulative average abnormal returns capture the excess returns an investor would have received over a particular event window if he/she had invested in security i . It is assumed that abnormal returns (AR_{it}) are normally distributed with mean zero and standard deviation s_{it} . The CAARs are sorted by action (addition or deletion) as well as by regions for further analysis.

To test the statistical significance of average abnormal returns and abnormal turnover ratio, a one-sample t-test is carried out:

$$(7) \quad t = \frac{\overline{X} - \mu}{S_x / \sqrt{n}}$$

Where μ = hypothesis mean which is zero,

\overline{X} = sample mean

S_x = sample standard deviation

N = sample

In this paper, the hypotheses are tested with a significance level of 0.05 or 0.1 for some specific samples. The statistical test aims to check whether or not the means of the sample is significantly different from zero and the probability of

the difference originating from a coincidence is 5 out of 100 or 10 out of 100.

2.3. *Data collection*

The data sample is manually collected from the annual review presentation of DJSI on the official website of RobecoSam from 2011 to 2015. However, RobecoSam only published the 100 largest additions and deletions (in terms of market capitalization) from 2011-2015. Table 6 below shows the total numbers of additions and deletions as well as published numbers.

Table 6: Data collection by year and by action

Year	ADD	DEL	Published
2006	46	36	0 ADD/0 DEL
2007	42	33	0 ADD/0 DEL
2008	33	25	0 ADD/0 DEL
2009	33	33	0 ADD/0 DEL
2010	48	46	3 ADD/3 DEL
2011	41	23	10 ADD/10 DEL
2012	41	41	10 ADD/10 DEL
2013	39	47	10 ADD/10 DEL
2014	32	46	10 ADD/10 DEL
2015	34	30	10 ADD/10 DEL

The study sample period is limited from 2011 to 2015 as mentioned in Table 6. Before 2011, I could not obtain the information about the 10 largest additions and 10 largest deletions from RobecoSam. The following data has been provided by RobecoSAM:

- The announcement day of addition and deletion events
- The effective day of addition and deletion events
- The names of companies

Later, daily data for analysis are obtained from Datastream for stock prices, stocks trading volume, MSCI World, MSCI locals, 1-year T-bill, 3-month T-bill.

3. Results

This section presents and describes the results from descriptive analysis together with comprising the cumulative average abnormal returns (CAAR) for stock returns and average abnormal turnover ratios (\overline{AVR}_t) for stock liquidity and the corresponding t-test statistics. The estimation window is 280 trading days. The complete window is 10 days before the AD and 10 days after ED. The significance level is 5 percent which means that the results are significant if the t-statistic is greater than 1.96; the results present in the following order: AR by action, CAAR by action, AVR by action, CAAR by region, and robustness.

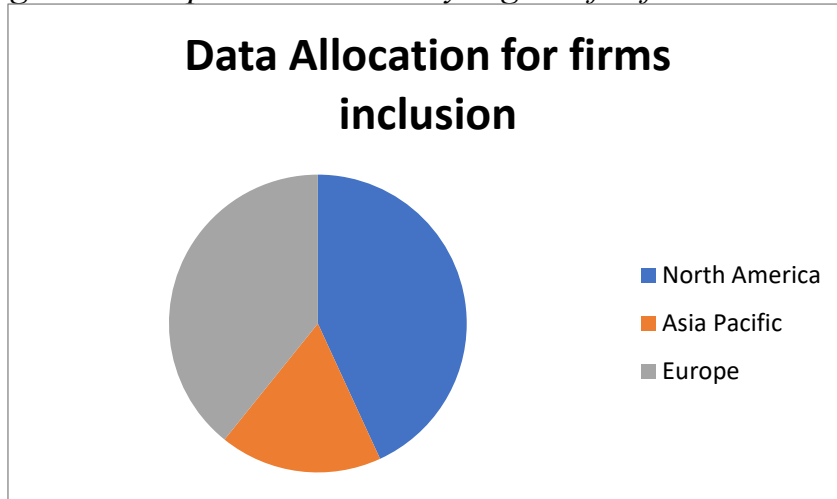
3.1. Descriptive analysis

The sample consists of the 100 corporations which are added to and deleted from the DJSI World. Daily data for analysis are obtained from Datastream for stock prices, stock trading volume, MSCI World, MSCI locals, 1-year T-bill, 3-month T-bill for average 307 trading days per year (280 days for estimation window, 27 days for the complete window AD-10 to ED+10) from 2011-2015.

T-bill rates are also cross-checked with the official website of the US Department of Treasury and those are annualized rates, hence these rates are divided by 280 trading days to obtain a risk-free daily rate for estimation and calculation of abnormal returns. The value for stock prices and benchmarks is all equivalent to United States of America Dollars (USD).

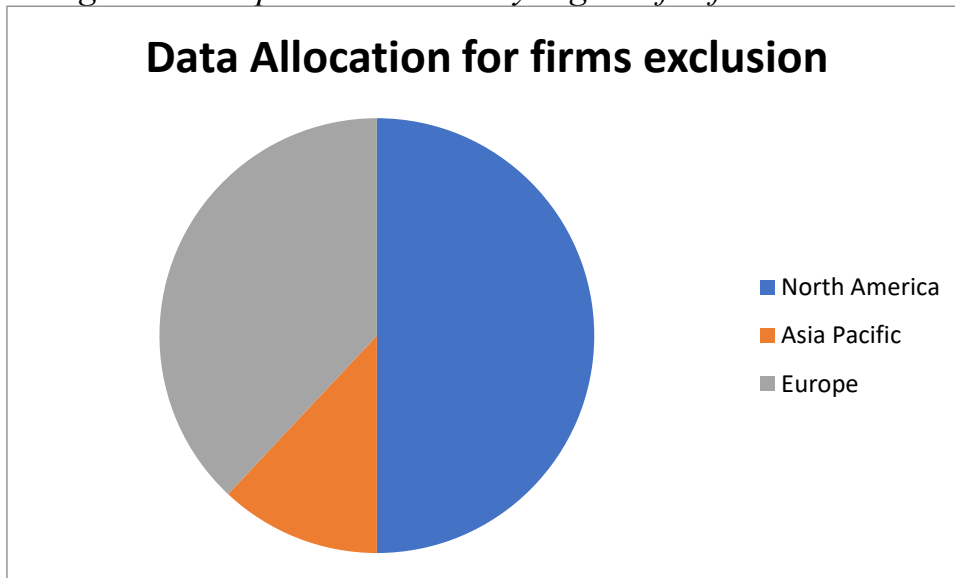
Figure 4 and Figure 5 below show the distribution of the events across regions based on actions. Three main geographical regions in the study are Asia Pacific (Asian countries plus Australia), Europe, and North America (the United States of America and Canada).

Figure 4. Sample distribution by regions for firms' inclusion



The pie chart shows that for additional events, 42 percent are firms from North America, 40 percent are firms from Europe and only 18 percent are firms from the Asia Pacific region. As mentioned in the literature review session, only the top 10 percent of performances in corporate sustainability are considered for addition.

Figure 5. Sample distribution by regions for firm exclusion



For deletion events, Figure 5 shows that again the majority of events are from North America (50 percent) while 38 percent from Europe and 12 percent from the Asia Pacific region.

Types	Inclusion	Exclusion
Mean	2.49e-04	0.09e-04
SD	0.0253	0.0174
Skewness	0.0836	0.0678
Kurtosis	10.0747	4.1988

Table 7 shows the summary statistics of daily returns such as the average, standard deviation, skewness, and kurtosis for sub-samples by action. When looking at the average daily returns, stock inclusions are significantly higher than stock exclusions which might indicate that the market reacts more strongly to the inclusion. The skewness is within the normal range for both inclusion and exclusion, proving that the samples are approximately symmetric and slightly right-skewed for both types of events. The kurtosis is high for both events which might suggest non-normal (extreme value) data, especially for a sample of stock inclusion.

To find outliers, I look at the time series analysis of independent variables, i.e., risk-free rates, and benchmarks, to suspect events would cause extreme values which might impact the validity of the results. Figures 6 and 7 present time-series behaviours of T-bill rates and benchmarks from the beginning of September 2010 to the end of October 2015. For regional benchmarks, I only look at MSCI US and MSCI Europe due to the proportion of those stocks in the sample.

Figure 6. Time-series graph of T-bill rates

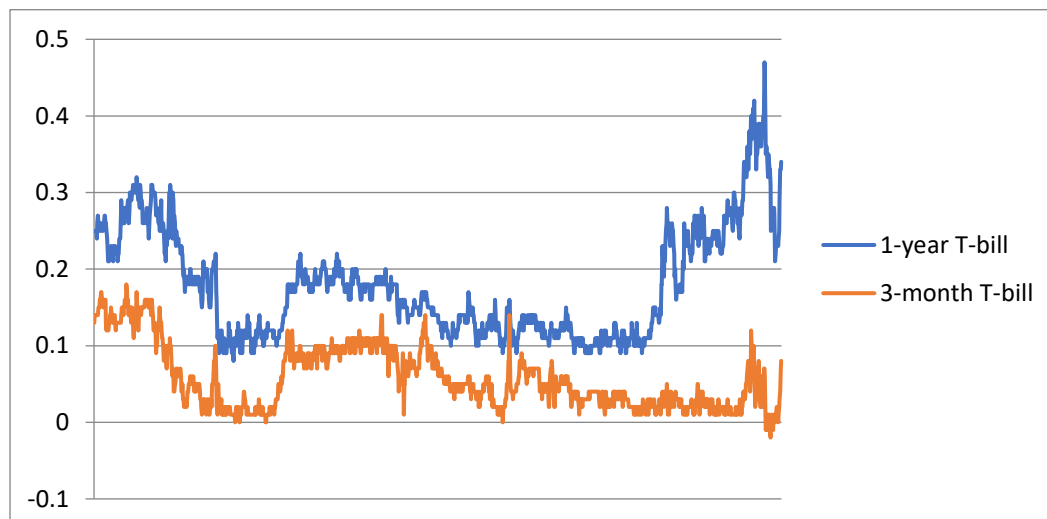
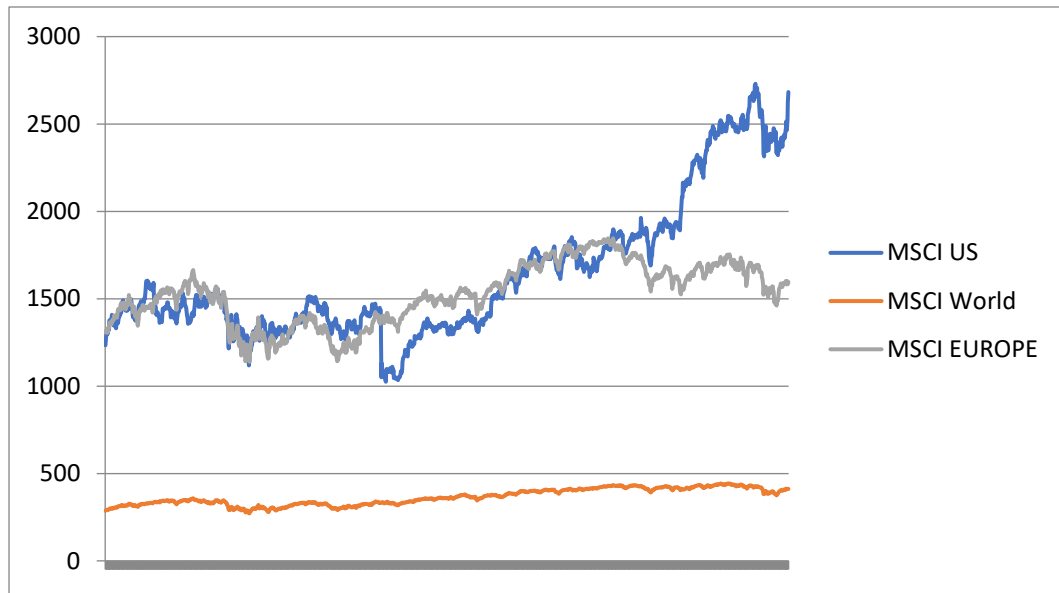


Figure 7: Time-series graph of benchmarks



The above figures show a big fluctuation in T-bill rates around the event window of year 2015 which also had a significant impact on US stocks which are about half of the sample. Table 8 provides a closer look at the fluctuation of T-bill rates in the event window of 2015.

Table 8: T-bill rates in the event window of 2015

	1-year T-bill	3-month T-bill
AD-10	0.36	0.06
AD-9	0.38	0.06
AD-8	0.39	0.08
AD-7	0.39	0.03
AD-6	0.37	0.03
AD-5	0.36	0.02
AD-4	0.36	0.02
AD-3	0.36	0.02
AD-2	0.39	0.06
AD-1	0.39	0.03
AD	0.39	0.02
AD+1	0.4	0.04
AD+2	0.4	0.07
AD+3	0.47	0.07
AD+4	0.46	0.06
AD+5	0.39	0.01
ED-1	0.35	-0.01
ED	0.36	0.01
ED+1	0.35	-0.01
ED+2	0.34	0.01
ED+3	0.32	0.01
ED+4	0.35	-0.01
ED+5	0.34	0.01
ED+6	0.33	0.01
ED+7	0.33	-0.01
ED+8	0.31	-0.02
ED+9	0.25	0
ED+10	0.26	0.01

According to Table 8, 1-year T-bill rates vary from the highest at 0.47 percent on AD+3 to the lowest at 0.25 percent on ED+9, and 3-month T-bill vary from the highest at 0.08 percent on AD-8 to the lowest at -0.02 percent on ED+8. So, within the event window of 2015, 1-year T-bill rates and 3-month T-bill rates drop 46.8 percent and 125 percent respectively. This is suspected to be the cause of outliers which might impact the results.

3.2. By Action

3.2.1. Returns

Table 9 reports abnormal returns (in percentage) through the complete event window for both stock additions and deletions.

Table 9: Mean abnormal returns for stocks inclusion and exclusion

Day	ADD			DEL		
	Mean AR	Median AR	<i>t-test</i>	Mean AR	Median AR	<i>t-test</i>
AD-10	-0.0003	0.0019	-0.11	-0.0002	-0.0016	-0.04
AD-9	0.0014	-0.0005	0.52	0.0000	0.0017	0.00
AD-8	-0.0032	-0.0019	-1.82	0.0028	0.0003	0.88
AD-7	0.0015	-0.0001	0.75	-0.0033	-0.0024	-0.75
AD-6	0.0019	0.0017	0.83	-0.0007	-0.0007	-0.18
AD-5	0.0020	0.0000	1.10	-0.0010	0.0014	-0.25
AD-4	-0.0013	-0.0025	-0.61	-0.0071	-0.0025	-1.77
AD-3	0.0000	0.0039	0.00	-0.0039	-0.0006	-1.12
AD-2	0.0011	0.0014	0.42	-0.0046	-0.0028	-1.37
AD-1	0.0048	0.0035	2.13**	0.0025	0.0031	0.71
AD	0.0004	0.0003	0.22	-0.0027	-0.0005	-0.89
AD+1	-0.0041	-0.0019	-1.97**	-0.0014	0.0023	-0.34
AD+2	-0.0043	0.0010	-1.20	-0.0037	-0.0008	-1.05
AD+3	0.0053	0.0015	1.49	-0.0046	0.0002	-1.18
AD+4	-0.0010	0.0021	-0.35	-0.0015	0.0003	-0.45
AD+5	0.0051	0.0024	2.08**	0.0013	0.0016	0.54
ED-1	-0.0055	-0.0054	-1.88	-0.0004	-0.0002	-0.11
ED	-0.0020	-0.0010	-1.05	-0.0063	0.0001	-1.98**
ED+1	-0.0001	-0.0011	-0.04	-0.0037	0.0011	-1.16
ED+2	0.0002	0.0003	0.06	0.0017	0.0033	0.47
ED+3	0.0031	0.0014	1.42	-0.0076	-0.0041	-2.19**
ED+4	0.0056	0.0033	1.79	0.0032	0.0027	0.72
ED+5	0.0030	-0.0030	1.09	-0.0035	0.0005	-0.98
ED+6	-0.0002	-0.0014	-0.06	0.0013	-0.0003	0.32
ED+7	-0.0061	-0.0029	-1.84	-0.0021	0.0008	-0.59
ED+8	0.0060	0.0014	2.15**	0.0014	0.0028	0.33
ED+9	0.0009	0.0006	0.44	-0.0093	-0.0082	-2.47**
ED+10	0.0038	0.0012	1.72	-0.0055	-0.0010	-1.24

In addition, Table 9 reveals positive abnormal returns and statistical significance on AD-1, AD+1, AD+5, and ED+8 and negative abnormal but

insignificant statistical returns in the effective event window (ED-1; ED+1) which might suggest that there is a positive effect on returns around the announcement day but not on the effective day. The positive abnormal returns only show a few days after the effective days. For deletion, 20 out of 27 days in the event window have a negative value of abnormal returns which are significant on ED, ED+3, and ED+9 showing the impact of deletion events on stock prices on and after the effective days.

For further analysis, the CAAR for each sub-event window is presented to examine the stock price patterns, not only on the 2 standards AD and ED events, but also on pre-announcement, post-announcement, and post-effective events. The CAAR for each sub-event window and corresponding t-test statistics can be found in Table 10 below.

Table 10: Cumulative abnormal returns in event windows by action

Event windows	ADD		DEL	
	mean	<i>t-test</i>	mean	<i>t-test</i>
CAR (AD-10, AD-1)	0.004	0.61	-0.004	-0.64
CAR (AD-1, AD+1)	0.002	0.53	0.001	0.24
CAR (AD+1, ED-1)	0.002	0.36	-0.002	-0.44
CAR (ED-1, ED+1)	-0.007	2.40**	-0.015	3.50**
CAR (ED, ED+5)	-0.015	3.70**	-0.013	2.31**
CAR (ED, ED+10)	-0.009	-1.14	-0.013	-1.27

According to Table 10, there is no statistically significant evidence to support the announcement effect for both addition and deletion, given those CAARs of pre-announcement, announcement, and post-announcement events are not statistically significant.

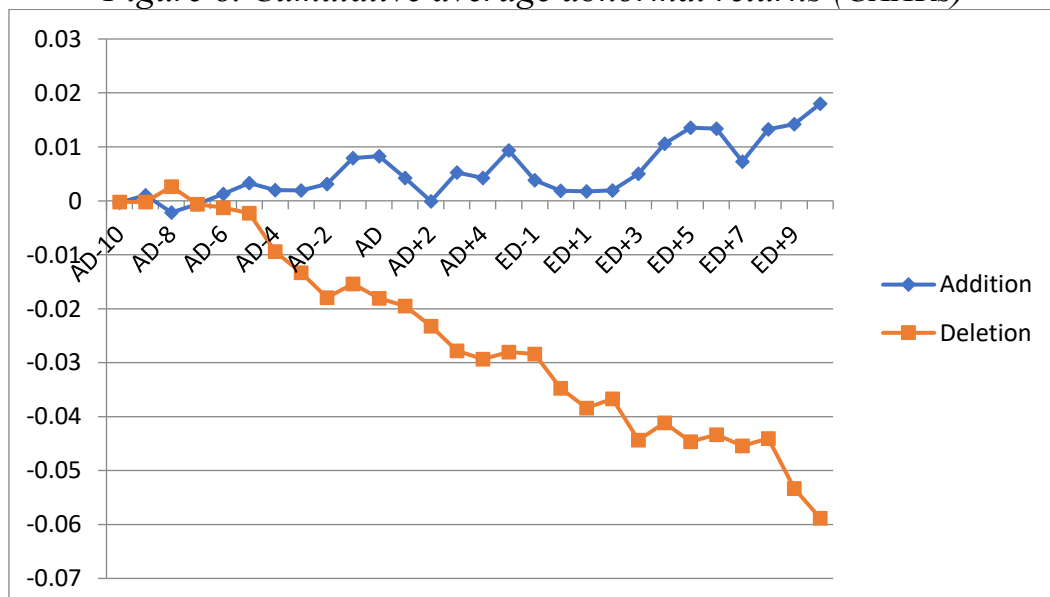
The findings are consistent with previous studies on DJSWI. However, for the effective and post-effective event windows, both deletions and additions experience a significant impact on stock returns. The significant CAARs on the effective event window are (-0.007) and (-0.015) for additions and deletions respectively. In the period after the effective, i.e., post-effective window (ED; ED+5), a significant but temporary decrease in stock prices is

observed for both events which confirm that the event of inclusion in DJSWI does not create positive abnormal returns to the stocks even though only the top 10 percent of performance in the sustainability of 2,500 companies in Dow Jones index are chosen for addition.

Figure 8 presents the time-series behaviour of CAARs in the complete window spreading from AD-10 to ED+10, providing a clear picture of patterns. According to Figure 8, before AD-4, there is no difference in trends of addition and deletion. A very slightly positive effect on addition seems anticipated on the announcement day (AD) and before the effective day (ED) from AD+3 to ED-2 which only lasts in about 2 days, then price adverse impact is observed especially from ED-2 to ED+1. The behaviour in stock prices of additional events does look to be fluctuating like a normal case, which might indicate no impact of the additional event on stock prices and returns as well as confirming negative abnormal returns around effective days as well.

For stock exclusion, the trend of CAARs decreasing starts from AD-10. According to Figure 8 there is a significant trend reduction in returns from AD-10 to ED+10. The observation might indicate the existence of the negative impact of deletion events on stock returns within the complete window event. It seems like the investors punish stocks that were deleted from the index more heavily compared to those added in. These findings are in alignment with Stekelenburg et al. (IFEFE, 2015) on a similar study on Dow Jones Sustainability Index Europe and contrasts with the study of Cheung (2010) on the US market. Moreover, market reaction before the announcement day with a big adjustment might suggest an opportunity to leak information which creates a strong punishment from the investors to the deletion.

Figure 8. Cumulative average abnormal returns (CAARs)



However, Figure 8 does not show or indicate if the persistence and price reversal are statistically significant or not.

3.2.2. Liquidity

This section is to study the markets' reaction to the hypothetical liquidity of observed stocks. The average turnover ratio is used as a proxy to measure the fluctuation of liquidity during the events. The results of the analysis of the average turnover rate (in percentage) through event windows are displayed in Table 10.

Table 11: Average Turnover Rate in event windows

Event windows	ADD		DEL	
	AVR (%)	t-test	AVR (%)	t-test
AD-10;AD-1	-0.1637%	-3.5709	-0.0495%	-1.9973
AD	-0.0998%	-1.7966	-0.0187%	-0.7223
AD+1;ED-1	-0.0422%	-1.1530	-0.0691%	2.1681
ED	-0.0245%	-3.3616	-0.1003%	-2.3900
ED+1;ED+10	0.0587%	3.3167	-0.1404%	3.6283

The positive effect on trading volume only shows after the effective day and is temporary for stock inclusion. In terms of the magnitude, stock inclusion experiences a significant change from a negative value (-0.0245 percent) before and on ED to a positive value (0.0587 percent) rights after ED, jumping 0.082 percent in 10 days. While the negative effect on trading volume appears right after the announcement day and lasts till after the effective day for stock exclusion. A decrease of 0.0401 percent in post-effective windows and the total while a statistically significant decrease of 0.0723 percent after AD are observed for the case of deletions.

3.3. By Regions

Table 11 reports on the CAARs for each sub-event window for three regions (Asia Pacific, Europe, and North America). Both announcement and effective effects are evitable for corporations in Europe, significant results in all event windows and action except on ED for addition, implying that European markets are more sensitive to the events of stock inclusion and exclusion in Dow Jones Sustainability World Index compared to markets in the Asia Pacific and North American regions.

Table 12: Cumulative average abnormal returns in event windows by regions

	Asia Pacific		Europe		North America	
	Add	Del	Add	Del	Add	Del
AD-10, AD-1	0.0144	0.036	0.0159	-0.0155	0.0039	0.034
	(2.54)**	(1.39)	(4.21)	2.98)**	(-1.06)	(-1.6)
AD-1, AD+1	0.052	0.032	0.073	0.023	-0.044	0.021
	(2.18)**	(1.1)	(2.12)	2.32)**	(-0.69)	0.82)
AD, ED-1	0.073	0.042	0.073	-0.0146	0.028	0.043
	(0.96)	(1.52)	(2.39)	3.99)**	(0.67)	(-3.1)
ED-1, ED+1	0.053	0.026	0.071	-0.060	0.025	0.033
	(0.82)	(0.68)	(1.59)	2.97)**	(0.22)	2.52)
ED, ED+5	0.0103	0.035	0.0146	-0.0109	0.0171	0.022
	(2.5)**	(0.77)	(4.19)	2.71)**	(0.36)	1.52)
ED, ED+10	0.0259	0.351	0.0348	-0.0339	0.0178	0.040
	(2.51)**	0.84)	(6.55)**	(-1.85)	(0.32)	1.170

In Asia Pacific markets, statistical shreds of evidence are found on the announcement and post-effective event windows while only one statistically significant piece is found for corporates from North America on the effective event windows. However, the positive reaction of European markets on the

announcement day for stock exclusion is noticed. One possible explanation is that the exclusion announcement has no impact on the pre-announcement and announcement events windows. Nevertheless, the markets react rapidly and quite heavily right after the announcement is published.

3.4. Robustness

The difference in direction and/or magnitude of change between 1-year T-bill and 3-month T-bill rates as well as MSCI countries, suggest a robustness test on stock returns using 3-month T-bill rates and MSCI countries. These results and robustness are similar with additional stronger statistical evidence. The details of robustness are as follows:

Table 13: Mean abnormal returns - Robustness

Day	ADD			DEL		
	Mean AR	Median AR	<i>t-test</i>	Mean	Median AR	<i>t-test</i>
AD-10	0.0000	-0.0007	<i>0.02</i>	-0.0031	-0.0018	<i>2.42**</i>
AD-9	-0.0017	-0.0021	<i>-1.27</i>	-0.0002	-0.0039	<i>-0.09</i>
AD-8	0.0012	-0.0007	<i>0.61</i>	0.0005	-0.0004	<i>0.37</i>
AD-7	0.0012	-0.0034	<i>0.54</i>	-0.0065	-0.0072	<i>3.04**</i>
AD-6	0.0054	0.0042	<i>3.36**</i>	-0.0007	0.0013	<i>-0.32</i>
AD-5	-0.0012	-0.0002	<i>-0.85</i>	-0.0026	-0.0007	<i>-1.29</i>
AD-4	-0.0012	-0.0032	<i>-0.71</i>	0.0020	0.0038	<i>1.11</i>
AD-3	0.0023	0.0032	<i>1.37</i>	-0.0015	0.0010	<i>-0.49</i>
AD-2	0.0005	-0.0022	<i>0.22</i>	0.0002	0.0007	<i>0.11</i>
AD-1	0.0024	0.0036	<i>1.22</i>	0.0079	0.0050	<i>2.85**</i>
AD	-0.0004	-0.0012	<i>-0.20</i>	-0.0037	-0.0009	<i>2.08**</i>
AD+1	-0.0001	-0.0001	<i>-0.07</i>	-0.0021	-0.0003	<i>-0.64</i>
AD+2	0.0027	0.0021	<i>1.56</i>	0.0035	0.0020	<i>1.71</i>
AD+3	0.0007	-0.0003	<i>0.45</i>	-0.0009	-0.0011	<i>-0.59</i>
AD+4	0.0018	0.0040	<i>0.85</i>	0.0031	0.0039	<i>2.23</i>
AD+5	-0.0030	-0.0005	<i>-1.09</i>	-0.0004	-0.0024	<i>-0.13</i>
ED-1	-0.0004	-0.0028	<i>-0.24</i>	-0.0049	-0.0041	<i>2.11**</i>
ED	-0.0054	-0.0034	<i>3.09**</i>	-0.0065	-0.0070	<i>2.71**</i>
ED+1	-0.0011	0.0008	<i>-0.64</i>	-0.0047	0.0003	<i>2.18**</i>

ED+2	0.0005	0.0012	<i>0.31</i>	0.0007	-0.0032	<i>0.18</i>
ED+3	-0.0032	-0.0019	- <i>2.41**</i>	-0.0014	-0.0017	<i>-0.93</i>
ED+4	0.0017	0.0020	<i>0.87</i>	0.0029	0.0031	<i>1.87</i>
ED+5	-0.0032	-0.0062	<i>-1.88</i>	-0.0047	-0.0071	- <i>2.47**</i>
ED+6	0.0001	0.0005	<i>0.07</i>	-0.0049	0.0001	<i>-1.76</i>
ED+7	-0.0029	-0.0033	<i>-1.60</i>	-0.0048	-0.0019	<i>-1.77</i>
ED+8	0.0151	-0.0031	<i>1.33</i>	0.0048	-0.0015	<i>0.97</i>
ED+9	-0.0096	-0.0003	<i>-1.34</i>	-0.0004	-0.0002	<i>-0.15</i>
ED+10	0.0035	0.0002	<i>1.45</i>	0.0053	-0.0011	<i>2.00**</i>

Table 14: Cumulative average abnormal returns (CAARs) – Robustness

Event windows	ADD		DEL	
	mean	<i>t-test</i>	mean	<i>t-test</i>
CAR (AD-10, AD-1)	0.004	0.61	-0.004	-0.64
CAR (AD-1, AD+1)	0.002	0.53	0.001	0.24
CAR (AD+1, ED-1)	0.002	0.36	-0.002	-0.44
CAR (ED-1, ED+1)	-0.007	2.40**	-0.015	-3.50**
CAR (ED, ED+5)	-0.015	3.70**	-0.013	-2.31**
CAR (ED, ED+10)	-0.009	-1.14	-0.013	-1.27

4. Conclusions

This research paper explores the relationship between sustainability performance and financial performance by looking at the impact of sustainability index changes on the market value of a corporation through its returns and liquidity. I study the effects of change in Dow Jones Sustainability World Index (DJSWI) around the announcement days and the effective days by using an event study for a sample of the top 100 additions and deletions in terms of market capitalization from 2011 to 2015, both the announcement and effective effect are measured from one day before actual announcement/effective to one day after to minimize the impact of noises and time lag. For each security, the complete event window runs from 10 days before the announcement day to 10 days after the effective day.

I do not observe statistically significant evidence to support the positive effect for additional events, given those CAARs of pre-announcement, announcement, and post-announcement events are not statistically significant. The findings are consistent with previous studies. However, for the effective and post-effective event windows, both deletions and additions experience a significant impact on stock returns. The significant CAARs on the effective event window are (-0.007) and (-0.015) for additions and deletions respectively. In the period after the effective, i.e., post-effective window (ED; ED+5), a significant but temporary decrease in stock prices is observed for both events which confirm that the event of inclusion in DJSWI does not create positive abnormal returns to the stocks although only top 10 percent of

performance in the sustainability of 2,500 companies in the Dow Jones index are chosen for addition.

For stock exclusion, the trend of CAARs decreasing starts from AD-10. According to Figure 8, there is a significant trend reduction in returns from AD-10 to ED+10. The observation might indicate the existence of the negative impact of deletion events on stock returns within the complete window event. It seems like the investors punish stocks that were deleted from the index more heavily compared to those added in. These findings are in alignment with Stekelenburg et al. (IFEFF, 2015) to a similar study on the Dow Jones Sustainability Index Europe and contrasting with the study of Cheung (2010) on the US market. Moreover, market reaction before the announcement day with big adjustment might suggest an opportunity to leak information which creates a strong punishment from the investors to the deletion.

In terms of liquidity, the positive effect on trading volume only shows after the effective day and is temporary for stock inclusion. In terms of the magnitude, stock inclusion experiences a significant change from a negative value (-0.0245 percent) before and on ED to a positive value (0.0587 percent) right after ED, jumping 0.082 percent in 10 days. Meanwhile, the negative effect on trading volume appears right after the announcement day and lasts till after the effective day for stock exclusion. For deletions, it is observed that there is a decrease of 0.0401 percent in post-effective windows, while there is a statistically significant decrease of 0.0723 percent after AD.

Classifying companies by regions, I find that both announcement and effective effects are evitable for corporations in Europe. Significant results in all event windows and action (except on ED for addition), imply that European markets are more sensitive to the events of stock inclusion and exclusion in Dow Jones Sustainability World Index compared to markets in Asia Pacific and North America.

The overall results support a temporary negative impact on stock prices for stock exclusion and positive/negative impact on trading volume for stock inclusion/exclusion after the effective day (ED) and appear that investors react more strongly on negative announcements than on positive news in regards to sustainability.

For future research on the topic, the followings need to be considered:

- A full list of stocks inclusion and exclusion in a longer time-frame (in 20 years).
- An analysis by year, by industry, by countries.

- Multivariate analysis could enrich the analysis when considering all explanatory variables.
- The link between sustainability performance and financial performance through financial analysis.
- Abnormal returns following index changes to examine the momentum of effect in sustainability indices other than DJSWI could be investigated with a longer event window to examine the momentum of changes.

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