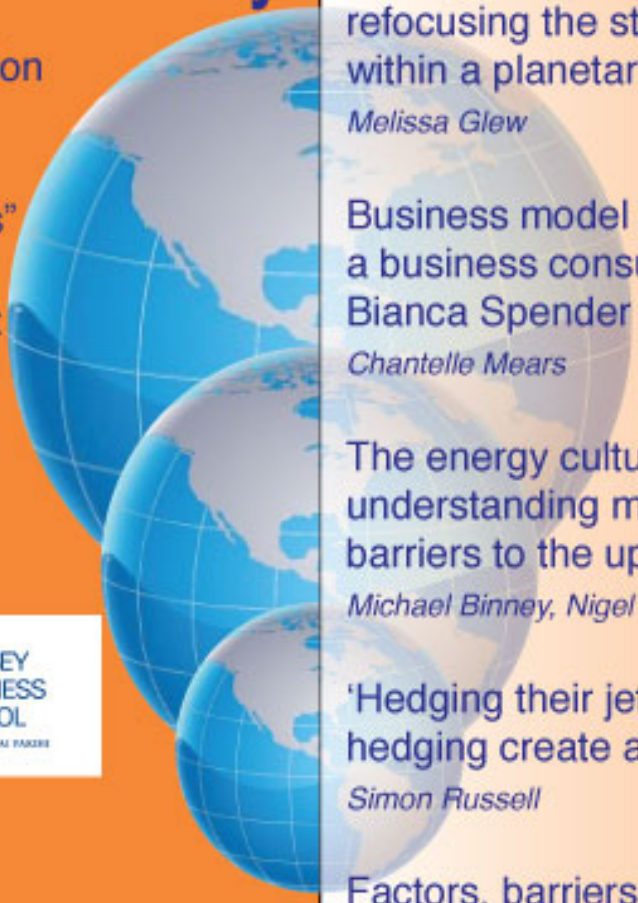
Journal of Asia Entrepreneurship and Sustainability

Volume XVI, Special Edition,
Issue 5, October 2020

Refereed Special Edition
"Massey MBAs Lead the Way - Business Strategies for Success"

Special Edition Editors:
Patricia Bossons
Heidi Le Sueur
F. Elizabeth Gray
Trish Bradbury



Print: ISSN 1177-4541
On-Line: ISSN 1176-8592
www.asiaentrepreneurshipjournal.com

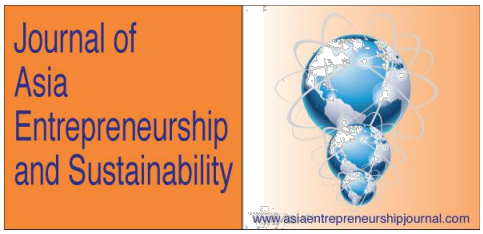


Table of Contents
Volume XVI, Issue 5, Oct 2020
Special Edition

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Special Edition Foreword

Patricia Bossons, Heidi Le Sueur, F. Elizabeth Gray,
Trish Bradbury
Massey University, Albany/Auckland,
New Zealand
P.Bossons@massey.ac.nz

Welcome to this Special Edition of the Journal of Asia Entrepreneurship and Sustainability. In this Edition, we showcase the 2020 Applied Business Research Projects of the Executive MBA students from Massey Business School, Massey University, in New Zealand. We are impressed and excited by the breadth and depth of the subject matter, which is enhanced by the rigour of the research. This, in turn, leads to output of real and practical value.

The Executive MBA programme at Massey is the longest running of all MBA programmes in New Zealand. Coming from its original roots as an Agricultural College, Massey University is well known for its practical and applied approach to business. For this reason, the students attracted to its flagship Executive MBA programme tend to be self-starters with a strong entrepreneurial outlook. The programme has a selective admissions process, which not only requires a minimum of 7 years' work experience and 3 years' management experience (successful applicants often have significantly more of both), and appropriate academic experience, but also an interview to determine 'best fit' – both for the applicant, and for the Massey programme. The students represented in this

Special Edition are great examples of practicing business people who have leveraged the opportunities presented by the EMBA programme to make transformational change in their chosen fields.

The Applied Business Research Project is the Capstone piece of work in the EMBA programme. Before beginning their Research, students have completed 12 courses, over 18 months part-time, whilst also managing full time jobs and having busy lives. Their ability to prioritise, lead, collaborate, make decisions and demonstrate extraordinary levels of self-management are tested to the full, and the qualification of Executive MBA is a testament to someone's ability to function at this level.

The contribution to business from the Research Projects can be very applied, working with a real business issue in the present, or it can be aspirational and offer recommendations for future change. For both options, the research adds real value by being evidence based, using valid research. Each EMBA Research Report contains clear and concise recommendations based on researched facts – this means that real value is delivered.

We hope that you enjoy the topics offered in this Special Edition, and appreciate the diversity, creativity and hard work which have made this possible.

The Special Edition Editors

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

An effective China market entry strategy for Lactoferrin powder, while operating under Covid 19 restrictions

Yi Lu
niuniu1711@gmail.com

Executive Summary

Milk New Zealand Dairy Ltd company (herein after called MNZD) is a New Zealand dairy company, it owns the international dairy brand—Theland and export milk product to China. Its parent company-Theland New Cloud (Shanghai) Digimart Ltd, is a member of Alibaba Group. In 2020, The Covid-19 pandemic is everyone's challenge and is expected to leave a lasting scar on the world's economies. Through the macroenvironment, industry and firm analysis, MNZD realise the current company strategy is no longer robust enough to deal with the post-pandemic situation. So, the senior management team decides to form a new product development task group to develop the Lactoferrin Powder project to entry offshore market.

The strategy consists of

1. Adaptation strategy of New Product development by offering Chinese consumers with lactoferrin Powder with enhance immune system benefits by the end of 2020.

2. Adaptation strategy of channel selections by consumers preference. Engaging 30%-50% more online e-commerce channels and livestream broadcasting platforms by the end of 2020.
3. Adaptation strategy of marketing approach such as KOL(key opinion leaders) influence on social media such as TikTok and WeChat by the end of 2020.

To achieve the common goals set by the new strategy below, I initialized the new product consumer research project.

As a marketing manager of Theland, the brand belongs to MNZD. The issue I will address in this research is about what kind of new product consumers are needs most and why they choose it. MNZD considers the factors during the product design stage of the new product development process. Using a new product element extracted from raw milk called LACTOFERRIN powder, a survey is designed to get information from consumers. The responses received are used to develop the new product formula/concept/package/targeted consumers and so on. The research gives us a sound idea and consumer portrait of the Lactoferrin Powder product development and to make it a successful entry into the market.

Objectives of the Research

The objectives include:

1. To determine the product features of LACTOFERRIN that consumers prefer along with the reasons for their choices.
2. To identify the potential consumers of LACTOFERRIN product

3. To determine the appropriate weight of the product as preferred by the consumers in the market.
4. To develop recommendations for developing a product according to the product features identified by potential consumers.

Research Questionnaire Design

The question design focus on this key element: What are the factors to consider in developing a LACTOFERRIN milk product for everyone's immunity system? Also includes the popularity of education of LACTOFERRIN, demographic of interviewees (Gender, age, occupation) the preference of glucose/pre-biotics, their open suggestions of package weight/design and so on (10 questions in all)

Methods Used

Survey

The survey is mainly combined by quantitative research method. For some consumer insights, the responses included close-ended questions for some of the issues. Meanwhile, some open questions required explanations to provide reasons for their answers.

The survey questions are as follows:
Lactoferrin fortified Milk Powder New Product Launch Research Survey

a) Do you know that LACTOFERRIN can increase immunity?

A. I know

B. I don't know

b) How would you define your Gender?

A. Male

B. Female

C. No disclosure

c) Would you tell us your age?

A. 20 or less

B. 20-30

C. 31-40

D. 41-50

E. More than 50

F. No Disclosure

d) Are you on an e-commerce channel as DAIGOU (a distributor that is doing the cross-board business to customers in New Zealand Chinese Community) or just an ultimate consumer?

A. Distributor

B. Consumer

e) Do you feel the need to add glucose when selecting a LACTOFERRIN fortified Milk Powder?

A. Yes

B. No

Your reason (optional):

_____

f) Do you feel the need to add prebiotics* when selecting a LACTOFERRIN fortified Milk Powder?

A. Yes

B. No

C. I don't know what the probiotic is.

* Background for researchers: Prebiotics is very popular in Chinese community and in Mainland China. It is on air/TVC/PR/Everywhere

g) If you have 2 kinds* of existing products net weight selection, packed in can , includes 280g and 320g. which one would you like to choose for the LACTOFERRIN fortified Milk Powder?

A. 260g

B. 320g

C. None of the above, my recommendation is:(add figures as interviewees want)

* Background for researchers: It is a realistic question based on the capacity and manufacture condition of current factory.

h) If you buy Lactoferrin, who do you think you will give the product to them as a gift?

A. Children

B. Parents

C. Myself

D. Others (please give examples)

E. All of them can be selected

i) What would you expect to have to pay for the Lactoferrin product in RMB(1NZD=4.67RMB)

A. Below 300

B. 300-400

C. 400-500

D. 500-600

E. 600-700

F. Above 700

Interview

The questions of the interview included:

1. Coronavirus is affecting a lot of people, and many are succumbing to the disease. What are you doing to ensure your body handles the virus if you are affected?

2. Is there a product you wish was available in the market to help you achieve your stated aim?

3. Do you now that LACTOFERRIN improves immunity?

4. Do you feel the need to add glucose when facing a LACTOFERRIN fortified Milk Powder?

5. Do you feel the need to include a prebiotic in the product?

6. If the product is manufactured using your stated preferences, which persons would you recommend the product to? Of what age?

7. What is your preferred packaging amount in the market?

Data Collection Procedures

- Closed-Ended Surveys
- One on One Interviews
- Data Analysis Procedures

Text Analysis

Statistical Analysis

Ethical and Cultural Considerations

Informed Consent

Confidentiality

Privacy

Results

Interview

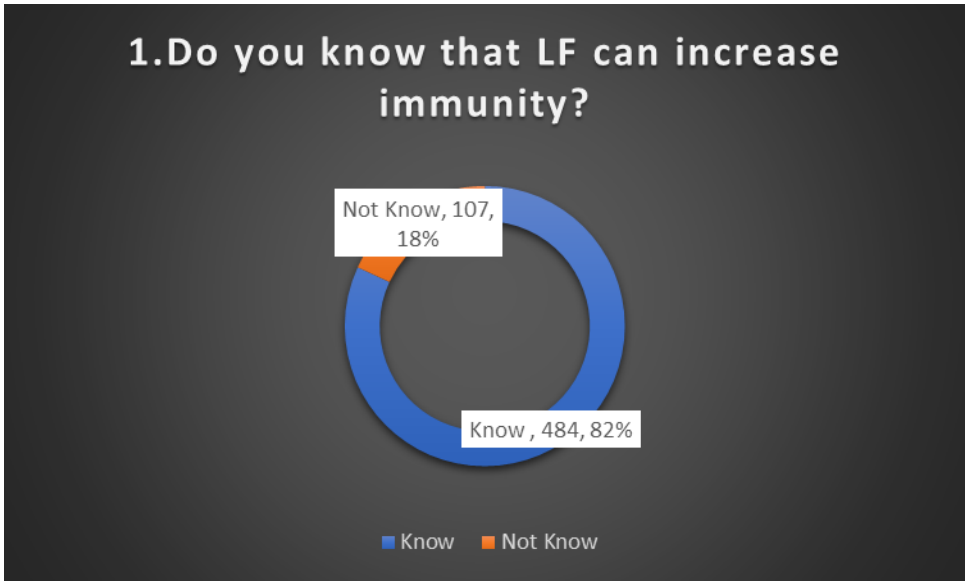
From the interviews conducted, all the individuals wish to have a product that could enable them to improve their immune system, especially during the period of the outbreak. Therefore, 100% of the individuals supported the provision of LACTOFERRIN products in the market. Since most of them are aware of the function of glucose in the body, they all supported the fact to include glucose in LACTOFERRIN at a percentage that is appropriate for easy digestion of LACTOFERRIN. Also, the prebiotic concept would help prevent the attack of some diseases hence essential in the body. However, the precautions that the respondents were quite concerned about is the presence of the right prebiotic content that is helpful in the human body. 60% of the sample population selected

the recommended product for children and the elderly. Because their understanding kids' immune systems are still weak. For the elderly, the cells tend to have lost the power to fight virus in the body. Therefore, LACTOFERRIN product would best serve the two groups of people. 40% think that the product is still best for individuals at any age and within a type of demographics.

Survey

Knowledge of product

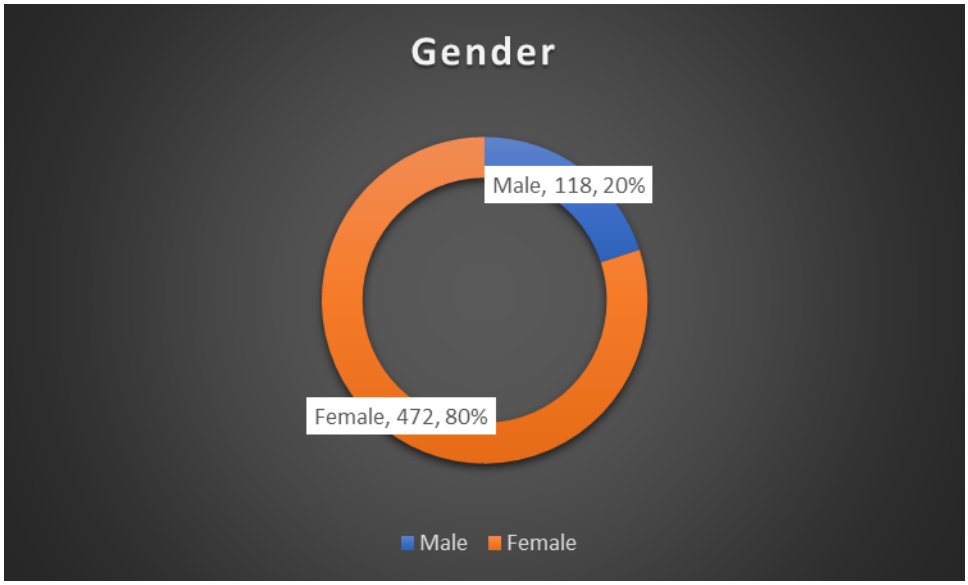
The survey involved ten questions which were answered by a larger group of individuals, which is 589 people. In the first question, 82% knew that LACTOFERRIN could improve immunity, while 18% did not know about this feature. It reveals that potential customers or consumers already have profound education knowledge of LACTOFERRIN.This result is as shown below:

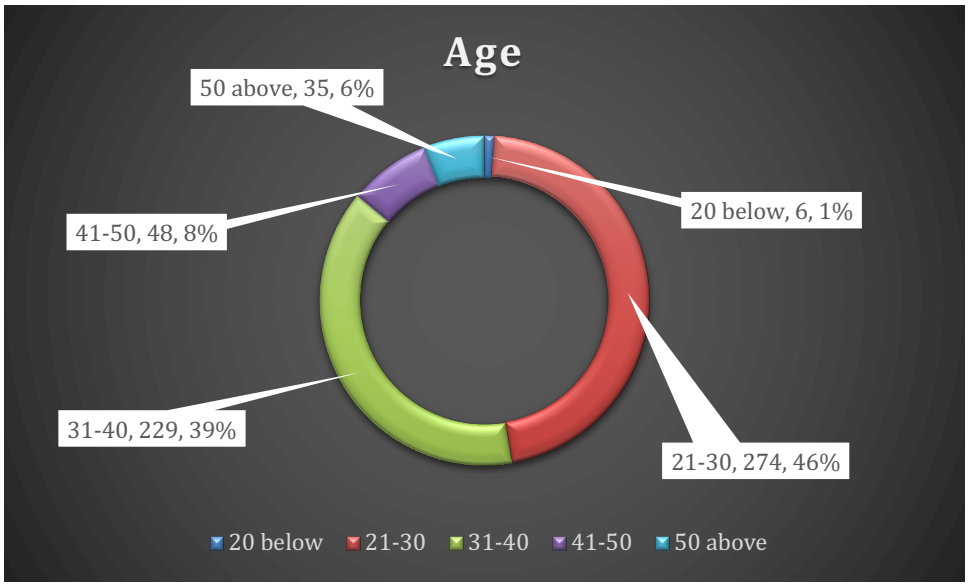


Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Demographics of Population

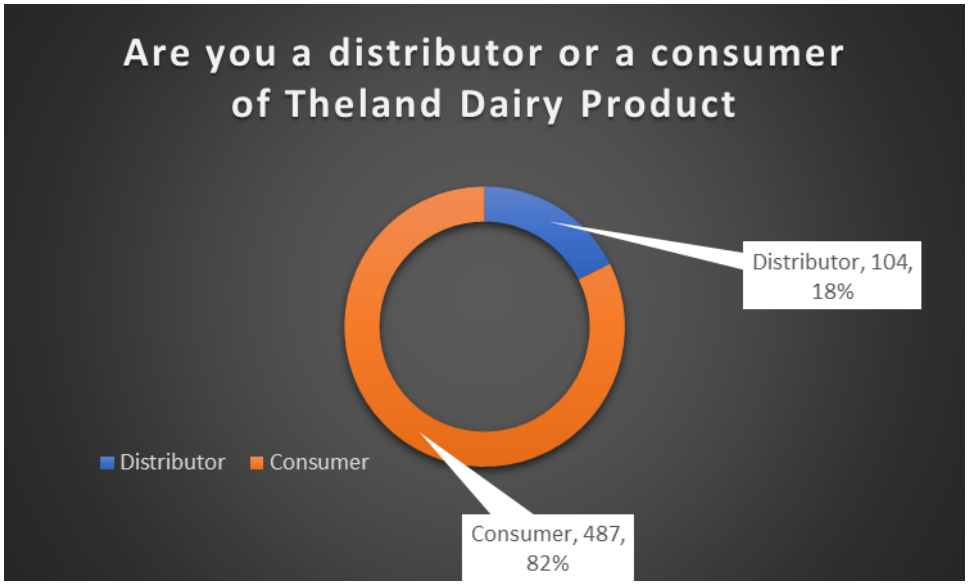
In this survey, all the participants responded, hence the results developed from it reflect the whole targeted population. The survey involved more female individuals compared to the male, with a ratio of 1: 4. The youngest participant was of the age of 21, while the oldest was above 50 years. This result is as shown below:





As indicated above, the highest number of people who participated were between the ages of 31 to 40, with 40 participants, followed by people between the ages of 41 to 50 years. This fact maybe because they are young individuals, most of them having young families and wish to protect them too. Therefore, the survey shows that most of the target population will include people between the ages of 20 to 50; hence their feedback is essential.

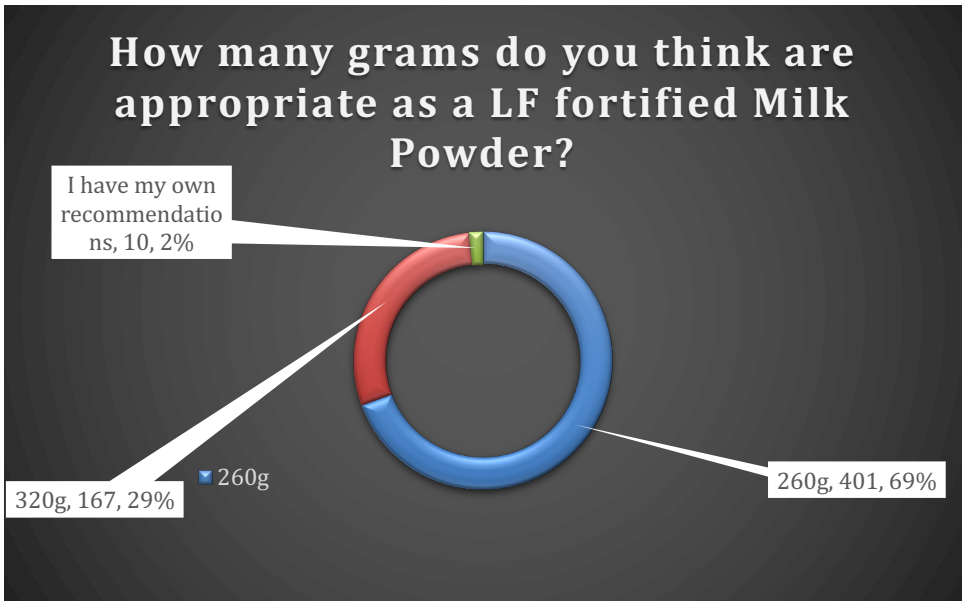
LACTOFERRIN product aims to serve consumers in various regions of New Zealand, Asia, and the Chinese market. Therefore, having an online platform for sales would be convenient for a wide range of the population to access and get the product. In the survey, a question aimed to determine the percentage of people who are on an e-commerce channel. The result is as shown below:



The survey showed that 82% of the survey population is Theland product consumers, which indicates that new product might can take the advantage of brand penetration of the old product. Normally they can make the sale through e-commerce, and most of its consumers will be able to purchase online. The rest of the population could buy through other platforms offline as traditional market. 18% of the survey is the potential distributors of Theland product. Their opinions about the new product is also very important.

Product Design

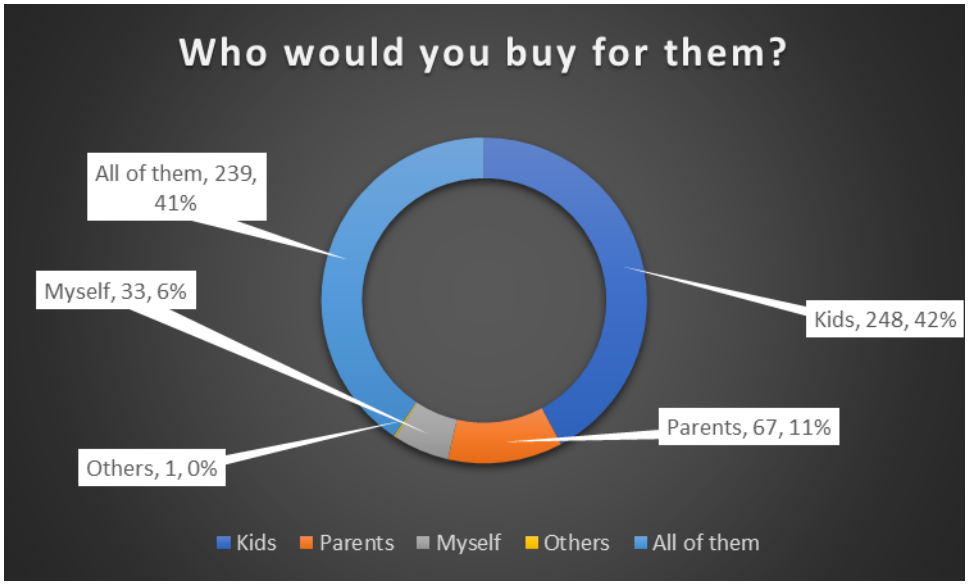
In the product design stage, it is also essential to know the amount that is appropriate in LACTOFERRIN fortified Milk Powder. The survey provided two options, either 260 grams or 320grams. The results show that a more significant number of people prefer a smaller quantity product package for purchase as most chose 260 grams. The results are as shown below:



However, upon the individual interview, the potential consumers all reflect that a single served sachet(1-1.5gram) might be the trend of the consumption method for businesspeople or school students as on the go occasional drink. Therefore, NPD taskforce group propose MNZD should consider providing the product with both family pack of 260g and single serves to cover the whole population and needs of consumers. If MNZD decides to use 260 grams, it is bound to lose approximately 31% of the target population. Therefore, in the marketing and business strategies, MNZD requires a plan to be able to avail products to serve all its target population.

Targeted Consumer group

In the marketing stage, the targeted demographics of the population are vital to finding the right advertisements and promotion strategies that will reach the people. In the survey, it was appropriate to identify the consumers of potential customers. One of the questions in the study required the participant to identify the group by which they would purchase the product for. It is a product that improves the immune of individuals hence appropriate for every age. However, identifying the specific group would help to strategize the success of the product. The results were as shown below:



From the results, 59% suggest that children, parents, and themselves should purchase and consume the product. However, the observation showed that children are the most recommended in this, with 42% of the participants feeling that the product would benefit children first more than it will do to other groups. It is, therefore, appropriate that the consumers reach out to the other groups to make them understand that the product also helps their bodies to be healthy and fight diseases. This strategy will ensure the customer base widens in that the product is purchased for children, parents, elderly, and all other individuals susceptible to coronavirus disease.

Discussion

Findings

Knowledge of Product

The results show that the products have the potential of being marketable in the market, as many of the individuals in the survey are aware of LACTOFERRIN and know that it improves immunity. At the time of the disease outbreak, there is a high demand for immunity boosting products; hence the knowledge on LACTOFERRIN shows a need for the product. Examination and assessment of the idea are vital if it could result in product success (Suhag, 2017) hence having information on knowledge in the market helps in development.

Demographics of the consumer population

Having the idea of providing an immunity-boosting product at a time when it is needed the most is a practical idea that is marketable. It is also appropriate to study the market by which the product should sell. Information on the additives to include help in designing the product. The ages of the participants provide information on the demographics of target consumers; make it more details of operation guide to strategize its plans. Also, the identification of the customer base of the group of consumers that could purchase the product helps to determine the best way for advertising the product to the audience. The information also creates confidence for the MNZD since potential customers are aware that the product, the product has a reason to buy in the market. During the market test, determination of the quantity wanted by individuals will take place; hence production will be determined by the market condition.

Product Design

LACTOFERRIN product aims to benefit both individuals and families at the time of the coronavirus outbreak. Therefore, MNZD strategize its actions fast to serve

consumers at an appropriate time and to gain the advantage of being the first entry, providing the product in the market.

Linkage to Research Question

The study aimed to identify the factors to consider in developing a LACTOFERRIN dominated milk product for everyone's immunity escort.

Consumer Suggestions

The aim of developing a new product is to satisfy the need of consumers in the market. In the development of a LACTOFERRIN product, the survey was vital in providing consumer preferences that enhance the development of a product that is marketable. The characteristics of a new product should be following the consumers' choices of products they wish to consume. As the product gets into the market, the features and design adapted to be appealing to the consumers, such as more convenience as a single serve sachet. It will influence them to purchase.

Conclusion and Recommendation

Conclusion

New product development involves eight stages where the management of a product generator needs to follow to develop a standard product that meets the consumer’s needs. Nevertheless, the success of a new product does not only rely on the stages but also the preferences of the consumers and the characteristics they wish to have. After development, the products need to be sold; therefore, the purchasing party requirements are essential in the development. The LACTOFERRIN product idea is based on the gap in the market and the high need

for supplements that improve immunity. Identification of the need shows the product is marketable. The survey conducted provided information to develop the design of the product. The responses received were positive and provided a guide on how to improve the product. MNZD should consider the consumers' value, the competitors, and the market position in its development of strategies to make the product sell and achieve desired results.

Recommendation

Continuity of LACTOFERRIN product development

Based on the analysis of data, development of the LACTOFERRIN product will go ahead due to the targeted consumer has strong sense of enhance their immunity. The people also have profound education of the LACTOFERRIN as a nutrition supplement. They are well informed of the benefits they are bound to receive. During the period of development of the idea on LACTOFERRIN, most of the people needed products that improve their immune system to help them fight the disease or protect them from the viruses. The concept development stage has been successfully completed and the further development has been going on based on the specific preferences of the consumers. More concepts are incorporated to the idea, including the amount of the additives, the survey shows support for the product and vast potential for sales, MNZD builds the idea from the concepts to a product that the potential consumers would love to purchase and consume. The function of a survey is well executed and will be followed effectively.

Online Digital Launch of Product

The next step would be an action plan for marketing. The launch project will be conducted in an omni channel proposal. Using online platforms to communicate to a diverse population. Having the target market in three regions. Commercialize the product and speed up the marketing cycle and reduces waste of resources. Launch the products in the New Zealand market first and then penetrate Asian and China mainland market. Utilize the online launch tools such as TIKTOK/FACEBOOK which covers most of the markets and can be influence the rest of the 2 market with leading Key Opinion Leaders.

Besides, the LACTOFERRIN product aims to serve the market at the period of the covid19 outbreak; the process for its development to launch use agile project management. Fast decision, flexible approach. It satisfies the needs of the people to develop a strong immunity to fight the disease. Therefore, a holistic online launch with global live stream broadcasting would speed up on commercialization to make the product known to potential consumers. Also save the resources and other functions, such as for logistics costs.

Basis for Pricing Decisions

A larger percentage of the survey supported the proposed attributes of LACTOFERRIN which leads to a marketable product that has the potential of having higher sales. To strategize on best practices for tagging a price, MNZD takes three elements as consideration. First, the cost of development of the product, second, the competitors' prices, and third, the customer expected value of the LACTOFERRIN product. Assessing competitors' prices allows MNZD to provide

the product at a moderate rate that will enable them to compete with the other firms. The consumers' preferences are essential in the development of LACTOFERRIN products. MNZD analysis the unique selling point to enhance the value of product：LACTOFERRIN with IgG, which would be the double protection of the immunity system. According to customers feedback, 60-80 NZD would be an acceptable range for a LACTOFERRIN Theland new product.

Reference is omitted due to the limited space, the full report will be available from louie.lu@milknewzealand.com

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Through our visitors' eyes - strategic change within a planetarium and observatory

Melissa Glew
melissag@anodising.co.nz

Executive Summary:

Not for profit organisations face several challenges with a contracting pool of funding options and growing competition they are now more than ever faced with sustainability challenges. Stardome has not been immune to these challenges and is facing decreasing attendance numbers and revenue.

Sustainability must be the focus of the organisation. To stay relevant in today's ever-changing environment Stardome needs to look at its business through its visitors' eyes. Employing a visitor-centric strategy will allow the organisation to stay relevant and meets its mission to:

Share our love of space (Stardome, 2018).

There is a need to gain competitive advantage over the other attractions in the region in order to grow visitor numbers. This competitive advantage can be gained by differentiating Stardome from the other amenities through exceptional service standards.

As Stardome faces a change in leadership, now is the time to change focus and become a truly visitor-centric organisation. This will involve change management, and Kotters 8 step change management model has been employed to help with the process. Due to time constraints this paper covers the first 6 steps in the model.

At stage 6 we look at four quick win projects which can be implemented to start the change process and gain momentum this is our toolbox:

- Staff Recruitment – getting the right people.
- Staff Training – becoming experts.
- Internal Marketing Plan – singing about our success, sharing information, breaking down silos.
- Leadership – driving the change from the top.

I believe this approach will put the organisation on a solid footing to grow attendance and its financial sustainability.

Introduction:

The focus of this research is on the ongoing sustainability of Stardome. The passion that its staff and volunteers have put into the business may now be the very thing that is stopping it from thriving and causing it to go into survival mode. The motivation for this study is to make sure Auckland does not lose one of its iconic amenities, and that Stardome lives up to its vision:

(Stardome, 2018)

This will require a change in thinking specifically around the role of the visitor in the organisation. A refocus which puts the visitor in the centre of the organisation's strategy will allow Stardome to gain a competitive advantage over its competition. This advantage should increase attendance which will allow the organisation to increase revenue and key performance indicators to enable it to access additional funding through philanthropic trusts and government funding.

Customer Centricity has been adopted all around the world to provide business with a competitive advantage in the market. Netflix, Disney, Lego and Coca Cola are a few shining examples (Debruyne, 2014) where a focus on the customer has allowed the business to grow and thrive. Consumer behaviour has changed dramatically in the last twenty years with access to online resources changing our buying behaviour (Wallace, 2013). Consumers are demanding better experiences and have higher demands and expectations. This is particularly relevant for museums as visitors post online about their experiences, go online to seek

discounted admission, and decide which facility to visit (Zanibellato, Rosin, & Casarin, 2018).

This paper looks at changes that have occurred in Auckland's Observatory and Planetarium – Stardome. The business has been firmly focussed on delivering space science information to its visitors, at the cost of entertaining and providing an experience. It is facing declining audiences and must change its focus to deliver what the visitor wants.

A recent change in leadership has occurred within the organisation, which allows the leadership team to now focus on some quick win projects that will re-focus staff to see the organisation "through the visitors eyes".

These quick wins are:
Recruiting The Right People: Staff are the front line of this strategy, and to deliver the best service we need to look at the people we are employing and how they represent our organisation. Taking time to get the best person for the role will reap benefits in the long run, aligning values as part of the recruitment process will allow the organisation to ensure they have the right people, and will lead to better staff retention rates (Robson, 2012).

Training Our Staff To Be The Best: To maintain high levels of customer service, ongoing training is needed to equip staff with the skills needed to drive the business strategy. The customer simply has to be "front of mind", training supports the business focus on this (Reilly, 2018).

Internal Marketing Plan: To give the best visitor, experience it is important for staff to understand and buy into the organisations mission or purpose (Balta, 2018). An effective way of gaining staff buy in is through an internal marketing campaign, which can keep the companies mission forefront of thinking, as well as the standards and expectations around that (Balta, 2018).

Leadership: A change in CEO will allow the business to set a new focus. A non-compromising values-based leadership approach will allow the organisation to focus firmly on the visitor. New business metrics around service excellence, and staff feedback will drive a culture firmly focussed on the visitor.

Literature Review:

Museums have traditionally been funded by local and central government with clear objectives around visitor numbers and accessibility to facilities driving performance (Alcaraz, Hume, & Mort, 2009). As a home for culture and collections these institutions are a vital part of many cities' fabric, with countries recognising the significance they add to their landscape. Visitor numbers as a key performance indicator certainly makes sense and these numbers are proudly displayed for all to see, however what is more vital than this is the information that can be obtained from those visitors, and what this information tells us about our offering (Wells, Butler, & Koke, 2012).

Statistics support the notion that the general public find museums exclusive and developed for the culturally elite (Coleman, 2018; Dawson, 2014), working on making this environment more inclusive is a challenge facing many institutions. It

could be said that museums have had an identity crisis with what their purpose is, do they exist to educate or to entertain and how is this balanced (Falk, 2016; Griffiths, 2006). Are museums able to balance the two whilst staying true to their mission.

The fostering of community relationships has been recognised as a way for institutions to increase engagement and make content more relevant to their visitors (Kadoyama, 2018). Stephen Bitgood suggests an Attention-Value model, which is based around how you get the visitors attention and what value you add through gaining that attention or engagement (Bitgood, 2013). This method aligns customer value but does not go deeper into the role of the organisation in delivery of a customer solution.

Stardome is providing an experience for its visitors which includes exhibits, displays and a planetarium show, "an experience occurs when a company intentionally uses services as the stage, and goods as props, to engage individual visitors in a way that creates a memorable event" (Pine & Gilmore, 1998). Creating a memorable experience would encourage repeat visitation and would move towards our visitors becoming our brand ambassadors (Wiedmann, Labenz, Haase, & Hennigs, 2018). Repeat visitation is a positive externality of providing memorable experiences which is a key component of customer centricity, gaining the customer for a lifetime (Raţiu & Negricea, 2008).

Customer centricity or in this case visitor centricity is an approach which remains firmly focussed on adding value, whilst breaking down silos to create a unified and

cohesive approach to strategically running a business (Parniangtong, 2017). As museums move towards greater sustainability and are required to be more transparent with their financial records (Morunga & Bradbury, 2012), being relevant and a must see attraction in the minds of their visitors is essential. In order to understand how this can applied in a Stardome context we need to understand how the customer-centric marketing approach has come about, and what this involves.

It is logical to any businessperson that without a customer to sell your product or service to, you do not have a business. For this very reason one may assume that business is naturally customer centric, in 1954 Drucker stated “it is the customer who determines what a business is, what it produces, and whether it will prosper” (Drucker, 2006). However, businesses have historically been very operational and product-centric (Kotler, Keller, Brady, Goodman, & Hansen, 2016) which has meant the majority of the business have been focussed on new products and product development, customer relationships were something that the marketing department took care of (Rust, Shah, Day, Parasuraman, & Staelin, 2006).

In the 1990’s research into customer centricity started to gain momentum, this was due in part to the fast-paced changing face of technology and globalisation during this era. Due to the increased and dramatic changes in the ability to store and analyse data, companies were now able to use Customer Relationship Management (CRM) systems which led to marketing being more technology driven (Rust et al., 2006). This ability to collect data enabled business to look at their products and services from a customer perspective and understand who was buying and what

was behind the purchasing decision. It allowed business to identify what market segments they were attracting, and they were able to implement targeted marketing strategies at these groups (Valls, 2018).

Consumer behaviour has been influenced dramatically in the last twenty years with access to online resources changing our buying behaviour (Wallace, 2013). Consumers are demanding better experiences and have higher demands and expectations. This is particularly relevant for museums as visitors post online about their experiences, go online to seek discounted admission, and decide which facility to visit (Zanibellato et al., 2018).

Museums now must think about what will give them competitive advantage, in order to remain sustainable and secure ongoing funding. Porter (Porter, 1990) suggests there are two ways to gain competitive advantage, through cost and through differentiation. Stardome has no room to move its pricing, and this is on par with the other museums and attractions in Auckland (Appendix 4). This therefore means it needs to differentiate itself from the others. The immediate way it can do this is through its staff delivering a superior visitor service experience(Berry & Berry, 2019), this superior service will set the organisation apart from others and will enhance the visit.

Central to the concept of becoming visitor centric is the need for the whole organisation to work cohesively focussed on the visitor.

There are four key areas that this research addresses:

These four areas will form our toolbox, they are the quick wins in our change management piece and will start the momentum to bring about change in the organisation.

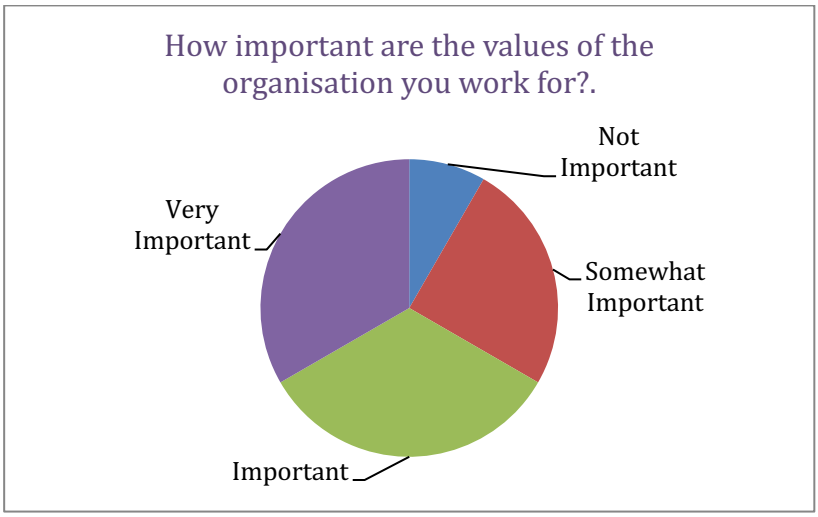
As part of this research a staff survey was conducted. All staff were asked to participate but were informed that this was not compulsory (Appendix 3). The survey was conducted using survey monkey with some structured questions, and some open-ended comment boxes. The survey was pre-empted with a confidentiality statement. Of the twenty-two staff that were approached twelve completed the survey a 54% return rate. The responses to the survey are explored throughout this paper.

Staff Recruitment – Getting the right people.

In order to get the best results, organisations need to hire the best people. The recruitment process is an opportunity to make sure there is not only an alignment of skills, but also an alignment of values. It is important to note that these values link to identity, and that money is not the only currency staff are looking for (Long, 2013).

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

It is common knowledge that NPO's wages and salaries are lower than that private or public sector, and what drives these organisations is staff passion to deliver the mission (Williams, 2018). Underpinning this delivery are the values of the organisation, which become the motivating force which drives performance. As we move into new generations of workforce, we are witnessing a change in job selection criteria from job candidates. More and more future staff are seeking employment that has a purpose and this is becoming one of the three key factors in attracting and retaining staff (Kohll, 2018).

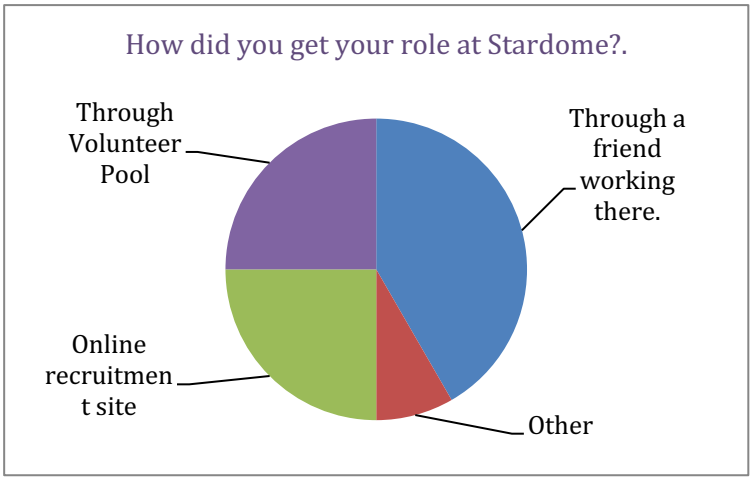


This thinking aligned with the result of the staff survey with 2/3rds of respondents saying the values of the organisation were important or very important to them. Building on this I explored how important the organisations purpose or mission was to staff.

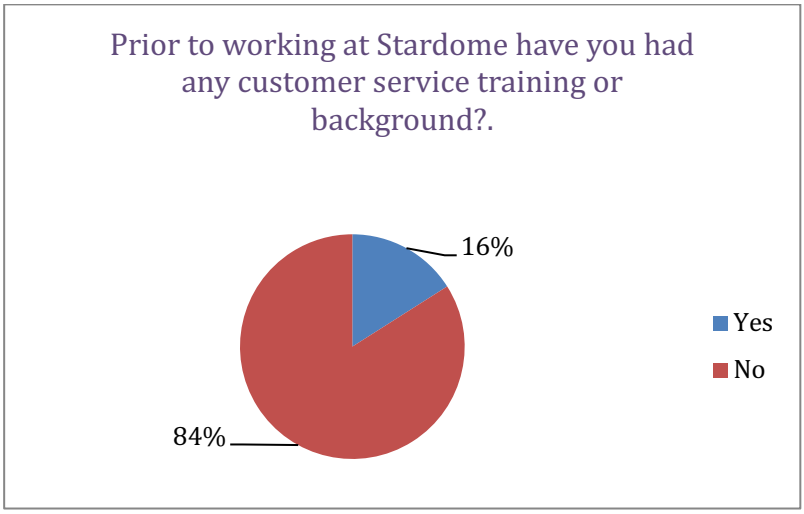
This overwhelmingly supported the literature with only one staff member saying the mission or purpose was not important to them.

For organisations to deliver on their mission they must seek the best staff. This can be achieved through robust recruitment processes (Palmatier, Moorman, & Lee, 2019). Stardome has often fallen into the trap of not recruiting roles, instead it has sourced staff through the volunteer pool, or through other staff members. This may be effective time wise, but it does not add to the skill base in the organisation, as many staff do not have prior experience with customer services.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com



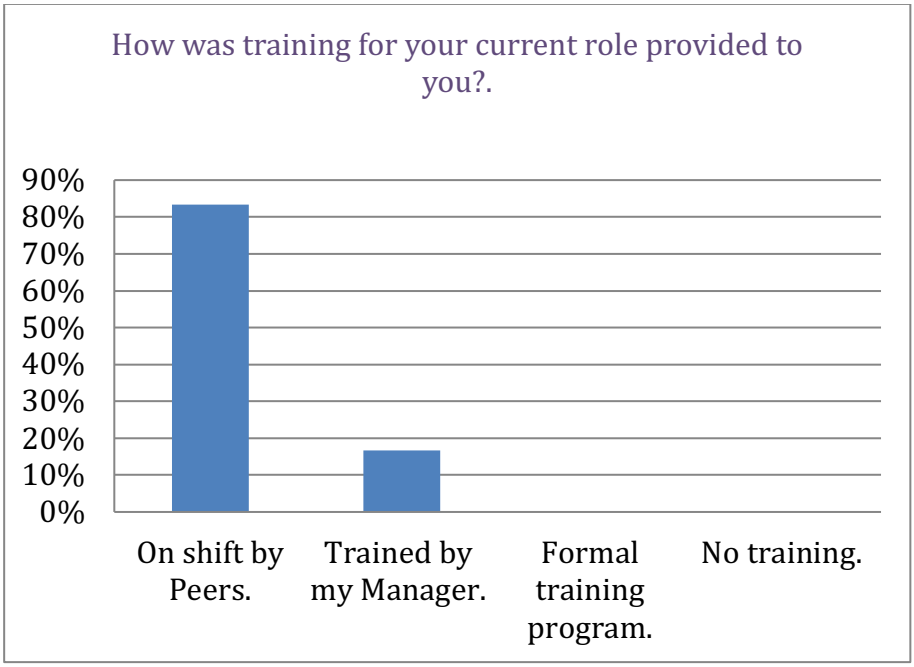
Of the staff surveyed on 25% went through a formal recruitment process. Building further on this, when questioned if they had any customer service background only 16% had any form of prior experience in this area.



Staff Training:

Once the right people are recruited to the organisation they need to be supported in their roles. Historically Stardome has spent training money on upskilling staff in the use of technology. There has been little focus on how visitors are dealt with.

Most staff are trained on the job by a peer or manager (Appendix 3), but there are no formal training plans signed off.



In order to retain staff, they need to feel valued and appreciated, they need to feel motivated to perform at their highest level. Herzberg (EPM, 2018) motivation theory suggests there are two factors which can increase motivation in an organisation that is the presence of motivating factors, and the presence of hygiene factors. A lack of either decreases motivation and performance.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

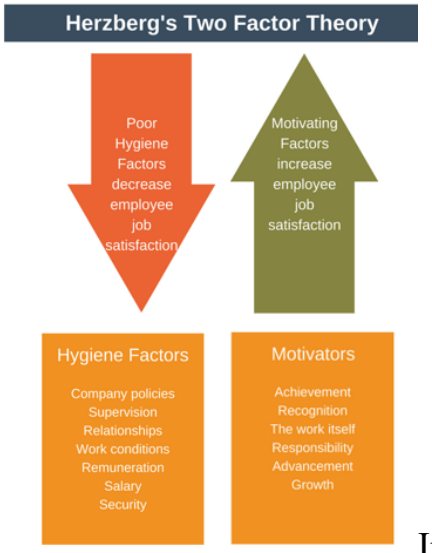
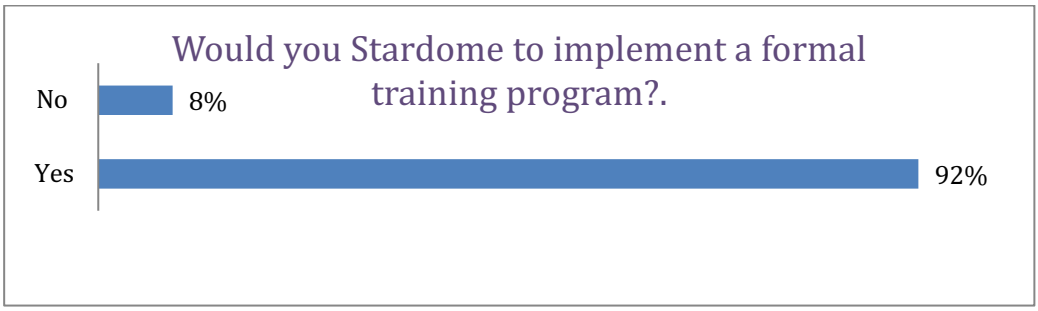


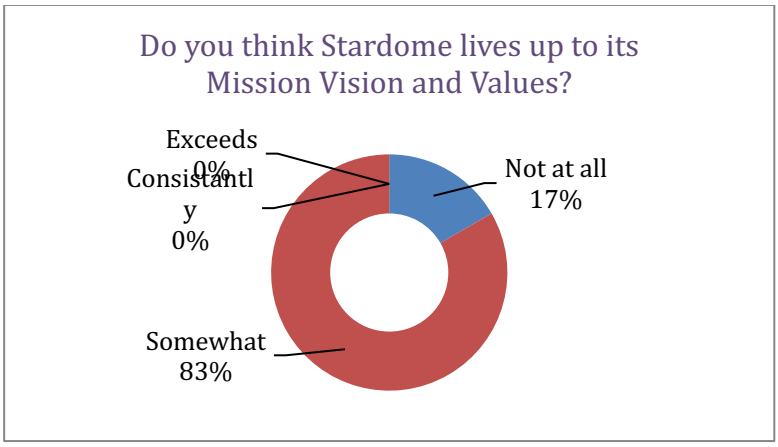
Image 1: (EPM, 2018)

Investing in staff training will reap long term benefits for the organisation, and it will give staff a sense of achievement, advancement and growth. Staff overwhelmingly commented that they would like a formalised training plan.



Other motivating factors for staff is the ability for the organisation to provide them with further career opportunities (Berry & Berry, 2019; Kohll, 2018) The tacit employment contract is built on employee and employer unsaid expectations e.g. that the organisation is sustainable and will continue to trade(Berry & Berry, 2019), if the tacit contract is broken then motivation and performance decreases. If

the employee joined the organisation for its mission, vision and values and it is no longer living up to these, they may become demotivated.

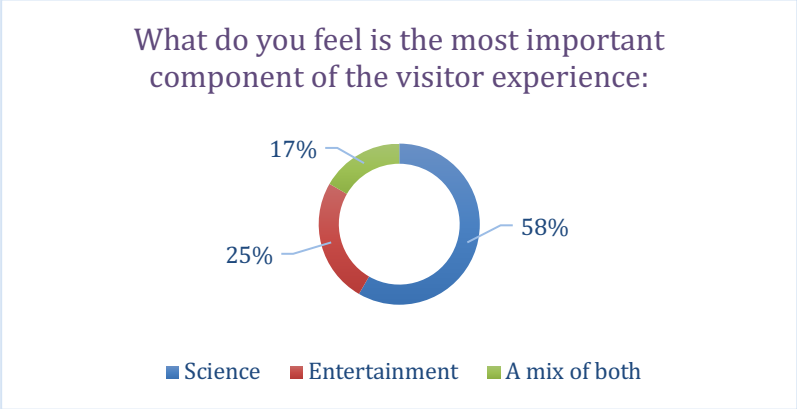


It was surprising to see that no one thought the organisation consistently lived up to its mission, vision and values, equally no one thought Stardome exceeded the mission, vision and values.

Internal Marketing Plan:

Stardome has found itself facing declining visitor numbers (Stardome, 2019), visitor feedback has highlighted issues with unfriendly staff, boring shows, and high educational content that has little entertainment (Rowe, 2019). The show schedule has remained the same now for over ten years, with staff and volunteers attached to the delivery of accurate scientific information over entertaining visitors.

The staff survey supports this thinking:



The difference in approaches between product-centricity and customer-centricity is developing products or services that specifically meet the needs of your customer, not developing products then selling them to as many people as possible (Valls, 2018). This is particularly relevant in the museum sector where we find ourselves competing with movie theatres, at home entertainment such as Netflix, and other cultural events such as the opera or ballet (Di Pietro, Guglielmetti Mugion, Renzi, & Toni, 2014). Customer value is achieved through empathy and understanding of the visitors needs by the whole organisation (Yohn, 2018).

Working on a whole visitor solution and raising awareness of the customers' expectations and different touchpoints throughout their visit, will allow the organisation to make small improvements that make dramatic changes to the visitor experience (Raţiu & Negricea, 2008).

In order to give the best visitor experience, it is important for staff to understand and buy into the organisations mission or purpose (Balta, 2018). We have seen

from the above feedback that staffs do not think the organisation consistently delivers on its mission, vision and values. An effective way of gaining staff buy in is through an internal marketing campaign, which can keep the companies mission forefront of thinking, as well as the standards and expectations around that (Balta, 2018).

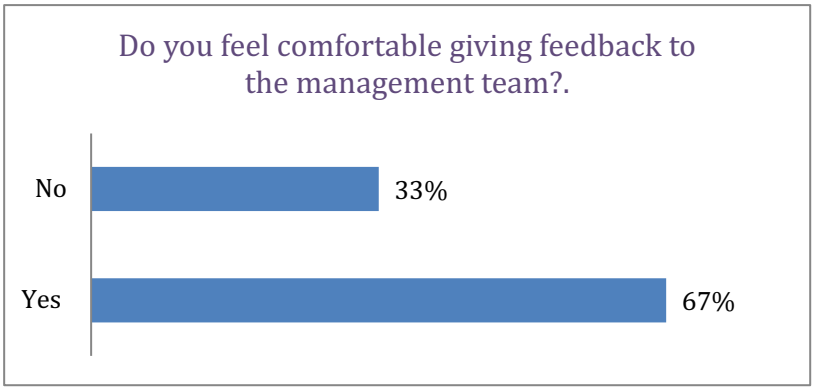
This approach will assist the organisation in breaking down silos.
Currently teams work in isolation within the Stardome Structure, this partly brought about by the day/night shift divide (Melissa Glew, 2018). A customer-centric approach breaks down silos as it requires the whole business to work together to provide solutions for the customer (Alcaraz et al., 2009). This approach also has the effect of bringing the culture together, with teams invested in providing the best service/product/experience for the customer (Yohn, 2018).

Leadership:
The concept of a visitor-centric organisation relies heavily on the leaders within the organisation, they are charged with being the champion for the approach. The success of a change in focus relies on a non-compromising approach, which puts the visitor in the centre of everything the organisation does. Bank of Baroda (Khandewal, 2013), is an example of a business that has applied this concept and has seen a competitive advantage achieved. Khandelwal (Khandewal, 2013) speaks of creating a sense of urgency amongst staff, and the need to get some quick wins under your belt in order to gain momentum.

A values-based leadership approach is ideal in this changing environment, as through your actions you are demonstrating what you want to see from your employees (Kraemer, 2011). There needs to be a sharing of vision which can only be led from the CEO's office. The visitor-centric leader must bring together the whole organisation in order to deliver the best service to the customer, this means putting stakeholders ahead of themselves.

Communication within this environment and providing opportunities for feedback from staff is also of upmost importance. Staff need to be able to contribute to the visitor solution, and they will bring insights from the front line that the management team will be unable to deliver (Robson, 2012).

Staff also need to feel that they can give feedback free from any negative consequences (Robson, 2012).



The metrics of the organisation need to change, with service excellence being celebrated (Khandewal, 2013; Robson, 2012). This needs to be prioritised by both the leadership and management teams.

A combination of the four areas outlined in this review will allow Stardome to gain some quick wins in order to start building a sustainable visitor-centric organisation. Appendix 5 explores the business in more detail.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Change Management:

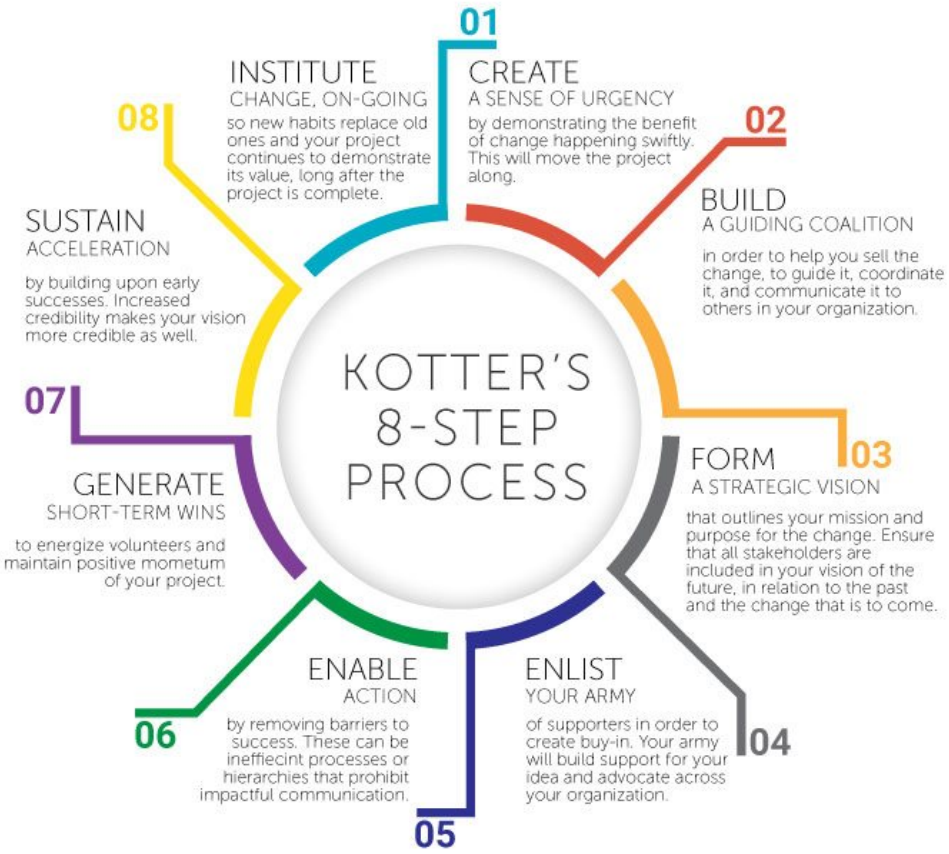


Image 5: Kotter's 8 step process (GroupeX-Solutions, 2017)

It was obvious from the beginning of my research that this project was a change management piece, using the tools obtained through my EMBA journey to implement a culture change. This culture change would challenge staff to put the visitor in the centre of their thinking, and let go of old I believe that Kotter's 8-step process is particularly relevant and useful in the planetarium environment, as we move to focus our thinking to the visitor experience (Appelbaum Steven, 2012). To instigate the change outlined in this paper, it was essential that the groundwork to make this successful was laid down. Change management is challenging, and in

order for this to be successful staff buy in and engagement is essential, statistics show that only 25% of change management projects are successful (Cameron & Green, 2015).

1. Create A Sense Of Urgency:

A museum's measure of success is often its attendance numbers (Bitgood, 2013). Funding within the sector is often based on the number of people using the facility, and the benefits of that usage. The benefits of coming to Stardome is access to experts in the field, and a world class planetarium, this is strongly linked to the education content of the shows and programs. The past three years the organisation has seen decreasing attendance figures, especially in the public domain.

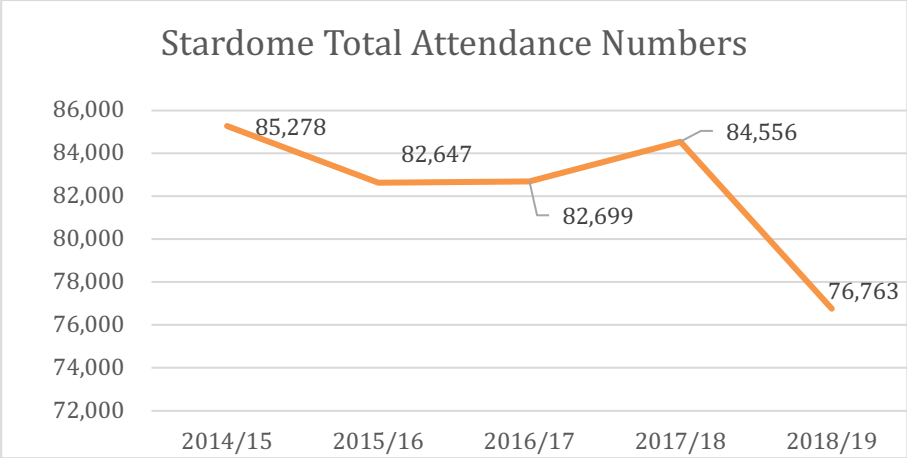


Image 6: (Glew, 2019)

This has produced a real sense of urgency for a change to happen for the business to remain sustainable. A continuing trend downwards in attendance will put future funding at risk, as well as revenue generated from these income streams. It is

simply not acceptable to follow the same programming that has been in place for over 12 years. There are new and future audiences with new and different expectations of the organisation, this has been identified in the competitor analysis (Appendix 2). The organisation needs to refocus on the visitor and develop shows that align with their expectations.

The customer experience must be looked at from all angles, with a focus on engaged staff to really bring the experience to life. This starts the moment the customer engages with the organisation, from booking online to phoning to get more information. The display area within the facility is small compared to other facilities throughout the region, and most visitors comment that they have come for the planetarium experience (Rowe, 2019). Competitive advantage will be gained through a superior customer service experience.

2. Build A Guiding Coalition:

In May 2019 a re-structure was implemented at Stardome in order to implement the new role of Visitor Experience Manager. This meant that the organisation now has a leadership team of four, and a management team of six, as seen below in Image (3).

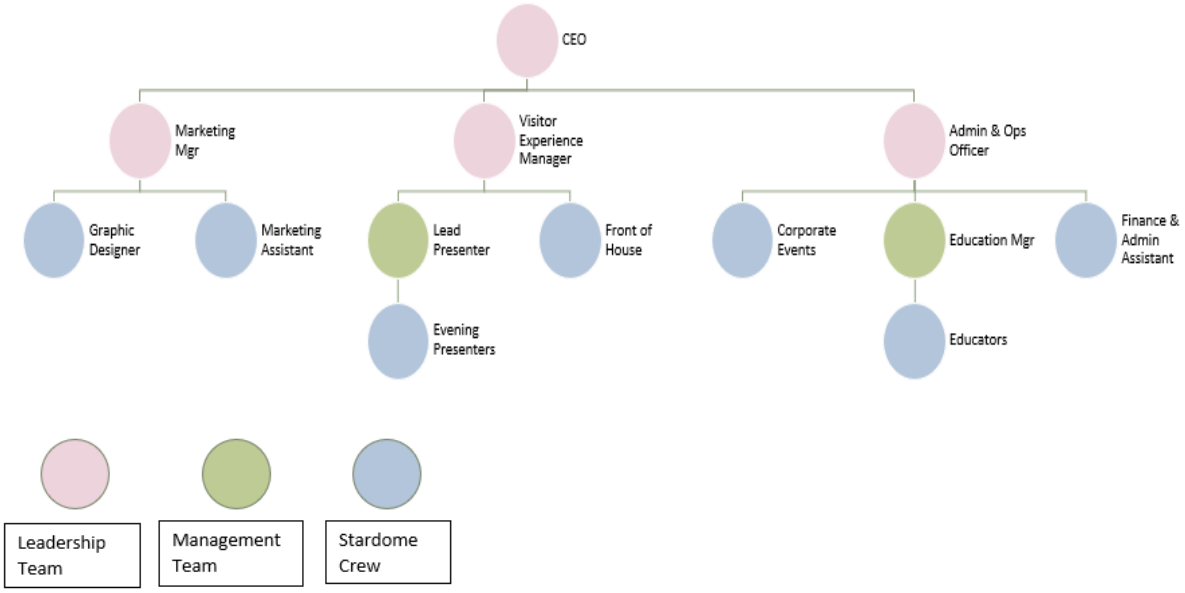


IMAGE 7 - Stardome Organisation Structure (Visitor-Solutions, 2019)

It was in my first week as Acting CEO that the new Visitor Experience Manager started. It was clear from the outset that both the Visitor Experience Manager and the Marketing Manager would become my coalition in bringing a change of thinking into the team. All three of us were focused on changing the role of our visitor within the organisation. We were the change champions within the organisation.

3. Form A Strategic Vision:

In 2016 the business contracted Visitor Solutions to facilitate the strategic planning process for them. Workshops were held with all stakeholders and the strategic vision for the coming 2016-2019 period was set. The strategic plan had 6 key aims:

STRATEGIC AIM 1	STRATEGIC AIM 2	STRATEGIC AIM 3	STRATEGIC AIM 4	STRATEGIC AIM 5	STRATEGIC AIM 6
Visitor Experience	Education	Venue Hire	Public Programmes	Retail	Research
Stardome will be considered a high quality, must see visitor experience by the people of Auckland.	Stardome will be the best scientific educational experience in New Zealand.	Stardome will operate the most successful niche functions venue in Auckland.	Stardome's public programmes will be innovative, fun and financially successful.	Stardome will operate the most successful scientific store in New Zealand.	Stardome continues to contribute to astronomical research in New Zealand and internationally.

IMAGE 8: Strategic Aims (Stardome, 2016)

The strategic plan and its aims were and remain very relevant today, unfortunately the strategic plan was not the guiding document of the business. It was never measured against, and there were no check ins to see if the team was delivering on the strategies set out in it. As staff moved on the document was all but forgotten. For staff to understand what the organisation was trying to achieve, and how we would achieve that (Strategies: Appendix 1) the strategic plan was discussed in detail with the leadership team.

It was agreed that the document was still relevant, however the Visitor Experience Strategic Aim encompassed all the other strategies and needed to be applied across the whole organisation, this would become the leadership teams focus. This aligned with the lack of focus on the visitor.

4. Enlist Your Army

As a leadership team we identified some key people within the organisation, who we felt would welcome this change and would work with us to encourage the change piece we were about to implement. We selected four people who crossed over the shifts, and who were well respected by their peers. We spent time with them sharing the vision and explaining what was happening in the organisation now.

There was a common feeling amongst the four that they had no idea attendance was so low, or that there was any issue at all. When we explored this further and discussed the declining attendance, we came across some common feelings:

- Stardome is funded, so the numbers attending does not matter.
- Getting your tickets and looking at the displays or shop is not part of the customer experience.
- I am not sure how to interact with customers, it is awkward.
- Visitors do not want to hear from us, we are just here to take the money.
- I do not tell people I work at Stardome.

(Change-Team, 2019)

Discussing how funding is granted, and why attendance and engagement is so important for our organisation brought about a change in thinking for our army. We noted that they started watching the numbers coming to shows when they were on shift. They even started emailing when they had shows with big numbers. They also started confiding in us and made us aware of what was happening on shift.

5. Enable Action

The organisation had broken down some of the barriers already, this had occurred through the restructure process, and the employment of the Visitor Experience Manager. The change in leadership also signalled a change to the team, as the previous CEO had been very hands off. The people within the organisation that had caused issues were no longer part of the leadership team.

There was a clear plan in place to start the change management piece, through some quick win projects:

➔ Staff Recruitment policy implemented.

➔ Formal staff training program put in place.

➔ Internal marketing plan.

➔ Strong and effective leadership approach.

Activating The Toolbox:

6. Generate Short Term Wins

Staff Recruitment: As we have explored earlier in this paper Stardomes recruitment practises are often very informal with many staff being employed because of who they know, or through an association with the business. Most staff do not have customer service backgrounds and have not undertaken a formal interview process.

In order to obtain the best staff a recruitment policy needs to be implemented across the business. Job skills need to be added to job descriptions and formal interviews with reference checks need to be put in place. This new recruitment policy needs to be released to staff so that they are aware this process will be free from bias and is fair and equitable.

Comments that came through the staff survey highlights this issue:

- I am sick of some staff getting special treatment because of who they are related to.

- If you are friends with the management team you get away with doing nothing. There are no consequences for some staff.

Stardome has recently been granted funding to move all payrates to the living wage. This will mean that they are paying a fair rate comparable to other businesses in the immediate area. This increase will attract a greater number and hopefully higher calibre of applicants.

The recruitment process also allows the business to explore the value alignment between potential employees and the organisation. Staff that believe and are engaged with the organisations mission are more likely to stay (Brown & Yoshioka, 2003).

Staff Training: Stardome has invested most of its training budget on upskilling staff in the use of planetarium technology. There has been no real focus on staff training for front of house. Due to the small number of staff everyone is expected to be able to work at reception and ticket shows.

Training for this role has been done by other staff on shift. This has proven to be problematic as mistakes and bad habits are passed on from staff member to staff member. There is no formal training plan to ensure staff are trained in all areas.

The staff survey reflected these issues:

- The system is glitchy and I don't know how to work it.
- I am left by myself and am unsure what to do.

- There are lots of notes and chaos at reception, we all do things differently.
- There is a lack of support, lack of empowerment and poor communications.
- Sometimes the communication between the day and night staff isn't great, a lot of small things can get lost with different customers talking to some of us and arranging things and then not being informed.

In order to address this it is important for the team to get together, to put all of the issues on the table and work out a way forward. This will allow staff to feel they have a voice and have been heard. Policies and procedures around the various functions also need to be developed and agreed upon. This will put the hygiene factors into play (EPM, 2018), which will increase staff motivation.

Formal training has to be prioritised, this has been conducted throughout the MOA group using Service IQ (MOA-HR, 2019; Service-IQ, 2019), this has proven to be very successful at both Auckland War Memorial Museum and Motat. The cost of the training would need to be built into the budget and may have to be offset against the technology training. This area does need to be prioritised, if the visitor is receiving poor service outside the planetarium this diminishes the experience inside the planetarium.

Internal Marketing Plan: "An internal marketing strategy is like an external marketing strategy in that it must tell a story that persuades the audience to take action. In the case of an internal strategy, the audience is your employees" (Allen, 2019).

In order to give the best visitor experience it is important for staff to understand and buy into the organisations mission or purpose (Balta, 2018). An effective way of gaining staff buy-in is through an internal marketing campaign, which can keep the company's mission forefront of thinking, as well as the standards and expectations around that (Balta, 2018). The Stardome internal marketing plan seeks to address issues which were apparent in the staff survey, where staff feel that they do not know what is happening in the organisation.

It is important for the business to recognise the importance of an internal marketing plan, especially since Stardome has limited funds and relies heavily on word of mouth and free publicity. If we observe the services marketing triangle (Image 8), we can see that the internal marketing function enables us to deliver our promise. This is achieved through an engaged workforce, all focussed on a common goal.

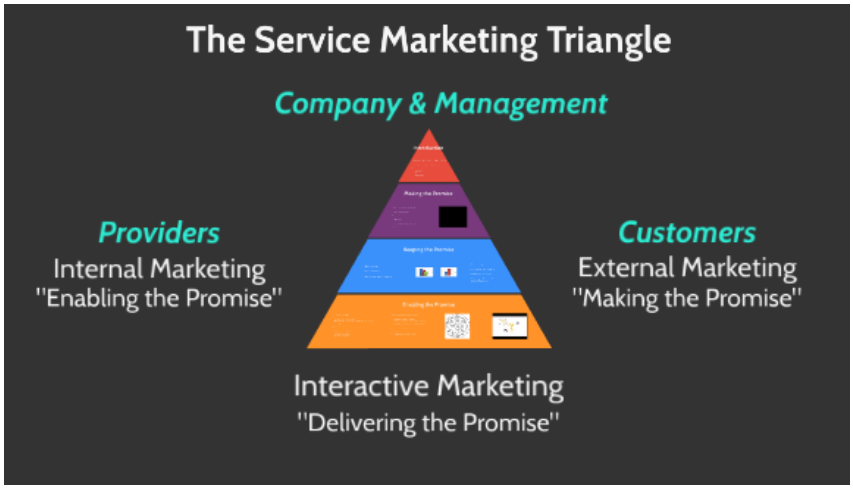


Image 9: (Prezi, 2020)

Current State:

The current marketing strategy is prepared and reviewed by the BOT, there is no internal marketing plan as part of the Strategy. When discussing this with the Marketing Manager (Rowe, 2019), she commented:

"We do not have a marketing champion on the board, and often marketing takes a back seat to other priorities. The biggest issue we have at Stardome is the customer service aspect of the experience, this does not match our marketing collateral. We can get people through the door, but our staff currently make them feel unwelcome and this diminishes the experience".

The lack of an internal marketing plan further drives the siloed environment the teams are working in, although the marketing team works across all revenue streams of the business it is often just with the management team. This was explored when completing my Marketing paper as part of my EMBA. When I spoke to Kelsey Rowe (Rowe, 2019)about this she agreed that an internal marketing plan would go a long way to ensuring staff were aware of any changes that were being made, as well as being able to give feedback and ideas on how to improve the visitor experience.

It would also allow everyone to know what projects were happening and get involved in those that interested them.

How Do We Get The Message Out There?

It had become apparent in the business that we were not communicating with our staff effectively. We received regular feedback that teams did not know about changes or new programs. That although everyone was allocated an email very few of them opened their emails, as the computer they were working on was logged into a general account. Realising that email may not be the best form of communication, we surveyed all staff to see what form of communication would be best for them, giving them the following options:

- Email
- Enews
- Whats App
- Physical Book, Notice Boards & Newsletters
- Facebook

After feedback from the survey was received it became apparent that we would need to use two forms of communication, email and a WhatsApp group. This change in communication channels has proven to be very successful, with all staff now receiving all internal communications. Staff were also asked how often they would like the communication to be:

- Weekly
- Fortnightly
- Monthly

Regular fortnightly communications would be instigated, with anything urgent going out as needed e.g. system issues, health & safety, rostering. It was agreed that all messaging needed to be consistent and in line with the organisation's external marketing plan. Successful visitor interactions would be heroed, and we would sing about these experiences. We would freely share visitor feedback and would align this to our mission and vision.

Leadership:

Leadership within the organisation could be described as very hands off. The CEO role has operated at a very high level with very little interaction with staff under the management line. This has caused many staff to feel undervalued in their roles and has led to a feeling of being "unheard". This was demonstrated in the staff interview:

What is not great about your role?.

- Progression and opportunities are unclear. Lack of leadership.
- Lack of support, lack of empowerment, poor communications
- I don't feel appreciated.
- Simple changes would make my job easier; management don't know what we do.

In order to address the issues, the CEO needs to be accessible to the staff. They need to feel that there is a true open-door policy. The internal marketing plan will support raising the CEO and leadership team profile, and the fortnightly CEO update will help establish a line of communication with all staff. Stardome is a

relatively small organisation, however the opening hours are 8am – 11pm, so this does mean that many staff work in the evenings. Changing up some hours so that the CEO is onsite to talk to staff is important, especially when trying to share a vision and gain buy in for this.

I believe that a values-based leadership approach is essential in this environment, that is that you lead by example. The behaviours that you expect from your staff you demonstrate in your approach (Nygaard, Biong, Silkoset, & Kidwell, 2017). This will help cement the organisations values, and new approach. It is important for staff to see the CEO interacting with visitors and "walking the walk". You simply cannot express your expectations and think that staff will follow that. Connection needs to be made for trust to be built up. Working on the floor will also mean that this roll will see some of the frustrations the team is experiencing.
The staff survey came back with overwhelmingly positive feedback around interacting with the visitor:

What is great about your role?.

- Contact with the public
- I get to interact with a wide variety of people.
- Engaging with visitors, positive science communication, ensuring the visitor experience is good, flexible schedule, cool technology
- My role has plenty of people contact and is not every day is the same, also enjoy working in an observatory.
- I really enjoy being able to help customers, even with all the little things and questions

- Educating and entertaining people about the wonders of the universe

Historically, museums have hired CEOs based on their ability to raise funds for the organisation (Griffin & Abraham, 2000), this has surpassed all other key attributes when hiring. However, a high level of emotional intelligence, and the ability to bring teams together with a strong vision reaps better results for museums, especially when value alignment and culture change is concerned.
I knew that my experience working under the previous CEO had not been very positive, and there was little interaction with the management team or staff. I felt that there was a lack of direction, and that I was often unheard. I realised that what was lacking was any coaching or mentoring, and that this was an important role of a leader in the organisation.

I needed something tangible to use that would allow the leadership and management team to feel heard and appreciated. The first thing that I implemented was a once a week team catch up, and then a weekly one on one.
In the one on one sessions I used the GROW model (Mindtools, 2019) to address some of the challenges that the team members were facing.

This allowed me to gain an understanding of what individuals perceptions were, it allowed us to set goals, and come to a common understanding of the current situation. From there we explored the various options, leaving no stone unturned. This allowed sharing of ideas, and there was no hesitation to put anything on the table as there were no wrong answers.

Clear plans were set out, with timeframes around completion and reporting back. The reaction to this was very positive, and feedback from the team was that they felt they had direction, and a clear understanding of what they needed to do.
I also spent time with each team member discussing the importance of personal reflection time (Bassot, 2016). This discussion allowed me to open up and share my personal experiences, gaining trust through emotional expression (Jawad & Kakabadse, 2019). As the weeks progressed the effectiveness of the reflection process started to show real dividends, and the team slowed down on how they approached issues with their own teams. One manager commented that upon reflection she had come to realise that she was favouring some staff over others, offering them shifts before others because they were fun to work with and they had similar interests. She came to realise that her unconscious bias was very unfair on the whole team.

In this instance we implemented a system for distributing available shifts fairly. What was also apparent was the need for staff to know what the CEO's expectations were, what the vision for the business was. In order to deliver this, I decided to deliver a Visitor Charter.

The Visitor Charter (Appendix 6) was a statement to staff on what the expectations were around how we dealt with our visitors. This would be developed through a workshopping approach with the leadership team feeding into it. This would then be tested on our "army" to get their feedback, before being released to all staff. This would proudly be displayed around the building for everyone to see.

This was the launch of the change – and allowed space for the leadership team to come together and work on a cohesive approach. The charter signalled to staff how important our visitor is to the organisation and that without them we would not exist. This charter is an internal document linking to Herzberg's (EPM, 2018) hygiene factors, it guides how we deliver the best experience all the time.

Conclusion:

This study has investigated some quick-win projects that Stardome can put in place in order to instigate a visitor-centric strategic direction. The move for the organisation to become visitor-centric is a necessity as it is not meeting the expectations of those visiting it. The continuing drop in attendance numbers jeopardises the organisations funding and sustainability.

The study has been limited to only encompass the first 6 steps of the change management model (Appelbaum Steven, 2012), as advancing past this point due to time constraints is not possible. There needs to be an organisation wide commitment to this new strategy, which if successful will break down the current siloed work environment.

Aligning the vision, mission and values of the business with the staff that are being recruited will mean greater staff retention and satisfaction. Training staff in how to deliver the expected service standards will pay dividends, as visitors become brand ambassadors for Stardome.

An internal marketing plan will allow staff top feel heard and valued and will open the lines of communication. This will also break down silos between departments and will encourage working together as one team.

The mission is clear:
Stardome is here to share our love of space in ways that challenge, inspire and educate (Stardome, 2018).

This will be achieved by:
Looking through our visitor's eyes.

REFERENCES:

Alcaraz, C., Hume, M., & Mort, G. S. (2009). Creating sustainable practice in a museum context: Adopting service-centricity in non-profit museums. *Australasian Marketing Journal (AMJ), 17*, 219-225. doi:10.1016/j.ausmj.2009.06.003
Allen, K. (2019). Creating an internal marketing strategy. Retrieved 05/01/2020 2020 from https://smallbusiness.chron.com/create-internal-marketing-strategy-12541.html
Appelbaum Steven, H. (2012). Back to the future: revisiting Kotter's 1996 change model. *Journal of Management Development, 31*(8), 764-782. doi:10.1108/02621711211253231
Balta, S. (2018). The Influence of internal marketing on employee satisfaction in the service industry. *Business Management Dynamics, 8*(1), 12-15.
Bassot, B. (2016). *The reflective practice guide : an interdisciplinary approach to critical reflection*: Routledge is an imprint of the Taylor & Francis Group, an Informa business.
Berry, J., & Berry, S. (2019). Achieving competitive advantage through people. Retrieved from https://timelesstime.co.uk/knowledgebase/competitive-advantage-through-people/
Bitgood, S. (2013). *Attention and value : keys to understanding museum visitors*: Left Coast Press, Inc.
Brown, W., & Yoshioka, C. (2003). Mission attachment and satisfaction as factors in employee retention. *Non-profit Management & Leadership, 14*(1), 13.
Cameron, E., & Green, M. (2015). *Making sense of change management: A complete guide to the models, tools and techniques of organizational change.* Great Britain: Kogan Page Limited.
Change-Team. (2019). Stardome Change Team - Anonymised.
Coleman, L.-E. (2018). *Understanding and implementing inclusion in museums*: Rowman & Littlefield.
Dawson, E. (2014). "Not designed for us": How science museums and science centers socially exclude low-income, minority ethnic groups. *Science Education, 98*(6), 981-1008.
Debruyne, M. (2014). *Customer innovation : customer-centric strategy for enduring growth*: Kogan Page.
Di Pietro, L., Guglielmetti Mugion, R., Renzi, M. F., & Toni, M. (2014). An audience-centric approach for museums sustainability. In (Vol. 6, pp. 5745-5762).
Drucker, P. F. (2006). *The practice of management* (1st Collins ed ed.): Collins.

EPM. (2018). Herzberg's motivation theory – two factor theory. Retrieved 05/01/2020 2020 from https://expertprogrammanagement.com/2018/04/herzbergs-two-factor-theory/
Falk, J. (2016). Museum audiences: A visitor-centered perspective. *Loisir et Société / Society and Leisure, 39*(3), 357.
Glew, M. (2018). 111725 People and Leadership Assessment Three - A workplace issue.
Glew, M. (2018). *Stardome competitors analysis*. Report.
Glew, M. (2019). *Rediscovering the stars*. Stardome
Government, N. Z. (2008). *Auckland Regional Amenities Funding Act 2008*. Wellington. Retrieved from http://www.legislation.govt.nz/act/private/2008/0003/latest/DLM1140001.html
Griffin, D., & Abraham, M. (2000). The effective management of museums: Cohesive leadership and visitor-focused public programming. *Museum Management and Curatorship, 18*(4), 335-368. doi:10.1080/09647770000301804
Griffiths, A. (2006). 'They go to see a show". *Early Popular Visual Culture, 4*(3), 245-271. doi:10.1080/17460650601002271
GroupeX-Solutions. (2017). Change management issues and tips on avoiding them. . *Customer success.* Retrieved 2019 from https://www.groupex-solutions.com/blog/Change-Management-Issues-and-Tips-on-Avoiding-Them
Jawad, A. Q., & Kakabadse, A. (2019). *Leadership intelligence : the 5Qs for thriving as a leader*: Bloomsbury Business.
Kadoyama, M. M. (2018). *Museums involving communities : authentic connections*: Routledge, Taylor & Francis Group.
Khandewal, A. (2013). *Dare to lead*: SAGE Publications Pvt. Ltd; First edition (April 9, 2013).
Kohll, A. (2018). What employees really want at work. Retrieved 2020 from https://www.forbes.com/sites/alankohll/2018/07/10/what-employees-really-want-at-work/#c14eb4a5ad3b
Kotler, P., Keller, K. L., Brady, M., Goodman, M., & Hansen, T. (2016). *Marketing management. [electronic resource]* (3rd edition ed.): Pearson.
Kraemer, H. (2011). *From values to action: The four principles of values-based leadership*. San Francisco: Jon Wiley & Sons.
Mindtools. (2019). The GROW model of coaching and mentoring. Retrieved 2/10 2019 from https://www.mindtools.com/pages/article/newLDR_89.htm
MOA-HR (2019). [MOA HR Workstream Meeting].

MOA. (2018). Museums of Auckland. Retrieved from https://museumsofauckland.com/
Morunga, M., & Bradbury, M. E. (2012). The Impact of IFRS on annual report length. *Australasian Accounting, Business and Finance Journal*(5), 47.
Nygaard, A., Biong, H., Silkoset, R., & Kidwell, R. (2017). Leading by example: values-based strategy to instill ethical conduct. *Journal of Business Ethics, 145*(1), 133-139. doi:10.1007/s10551-015-2885-9
Palmatier, R. W., Moorman, C., & Lee, J.-Y. (2019). *Handbook on customer centricity : strategies for building a customer-centric organization*: Edward Elgar Publishing.
Parniangtong, S. (2017). *Competitive advantage of customer centricity*: Springer Singapore.
Pine, B. J., 2nd, & Gilmore, J. H. (1998). Welcome to the experience economy. *Harvard Business Review, 76*(4), 97-105.
Porter, M. (1990). *Competitive advantage of nations: Creating and sustaining superior performance*. New York: The Free Press.
Prezi. (2020). The service marketing triangle. Retrieved from https://prezi.com/irgvmg9tzsw2/the-service-marketing-triangle/
Raţiu, P., & Negricea, L. (2008). Customer experience management - the most important dimension of the service firm strategy. *Annals of the University of Oradea, Economic Science Series, 17*(4), 1169-1173.
Reilly, P. (2018). Building customer centricity in the hospitality sector: the role of talent management. *Worldwide Hospitality and Tourism Themes*(1), 42. doi:10.1108/WHATT-10-2017-0068
Robson, K. (2012). *Service-Ability. [electronic resource] : Create a customer centric culture and achieve competitive advantage*: Wiley.
Rowe, K. (2019) *Role of marketing at Stardome/Interviewer: M. Glew*.
Rust, R. T., Shah, D., Day, G. S., Parasuraman, A., & Staelin, R. (2006). The path to customer centricity. *Journal of Service Research, 9*(2), 113-124. doi:10.1177/1094670506294666
Service-IQ. (2019). Workforce development. Retrieved 1/10 2019 from https://www.serviceiq.org.nz/about-us/wfd/#sp
Stardome-Leadership. (2019). *Stardome visitor charter*.
Stardome. (2016). Stardome summary strategic plan. Retrieved from https://www.stardome.org.nz/wp-content/uploads/2016/10/Stardome-Strategic-Plan-2016-2019_Summary-A4.pdf
Stardome. (2018). Stardome annual report 2018.

Stardome. (2019). *Stardome annual attendance statistics 2019*. Report. Auckland Observatory and Planetarium Trust. Auckland.
Valls, J.-F. (2018). *Customer-centricity : the new path to product innovation and profitability*: Cambridge Scholars Publishing.
Visitor-Solutions. (2019). *Stardome Restructure Report*.
Wallace, R. P. D. (2013). How the internet has (not) changed the influence of prior product experience on the consumption and evaluation of experience goods. *Journal of Customer Behaviour, 12*(2/3), 193-210. doi:10.1362/147539213X13832198548373
Wells, M. D., Butler, B. H., & Koke, J. (2012). *Interpretive planning for museums : integrating visitor perspectives in decision making*: Left Coast Press, Inc.
Wiedmann, K.-P., Labenz, F., Haase, J., & Hennigs, N. (2018). The power of experiential marketing: exploring the causal relationships among multisensory marketing, brand experience, customer perceived value and brand strength. *Journal of Brand Management, 25*(2), 101-118. doi:10.1057/s41262-017-0061-5
Williams, C. (2018). The importance of having a mission driven company. Retrieved 2020 from https://www.forbes.com/sites/williamcraig/2018/05/15/the-importance-of-having-a-mission-driven-company/#659e2893a9c1
Yohn, D. L. (2018). Six ways to build a customer centric culture. Retrieved 12/09 2019 from https://hbr.org/2018/10/6-ways-to-build-a-customer-centric-culture
Zanibellato, F., Rosin, U., & Casarin, F. (2018). How the attributes of a museum experience influence electronic word-of-mouth valence: An analysis of nnline museum reviews. In (Vol. 21, pp. 76-90).

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Business model innovation - a business consulting report for Bianca Spender

Chantelle Mears
chantelle.r.mears@gmail.com

Executive Summary

The purpose of this report is to innovate a business model innovation for Australian affordable luxury brand Bianca Spender. The brand has reached a point in the business lifecycle where a business model innovation is required to achieve growth in an increasingly challenging marketplace. Bianca Spender seeks to increase revenue and grow brand footprint while operating with sustainable manufacturing processes.

Research design uses qualitative research methodology that synthesizes macro environmental factors, micro environmental factors, and data from 137 active customers identifying demand for additional product offerings. Specifically, core workwear styles that do not fall within the traditional seasonal fashion calendar and limited-edition products. Global market trends in digital marketing, 'pull' supply chain processes and distribution through direct to consumer channels prove to be effective strategies for efficient stock management, increasing store footfall and amplifying brand awareness. It is therefore recommended that Bianca Spender innovates the go to market business model to incorporate additional product

offerings that are distributed exclusively through vertical channels to strengthen direct to consumer channels, generating greater customer value.

An audit of the current business model benchmarked against a market analysis revealed that direct to consumer channels require strengthening to decrease vulnerability on wholesale partner David Jones due to declining profits and predicted store closures. The current customer journey is fractured creating barriers to achieving growth; therefore, it is recommended to streamline the omni-channel retail process by unifying customer touch points to set the proposed range structure and go to market strategy up for success.

The recommendations are organized using the McKinsey's Three Horizons framework to create a stepped pathway over a 5-year timeframe to achieve a 50% increase in revenue.

Introduction

Australian fashion business models that are privately owned are challenged in the current retail landscape. Increasing raw material costs, department store demands, increasing global competition and increased marketing requirements are diminishing margins (Craik, 2015). Local fashion labels that do not have outside financial investment are struggling to achieve business growth beyond their local market (O'Donnell, 2013). Increased sustainability requirements are at the forefront of consumer demand, adding further costs to the manufacture of garments (O'Donnell, 2013).

Innovation to current fashion business models are required to remain competitive in the market. Business model innovation is a strategic tool managers use to gain competitive advantage by challenging existing business architecture to find new ways to increase value (Mezger, 2014). The process in which to innovate business models can be a complex business task as it involves creating value offering, innovating value chains, reinventing revenue models and restricting business resources (Chesbrough, 2010). O'Donnell (2013) echoes this statement by describing the innovation of business models as creating value, innovating value chains, reinventing models, and restricting valuable resources.

In response to enhanced challenges traditional business fashion business models face, this paper will investigate business model innovation within the fashion industry, with a specific focus on high-end (or affordable luxury), privately owned womenswear label Bianca Spender. This research aims to evaluate the current business model against competitor models and consumer value to make recommendations on a business model that aims to increase factors that contribute to greater value creation and decrease factors within the current business model that do not add value. The outcome of this report is to identify a roadmap to innovate the current business model to achieve growth objectives.

Bianca Spender is an Australian based fashion label that has been in operation for ten years designing, manufacturing, and retailing high-end womenswear fashion. Distribution takes an omni-channel approach and includes David Jones concession stores, two bricks and mortar retail stores and an e-commerce platform. The firm is owner operated and classified under the four main models of ownership as an

entrepreneurial model, whereby the firm is owned and operated by the founder, Bianca Spender (Johnson, Whittington, Scholes, Angwin, & Regner, 2018). The business value proposition is luxury at every touch point, premium retail positioning and location, high quality tailoring and garment construction made with sustainability manufacturing practices within Australia.

The fashion landscape in the high-end category poses challenges to reach the $10 million revenue mark including vulnerability to demanding department store terms, the rise of sale activity led by department store schedules, increasing retail rent and raw material costs while operating in a hyper competitive marketplace (Craik, 2015). A further challenge to achieve growth is Director Bianca Spender's reluctance to align with a corporate retail investor, a strategy employed by competitors in the same category to support growth initiatives. The reluctance to bring on investment stems from a viewpoint that company values and ethos are compromised in favour of shareholder return.

Managerial Challenge

The challenges faced under the current business model and operating environment requires a business model innovation to achieve growth in this market. There is a myriad of opportunities to recalibrate the business to meet shifting consumer demand. This report aims to research a model suitable for Bianca Spender to increase the brand footprint, revenue and consumer value creation while operating under sustainable manufacturing business practices.

Background of the Firm

Organizational Structure

The current organization structure consists of a lean team due to a separation of shared resources from established fashion business, Carla Zampatti. The current model of shared resources creates inefficiencies due to location, dispatch times, communication lines and workflow priorities. Bianca Spender's reliance on Carla Zampatti's workroom resource is classified as a co-opetition-based partnership as while not a direct competitor is a competing product within the fashion category (Levy, Loebbecke, & Powell, 2003).

The organization structure has complex reporting lines to senior management. Bianca Spender is Head Designer and Director of the business and as the business has grown her time is stretched causing inefficiencies and bottlenecks across the business. Currently all functions report directly into Bianca including production, retail operations, marketing, and finance. The team lack executive or senior level expertise in their respective departments, however, perform well at an operational level. Director Bianca Spender is a competent business director with an educational background in commerce, however, lacks extensive experience at an executive level.

Requirement for an advisory board has been recognized by Bianca however the business is yet to identify key partners to put a board in place. Expertise in retail, finance and operations are required to form an effective board to support growth recommended growth strategies.

Current Business Model Canvas

An analysis of the current business model has been undertaken and shown in a Business Model Canvas (Pigneur, 2012). Key areas of the canvas will be described in detail in the subsequent sections, and a comprehensive Business Model canvas is detailed in Appendix A. Bianca Spender is aiming for 50% revenue growth to reach a $10 million revenue target by 2025. Goals to increase revenue through existing channels including a 50% increase in e-commerce revenue are in place to achieve for FYE2021. Further strategies to achieve this revenue goal are yet to be confirmed. Plans to recruit an advisory board, address operational inefficiencies caused by their shared services model, point of sale technology and dispatch and delivery timeframes for e-commerce sales are areas the leadership team have identified as issues and seek to resolve in the short term (within 6 months). A new e-commerce platform is under development with a launch deadline for April 2020. A dedicated Digital Marketing Manager has been appointed to drive marketing and e-commerce activity and starts her role in January 2020.

Distribution Channels

Spender's distribution strategy classifies as a hybrid model whereby the brand supplies direct to consumer and through a wholesale model (Berg et al., 2018). The wholesale model is exclusively via David Jones departments stores throughout Australia. Wholesale distribution is structured as a concession model whereby stock, staff and deliveries decision making are managed by the brand. Under this model, product launches, delivery scheduling and discount activity are dictated by David Jones.

Bianca Spender product is distributed through David Jones concession stores, two bricks and mortar stores located in premium retail districts in Melbourne and Sydney, and an e-commerce website. Out of season and unsold stock is cleared through an annual warehouse sale held in offsite locations within Sydney.

Collections are launched under the traditional fashion seasonal calendar, whereby designers produce a summer and winter collection annually that drop into store weekly for the duration of a 4-month season. Outside of these months are periods of sale activity.

Value Proposition

The purpose of a value proposition is to describe the services and/or products that are valued by the customer segment (Johnson et al., 2018). Bianca Spender's leading value proposition is to design and produce high quality clothing using artisanal design methods, superior materials and produce using sustainable manufacturing methods within Australia. Designs are inspired by art, literature, and cultural references.

Marketing and Sales Channels

Marketing channels include direct marketing including weekly marketing emails to a CRM database of 19,000, an active Instagram content schedule, PR initiatives driven by an external PR agent to secure editorial placements, celebrity representation and news stories in fashion publications. Experiential marketing, or VIP loyalty events held in Bianca Spender stores are rarely executed. An annual

marketing fee is paid to the David Jones marketing department based on a percentage of annual sales that guarantees brand placement in David Jones marketing touch points including fashion shows, placement in David Jones publication, Jones and opportunities to dress David Jones celebrity brand ambassadors.

The Bianca Spender brand experience is fractured due to limited customer touchpoints and lack of consistency across each. This is largely driven by a lack of bricks and mortar stores, majority distribution through David Jones and a suboptimal e-commerce platform. Distribution through David Jones enjoys large footfall numbers however competing brands share limited floor, mannequin and window space creating scarce opportunity to display product in an engaging way.

Cost Structure

Product is produced in Australia with an average gross margin (cost to RRP) of 80%. While the average gross margin is healthy for products that are manufactured locally, high fixed operating costs specifically salaries, rent, commission, and consultancy fees contribute to a lean operating profit. Australian employment legislation enforces casual loading, 150% wage rates on weekends and public holidays and superannuation contributions (fairwork.gov.au, 2019). The seasonal nature of product is subject to diminishing margins if desired sell through targets are not achieved within the seasonal sales cycle. The business operates with lean operating capital and experiences long cash cycles due to manufacturing to market timelines.

SWOT Analysis

Strengths and Opportunities

Bianca Spender has established a strong network of supply chain relationships within Australia. Larger economies of scale give Bianca Spender production priority over smaller designers with supply chain echelons ensuring reduced production lead times of 4 weeks. Competitors that produce offshore experience manufacturing lead times as high as 24 weeks with consideration to shipping methods, typically air freight or sea freight.

Opportunities to increase direct to consumer channels to communicate a consistent brand voice, capture a vertical margin and reach global markets are areas where the business can streamline to optimize revenue.

Vulnerabilities and Threats

Department store growth is in decline, David Jones have reported a 50% decrease in operating profit for the last year and undertaking a retrenchment strategy by reducing their retail footprint, cutting underperforming brands and closing stores in low performing markets (Powell, 2019). As a result, the Bianca Spender floor space allocation in the Chadstone, Victoria store has been reduced which in turn has capped opportunity for sales and is forecasted to achieve a break-even profit based on the stock capacity allocated in the new concession space. The CBD Sydney concession store has reported a 20% decrease in sales year on year, this is partly attributed to the closure of a floor in David Jones for refurbishment, which has since been completed at the close of 2019 (Singer, 2019). 70% of Bianca

Spender revenue is generated through David Jones concession stores, therefore failing sales revenue through these channels has a substantial impact on the business.

Weak direct to consumer sales and majority distribution through David Jones department stores is the most critical vulnerability and largest threat to the business. Decisions to reduce floor space or remove the brand from lower performing David Jones branches poses a major threat to the operations of the business. Predictions of David Jones store consolidations and closures are likely in the instance that declining revenue figures continue (Carey, 2020). Distribution channels to shift products are stocked to full forecasted demand capacity and additional units are unlikely to sell within the seasonal time frame to gain a full margin. Due to the low profit margins and seasonal shelf life of products that without significant scale, long term viability is questionable. Low margin income streams also mean that Bianca Spender Ltd is particularly vulnerable to increases in costs.

Research Design and Data

This research paper will use a Model Building approach and a case study design for the business model innovation for Bianca Spender. The method will include a qualitative research strategy using survey questions to gain an in-depth understanding of customer value for high end womenswear fashion.

The method will incorporate use of Osterwalder and Pigneur's (2010) five phase approach to build the business model; mobilize, understand, design, implement and

manage. For the purpose of this research and limited time constraints for this project, only phases one to three will be undertaken with recommendations for senior management to implement measurement strategies to adapt the model in response to future market reactions (Pigneur, 2012).

The combination of case study, literature review and use of survey interviews follow a descriptive approach.

Literature Review

To enable strategic decision making it is imperative that a situational analysis of the current position is undertaken. In the case for Bianca Spender it is crucial to evaluate the macro and microeconomic environment to consider factors in direct and wider markets to strategically position the business ahead of demand. Accordingly, the following section addresses global macroeconomic context as well as national factors, then a microeconomic analysis will be undertaken to identify factors affecting Bianca Spender.

Microeconomic Environment

Australian fashion business models that are privately owned are challenged in the current retail landscape. Increasing raw material costs, department store demands, increasing global competition and increased marketing requirements are diminishing margins (Craik, 2015). Local fashion labels that do not have outside financial investment are struggling to achieve business growth beyond their local market (O'Donnell, 2013). The Australian retail fashion industry is regarded as high risk and companies often operate with lean capital with long cash cycles due

to expansive manufacturing lead times and slow speed to market. Securing investment can be challenging, especially for new entrants into the market with little manufacturing and trading history (Craik, 2015). Increased sustainability requirements are at the forefront of consumer demand, adding further costs to the manufacture of garments (O'Donnell, 2013). De-regulatory policy reform in the 1980's altered the local textile and design infrastructure in Australia. The removal of tariffs and protectionist policy saw global players enter the market, gave way to shifting manufacturing offshore, repositioning the sector as a design and cultural industry (Craik, 2015). Opening the industry up to global markets saw increased competition, highlighting seasonal lags against larger players positioned in Northern hemisphere markets.

These challenges remain in present day, coupled with changing consumer needs, requirement for sustainable production methods. Several profile businesses within the apparel category have not survived these challenges. Leading Australian department stores Myer, David Jones and Target have struggled to reverse a downturn in sales while designer labels with large brand footprints have ceased operation or sold the firm to large retail investment firms including; Kirrily Johnston, Lisa Ho, Sass and Bide, Ksubi, Willow, Belinda Seper, Bettina Liano, Collette Dinnigan, and Little Joe (Gail Elliott) (Sexton, 2013). Kirrily Johnston stated that issues with wholesale payment terms and rising e-commerce competition coupled with long payment cycles as key challenges contributing to the closure of her label (Kirrily Johnston cited by Thomson, 2013).

Macroeconomic Trends

McKinsey (2019) Fashion Report identifies the following 10 global trends forecasted to influence the fashion industry and subsequent business models as; self-disruption, cautious business practice, importance of India as a trade partner, new trade agreements as an opportunity and a threat, rental and subscription models, consumers taking a conscious approach to fashion purchasing and shift to sustainably produced goods, shorter lead times driven by mobile user behaviour, business transparency, diversification of digital ecosystems and on demand, Just In Time (JIT) manufacturing. The report continues to state businesses that are likely to succeed in the future landscape of fashion will either invest in operational efficiencies or brand strength and that achieving scale is the underpinning foundation for success (Amed & Berg, 2019).

Go to Market Business Models

Fashion shopping habits have changed dramatically following the advancements of digital and social media technology (Amed et al., 2019). Access to global trends, ability to share and collaborate tastes has connected consumers and brands globally (Webber & Weller, 2001). The global consumer is now more open to try new brands and has also increased expectations of accessibility. Manufacturers of fashion with traditional business models are failing to keep up with increasing consumer demands (Brun, Castelli, & Karaosman, 2017). Go to market processes differ in terms of timing, availability, and supply chain management. These can be defined as; seasonal collections, read and react, fast track and never out of stock processes (Berg et al., 2018). Brands that retain traditional seasonal models are often reluctant to advance their manufacturing processes due to a belief that

fashion largely remains a creatively driven art form preferring to adhere to the 6 monthly summer and winter seasonal collection cycles (Berg et al., 2018). Consumers are exposed to collections through editorial channels yet cannot access the product for as long as 6 months following. It is acknowledged that a requirement to improve value chains and embrace digitization, yet it remains a challenge (Berg et al., 2018). Brun et al (2018) found the greatest priority for fashion firms was to reduce speed to market followed by improving demand forecasting, increasing digital presence, and reducing sale activity.

Increasing speed to market by shortening design and manufacturing lead times mitigate risks of over stocking and missing market opportunities (Brun et al., 2017). Remaining close to the market enables brands to read and react, providing accurate data to anticipate consumer demand. Companies operating under the seasonal 6 monthly cycle often miss opportunities to respond to trends or to replenish sell out styles (Berg et al., 2018). The most successful brands operate under a direct to consumer (Berg et al., 2018). Berg (2019) states that vertically integrated business models set the pace for speed to market.

Investment in operational efficiencies through supply chain reconfiguration are changing business models such as U.S brand Alexander Wang whereby designs are released monthly to consumers. Dool (2018) reports that movement to this new model provides consumers with more relevant merchandise that is consistent with the immediate needs of the consumer. A further case study that exemplifies this go to market strategy is U.S streetwear brand Supreme. The business has built its business model on ‘drop culture’ whereby limited-edition pieces in collaboration

with other high-profile designers are offered throughout restricted distribution channels, usually selected Supreme stores around the globe, with little marketing lead time. The strategy has been very successful to direct consumers to their bricks and mortar stores, often requiring security and council permits due to the heavy footfall and 'hype' the drops attract (Dool, 2017).

Supply Chain Optimization

New entrants into the fashion industry are moving away from manufacturing and high street retailing to creating niche products and shifting to a direct to consumer model or on-demand manufacturing to create deeper connections with their customers (Theodosi, 2018). Bypassing traditional wholesale models risks reduced brand visibility gained through representation at established multi-brand retailers, however mitigated by the ability to capture data through direct customer interaction, reduce price points and offering more personalized services creating opportunity for hyper-targeted marketing initiatives (Theodosi, 2018). New brands are also using a pull supply chain strategy based on consumer pre-orders. A pull supply chain strategy is driven by consumer demand as opposed to a push strategy whereby product quantities are determined by the manufacturer and pushed down the supply chain (Gardiner, 2013). An example that has adopted this model is footwear label Bionda Castana whereby the brand offers four styles per month that are sold on a pre-order model, thus reducing risk of holding seasonal inventory (Theodosi, 2018). Orders are shipped directly from the manufacturer partner to the consumer, cutting freight and logistical costs in half. This lean model of supply ensures a 100% sell through based on real time demand (Theodosi, 2018). Brands are also utilizing social media to capitalize on 'drop culture' whereby limited-

edition ranges are released with little warning via exclusive channels. A brand that successfully employed this tactic is Burberry whereby a limited-edition t-shirt was released exclusively through Instagram and WeChat channels for 24 hours. Burberry then leveraged consumer interest to release further limited-edition designs exclusively through their London flagship store for a limited timeframe (Berg & Amed, 2019).

Omni-Channel Retailing

Omni-channel retailing can be classified as integration and streamlining retail channels to provide a seamless brand experience to consumers (Jihyun, 2019). Consumers that engage in omni-channel shopping move freely between the different channels, all within one transaction process (Kim & Chun, 2018). Executing a seamless omni-channel system is a complex task to unify back-end processes (Kumar, Anand, & Song, 2017). Digitization is rapidly driving change to e-commerce demands and consumer expectation, as such the retail sector is challenged to keep pace (Kim & Chun, 2018). Variables such as speed to market, cost, after sale service, response to trends are operating in real time while retailer margins are declining (Jocevski, Arvidsson, Miragliotta, Ghezzi, & Mangiaracina, 2019). Consumers' expectation to provide a seamless omni-channel experience incorporating these variables are required to remain competitive (Oca, 2019). Advancements in omni-channel retailing have opened markets up to global players, increasing competition for local retailers coupled with rising fixed costs are diminishing profit margins (Webber & Weller, 2001).

Bricks and Mortar Stores

Retail bricks and mortar strategies are being re-defined due to reduction in foot traffic, increasing rental costs and increased consumer spending via online channels (Hollender & Breen, 2010). Sectors such as music, books and consumer electronics have responded to these changes in the retail environment by consolidating stores and evolving the storefront from a pure revenue generating channel to a brand touchpoint as part of the customer journey (D'Arpizio, Levato, Prete, Del Fabbro, & de Montgolfier, 2019).

The traditional role of the bricks and mortar store is evolving beyond the purpose of revenue generation and brands are innovating traditional physical retail offerings. Overdiek (2018) explores using Pop Up or temporary store strategies to test local markets, gather data and increase brand footprints with little risk (Overdiek, 2018). Showrooming is another strategy replacing traditional format stores. Showrooming maintains a physical touchpoint for consumers however reduces operational challenges such as inventory management, merchandising and reduces fixed costs such as employee and floor space costs associated with inventory storage (Jin & Shin, 2020). Demand forecasting, lower return rates and opportunity for cross or up-selling are also benefits to operating under this model (Gu & Tayi, 2017).

E-commerce

Online shopping for fashion purchases contributes to the largest portion of total e-commerce sales in Australia and has experienced growth of 20.8% growth from 2018 – 2019 (Yip & Jones, 2019). Marketing cut through is increasingly

challenging via digital channels. Fashion consumers become overwhelmed by the large volumes of content generated globally. Static imagery using models or influencer imagery is no longer seeing effective levels of consumer engagement (Berg & Amed, 2019). Berg & Amed (2019) predict marketing strategies will resemble media productions where brands use storytelling to mitigate consumer fatigue. However, Jin & Shin (2020) state that harnessing digital technologies are necessary however alone are not enough for developing successful business models. The key to success will be measured by how effectively each model addresses unmet consumer needs and manages demand uncertainty (Jin & Shin, 2020).

In contrast to this viewpoint, a report compiled by PwC (2019) on Australian retail consumer behavior showed that despite advancements in digital marketing strategies, Australian consumers prefer to seek inspiration and product knowledge directly from retail stores, as opposed to inspiration from celebrity ambassadors or paid influencers. 36% of consumers will first visit a department store and 27% will visit a brand's stand-alone retail store (PwC, 2019). This indicates that retail and department stores still have a strong influence as touch points in the customer purchase journey and presents an opportunity to communicate brand values in store by implementing an integrated marketing strategy (PwC, 2019).

Data Collection

To understand customer perception of Bianca Spender in terms of value, distribution, price, geographic location and channels active consumers receive promotional and marketing messaging, and an open question asking areas Bianca

Spender can improve on with product or promotion, an online survey was deployed to the Bianca Spender CRM database of 19,000. A total of 135 participants responded, of the 131 participants 24 did not qualify to complete the survey due to inactivity in purchasing behavior for longer than 3 years. A total of 107 responses were valid. The data is summarized as follows.

Geographic Location of Active Customers

50.4% of customers that participated were NSW based, 30.5% Victoria based, 10% in QLD 3.1% in ACT and WA. Summary majority of active customers are situated in NSW, an unsurprising result as product distribution volumes align with the geographical location of active customers. While accurate data is not available within the firm's current CRM system, based on stock distribution and sales data it is evident that the largest percentage of Bianca Spender customers are situated in NSW.

Value Proposition

Bianca Spender customers value quality as the major driving force behind purchase decisions with 87% selecting quality as one of their three top driving decisions for purchasing Bianca Spender clothing. 59% indicated fit and 51% indicated locally made. Fabrication was 35%.

Only 19% of customers valued sustainable production methods. The results are consistent with a report prepared by Deloitte (2019) whereby Baby Boomer and older Millennials value quality and fit above sustainable production methods when purchasing luxury and affordable luxury goods (Deloitte, 2019). The Bianca

Spender customer ranges from 25 to 70 years of age, with the largest proportion between 35 and 50 years of age (Bianca Spender, 2020). Consumer value is aligned with Bianca Spender's internal value proposition of creating artfully designed clothing that is of high quality and manufactured to last the test of time.

Pricing

Perception of value for money showed 68% of respondents perceived Bianca Spender product was priced in line with value and 31% of respondents felt that Bianca Spender was priced above perceived value. When investigating the respondents that indicated Bianca Spender clothing is priced above value with the open format question, what more would you like to see with regards to price or promotion from Bianca Spender showed 30% would like to see additional product lines, particularly corporate and workwear garments offered at a slightly lower price point. Of the 30% that would like to see lower price pointed lines, 20% indicated a desire for such ranges to be released as evergreen product lines.

Distribution Channels

55% of those that answered shopped exclusively at their local David Jones store showing that customers shop predominately in David Jones, aligning with the current distribution model. 15% shop exclusively online, 24% a combination of all channels and only 4% solely at Bianca Spender boutiques. This indicates an opportunity to strengthen the direct to consumer distribution channels considering current store positioning, e-commerce performance, retail staff training and tailoring product offering to provide a seamless customer experience via each

channel. This is in line with the literature findings whereby consumers will use many touch points across the customer journey process.

Marketing and Promotion

62% of promotional activity is received via Bianca Spender's email database in the form of weekly electronic marketing emails, 69% via Bianca Spender's business Instagram page, David Jones promotional material is 7.1%. 39% of promotional activity is received via the Bianca Spender website, which currently has limited functionality for content management. This shows that despite dominant sales via David Jones distribution, marketing and promotion activity is driven direct to consumer from the internal marketing department.

Suggestions to Improve Product or Promotion - Open Text Field

The free text question sought to uncover insights pertaining to changes consumers would like to see regarding price or promotion. Responses were categorized into key themes; fit, sizing and fabrication, additional product lines, VIP and loyalty rewards, information of news and sales, distribution, and additional service offerings:

- Additional product lines – 36%
- Fit, sizing and fabrication – 19%
- Information of news and sales – 19%
- Distribution – 11%
- VIP and loyalty rewards – 6%
- Additional service offerings (tailoring, alterations etc) – 5%

A clear appetite for additional products emerged from the data. Of the 36% of requests for additional product lines with the majority suggesting an evergreen collection of core workwear wardrobe solutions. Current collections carry a component of seasonal corporate workwear garments that are highly priced due to high manufacturing costs. Further suggestions for exclusive limited-edition pieces were made including one off designs. Secondly, requests for a wider range of fits suitable for various body shapes were requested. Bianca Spender does not offer a tailoring, personalization, or hemming service currently. The subsequent key theme showed a desire for more information around sale periods and brand news, requests for fit and styling advice and increased content via social media about the brand and a VIP and loyalty reward system. Bianca Spender does not currently have a VIP program in place due to insufficient capability within their current POS and CRM technology.

Conclusions

The focus for Bianca Spender is to innovate the business model to increase value to the consumer to grow revenue. Therefore, it is imperative that the business model is structured to increase activities that contribute to consumer value and decrease activities that do not. Global trends such as restructuring go to market strategies, advancements in omni-channel retailing and optimizing supply chains were identified within the literature review. Synthesizing consumer data against the literature review showed disparity between consumer demand and global trends. The following findings highlighted opportunities for business model innovation pathways.

Go to Market Business Model

Data from the free text question on how Bianca Spender can improve value by promotion or product highlighted demand for an evergreen product offering with a specific request for corporate dressing, at a slightly lower price point. Consistent with Berg (2019) whereby speed to market, higher production and supply chain efficiencies, reduced design and development costs and opportunity for economies of scale and scope presents an opportunity to produce a lower priced corporate and workwear range that is manufactured at scale, is not bound by seasonal sales cycles and reaches a wider market size. Further requests for limited edition or exclusive product were requested, indicating demand for highly designed garments produced in limited quantities.

Omni-Channel Retailing

Consumer sales channels data showed the majority of consumers shopped via David Jones distribution channels, however as illustrated in literature, brands that provide seamless omni channel customers experience and use direct to consumer channels business models are experiencing greater success than wholesale and vertical hybrid models. Macro environmental analysis shows that David Jones is experiencing a heavy downturn in revenue with future store closures and a strategy to consolidate brands to remove poor performers. Therefore, to futureproof the business against macroenvironmental shocks it is recommended that Bianca Spender focuses business activities to strengthen the omni-channel customer experience and direct to consumer channels.

Supply Chain Optimization

Based on the data showing consumer appetite for an evergreen workwear range, it is recommended that Bianca Spender restructures the traditional 6 monthly seasonal model to include this as an additional range. Benefits outlined within the literature review show that evergreen collections that are manufactured at scale reduce design and development costs and reduce sales during mark down periods by lengthening sales cycles. Further market analysis to refine this business model using design thinking methodology is required including consumer research using customer empathy mapping and customer journey tools, prototyping, and testing to develop a range that meets market demand (Brown, 2008). A value chain analysis is then recommended to map out internal activities including supply chain and operational changes, marketing, sales and service, pricing and competitor analysis and financial modelling (Johnson et al., 2018). Key considerations for brand, price and positioning are vital to ensure the Bianca Spender brand and value proposition are not diminished by introducing a lower cost range.

Additionally, insights from the data collected showed consumer appetite for additional limited-edition pieces outside of the summer and winter collections. Herein lies an opportunity to employ a ‘drop’ strategy explored in the literature review. Utilizing deadstock fabric and releasing small design runs exclusively through direct to consumer channels at a premium price point could increase sales activity through direct to consumer channels and increase consumer engagement. Further, introduction of these ranges could employ a pull strategy whereby consumers are able to pre-order enabling accurate stock and size forecasting, reducing stock overruns. Further benefit to employing a ‘drop’ strategy is the

ability to ‘read and react‘ and collect data for future design decisions based on true consumer demand.

Restructuring the go-to-market strategy by introducing an evergreen and ‘drop’ range is intended to complement the existing seasonal collection model, however recalibrating product volume could prove to increase revenue with higher volume margins, higher full price sell through in turn reducing the volume of garments sold at a discount. Figure 3 (inset) depicts a recalibrated range pyramid to illustrate the proposed collection and subsequent go-to-market structure. It is vital to retain the existing seasonal mainline collection to ensure David Jones distribution channels are serviced while creating seasonal product that align with seasonal media publications.

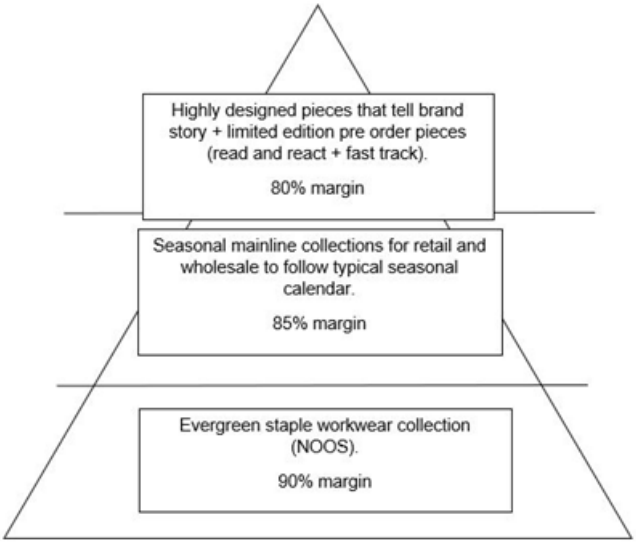


Figure 1 – Proposed Go-To-Market range structure

Direct to Consumer

The current direct to consumer channels are generating sub-optimal revenue figures and the business has a heavy reliance on David Jones distribution channels.

Strengthening direct to consumer channels will mitigate risk outlined in the macro environmental analysis. Due to limited operating capital, a more cautious approach is recommended for growth. Employing new store formats such as pop-up or temporary stores is advised to test new markets, capture data to tailor product offering to local markets before committing to retail store leases and fit out costs. Furthermore, adopting a showroom strategy for future stores is recommended to reduce operating costs and to maximize 3PL capabilities.

A requirement to streamline and unify customer experience touchpoints across direct to consumer channels by upgrading POS, e-commerce and inventory management technology is recommended to increase speed to market, consolidate inventory removing issues of availability, reduce delivery times and upgrade the e-commerce channel to replicate the luxury at every touch point value proposition. It is suggested that additional customer service functionalities to increase personalization such as live chat, personal styling and integrating further communication channels such as WeChat and WhatsApp are introduced.

Sustainable Business Practices

It is recommended that activities and costs associated to extend the sustainability strategy further than what is currently in place is reduced. Current sustainability business practices are sufficient to align with company values and market requirements and exceed those of direct competitors. Consumer data indicates that additional efforts to improve sustainability processes will not yield additional revenue in the short term. Undertaking a new go to market strategy will also increase sustainable business practices through the reduction of dead stock by

extending sales cycles, creating seasonless product, utilizing dead stock fabrication and using a pull strategy where garments are pre ordered or produced in limited quantities. Opportunities to integrate these benefits into marketing communications will continue the sustainability conversation while ensuring business resources are aligned to value generating activities.

Recommendations using McKinsey Three Horizons Framework

The recommendations will be presented using McKinsey Three Horizons framework to organize top line activities (see Figure 4, inset) (Johnson et al., 2018). Horizon One includes activities to maintain and strengthen the core business, typically across a three-year time frame. Horizon Two strategies are designed to nurture emerging business across a three to five-year period and Horizon Three strategies are designed to create new business opportunities across a ten-year time frame. Blank (2019) challenges the timebound nature of the framework due to rapid advancements in technology, enabling businesses to innovate faster. Based on the rapidly changing nature of the fashion industry, the following Three Horizons framework will be solely used as a high-level guide for activities that are not tightly bound to the above time frames (Blank, 2019). Recommendations for Horizon Three are indicated based on macro environmental factors detailed in this report.

Horizon One | Maintain and strengthen core business activities

- Recruit General Manager to employ and onboard key personnel, implement structured KPI systems across departments with expertise in key growth areas.

- Begin range restructure by introducing a ‘drop’ strategy with limited edition releases that compliments seasonal ranges to increase activity via direct to consumer channels.
- Strengthen direct to consumer distribution channels with pop-up or temporary stores to test location and positioning, capturing data to tailor product offering and broaden the direct to consumer channels and brand footprint. It is recommended that to strengthen direct to consumer channels, a pop-up strategy is undertaken in Horizon One to collect data to inform investment for permanent store placements in Horizon Two.
- Unify omni-channel with new website platform and upgrade technology to streamline back end operations and consequently the customer journey experience. Current technology platforms do not facilitate seamless transactions.
- Onboard an external 3PL inventory and distribution partner to streamline existing inventory management and optimize distribution speed.
- Implement an integrated marketing strategy to communicate brand values across internal and external parties to unify the brand voice and optimize all customer experience touch points.
- Begin design thinking methodology to develop evergreen corporate range using the steps outlined below (Figure, 5) (Brown, 2008).

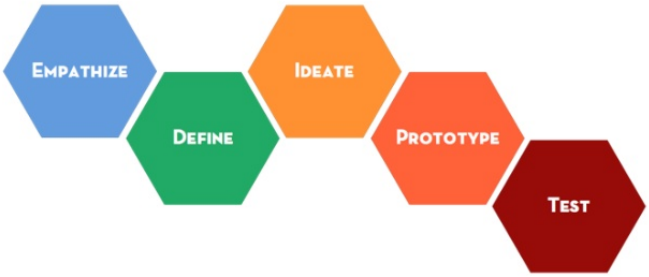


Figure 2 – Design Thinking Methodology (Ferrell, 2014)

1. Empathize by undertaking customer research to uncover insights into corporate lifestyle, behaviors and demographics using customer empathy mapping, desktop research and surveys.
2. Define the problem to be solved by synthesizing data to uncover insights pertaining to design, price, placement, and promotion.
3. Begin ideation process with the design team to develop a corporate collection.
4. Prototype and test the range with key customer groups.
5. Develop based on insight.
6. Deliver corporate range to market using a comprehensive launch strategy.

Horizon Two | Nurturing emerging business

- Introduce range diversification with an evergreen corporate collection sold exclusively through direct to consumer channels.

- Using data from pop up or temporary store activity, open bricks and mortar showroom stores in relevant areas considering tailored product offering and in store experiential activity relevant to each location.

Horizon Three | Create new business opportunities

- Consideration to innovate the full supply chain to a pull system by shifting distribution models exclusively through direct to consumer channels, producing evergreen products, eliminating the seasonal collections calendar to reduce inventory inefficiencies, increase speed to market reactivity and optimizing full price sell through.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

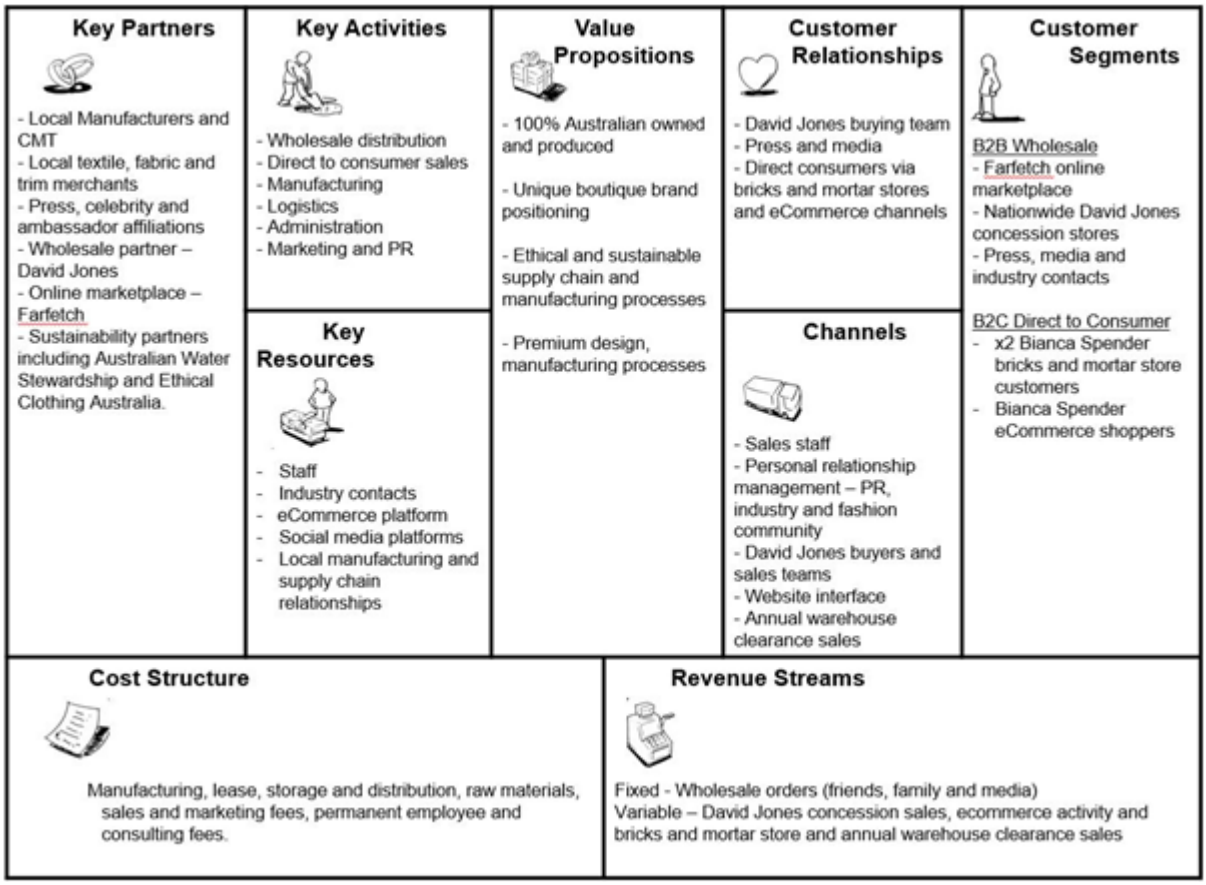
APPENDICES

APPENDIX A – Business Model Canvas: Current State

APPENDIX B – SWOT Analysis

APPENDIX C – Business Model Canvas: Future State

APPENDIX A – BUSINESS MODEL CANVAS: CURRENT STATE



Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

APPENDIX B - SWOT ANALYSIS

STRENGTHS	OPPORTUNITIES
· Established supplier relationships and relative economies of scale for a locally produced business. · Strong domestic distribution in relation to aligned local competitors. · Distinctive point of difference in design and aesthetic. · Loyal team and customer base. · Sustainable business practice, values, and culture. · Local supply chain network enabling better speed to market	· Growth in e-commerce sales both locally and in international markets. · Positioning the brand as a leader in sustainability, practices and supply chain processes are in place and opportunity to communicate to the market. · Optimize sales team to increase retail revenue. · Retail store opportunities in regions where brand is not represented to counter vulnerability to David

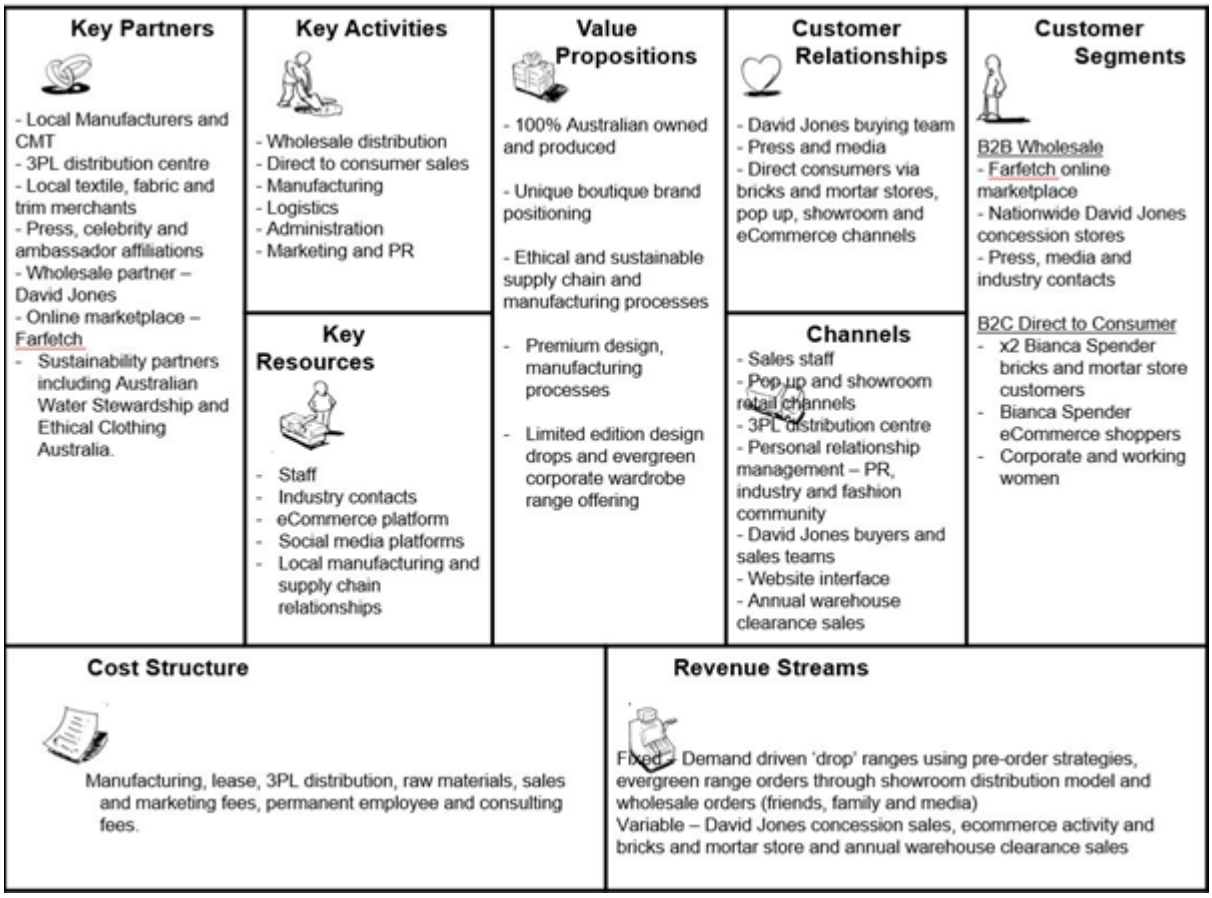
than competitors who produce offshore.	Jones performance and communicate the Bianca Spender brand story direct to customers. · Opportunity to unify and optimize marketing and PR activity to communicate sustainability values and brand story at every touch point. · Diversification of range planning and product offering.
WEAKNESSES	THREATS

· Lack of external funding to mobilize growth strategies. · Inefficient technology in place for stock management, reporting, CRM, and e-commerce systems. · Underperforming sales staff in Bianca Spender bricks and mortar stores. · Bricks and mortar stores not performing at optimum sell through capacity. · Lean team operating at capacity, little room for error or growth. · Lack of senior management and board presence. · Lean capital business.	· Heavy reliance on David Jones performance coupled with declining sales and reduction of retail footprint. · Hyper competitive and highly saturated market locally and globally. · Declining retail industry and forecasted local recession in Australia. · Rising production and raw materials cost. · Ageing demographic.

· Smaller digital database than competitors. · Underdeveloped e-commerce platform and digital strategy. · Limited physical consumer touchpoints to communicate the brand story – window merchandising and store environments.	

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

APPENDIX C – BUSINESS CANVAS: FUTURE STATE



References

Amed, I., Balchandani, A., Beltrami, M., Berg, A., Hedrich, S., & Rolkens, F. (2019). *The 'digital land grab' in fashion* Retrieved from https://www.mckinsey.com/industries/retail/our-insights/the-digital-land-grab-in-fashion

Amed, I., & Berg, A. (2019). *The State of Fashion 2019*. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Industries/Retail/Our%20Insights/The%20State%20of%20Fashion%202019%20A%20year%20of%20awakening/The-State-of-Fashion-2019-final.ashx

Berg, A., & Amed, I. (2019). *The State of Fashion 2020*. Retrieved from file:///C:/Users/chant/Downloads/The-State-of-Fashion-2020-final.pdf

Berg, A., Heyn, M., Hunter, E., Rolkens, F., Simon, P., & Yankelevich, H. (2018). *Measuring the fashion world. Taking stock of product design, development and delivery*. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Industries/Retail/Our%20Insights/Measuring%20the%20fashion%20world/Measuring-the-fashion-world-Full-report.ashx

Bethan, A. (2019). Commercial, social and experiential convergence: fashion's third places. *Journal of Services Marketing, 33*(3), 257-272. doi:10.1108/JSM-04-2018-0116

Blank, S. (2019). McKinsey's Three Horizons Model Defined Innovation for Years. Here's Why It No Longer Applies. Retrieved from https://hbr.org/2019/02/mckinseys-three-horizons-model-defined-innovation-for-years-heres-why-it-no-longer-applies

Brown, T. (2008). Design Thinking. *Harvard Business Review*, 84. Retrieved from https://stream.massey.ac.nz/pluginfile.php/3375662/mod_resource/content/1/%282008%29%20Tim%20Brown%20-%20Design%20Thinking%20%28HBR%29.pdf

Brun, A., Castelli, C., & Karaosman, H. (2017). A focused supply chain strategy for luxury fashion management. In (Vol. 21, pp. 544-563).

Carey, A. (2020). Experts say more Aussie department store closures likely as retail apocalypse continues. Retrieved from https://www.news.com.au/finance/business/retail/experts-say-more-aussie-department-store-closures-likely-as-retail-apocalypse-continues/news-story/60c0b3e41e50d7c1e01dda6be4930822

Chesbrough, H. (2010). Business model innovation: Opportunities and barriers. *Long Range Planning, 43*(2-3), 354-363. doi:10.1016/j.lrp.2009.07.010

Craik, J. (2015). Challenges for Australian fashion. *Journal of Fashion Marketing and Management, 19*(1), 56-68. doi:10.1108/JFMM-03-2014-0017
D'Arpizio, C., Levato, F., Prete, F., Del Fabbro, E., & de Montgolfier, J. (2019). *The Future of Luxury: A Look into Tomorrow to Understand Today*. Retrieved from https://www.bain.com/insights/luxury-goods-worldwide-market-study-fall-winter-2018/
Deloitte. (2019). *Bling It On | What Makes a Millennial Spend More*. Retrieved from United Kingdom: https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/consumer-business/deloitte-uk-young-luxury-shopper-2017.pdf
Dool, S. (2017). Will the Year of 'The Drop' change fashion forever? Retrieved from https://fashionista.com/2017/11/fashion-drop-trend-retail-strategy-2017?utm_source=site&utm_campaign=related
fairwork.gov.au. (2019). Employee Entitlements. Retrieved from https://www.fairwork.gov.au/employee-entitlements
Foundation, E. M. (2017). *A New Textiles Economy: Redesigning Fashion's Future*. Retrieved from http://www.ellenmacarthurfoundation.org/publications
Gardiner, D. (2013). *Operations management for business excellence* (Third ed.). New Zealand: Pearson.
Gu, Z., & Tayi, G. K. (2017). Consumer Psuedo-Showrooming and Omni-Channel Placement Strategies. *MIS Quarterly, 41*(2), 583-A540. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=heh&AN=123148200&site=eds-live&scope=site
Hax, A. C. (2010). *The delta model. [electronic resource]: reinventing your business strategy*: Springer.
Hollender, J., & Breen, B. (2010). *The Responsibility Revolution: How the Next Generation of Businesses Will Win* (Vol. 1st ed). San Francisco: Jossey-Bass.
Jihyun, K. (2019). Luxury fashion goods ownership and collecting behavior in an omni-channel retail environment: Empirical findings from affluent consumers in the US. *Research Journal of Textile and Apparel, 23*(3), 212-231. doi:10.1108/RJTA-01-2019-0001
Jin, B. E., & Shin, D. C. (2020). Changing the game to compete: Innovations in the fashion retail industry from the disruptive business model. *Business Horizons*. doi:10.1016/j.bushor.2020.01.004
Jocevski, M., Arvidsson, N., Miragliotta, G., Ghezzi, A., & Mangiaracina, R. (2019). Transitions towards omni-channel retailing strategies: a business model

perspective. *International Journal of Retail & Distribution Management, 47*(2), 78-93. doi:10.1108/IJRDM-08-2018-0176
Johnson, G., Whittington, R., Scholes, K., Angwin, D., & Regner, P. (2018). *Fundamentals of strategy* (Fourth ed.). England: Pearson.
Kim, J.-C., & Chun, S.-H. (2018). Cannibalization and competition effects on a manufacturer's retail channel strategies: Implications on an omni-channel business model. *Decision Support Systems $V 109*, 5-14.
Kotler, P., & Keller, K. (2015). *Marketing Management*. England: Pearson.
Kumar, V., Anand, A., & Song, H. (2017). Future of Retailer Profitability: An Organizing Framework. *Journal of Retailing, 93*(1), 96-119. doi:10.1016/j.jretai.2016.11.003
Ferrell, J. (2014). d. Hasso Plattner. Institute of Design at Stanford Retrieved from file:///C:/Users/chant/Downloads/design%20thinking%20tools_NZ.pdf
Levy, M., Loebbecke, C., & Powell, P. (2003). SMEs, co-opetition and knowledge sharing: the role of information systems. *European Journal of Information Systems, 12*(1), 3-17. doi:10.1057/palgrave.ejis.3000439
McNeill, L. S., & Snowdon, J. (2019). Slow fashion – Balancing the conscious retail model within the fashion marketplace. *Australasian Marketing Journal*. doi:10.1016/j.ausmj.2019.07.005
Mezger, F. (2014). Toward a capability-based conceptualization of business model innovation: insights from an explorative study. *R&D Management, 44*(5), 429-449. doi:10.1111/radm.12076
Mitchell, S. (2018). David Jones unveils $200m reno for Elizabeth Street flagship. Retrieved from https://www.afr.com/companies/retail/david-jones-unveils-200m-reno-for-elizabeth-street-flagship-20180618-h11joh
Morrison, H., Petherick, L., & Ley, K. (2019). *The Future of Circular Fashion: Assessing the viability of circular business models*. Retrieved from https://fashionforgood.com/wp-content/uploads/2019/05/The-Future-of-Circular-Fashion-Report.pdf
O'Donnell, S. S. (2013). Can Australia's struggling fashion industry support its new stars? *The Guardian*. Retrieved from https://www.theguardian.com/fashion/2013/jul/11/australian-fashion-new-stars
Oca, A. (2019). There's an app for that—if the supply chain can sense and pivot. *Supply Chain Management Review, 23*(3), 48-49. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=136545485&site=eds-live&scope=site

Overdiek, A. (2018). Opportunities for slow fashion retail in temporary stores. *Journal of Fashion Marketing and Management: An International Journal, 22*(1), 67-81. doi:10.1108/JFMM-05-2017-0042
Pigneur, A. O. a. Y. (2012). *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers* Wiley-Blackwell.
Powell, P. (2019). David Jones to aggressively close stores as profit plunges. *Sydney Morning Herald*. Retrieved from https://www.smh.com.au/business/companies/david-jones-to-aggressively-close-stores-as-profit-plunges-20190829-p52m49.html
PwC. (2019). *Retail and Consumer Market Insights*. Retrieved from Australia: https://www.pwc.com.au/publications/retail-consumer-market-insights/quarter-1-2019.html
Singer, M. (2019). David Jones puts customers ahead of VIPs for $200m store relaunch. Retrieved from https://www.smh.com.au/lifestyle/fashion/david-jones-puts-customers-ahead-of-vips-for-200m-store-relaunch-20190710-p525vq.html
Standish, J., & Morrison, H. (2019). A Circular Future for Fashion. *WWD: Women's Wear Daily*, 19-19. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=137660837&site=eds-live&scope=site
Theodosi, N. (2018). Brands, Retailers Seek New Ways to Do Business. *WWD: Women's Wear Daily*, 14. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=133650354&site=eds-live&scope=site
Webber, M., & Weller, S. (2001). Trade and inequality: Australia's textile, clothing, and footwear industries, 1986–1996. *Journal of Economic Geography, 1*(4), 381. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.26160360&site=eds-live&scope=site
Yip, R., & Jones, E. (2019). *Inside Australian Online Shopping*. Retrieved from Australia:

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

The energy cultures framework - understanding material culture barriers to the uptake of natural gas

Michael Binney, Nigel Grigg
michael@binney.co.nz

Conflicts of Interest:
At the time of writing, a gas distribution company employed the primary author.

Abstract

This paper critically assesses natural gas material culture barriers concentrating on physical obstacles (e.g. house characteristics, insulation levels, access, accessibility, installation difficulties, safety, and affordability of gas appliances) which may be preventing residential uptake of gas in New Zealand. Gaining an insight into these obstacles and consumer behaviours that drive investment decisions will assist in potential process improvements and marketing objectives to encourage gas substitution. The paper is based on a review guided by the theoretical lens of the Energy Cultures Framework (ECF) [24] and a survey sent to consumers who had in the past cancelled their gas applications. Findings indicate that barriers do exist, and different consumers experience different barriers (e.g. confusion about using natural gas, the complexity to connect to it, and the affordability of appliances). Principal component analysis (PCA) with varimax

rotation and k-means ++ clustering was used to reduce and cluster variables by fuel type, summated scales were employed to bring the two methods together. The main conclusion from this research is that there is a dual layer of reciprocal barriers (internal which are directly controllable by the distributor and external which are outside the direct control of the distributor).

1. Introduction

Peak demand is of vital importance to transmission and distribution companies in today's energy environment and is a significant contributor to infrastructure investment and consumer price increases. Peak demand refers to the highest demand point in a given trading period typically, New Zealand's market profile exhibits two daily peaks, the first occurring in the morning around 7 am, and the second in the evening happening around 7 pm. On occasions, the electric grid is pushed beyond these two daily peaks characteristically over the winter months June to August in New Zealand [26]. [26] States New Zealand's demand for electricity is around 40,000 gigawatt-hours per year with around two-thirds of that demand stemming from the North Island. Peak demand events occur a handful of times in any given year, and the requirement to cover these peak events drives grid investment specifically to meet critical coincident peaks [12].

Natural Gas (gas) provides a substantial contribution to New Zealand's energy supply supporting electrical generation and as a mass-market energy choice. Gas is only available in the North Island of New Zealand and is sourced from 15 different gas fields both onshore and offshore [6]. There are five gas distribution companies in New Zealand of these, only three have dual ownership of electrical distribution

networks, and one is privately owned, operating a closed network which falls out of regulation.

Traditional electricity pricing methods of a daily fixed charged along with a variable per unit charge fail to capture investment costs adequately [2,13]. Within the New Zealand context, electricity smart meters have been rolled out to a majority of domestic households over the last decade; the data granularity has provided an avenue to new electrical pricing methods which can adequately capture the cost of peak demand. The two most common pricing methods are time-based and demand-based pricing, and while they are useful in lopping peak demand, they are by nature complex for consumers to understand, require considerable education, trial periods, changes in consumer behaviour, and in-house smart devices to be truly useful in their desired goals.

However, a more straightforward approach is available. Gas, due to the ability of line-packing and adequate capacity, does not incur the same issues of peak demand as New Zealand's electrical grid. There are many benefits to the use of gas. From a distribution perspective, a residential dwelling that uses gas can shift up to 70 percent of their load away from the electrical network thereby freeing up considerable capacity on a mass uptake basis negating the need for extensive capacity driven investments. From a customer perspective, gas is one-third the running cost of electricity and does not necessitate behavioural changes in consumption patterns. The drawback is a second daily

fixed line charge, although the impact of this daily gas line charge can be minimised by socialising it across multiple appliances, i.e. the more gas appliances installed, the higher the benefit. In addition, a domestic household can move from an electrical standard user tariff to a low user tariff meaning a reduction in daily fixed electrical line charges which further offset the secondary fixed charge.

Gaining a meaningful understanding of the barriers to gas uptake requires the decisions and behaviours around considering gas from a consumer perspective to be explored. The decision to move to gas requires physical changes to the house set-up, new appliances, compliant meter locations, external pipework, trenching, house topography; choices may even be driven by the physical characteristics of the house, i.e. number of occupants, the age of occupants, and insulation levels. Given the involvement of so many real-world physical aspects, the substitution of electricity to gas manifests as a physical conversion, therefore, exploring the material culture aspect of the ECF with attention given to gas substitution will bring to light the physical barriers related to the behaviours of gas uptake.

1.1 Research Objectives

The paper seeks to critically assess the material culture barriers to gas with a focus on physical obstacles (house characteristics, insulation levels, access to the gas main, installation, safety perceptions, availability and affordability of appliances, and existing energy sources) that may be preventing wider residential uptake of gas in New Zealand.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

The following research objectives were followed in the attainment of this aim:

1. Analyse focused material culture responses in survey data; to
2. Critically evaluate causes preventing the uptake of residential gas use in New Zealand; to
3. Determine how to improve the value proposition of natural gas substitution; and
4. Formulate opportunities for improvement in the material culture barriers; and
5. Develop a model for natural gas material culture.

The literature review and background research indicated gas presented a more straightforward alternative that consumers understand regarding price designs while avoiding issues of price discrimination, requires no behavioural consumption adjustments or in-house smart devices, then there must be degrees of physical barriers preventing consumer uptake. Part of improving the value proposition will be to determine through analysis of the empirical data if traditional utility models are still warranted in an environment shifting towards customer centricity. Therefore, the research question was "What are the material culture barriers to the uptake of gas?"

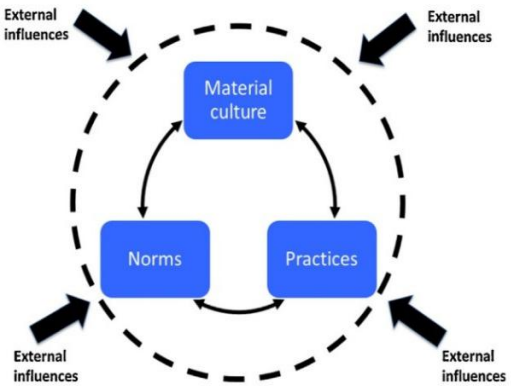


Figure 1. The Energy Cultures Framework [25]

2. Background to the framework

The ECF [figure 1] illustrates energy behaviour as a symbiotic relationship between three core components. These are material culture (physical aspects of the household and associated energy-related appliances), energy practices (actions and processes), and norms (perceptions and expectations of what is reasonable behaviour) [24]. These components are also subject to broader external influences outside of an individual's locus of control such as social marketing, energy pricing, building regulations, and government subsidies all which impact on and shape the core components of the framework. For example, inefficient home heating may be a result of old appliances (material culture) or incorrect thermostat settings (energy practices), or merely the individual's expectations on what is considered warm (norms). To achieve behavioural change one or more of these components must be altered, and the changing of one component will impact on another. For example, moving from a heat pump to central gas heating (material culture) will result in expectations of instant warmth (norms) and changes to the number of hours or rooms heated (practices).

2.1 Components of the framework

Material Culture is primarily focused on the real-world physical barriers to changing energy behaviour. These can include house characteristics such as the number of occupants to the number of dependent children and their ages; energy sources utilised, heating devices, and insulation levels. Norms are concerned with the social notions of 'what is expected.' e.g. social aspirations, respect for traditions, environmental concerns, and expected comfort levels. Energy practises place a specific focus on the actions and behaviours related to household energy

use, such as the number of rooms heated in the home, hours of heating, heat settings, and maintenance of energy appliances.

2.2 Method forming the framework

The framework was initially formed from several smaller projects across multiple disciplines (geography, marketing, physics, law, economics) and then linked to the conceptual notion of energy cultures. Experts from varying fields of study were each held responsible for their projects with the results shared and discussed collaboratively [18]. The framework consisted of several main stages covering values and behaviours, energy behaviour, energy culture clusters, understanding consumer choice, energy performance standards, energy behaviour change, and hot water heating choices to name but a few. The ECF serves as a structure to support the rationale of this research by informing the purpose, research aims and objectives, and the research question. Most importantly the framework provided a grounding base for the literature review and the selected methods of analysis [10]. According to [24], the material culture of a household can be viewed as a technical system in its own right. Often the decisions driving the choice to connect to gas is initiated from a cognitive norms context such as expected comfort levels or environmental concerns. However, once initiated physical barriers start to manifest in the form of heating devices and installation costs, safety concerns, physical access, and outside influencers such as income and availability of energy efficient devices. To remove physical barriers and increase connections to gas an in-depth understanding must first be obtained and is the motive for the research to focus on the material culture context of the framework. Also, according to [1] material

culture was identified as one of two contexts needing the most attention for future study.

3. Research methodology

A strong focus of the research concentrated on objectives one and two with the chance to study and evaluate consumer perceptions of physical barriers to residential gas uptake. Even though there are apparent barriers such as income and access to gas much remains uncertain about the real-world physical obstacles that impede consumer decisions and how strong some barriers are in relation to others. Therefore, the prospect to gain a cross-section of consumer views will contribute significantly to increase understanding and inform business process design to reduce or remove impediments. The literature review identified a gap in existing research where the potential for gas as a demand-side management tool has been overlooked in favour of more complex electricity side driven alternatives. It became clear that given the simplicity and advantages gas can offer to distribution companies and lifestyle benefits to consumers there must be barriers inhibiting the broader adoption of gas, and the need to understand these barriers should be based on research. An essential aspect of this research will be the analysis of empirical data on critical indicators of material culture concepts as identified by [24]. Objective one was addressed through the collection and statistical examination of survey data; objective two extends the research through analysis of data collected in a market setting and the theoretical lens of the ECF, while objectives three and four takes the research forward by improving the business value proposition. The last objective simplifies the findings into a visual model representing key findings for presentations and discussions. By comparing the literature review with real-

world practice, the research gains a richer understanding of consumer issues surrounding the uptake of gas allowing for a more useful contribution to knowledge in the gas distribution environment.

Objective two of the research aims to evaluate the barriers to the uptake of natural gas critically, to do so collection and analysis of empirical data are required. The reality of material culture is objective and autonomous from the researchers so can be examined in a manner to draw descriptive inferences from a representative sample. According to [21], this is in line with a positivist view of the world. The question then becomes which type of research method is best suited to assist in the study of a positivist business problem that focuses on stakeholder views to gain an understanding of the material culture phenomenon. An explanatory research design does not fit the landscape of this research as it uses imagination and ideas. The design tends to focus on the unexplored with emphasis on personal judgements. Experimental research is also inappropriate due to its focus on causal relationships and the tendency to remove the observable facts from its context. Diagnostic research has some merits in that the research is trying to understand the origins of material culture barriers and describe the factors that drive problematic barriers to uptake. However, the present authors are interested in describing and making sense of a particular situation based on the collection and presentation of survey data. The data collected focused on attitudes, beliefs, and opinions; while using demographics to classify statistical categories to answer a "What are" question. [4] State that research which relates to the examination of items in their natural environment using methods such as mathematical modelling is quantitative in design. While [5] states descriptive statistics presents a scientific way to deal with

classifications, descriptions, collections, and interpretations of data collected in surveys with the purpose to draw insights and describe the population. Therefore, the nature of the research fits a descriptive research design with a quantitative focus intended to draw out insights and describe the phenomenon.

The outcome of this particular research is not intended to produce a new hypothesis, instead compare results alongside existing theory and with what is already known regarding knowledge and processes from a business context, resulting in improved understanding of the physical barriers inhibiting gas uptake and the businesses ability to deal with them.

3.1 Data collection strategy

The strategy employed to implement the empirical research was a survey. According to [3], a survey is a numeric description of trends, attitudes, or opinions of a population through the study of a sample of that population. By this definition, a survey is an optimal vehicle to facilitate the researcher's exploration of the material culture in regard to gas connections, resulting from the desire for a statistical interpretation of the phenomenon. A survey approach gives the focus required to describe the attitudes and beliefs of residential consumers to the uptake of gas as a fuel substitution and fits perfectly with research objectives two and three, to analyse and critically evaluate consumer attitudes and beliefs to the physical barriers to gas connections and enhance aspects of the business model. In an acknowledgement that consumers are diverse in their decision making and physical topography impacts decisions, obtaining a diverse range of stakeholder views from within the residential sample is necessary for context. A combination

of random and convenience sampling methods was used to generate a targeted, heterogeneous sample. This method was the most opportune as the first author worked at a distribution company. From a list of gas applications, a group of cancelled applications was identified. These would provide maximum insight into material culture issues resulting in the applications being cancelled. Within each area of the network footprint, e-mail addresses were selected from the available list of cancelled applications and a link to the survey sent out. Thus, a heterogeneous range of geographic locations was selected, providing some socio-economic stratification. To further assist in increasing response rates, and target potential new connections, a link was posted on the company Facebook page as a means of engaging within an active online community interested in gas. This method did not control the potential respondents and was more of a convenience sample. However, the final sample of respondents provided sufficient range and coverage to enable the methods described in this paper to be reliably applied. By selecting a heterogeneous approach, we achieved a representative sample where n = 173, representing well the views of the gas community. The instrument and responses were then tested for reliability using Cronbach's Alpha. The Alpha is the most common and accepted measure of reliability, as a rule of thumb α=0.700 indicates the acceptable reliability of the survey instrument.

3.2 Generation of data

The first author developed an anonymous internet survey which placed specific focus on the material barriers identified by the ECF. Question types consisted of 35 closed-ended ordinal options on a Likert scale and some directed open-ended responses which allowed respondents to express their views in a specific context.

A link to the survey hosted on Survey Monkey was sent out to 869 e-mail addresses contained in the database of the researcher's employer. These individuals had, for one reason or another, withdrawn their applications for a gas connection, making them an ideal target sample for assessing barriers to uptake. Selection of an on-line survey strategy offered certain advantages. Firstly, was the timeline consideration as the online survey gave the ability to reach hundreds of customers on the distribution networks widely geographically dispersed footprint. Secondly, access due to these customers being in rural/urban areas, plus an online survey granted the researcher quick access to these consumer groups [28] by posting the link on the company Facebook page and accessing of e-mail addresses through the company database. Thirdly, the online survey provided the benefit of allowing the researcher to conduct preliminary analyses of the data while waiting for the desired number of responses to be collected [28]. Lastly, but importantly for a utility organisation which is publicly accountable and supported by regulation, the online survey was cost-efficient; the method avoided postage, printing and data entry costs associated with postal and phone surveys.

3.3 Survey measures

The survey instrument had three sections. Firstly, gas material culture had 24 items that were adapted from the energy cultures questionnaires [24] and company market research [7,8,9]. The items used to measure gas material culture included: insulation; existing energy sources; access to gas mains; installation; availability and affordability of gas appliances; and safety perceptions. Secondly, the market perception of natural gas items was modified from [22] and consisted of 14 items on a 5-point Likert scale ranging from 1 = strongly agree and 5 = strongly disagree.

These included: efficiency and cost-effectiveness; safety of use; ready availability; security in its future supply; ease and convenience of installation; support by reasonably priced appliances; price elasticity measures; and availability of accessible information. The propensity to switch to natural gas consisted of five items and the last item measured overall interest in natural gas, both measured on the same Likert scale as above. Finally, eight items about demographics to analyse the results into categories for statistical analysis.

3.4 Data analysis methodology

Regarding the analysis, the following stages were used in the analysis of questionnaire data. PCA was carried out to reduce the data in terms of dimensionality (section 3.5), while K-means ++ clustering was carried out to cluster behavioural traits based on the grouping of similar responses (section 3.6). Summated scales were finally calculated from the principal components, to determine which of them had the most prominent influences on the identified fuel type clusters (section 3.7).

3.5 Principal Component Analysis

PCA was used to reduce the 38 original questionnaire items relating to barriers identified by the ECF, into a smaller number of latent factors (constructs). PCA reduces the dimensionality of data by geometrically projecting the data onto lower dimensions termed principal components, with a goal of finding the best summary using the least principal components based on the law of conservation of mass [19]. PCA is a multivariate technique to identify sources and relative contributions where information on some characteristics is unavailable, but a measured

concentration exists [14]. The approach was used to analyse the interrelationships among the material culture variables and reduce these down to a smaller number of underlying intercorrelated groupings, essentially condensing the variables down into a set of latent variables with minimal loss of information. A table of the latent variables was created displaying relationship values between the variables of material culture helping to identify common factors. The primary statistical tool used for PCA was The Statistical Package for Social Science (SPSS) version 20.

3.6 K-means ++ Clustering

K-means clustering is commonly used in business analytics. Analysis of survey data using K-means clustering provided a way to divide the survey data into hot water fuel type groupings known as clusters. The application of cluster analysis in this instance is a form of market segmentation, whereby the survey responses based on their similarity to the dimensions of material culture were grouped and coded to inform and classify segmented traits which would then give rise to consumer classifications of underlying cultural barriers of gas uptake. The type of K-means clustering employed was partitional clustering or non-hierarchical meaning there were no over-lapping subsets as each object was present in only one cluster. Microsoft Excel (Excel), with a free statistical resource pack add-in from [29], was used for K-means clustering. The add-in expanded Excel's native statistical functions allowing for a broader range of advanced statistical analysis usually performed in SPSS. In particular, the add-in used the K-means ++ algorithm for clustering which produces better results than the original K-means approach.

3.7 Use of summated scales

Summated scales are one of the most used methods in social sciences for the assessment of characteristics [27]. Developed for the measurement of attitudes, beliefs, and perceptions summated scales are an ideal bridge for linking the two forms of statistical analysis together. The first step in the creation of summated scales is to define what is being measured [27] in this instance the material culture barriers to gas uptake. Many responses indicating attitudes towards physical culture barriers had been collected through the survey instrument. Groups of items relating to each identified component from the (rotated varimax) matrix of the PCA were averaged via summated scales. Then the scores for the items from each identified cluster were also averaged, and the differences between the averages of the PCA scores and the K-means cluster scores were examined. Substantial differences between the two proportions indicated which components have a direct impact on the fuel type clusters, in other words, which components are (a) influencing attitude scores and (b) contributing to material culture barriers. [11] States there are several advantages to using summated scales. Firstly, the use of multiple items in a summated scale results in a portion of random error cancelling out across items. Secondly, summated scales do not constrain responses to a smaller number of discrete categories (ordinal data) instead; introduce more of an interval scale to the variables facilitating a more extensive range of analysis. Finally, focusing on intuitive dimensions identified in the PCA changes the perspective of the research from symptoms to a cure.

3.7 Assessing quality of data

Several steps were taken to ensure content, internal and external validity, and survey reliability was measured via internal consistency using Cronbach's Alpha. Ensuring PCA quality involved several measures. Firstly, communalities of one for each factor for the inverse correlation matrix was achieved indicating the variance in each item was explainable by the extracted factors. Secondly, the factor scores matrix was checked for satisfactory primary factor loadings of 0.442 and above. This measure indicates how strongly each item loaded on to each factor. In addition, cross-loadings (indicating how strongly each item loads onto the other), were measured, aiming for a distribution gap of 0.2 or less, as higher cross-loadings indicate that a factor measures several concepts, which is not desirable as the analysis is aiming to determine distinct factors. The dataset was also measured for suitability to a factor analysis using the KMO test and Bartlett's test of sphericity (BTS). The KMO test measures sampling adequacy for each variable, the higher the proportion, the more suited the data is to factor analysis [23]. In other words, values close to zero indicate widespread correlations in the data set, a significant problem for factor analysis. If the BTS is substantial and the KMO is greater than 0.600, then factorability can be assumed [20]. Regarding K-means clustering, the K-means ++ algorithm was used which produces significant improvements in the final error of K in comparison to the traditional K-means clustering approach.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

4. Analysis

Component	Initial Eigenvalues			Loadings			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.585	15.093	15.093	5.585	15.093	15.093	3.639	9.835	9.835
2	2.323	6.278	21.371	2.323	6.278	21.371	2.394	6.472	16.306
3	2.033	5.495	26.866	2.033	5.495	26.866	2.375	6.418	22.725
4	1.894	5.120	31.986	1.894	5.120	31.986	2.103	5.685	28.409
5	1.813	4.901	36.887	1.813	4.901	36.887	1.817	4.910	33.320
6	1.638	4.426	41.313	1.638	4.426	41.313	1.638	4.427	37.746
7	1.462	3.951	45.264	1.462	3.951	45.264	1.559	4.215	41.961
8	1.430	3.865	49.129	1.430	3.865	49.129	1.457	3.939	45.900
9	1.312	3.546	52.674	1.312	3.546	52.674	1.376	3.718	49.618
10	1.262	3.412	56.086	1.262	3.412	56.086	1.365	3.690	53.308
11	1.171	3.165	59.252	1.171	3.165	59.252	1.338	3.616	56.923
12	1.124	3.037	62.288	1.124	3.037	62.288	1.312	3.546	60.469
13	1.088	2.940	65.228	1.088	2.940	65.228	1.305	3.527	63.996
14	1.039	2.809	68.037	1.039	2.809	68.037	1.275	3.446	67.442
15	1.018	2.751	70.787	1.018	2.751	70.787	1.238	3.345	70.787
16	.936	2.530	73.317						
17	.904	2.443	75.759						
18	.814	2.200	77.959						
19	.782	2.113	80.073						
20	.765	2.068	82.141						
21	.693	1.874	84.015						
22	.620	1.676	85.691						
23	.594	1.605	87.296						
24	.562	1.520	88.816						
25	.515	1.392	90.207						
26	.468	1.264	91.471						
27	.438	1.183	92.654						
28	.381	1.030	93.684						
29	.362	.978	94.661						
30	.342	.924	95.585						
31	.333	.900	96.485						
32	.305	.823	97.308						
33	.256	.692	98.001						
34	.251	.677	98.678						
35	.223	.604	99.282						
36	.162	.439	99.721						
37	.103	.280	100.000						

Extraction Method: Principal Component Analysis.

Table 1. Total Variance Explained

4.1 Reducing the data: principal component analysis

To achieve the reduced factors a correlation matrix containing the standard deviations of each indicator was calculated. Secondly, the eigenvalues of the correlation matrix were calculated along with the associated unit eigenvectors producing communalities of one for each variable in the loading matrix. Table 1 depicts all eigenvalues and percentage variances and shows that the first component had an eigenvalue of 5.585 with a percentage variance of 15.093 percent and consisted of five items all relating to appliance propensity.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

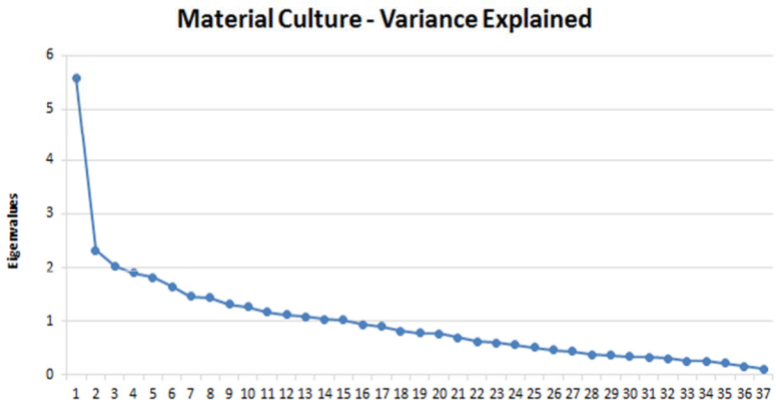


Figure 2. Scree Plot of Variance

To determine the number of reduced factors, the eigenvalues for each of the indicators were divided by the total number of indicators, this displayed the percentage variance accounted for by each eigenvalue, and a cumulative sum calculated. A Scree Plot [figure 2] was created to plot the percentage values of each

eigenvalue allowing for a visual representation and identification of the inflection point. The inflection point is the point on the line curve where the data begins to level out, also referred to as an elbow. Ideally, the inflection point should describe between fifty to seventy percent of the data set [29], and factors to the right of the inflection point eliminated from analysis. The Scree Plot was cross validated with the Kaiser approach where the practice is to retain factors with eigenvalues higher than one and discard values less than one.

A full load factor matrix was calculated by multiplying each unit eigenvector by the absolute square root of the corresponding eigenvalue and each indicators communalities calculated by summing the squares of each indicators factor variables. Communalities are similar to the relationship in regression analysis and display the variance of each indicator by the extracted factors. Finally, drawing from the full load matrix, the number of reduced factors were taken for an unrotated reduced factor matrix and the sum of squares calculated for each factor, along with error terms (communalities and specific variance) for each indicator. The reduced factor matrix was then rotated using the orthogonal varimax method due to the underlying assumption of uncorrelated factors influencing the indicators [29] [Table 2]. The rotation did not change the overall communalities or variance, but it did alter the distribution of variances among the reduced factors [29]. This approach produced the cleanest model in terms of maintaining the orthogonal axis and the lowest number of cross-loadings. Also, the rotation produced a simple factor structure where each indicator had a strong loading on one factor and minimal loadings on other reduced factors. The minimum value of factorial analysis for all items representing each research variable in the rotated matrix was set at 0.442 and above, ensuring the items met a minimum satisfactory level of validity analysis [15].

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Table 2 illustrates the rotated factor solution. In the first-factor, gas hot water and central heating have the highest factor loading in the analysis at 0.893.

Rotated Component Matrix - Select Items

Component	1	2	3	4	5	6
Propensity for natural gas hot water	0.670					
Propensity for natural gas central heating	0.793					
Propensity for natural gas cooking	0.705					
Propensity for natural gas hot water and heating	0.893					
Propensity to consider natural gas for all three	0.882					
Perception of natural gas cost and efficiency as a fuel		0.674				
Perception of natural gases environmental impact		0.824				
Perception of safety in using natural gas in the home		0.654				
Perception of ongoing future supply of natural gas		0.608				
Convenience and ease of installing natural gas into the home			0.766			
Supported by reasonably priced gas appliances			0.678			
Supported by easy to find information about installing and using natural gas			0.804			
Natural gas is available on your street?				0.845		
Aware of free connection offers				0.548		
Natural gas is readily available on my street				0.786		
Price elasticity of hot water plus install considered too expensive					0.814	
Price elasticity of central heating plus install considered too expensive					0.804	
Is gas safe in the home						0.773
Health risks in the home						0.799
Price elasticity of hot water plus install considered expensive						
Price elasticity of central heating plus install considered expensive						
Price elasticity of central heating plus install considered optimal						
Offers value for money over time						
The day-to-day running cost relative to electricity						
Main energy source for heating the home						
Interest in installing gas into the home						
Price elasticity of hot water plus install considered too cheap						
Price elasticity of central heating plus install considered cheap						
Price elasticity of hot water plus install considered expensive						
Ownership of dwelling						
Price elasticity of hot water plus install is optimal						
Price elasticity of central heating plus install is optimal						
Homes with increased insulation						
Price elasticity of hot water plus install considered too expensive with upgraded insulation						
Likelihood to spend $3,000 on hot water plus install if installing premium central heating system						
Price elasticity of premium central heating plus install						
Cronbach's Alpha	0.875	0.759	0.744	0.616	0.680	0.539
Mean item correlations	0.793	0.664	0.766	0.786	0.809	0.786

Other indicators included in the first component were the interest in all three-gas appliances (0.882), interest in central heating (0.793), interest in gas cooking (0.705) and interest for continuous gas hot water (0.670). Cronbach's alpha for the first component was calculated at α=0.875 signifying internal reliability of the component. Component 1 has been titled "Appliance Propensity" as it

demonstrates the inclination of consumers towards which appliance mixtures they consider when reviewing gas as an energy option.

The second component has an eigenvalue of 2.232 with a percentage variance of 6.278 percent consisting of four items. These are the environmental impacts of gas (0.824), the cost, and efficiency of gas as a fuel (0.674), the safety of using gas in the home (0.654), and the ongoing future supply of gas (0.608). Cronbach's alpha for the component is α=0.759 indicating reliability. The component has been titled "Fuel Perception" as all the items on the component reflect the way consumers view gas.

The third components eigenvalue is 2.033 with a percentage variance of 5.495 percent consisting of three items. These are information on installing and using gas (0.804), convenience and ease of installing gas into the home (0.766) and supported by reasonably priced gas appliances (0.678). Cronbach's alpha for the third component is α=0.744 indicating reliability. The component has been labelled “Installation Complexity" as each item plays a role in the installation of gas into the home. The fourth components eigenvalue is 1.894 with a percentage variance of 5.120 percent and consists of three items. These are the availability of gas on the street (0.845), is gas readily available (0.786), and are consumers aware of free connections (0.548). Cronbach's alpha for the component is α=0.616 suggesting questionable reliability. The component is below the α=0.740 threshold identified by [16] for the size of this data set but displays a strong mean item correlation (0.786), the items loaded onto the factor make sense, and accessibility of gas is meaningful to the research, so the component was included into the analysis and

summated scales. The component has been labelled Access and Availability. The fifth component has an eigenvalue of 1.813 with a percentage variance of 4.901 percent consisting of two items. These are price elasticity of hot water plus installation (0.814) and price elasticity of central heating (0.804). With a Cronbach's alpha of α=0.680 also below the threshold. However, as per the fourth component, the mean item correlation is sturdy at 0.809 and meaningful to the research. The component has been labelled "Appliance Pricing" as these items represent the tipping point where consumers cannot justify investing in gas appliances. The sixth and last component selected has an eigenvalue of 1.683 with a percentage variance of 4.426 percent and consists of two items. These are health risks from gas in the home (0.799) and gas safety in the home (0.773). The sixth component also had a Cronbach's alpha (0.539) below the α=0.740 threshold and like the last two components had a high mean item correlation (0.786) and appeared meaningful to the research. The sixth component has been labelled "Health and Safety" as it represents the consumer views about the safety of gas in the home and any negatively associated health risks from its use.

Component	Num of Items	Component Label	The Barrier
1	5	Appliance Propensity	External
2	4	Fuel Perception	External
3	3	Installation Complexity	Internal
4	3	Access Availability	Internal
5	2	Appliance Pricing	Extrenal
6	2	Health and Safety	Internal

Table 3 lists the six primary material culture barriers to gas uptake from the PCA and if these barriers are internal (directly relatable to

the distributor) or external influencers (outside of the distributor's direct control). PCA results suggest that appliance propensity is the strongest barrier to gas uptake, an external influencer, followed by fuel perception an external influencer, installation complexity an internal barrier, access and availability another internal barrier, appliance pricing an external influencer. The least important of the selected components is Health and Safety, an internal barrier as a distributor is responsible for the overall safety of the network.

4.2 Grouping the data – k-means ++ clustering

For K-means analysis, survey responses (n = 173) were filtered according to residential hot water fuel type. For residential gas services, hot water is a base-load demand and the most preferred by gas network companies, with central heating and cooking seen as an upselling opportunity. Clustering by hot water fuel type assists in informing the understanding of specific market segments and possible incentives to dislodge those customers from their existing fuel choices. Initialising the initial centroid and resulting centroids for each (k) were determined using the K-means ++ algorithm to improve initial seedings. The algorithm starts by picking the initial centroid at random from all data points in the sample. Each data point closest to the centroid is assigned to that cluster. The next centroid is selected by choosing the maximum value from the calculation of the minimum squared distance between each data point and already defined centroids, and again each data point closest to the newly defined centroid is assigned to that cluster. The process was repeated until the centroids did not change and the resulting intra-cluster variation minimised. The Euclidian distance was used as the proximity distance measure with the quality of the clustering measured by the sum of squared

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

error. To determine the optimal number of clusters the elbow method was utilised [17]. The elbow method examined the total sum of squared errors across cluster selections to determine the point where adding additional clusters resulted in minimal improvement to the within-cluster sum of squares. The approach is very similar to the inflection point used for selection in the PCA. The K-means ++ algorithm was run nine times for (k) runs of two through ten clusters with each run performed for ten iterations, and for each (k), the within-cluster sum of squares was plotted on a default Excel line chart producing a Scree Plot. The resulting location of the bend (elbow) on the line chart was considered to be the appropriate indicator of the number of clusters and was therefore selected.

For each primary residential hot water fuel type, (Electricity and LPG) analysis suggested five distinct clusters using the elbow method. Also, clustering on responses which indicated a natural gas connection was already present was analysed, offering the chance for a retrospective look back to determine any negative aspects of connecting to gas post completion; this approach also suggested five distinct clusters.

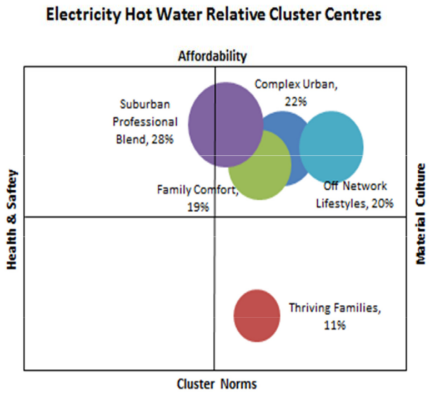


Figure 6. Relative electricity cluster centres

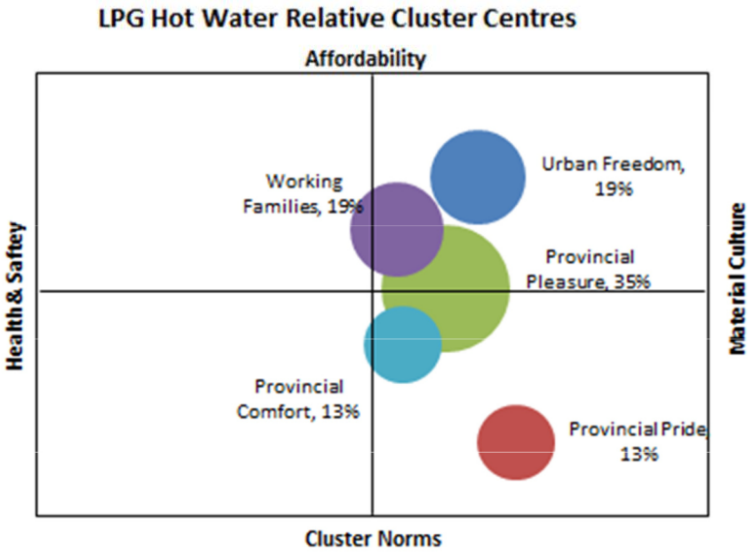


Figure 7. Relative LPG cluster centres

LPG clusters were analysed using the same approach as electricity and consisted of (n=31) respondents from the overall sample. Again, five distinct clusters were identified with four of these in rural centres [figure 7]. Of the five groupings The Urban Freedom, Provincial Pride, Provincial Pleasure, Working Families, and Provincial Comfort, only one showed an interest in connecting to gas, the Provincial Pleasure; the other four were disinterested but indicated high appliance propensity failing to translate that through to overall interest in connecting to gas. The Provincial Pleasure were typically middle-aged couples with dependents, above average income and resided in the Hawke's Bay region. They have neutral views on the complexity and ease of gas installation and were unsure on the overall market perception of gas, despite no access to the gas main they remained interested with a propensity for all three appliance types (continuous hot water, central heating, cooking). Working Families also shared a high tendency for

interest in all three appliances and access to the gas main. However, they lacked the enthusiasm to connect. Typically, from the Manawatu region, this group tended to be middle-aged couples or single parents with dependents and were one of only two clusters to identify their dwelling as a flat rather than a standalone house. They see the process of installing gas as complicated and confusing yet perceive value in gas over time. With lower than average national income and near new appliances likely driven by special pricing deals with no upfront cost's life stage might play a more prominent role than physical barriers for this cluster.

The only urban group (Urban Freedom) within the LPG clusters were typically middle-aged adult couples with no dependents from Wellington. Well, they perceive value over time in gas they see the installation process as confusing and complicated and were unsure of the market perception of gas as a fuel choice. Despite their confusion, they possessed a high propensity for gas appliances but lacked the intention to follow through with a connection due to a lack of access. Provincial Pride and Provincial Comfort reside in the Hawke's Bay and Manawatu regions, respectively. They share similar demographics, share neutral views on the installation process, possess high appliance propensity, and both are disinterested in connecting. However, they diverge at this point with the Provincial Pride cluster more confident in their perceptions of the gas market, they see value for money relative to electricity and understand the market pricing mechanisms, they know how to source information on using and installing gas, but have no access to the gas main. Whereas the Provincial Comfort are far less sure of gas regarding value, pricing and running costs, they have access to the gas main but are uninterested in finding out anything more about it as it is too confusing.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

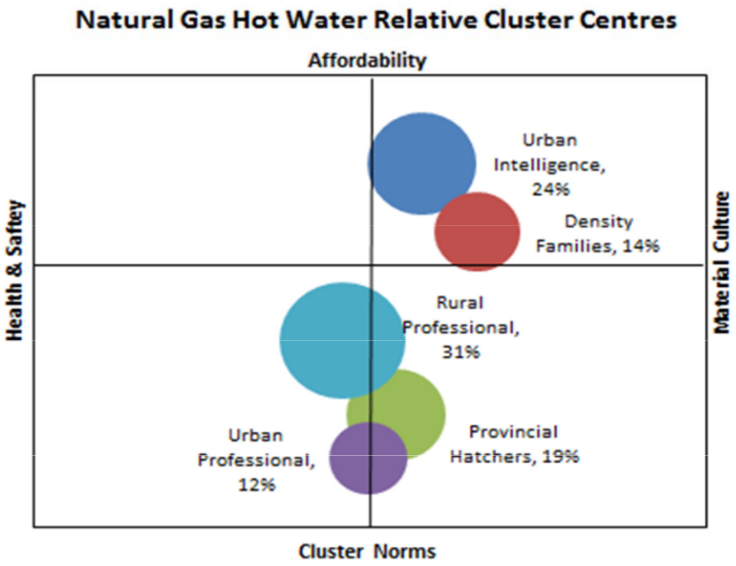


Figure 8. Relative Natural Gas cluster centres

Gas clusters also used the same analytical approach as the previous two fuel types and using the elbow method also identified five distinct clusters [figure 8] within a sample of (n=42).

The clusters Urban Intelligence, Density Families, Provincial Hatchers, Urban Professional, and Rural Professional were spread out across the distribution network footprint. They all shared positive attitudes, propensities, market perceptions and beliefs regarding gas. Surprisingly, two of the clusters Urban Intelligence and Urban Professional showed a disinterest in gas. Both clusters were empty nesters, in that their dependents were fully-grown and likely to have left the primary dwelling. With fewer people in the household the variable benefits of running gas, particularly hot water would have diminished, and with two daily fixed line charges, these clusters were likely looking to streamline costs and consider alternative fuels in the future, as they start downsizing. Like the LPG

Working Families cluster, life stage may become a barrier to some existing gas customers.

4.3 Summated Scales and Material Culture Barriers for Fuel Type Clusters

Groups of items from the fuel clusters were taken that made up one of the components. The average score for each item in the group from each fuel type cluster was then compared to the average of the principal component. The difference between the two averages was then calculated with the most substantial variances indicating which principal component has the most significant influence on that cluster.

	Most Common Barriers Amoung All Clusters			
Barrier	Electricity	LPG	Natural Gas	Original PCA
1	Installation Complexity	Installation Complexity	Appliance Pricing	Appliance Propensity
2	Appliance Pricing	Installation Complexity	Installation Complexity	Fuel Perception
3	Fuel Perception	Appliance Pricing	Fuel Perception	Installation Complexity
4	Appliance Propensity	Fuel Perception	Health and Safety	Access Availability
5	Access Availability	Appliance Propensity	Appliance Propensity	Appliance Pricing
6	Health and Safety	Health and Safety	Access Availability	Health and Safety

Table 4. Common cluster barriers

Table 4 illustrates the most significant barriers for all the fuel clusters. For electricity clusters, these are in order from top to bottom Installation Complexity, Appliance Pricing, Fuel Perception, Appliance Propensity, Access Availability, and Health and Safety.

For LPG Installation Table 4. Most common barriers Complexity takes, the top two spots followed by Appliance Pricing, Fuel Perception, Appliance Propensity, and Health and Safety filling out the remaining four spots. For respondents who already indicated the use of natural gas hot water their barriers were Appliance Pricing, Installation Complexity, Fuel Perception, Health and Safety, Appliance Propensity, and Access Availability.

Clustering by fuel type and the summation of cluster scores to PCA results brings an entirely different mixture to the strength of barriers first indicated by PCA alone. The use of summated scales between the two data analysis methods introduces a level of granularity otherwise missed by a single approach. For example, Appliance Pricing was ranked fifth by the PCA but appears in the top three barriers for all fuel type clusters, indicating market prices of appliances (including installation) play a significant external role in the uptake decision. Concerning the top three PCA results, Appliance Propensity is swapped out for Appliance Pricing, and Installation Complexity and Fuel Perception remain.

5. Discussion

This paper, through the use of quantitative methods, sought to understand the material culture barriers to natural gas uptake in New Zealand through the beliefs and attitudes of potential gas customers. The results support and shed further light on the material culture aspect of the ECF with a focus specific to gas. Key findings include the significance of gas appliance tendencies with consumers preferring a combination of continuous hot water and central heating while generally feeling these appliances lack the support of appropriate market pricing. Also, the

identification of a customer journey in consideration of gas which is shaped by external influencers and internal company barriers demonstrating the resilience of existing gas users in overcoming multiple cultural barriers. A heartening finding was the positive response to the market perception of gas, with a number of clusters indicating value over time, safety in its use, no major health concerns, and that they would consider gas in the future. Results of this research point to the importance of distributors to not only focus internally on their own processes but leverage external relationships to extend their influence to the broader range of external influencers for an integrated customer-centric approach over a traditional utility model.

The paper suggests that the material culture barriers directly attributable to the distributor for gas uptake are installation complexity, access and availability, and health and safety. Findings indicate that the reduction of appliance cost barriers and simplification of the installation process would significantly reduce the obstacle to uptake. Appliance pricing links to appliance propensity with consumers interested in several gas appliances, although once they discover the full price of appliances plus installation interest rapidly drops, results demonstrate consumers expect $2,000 to $2,500 for continuous hot water. From an industry perspective, this is difficult to achieve as the installation component is around $1,800 covering labour, pipes, electrical wiring, and code of compliance. The hot water units then range from $1,000 to $1,200 plus, producing a market rate of around $3,000 or more for straightforward connections. This suggests one of two things; either market price must drop to meet expectations or transparency and education on pricing increases to raise these expectations. The same applies to central heating

systems with respondents implying $4,000 to $8,000 as an optimal price range. While there are heating systems plus installation available in this range, they often tend to be inefficient resulting in increased running costs. The complexity of installation is a result of a fragmented connection supply chain involving five different business entities, the distributor, energy retailer, civil works crews, gas fitters, and electricians. While there is some simplification with distributors sub-contracting civil works and gas fitters, sub-contracting electricians the emphasis is still on consumers to manage alignment of all these parties to deliver the final connection effectively acting as a project manager. Consumers want convenience, perhaps by vertically integrating the supply chain the installation complexity barrier can be overcome.

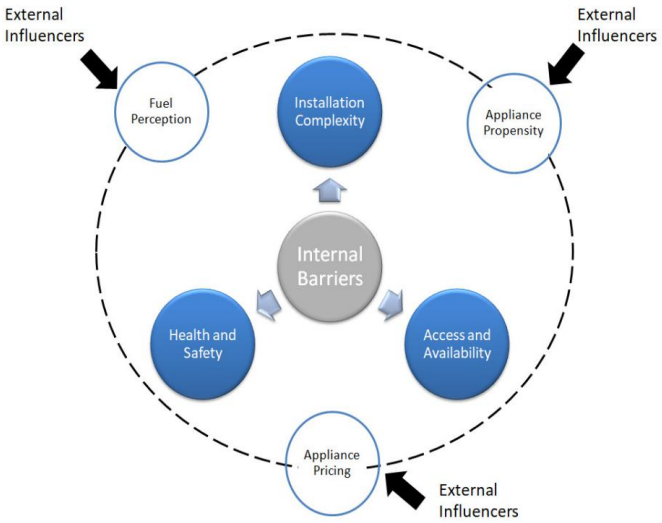


Figure 9. Energy Cultures Extension – Gas Material Culture

Figure 9 depicts a conceptual extension of Gas Material Culture resulting from the present study. Like the symbiotic relationships in [25] the gas material culture framework exhibits a reciprocal relationship between external influencers and internal barriers. A change in one external influence barrier impacts on another

leading consumers inwards towards the internal barriers, for example, a shift in appliance pricing alters the fuel perception resulting in a movement in appliance propensity. The decision to invest in gas becomes stronger shifting inwards towards internal company barriers, and if consumer expectations are met, a successful connection is likely. Shifts in internal barriers must be driven by policy and process changes from the distributor.

6. Conclusion

The conclusions from the present research are that barriers preventing uptake of gas in New Zealand take many forms including house characteristics, life stage, social perceptions, income, topography, access, availability, and the installation process. The top three barriers identified across the fuel sub-clusters were appliance pricing, fuel perception and installation complexity. Price elasticity responses indicate a disparity in market pricing signalling a lack of appropriately priced appliances and information on installation and use of gas affects the perception of gas use in the home. Most consumers were left feeling confused about the installation process because of a fragmented supply chain.

Material culture barriers extend beyond just the distributor requiring a coordinated, collaborative effort for prevention, removal, and ongoing management. The results of this research demonstrate a complicated reciprocal relationship between external influencing barriers outside the direct control of a gas distributor and internal barriers within the distributor's control. Even if the distributor were to make a concentrated solo effort to remove all internal barriers, it would not overcome barriers originating outside of the distributor's sphere of control. Consequently, the

resolution extends beyond a concentrated solo effort to a leveraging of relationships between the distributor, service providers, and energy retailers. Ideally, distribution companies must provide support beyond just the physical assets and create an ecosystem of supporting information and influencing networks to facilitate the decision making of potential consumers towards gas. Idyllically, whomever a potential customer first engages with (gas fitter, appliance sellers, energy retailers, the distributor) the originating point of engagement should be able to facilitate gas connections by leveraging such relationships within an open and engaging network.

Ultimately, until gas distribution companies cease viewing themselves as regulated monopolies under a regulated utility business model, consumers will continue to encounter the barriers identified in this research. A shift in strategic positioning towards a customer-centric service model placing the distributor closer to the customer will do more to create opportunities for the removal of existing barriers while still achieving business orientated results in a regulated environment. Such a drastic change in operational strategy should be conducted in incremental phases as not to devalue core business activities in the pursuit of customer centricity.

References

[1] Barton, B., Blackwell, S., Carrington, G., Ford, R., Lawson, R., Stephenson, J., . . . Williams, J. (2013). Energy cultures: implication for policymakers: Centre for Sustainability, University of Otago.
[2] Coates, S. (2017). New Technologies + old tariffs = Problem! Paper presented at the Downstream Energy Conference, Auckland, New Zealand.
[3] Creswell, J. W. (2014). Research design : qualitative, quantitative, and mixed methods approaches: Thousand Oaks : SAGE Publications, c2014.
[4] Denzin, N. K., & Lincoln, Y. S. (2011). The Sage handbook of qualitative research. Thousand Oaks, CA: Sage Publications.
[5] Ferguson, G. A. (1960). Statistical analysis in psychology and education. Educational & Psychological Measurement, 20(4), 863-869.
[6] Gas Industry Company. (2016). The New Zealand Gas Story. Retrieved from The Gas Industry Company, Wellington, New Zealand: http://gasindustry.co.nz/dmsdocument/5344
[7] Glen, P. (2011). Stage 2 Quantitative Survey. Powerco Market Research. Market Research. Peter Glen Research. Unpublished.
[8] Glen, P. (2013). Powerco Pricing Research. Powerco Market Research. Market Research. Peter Glen Research. Unpublished.
[9] Glen, P. (2017). Gas Hub Market Research - Disconnections. Powerco Market Research. Market Research. Peter Glen Research. Unpublished.
[10] Grant, C., & Osanloo, A. (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house". Administrative Issues Journal, 4(2), 4.
[11] Grapentine, T. (1995). Dimensions of an attribute. Marketing Research, 7(3), 18-27
[12] Gyamfi, S., Krumdieck, S., & Urmee, T. (2013). Residential peak electricity demand response—Highlights of some behavioural issues. Renewable and Sustainable Energy Reviews, 25, 71-77. doi:https://doi.org/10.1016/j.rser.2013.04.006
[13] Hledik, R. (2014). Rediscovering Residential Demand Charges. The Electricity Journal, 27(7), 82-96. doi:https://doi.org/10.1016/j.tej.2014.07.003
[14] IEHIAS. (n.d.). Principal components analysis | Integrated Environmental Health Impact Assessment System. Retrieved from http://www.integrated-assessment.eu/eu/guidebook/principal_components_analysis.html
[15] Ismail, A., Mohamed, H. A.-B., Sulaiman, A. Z., Mohamad, M. H., & Yusuf, M. H. (2011). An empirical study of the relationship between transformational

leadership, empowerment and organizational commitment. Business and Economics Research Journal, 2(1), 89.
[16] Javali, S. B., Gudaganavar, N. V., & Raj, S. M. (2011). Effect of varying sample size in estimation of coefficients of internal consistency.
[17] Kassambara, A. (2017). Practical Guide to Cluster Analysis in R: Unsupervised Machine Learning (Vol. 1): STHDA.
[18] Lawson, R., & Williams, J. (2012). Understanding energy cultures. Paper presented at the conference of the Australian and New Zealand Marketing Academy.
[19] Lever, J., Krzywinski, M., & Altman, N. (2017). Points of Significance: Principal component analysis. Nat Meth, 14(7), 641-642. doi:10.1038/nmeth.4346
[20] Olawale, F., & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. African Journal of Business Management, 4(5), 729.
[21] Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. Information systems research, 2(1), 1-28.
[22] Powerco Household Survey. (2008). Powerco Market Research. Market Research. Pistoll and Associates Ltd. Unpublished.
[23] Statistics How To. (n.d.). Kaiser-Meyer-Olkin (KMO) Test for Sampling Adequacy. Retrieved from http://www.statisticshowto.com/kaiser-meyer-olkin/
[24] Stephenson, J., Barton, B., Carrington, G., Gnoth, D., Lawson, R., & Thorsnes, P. (2010). Energy cultures: A framework for understanding energy behaviours. Energy Policy, 38, 6120-6129. doi:10.1016/j.enpol.2010.05.069
[25] Stephenson, J., Carrington, G., Doering, A., Ford, R., Hopkins, D., Lawson, R., . . . Rees, D. (2015). The Energy Cultures Framework: Exploring the role of norms, practices and material culture in shaping energy behaviour in New Zealand. Energy Research and Social Science, 7, 117-123. doi:10.1016/j.erss.2015.03.005
[26] Transpower. (2017). Electricity Demand | Transpower. Retrieved from https://www.transpower.co.nz/system-operator/security-supply/electricity-demand
[27] Trochim, W. (2006, 20/10/2006). Social Research Methods - Knowledge Base - Likert Scaling. Retrieved from https://www.socialresearchmethods.net/kb/scallik.php
[28] Wright, K. B. (2005). Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. Journal of Computer-Mediated Communication, 10(3), 00-00.
[29] Zaiontz, C. (2017). Performing Real Statistical Analysis Using Excel.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

‘Hedging their jets’ - does fuel hedging create advantages for airlines?

W. Simon Russell
simon@eaglevaia.com

Abstract

Airlines are marginally profitable businesses in good years and investors have long been wary of seeking returns from an industry with high capital investment in aircraft and volatile jet fuel prices. This research seeks to understand the relationship between jet fuel hedging and emerging fuel-efficient aircraft technology and whether fuel hedging remains relevant for airlines with aircraft fuel efficiency improving around 40 percent from the 1990’s. Jet fuel typically accounts for 25 percent to 50 percent of an airlines cost structure. Airline hedging positions and management policy was the first area of exploration in the literature, however analysis of data and the literature, revealed a larger trend for the industry in terms of fuel hedging through technology. The introduction of new, fuel-efficient aircraft into an airline fleet creates fuel saving advantages for an airline against competitors operating older aircraft. Little or no literature related to both fuel hedging outcomes and the entry of new aircraft technology as an embedded hedge through lower volume consumption to offset price increases. This research interest included the period from 2015 onwards when fuel prices were low for jet fuel, as compared to the earlier period of 2008 to 2013 when fuel prices reached industry highs and found no correlation between airline business models and the

decision to hedge fuel or not. This research quantifies the effect of technology hedging for airlines and ongoing fuel burn volume reductions, and this combination was not found in the literature. Further analysis could expand the sample airline population and examine data using more sophisticated modelling techniques, such as data envelopment analysis (DEA). The findings in this report validate the aircraft technology upgrades occurring at many airlines as an effective mechanism to lower volume of fuel burned, which then acts as a factor in reduced overall fuel cost.

1 Introduction

The global airline industry is typically a low profit margin industry (Berghofer & Lucey, 2014), and experiences major fluctuations in one of the largest costs items for airlines, namely aviation jet fuel. Warren Buffett is quoted as making a joke about airlines that 'the best thing a clairvoyant economist in 1903 could have done for future investors would have been to go to Kitty Hawk and shoot down Orville Wright', such was his aversion to airline stocks and returns (Derousseau, 2017). The major operating cost of jet fuel plus the volatility of prices is a challenge for airlines to maintain cost stability while competing profitably with other airlines and has driven airlines to find solutions to both volume of fuel consumption and methods to limit fluctuating prices.

This research examines three ways to reduce fuel burn and therefore reduce exposure to excessive costs and volatility. The first method examined is jet fuel hedging and the advantages and disadvantages for airlines with attention paid to different approaches and attitudes toward this method from the literature. Airlines

may also apply a second method of fuel reduction within their business model and referred to as 'operational hedging', where airlines fly shorter routes, optimise weight of onboard equipment, and employ fuel saving tactics such as engine off during taxi to a gate through ground-based tow equipment, and while this is important it is less relevant to the research. A third approach has emerged from the analysis of earlier high oil prices and the push by airlines to procure newer, more fuel-efficient aircraft for both fuel saving benefits and environmental reasons to reduce pollutants from fossil fuels. Within this third approach, new aircraft introduction provides competitive advantage for airlines making investments in modern technology, not only for environmental benefits, but also for significant operational cost advantage through reduced fuel burn per seat kilometre flown.
To manage fluctuations in volatile external jet fuel prices, airlines began entering the derivatives trading markets in the late 1980's and arranging hedges for jet fuel with other commodities such as crude oil as a cross-hedging instrument (Adams & Gerner, 2012). The financial markets are highly complex and well beyond a typical airline's ability to both manage running an airline and trading in commodities such as crude oil, causing airlines to established treasury departments dedicated to trade in oil derivatives, and hiring financial markets traders and commodities specialists (Kelly, 2014). From an article in Fortune magazine, the former company president of American Airlines, Scott Kirby, is quoted as saying, 'hedging is a rigged game that enriches Wall Street' (Mellow, 2016). Quoting in an excerpt from a book by Kate Kelly, also in Fortune magazine, she described airlines as 'comically bereft of any trading savvy', even though only one, Southwest Airlines 'had betted correctly' with mixed results (Fortune, 2014).

The presumption that airlines can exploit the financial markets through derivatives hedging and beat financial analysts by placing long hedges or short hedges to counter fluctuations in the market requires an assumption that the market is inefficient and that an airline can bet on fuel price rising by places hedges at a lower price, which also presumes that derivatives traders are less sophisticated than an airline treasury department and this is highly unlikely (Sturm, 2009, p. 133). The evidence shows that fuel hedging is a zero-sum game and examples of airlines beating the market is low.

New aircraft entry into airline fleets provides advanced, fuel-efficient technology with direct relevance to this research question for exploring the factors influencing fuel hedging and how airlines can lower their overall exposure to fuel prices. The airline industry is currently experiencing a period of low jet fuel costs with record profitability levels at many airlines. The International Air Transport Association (IATA) expects 2018 profits to reach $38.4 billion, up almost $4 billion from 2017.

Little academic research exists which examines not only jet fuel hedging, but other major variables and indicators of airline performance and whether correlations exist between the practice of fuel hedging for airline profitability and investor confidence (Treanor, Rogers, Carter, & Simkins, 2014). As more fuel-efficient aircraft enter the market and jet fuel prices stay low, what is the role of fuel hedging to manage risk, and how is it that some airlines perform strongly without the need to adopt this industry accepted practice? (Mellow, 2016).

This research evaluates how new fuel-efficient aircraft technology is beginning to influence competitiveness in the airline industry and fuel hedging. The literature also identifies that few studies exist outside of the US airline scene – especially for low-cost and full-service airlines around the world, and provides an opening for new research to be undertaken (Berghofer & Lucey, 2014).

The future of hedging and its validity for airlines is called into question in the literature, with commentary that airline purchasing is small in the oil trading markets and therefore, unable to influence prices (Morrell & Swan, 2006). This means that airlines are purchasing jet fuel at the market price level and if airlines suggest they beat the market, then they have moved into speculator territory (Morrell & Swan, 2006).

Individual airlines within low-cost and full-service airline segments have both advocates and detractors for fuel hedging, thus it appears to be a little-explored area in the literature reviewed for this research proposal (Berghofer & Lucey, 2014). Little research appears to be available on fuel hedging outside of the US ((Berghofer & Lucey, 2014; Treanor et al., 2014), and whether the sustainability of an airline business model and changes in key cost, revenue, and asset drivers can be modelled to indicate where performance failure points may occur for airlines.

The objectives of this research are to:

1. Understand the critical insights from the available literature on fuel hedging and its impact on airline financial performance.

2. Synthesise the critical insights and the findings from the current body of literature on the practices and policy for jet fuel hedging
3. Compare the data on fuel hedging performance and validate whether this has improved or reduced airline performance.
4. Identify a range of propositions that analyse the current state of fuel hedging at airlines and evaluate whether future research could benefit from further empirical study.
5. Develop a conceptual model for thinking about the practice of hedging in various forms – fuel, operational, and technology introduction – to understand where competitive advantage may exist for airlines.

Evidence as to whether fuel hedging improves performance and provides competitive position for those airlines that hedge is unclear from the literature available. At a time when the industry is experiencing low fuel prices, the case for hedging is not clear.

In an era of low global oil prices, is fuel hedging still relevant for airlines to manage volatility in fuel prices, and why are performance results so mixed amongst world-leading airlines?

2 Literature Review

Industry background

Jet fuel is the single largest cost for airlines and fluctuations can change an airline's cost competitiveness over a very short time. Recovering additional cost of fuel through price increases is difficult from a competitive perspective if

competitors do not respond with price increases on the same routes and flights (Koopmans & Lieshout, 2016). Monthly fluctuations in fuel make budgeting difficult and many airlines, but not all, have employed fuel hedging using financial derivatives to minimise fuel price volatility by purchasing forward contracts and swaps in the financial markets.

Literature evaluation matrix

A literature evaluation matrix was used as a roadmap for the review and classification of literature review across categories affecting fuel hedging decision-making and airline performance.

The literature was evaluated against 14 categories relevant to the research and covered: historic analysis, financial derivatives, future hedging/speculation, foreign currency impact, cost structure impact, industry trends airline management practices, fuel hedging policy, fuel price, financial performance, global perspective, fleet diversity (number of aircraft types), new aircraft technology, and fuel efficiency.

This methodology assesses historic focus, current management practices of airlines for fuel hedging through oil derivatives, impact on financial performance, and whether the literature addresses changes in core aircraft technology and fuel efficiency which the airline industry has invested in through new aircraft procurement. Over forty journal articles and media reports were reviewed from the literature review covering a thirty-five year period from the introduction of fuel hedging in the late 1980's through to the current period. Each article was mapped

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

to analyse relevance and gaps for the research.Figure 1- Literature Evaluation Matrix with categories for gap analysis

				Caterories													
Author	Year	Title	Journal/ Book/ Article/ Magazine	Historic analysis	Financial derivatives	Future Hedging/ speculation	Foreign Currency impact	Cost structure impact	Industry trends	Airline Management practices	Fuel Hedging policy	Fuel Price	Financial Reformance	Global perspective	Fleet Diversity (no. types)	New aircraft technology	Fuel Efficiency
Koopmans, C., & Lieshout, R.	2016	Airline cost changes: To what extent are they passed through to the passenger?	Journal of Air Transport Management					Yes		Yes		Yes	Yes	Yes			
Zou,B., Kwan,I., Rutherford,D., Kafle,N.	2016	Airline Fuel Efficiency: Assessment Methodologies and Applications in the U.S. Domestic Airline Industry	Emerald Group Publishing Limited	Yes				Yes	Yes	Yes	Yes					Yes	Yes
Korkeamäki, T., Liljeblom, E., & Pfister, M.	2016	Airline fuel hedging and management ownership	Journal of Risk Finance			Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Morrell, P., & Swan, W.	2006	Airline Jet Fuel Hedging: Theory and Practice	Transport Reviews	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			
AirlineBusiness.	2016	Big divide in fuel hedging appetite	Airline Business		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Jasper, C., Johnsson, J., & Katz, B.	2017	Big Jets Get Squeezed	Bloomberg Businessweek						Yes			Yes		Yes	Yes	Yes	Yes
Standard, E.	2009	Cathay Pacific has its wings clipped by fuel hedging	Evening Standard	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Allen, M.	2016	Cathay Pacific: Low fuel price hasn't helped us like other airlines	Airfinance Journal	Yes		Yes		Yes	Yes		Yes		Yes	Yes			
Dutton, J.	2016	CFO interview: Flybe aims for long-term profitability	Airfinance Journal			Yes	Yes			Yes	Yes	Yes	Yes	Yes			
Balcilar, M.,Gupta,R., Wohar,M.E.	2016	Common Cycles and Common Trends in the Stock and Oil Markets: Evidence from More Than 150years of Data	Energy Economics	Yes					Yes			Yes		Yes			
Adams, Z., & Gerner, M.	2012	Cross hedging jet-fuel price exposure	Energy Economics	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes				
Ed Hirs	2016	Delta CEO Admits To $4 Billion Lost In Hedging Fuel Costs	Forbes	Yes		Yes				Yes	Yes		Yes				
David, A. C., Daniel, A. R., & Betty, J. S.	2006	Does Hedging Affect Firm Value? Evidence from the US Airline Industry	Financial Management	Yes			Yes	Yes	Yes		Yes	Yes					
Simmons, G.	2015	Does hedging reduce risk? Analysis of large domestic airlines	Journal of Business Strategies	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Treanor, S. D., Rogers, D. A., Carter, D. A., & Simkins, B. J.	2014	Exposure, hedging, and value: New evidence from the U.S. airline industry	International Review of Financial Analysis	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Jin, Y. B., & Jorion, P.	2006	Firm value and hedging: Evidence from US oil and gas producers	Journal of Finance	Yes	Yes	Yes	Yes		Yes				Yes				
Berghofer, B., & Lucey, B.	2014	Fuel Hedging, Operational Hedging and Risk Exposure–Evidence from the Global Airline Industry	International Review of Financial Analysis	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Lim, S. H., & Hong, Y.	2014	Fuel hedging and airline operating costs	Journal of Air Transport Management	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Tumec, P. A., & Lim, S. H.	2015	Hedging jet fuel price risk: The case of U.S. passenger airlines	Journal of Air Transport Management	Yes	Yes			Yes		Yes	Yes						
Naumann, M., & Suhl, L.	2013	How does fuel price uncertainty affect strategic airline planning? Operational Research	Operational Research	Yes	Yes	Yes				Yes			Yes				
Kretjanpolar, W. D., & Concha, D.	2016	Impact of fuel price fluctuations on airline stock returns	Applied Energy	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Chin Yen Alice, L., & Jones, K. J.	2016	Integrated Risk Management on Fuel Hedging Program: A Case Study on Southwest and China Eastern Airlines	Academy of Business Research Journal	Yes	Yes	Yes		Yes		Yes	Yes		Yes				
Simons, H. L.	2016	Jet Fuel Arbitrage	Modern Trader		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Gaudenzi, B., & Bucciol, A.	2016	Jet fuel price variations and market value: a focus on low-cost and regular airline companies	Journal of Business Economics & Management		Yes					Yes	Yes	Yes	Yes				
Morkert, R., & Swidan, H.	2016	Making Fuel Hedging a Meaningful Strategy - The Case of Airlines	Academy of Management Annual Meeting Proceedings	Yes	Yes	Yes		Yes		Yes	Yes		Yes				
Mellow, C.	2016	Never Use A Hedge To Bet On Markets	Global Finance	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Sibdari, S., Mohammadian, I., & Pyke, D. F.	2018	On the impact of jet fuel cost on airlines' capacity choice: Evidence from the U.S. domestic markets	Transportation Research					Yes	Yes	Yes							
Karp, A.	2015	Playing the Hedging Game	Air Transport World		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes				
Park, K.	2017	Singapore Air Extends Jet Fuel Hedging as OPEC Cuts Sway Oil	Bloomberg News		Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes			
Benzakein, M.J.	2014	What does the future bring? A look at technologies for commercial aircraft in the years 2035–2050	Propulsion and Power Research					Yes	Yes					Yes		Yes	Yes
Sturm, Ray.R.	2009	Can Selective Hedging Add Value to Airlines? The Case of Crude Oil Futures	International Review of Applied Financial Issues & Economics	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes				
Hedi Arouri, M. E., & Khuong Nguyen, D.	2010	Oil prices, stock markets and portfolio investment: Evidence from sector analysis in Europe over the last decade	Energy Policy	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes			

Little or no research examined major changes in aviation for fuel efficiency and new aircraft technology as significant factors impacting the volumes of fuel consumed to carry passengers, as well as resultant effects on the environment. A gap exists in the literature for the most recent period of price volatility and hedging disparity amongst airlines and this is the research area of interest from 2015 onwards when fuel prices were low for jet fuel, as compared to the period 2008-2013 when fuel price reached industry highs. The outcomes from airlines selecting hedging positions and airline management behaviours and policy were explored, together with the arrival of new aircraft technology at selected airlines, and the combination had direct relevance to the research question on the factors that influence fuel hedging.

Many airlines are unconvinced that fuel hedging is a sector they should be involved in, with American Airlines CFO Derrick Kerr quoted as saying 'somehow you've got to convince yourself you know better than the oil market experts' (Karp, 2015, p. 14).

The risk of hedging or not does not depend on whether other airlines follow suit, however the airline hedging environment must create winners and losers in a competitive environment and depend upon the success of the hedge outcomes (Simmons, 2015). This null hypothesis does not change the market reality that airlines all have equal jet fuel costs after hedge results are taken in account (Simmons, 2015).

Fuel hedging through financial market derivatives was not found to decrease risk exposure in a study from 2014 which claimed to be one of the first to consider airlines outside of the United States (Berghofer & Lucey, 2014). Airline jet fuel is not traded on the New York Mercantile Exchange (NYMEX) and therefore must be traded through futures contract with similar commodities such as heating oil or crude oil.

The oil and fuel derivatives market functions as a zero-sum-game, where betting on oil market prices is expected to return zero with winners and losers evenly balanced. Airlines that think otherwise that hedging delivers gains in a sophisticated trading market have deluded themselves and are now speculators on oil price up and downs (Morrell & Swan, 2006). Reducing risk is the purpose of hedging, either to fix the input price through a forward pricing or swap contract, or constructing a collar around an upper and lower jet fuel price with a price exercise point to manage a range, described as calls and puts (Simmons, 2015).

Delta airlines lost US$ 4 billion on fuel hedging costs over eight years to 2016, with new CEO Ed Bastian commenting on whether the airline would lock in fuel prices through hedging, ‘I don’t get paid to make those kind of bets’(Hirs, 2016). Cathay Pacific acknowledged in 2016 that its fuel hedge programme has not helped the airline as others benefitted from low oil prices (Allen, 2016). In an earlier episode in 2009, Cathay Pacific bought fuel hedging contracts when the market price for fuel peaked prior to a major fall in jet fuel prices over subsequent months, and lost HK$7.6 billion from the plunge (EveningStandard, 2009).

2.1 Operational hedging and fleet diversity, oil price market

Operational hedging is managing fuel price fluctuations through increases or reductions in aircraft capacity and aircraft size deployed on specific routes by time of day or day of week (Ryanair, 2017). In 2016, Emirates achieved a one percent reduction in fuel through 'consumption reduction initiatives' through flexible flight routings and the use of new, performance-based-air navigation procedures (Emirates, 2016, p. 33).

During periods of increased passenger demand, airlines may supplement services by operating additional flight frequencies and therefore higher overall fuel burn for a route, as compared to lower frequencies but with larger aircraft to accommodate demand (Sibdari et al., 2018). These variables were tested using Sobol's model to test input variability versus output variables which the authors believed were 'fascinating and quite important' (Sibdari et al., 2018). The research showed that aircraft size and frequency of flights moved in an opposite direction in the regression analysis using Sobol's method, as compared with passenger demand and fuel price. Indices developed using the Sobol ANOVA-based method and examined variability of external (exogenous) factors on fluctuations in capacity decision making and could prove useful for future research on this topic using these techniques (Sibdari et al., 2018).

Larger aircraft to minimise fuel consumption per passenger was considered, but the research acknowledged that only was feasible if sufficient passenger demand existed (Naumann & Suhl, 2013).

2.2 Aircraft technology and ownership

When fuel prices are low however, it makes operating older, less fuel-efficient cheaper for U.S. airlines as a result of lower cost of capital than purchasing new aircraft (Ferguson, 2018). Aircraft replacement with newer, more fuel-efficient models is acknowledged as a permanent method of reducing fuel demand and therefore reducing the effects of fluctuating fuel prices (Morrell & Swan, 2006). Singapore Airlines uses a mix of deliberate fuel hedging policy in conjunction with ongoing aircraft technology introduction, operating a modern jet aircraft fleet (SingaporeAirlines, 2017).

Analysis of airline annual reports for the period 2012 to 2017 identified fuel efficiency gains from introduction of new aircraft. In 2017, Ryanair, Europe's largest airline by passenger traffic in 2017, has invested billions of euros in new aircraft introduction to its fleet thereby reducing fuel consumption by 45 percent on previous models, according to the airline's annual report. (Ryanair, 2017).
The literature review highlighted mixed views on the effectiveness of fuel hedging, a lack of certainty in outcomes result from hedging, different attitudes, and airline management policy about hedging, and emergent trends in fuel efficiency. A discovery was the lack of research focus on the considerable advancements in aircraft technology over the last forty years, and how technological advances in airframe design and new engine technology have contributed to major fuel efficiency gains for airlines.

2.3 Hypothesis

An effect of investment in new aircraft provides sustainable competitive advantage whether fuel prices are high or low so that an airline with new aircraft technology is better able to withstand fluctuations in price on its costs base due to lower fuel consumption. Airlines that leverage fuel efficiency of new aircraft create a sustainable competitive advantage over those airlines with older aircraft fleets that practice speculative hedging with oil derivatives and uncertain short-term gains or losses from fuel pricing.

3 Data and Methodology

This research follows a positivist and deductive reasoning approach with an assertion that jet fuel hedging research in the literature has been historical and focused on the US domestic airline industry. Limited research exists on new aircraft technology introduction for reduced fuel burn.

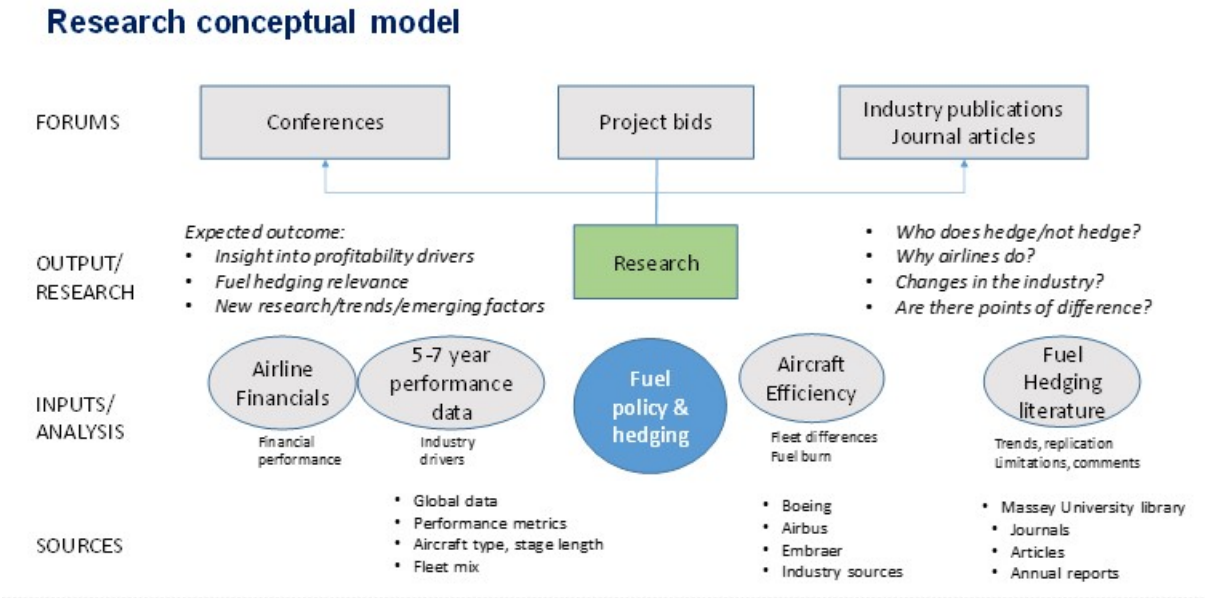
Abductive reasoning was applied to logically infer where advantage could be gained by airlines with fuel hedging and reduced fuel consumption, and to provide the simplest and most obvious explanation of future success criteria.

A positivist approach was taken which relies specifically on data and evidence that are subject to empirical scrutiny and validation. Data on airline financial and operating performance is readily available from public sources such as annual reports, financial markets information from websites, and proprietary data services such as Bloomberg and this research tested the impact of fuel on cost volume in three key areas:

- Fuel hedging policy and price changes
- Operational fuel hedging
- Aircraft Technology impact on fuel

The interaction between these areas was examined in the literature and a model guided how the data and literature sources combined to form inputs for analysis and development of findings. Outputs of this research have direct application in forums such as: airline industry conferences, consulting projects bids with airlines, and relevance for journal and article contributions.

Figure 2 - Conceptual model for fuel hedging literature and airline data synthesis



Microsoft Excel and Tableau software were used to analyze the available financial and operational data from the annual reports and Bloomberg data extracts.

3.1 Limitations of the Methodology

The abundance of data for airlines in annual reports, proprietary data sources such as Bloomberg and other airline proprietary subscription data sources such as the Official Airline Guide (OAG) is immense and readily available for further research. Other sources of data for this research included articles and data analyses from the International Air Transport Association (IATA), the International Civil Aviation Organisation (ICAO), and the International Council on Clean Transportation(ICCT) for information on aircraft fuel efficiency and CO2 emissions relating to the introduction of advanced aircraft technology.

Future research will require greater sophistication of modelling and analysis techniques, such as data envelopment analysis (DEA) to provide a deeper and richer exploration of available data.\

4 Findings and analyses

Introduction

Jet fuel costs represents a significant percentage of a typical airline's operating cost structure and sudden price changes in oil can negatively affect profitability (Morrell & Swan, 2006). The two airline categories evaluated in this research are full-service airlines (FSA) and low-cost airlines (LCC), and jet fuel costs account for between 25 percent and 50 percent of operating costs (Koopmans & Lieshout, 2016). All airlines seek ways to mitigate the cost and volume of jet fuel consumed to remain competitive, and emerging engine technologies and improvements in modern aircraft design have an impact of fuel consumption and fuel burn efficiency.

The analysis examines the following categories to explore trends and changes in the industry over a ten-year period. Categories include:

- Average sector length
- Aircraft fuel efficiency
- Fleet sizes and age
- Fuel Hedging Policy
- Gains and losses through hedging
- Modern technology impact on fuel efficiency
- Fuel price sensitivity
- Geopolitical changes impacting oil production and price

4.1.1 Average sector length

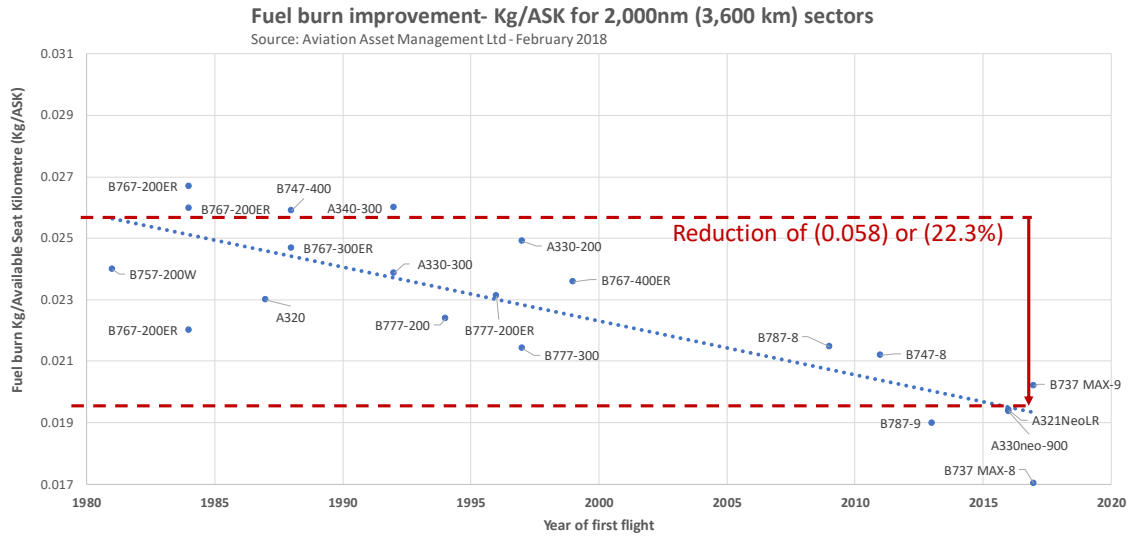
Aircraft fuel consumption was evaluated based on average sector length as aircraft burn fuel more efficiently at altitude after take-off, therefore shorter sectors consume more fuel per kilometre of distance than longhaul flight, and this factor was explored in the research.

4.1.2 Aircraft fuel efficiency

From the analysis and the literature, a younger aircraft fleet includes more technologically advanced aircraft which have lower fuel burn performance compared to older aircraft and provide competitive advantage to airlines such as Norwegian (Norwegian, 2017, p. 5). Analysis of aircraft types and fuel burn from 1980 to 2018 shown in the following chart indicates a 22.3 percent reduction per Kg/ASK in fuel burn for short-haul to medium-haul sector lengths of 2,000

nautical miles (nm) or 3,600 kilometres (km) across all aircraft types. The measure shows that lowered fuel burn per ASK was achieved as new aircraft technology has been introduced over the past 35 years.

Figure 1- Aircraft Fuel burn improvement 1980-2018
Source: Wikipedia and Aviation Asset Management Ltd



An analysis of estimated fuel burn for long-haul sectors of 6,000 nm (11,100 km) shows a fuel burn reduction of 23.5 percent less Kg/ASK on the trend line from 1980 to 2016.

Fuel Hedging Policy

The analysis showed a marked polarity across a diverse group of airlines hedge fuel as compared with those who do not hedge, and the differences are not limited to full-service airlines and low-cost carriers as airline groupings. The following table shows a selection of airlines and their hedging policy and behaviours for 2018.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Fuel hedging in place for 2018	None or minimal Fuel Hedging in 2018[1]
Singapore Airlines (FSA) – 33-39 percent Ryanair (LCC) – 90 percent Easyjet (LCC) 90 percent Flybe UK (LCC) 60 – 90 percent Lufthansa (FSA) 64 – 79 percent	American (FSA) – zero percent Delta (FSA) – zero percent United (FSA) – zero percent Emirates (FSA) – zero percent) Norwegian (LCC) - 25 percent

Source: Reuters, Bloomberg, and Company annual reports- https://www.reuters.com/article/us-aviation-finance-airlines/major-carriers-say-no-plans-to-hedge-fuel-despite-rising-prices-idUSKBN1FB29H

Modern technology impact on fuel efficiency

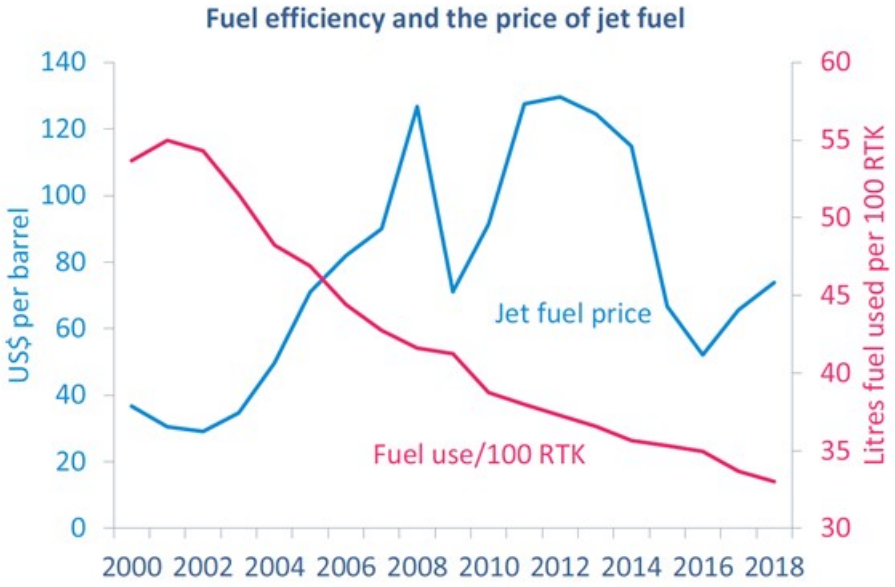
Hawaiian airlines and Boeing announced in March 2018 that the Boeing 787-9 Dreamliner aircraft ordered by the airline, 'can carry about 290 passengers on flights of about 7,635 nautical miles (14,140 km), while using 20 percent less fuel

1

and emitting 20 percent fewer emissions than the airplanes it replaces'(M2Communications, 2018).

IATA have charted fuel reductions in litres used per 100 Revenue Tonne Kilometres (RTK) from 2000 to 2018 showing litres to carry revenue load of passenger and cargo have decreased from around 55 per 100 (RTKs) to 33 per 100 RTKs (see chart below)

Figure 4- Fuel prices in US$ per barrel and litres used per 100 ATKs from 2000-2018
Source: IATA; https://www.iata.org/publications/economics/Reports/Industry-Econ-Performance/IATA-Economic-Performance-of-the-Industry-end-year-2017-report.pdf



Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Operating cost exposure of airlines to fuel prices

An analysis of the average percentage for fuel cost as a percentage of total operating cost highlights the greater impact of fuel price changes at low-cost carriers as compared to full service airlines from the sample data for 2007 to 2016.

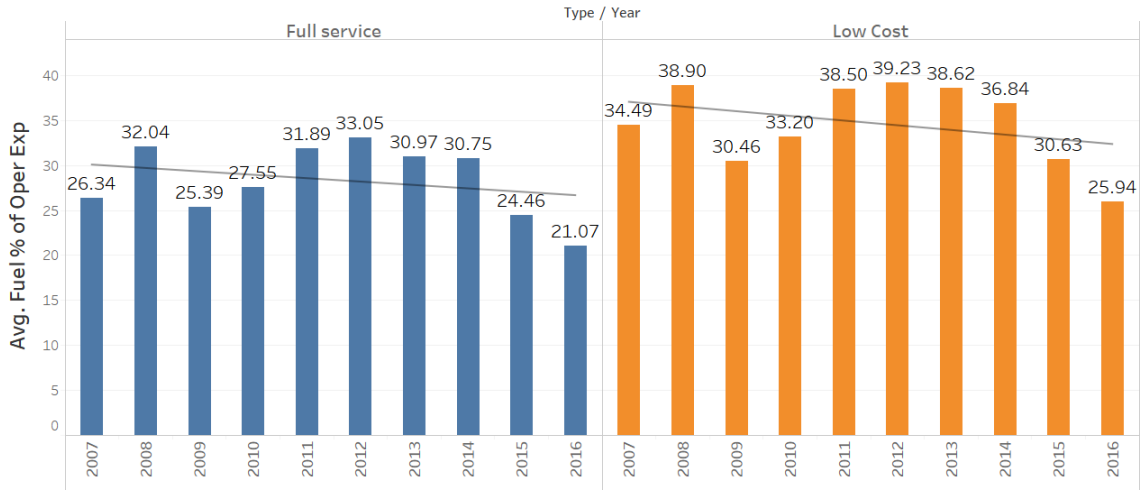


Figure 5- Average fuel cost as a percentage of operating cost - Full Service Airlines vs Low-Cost Carriers 2007-2016 Source: Bloomberg data

Low Cost carriers are more exposed to fuel as a percentage of all costs than Full Service airlines.

Norwegian Air has progressively and strategically upgraded its aircraft fleet to the newest generation Boeing 787-9 and 737-800 aircraft reporting significant fuel reductions on earlier generation aircraft that 'will continue to take advantage of its increasing competitive power realized through continuous cost efficiency' (Norwegian, 2017, p. 8).

Operational hedging

Airlines continuously seek to reduce aircraft fuel burn through an approach described as operational hedging which includes flying shorter routes using the latest navigation technology, reducing weight of onboard equipment, and employing fuel saving tactics such as engine off during taxi to a gate through ground-based tow equipment. Another aspect of operational hedging is fleet diversity to match better-suited aircraft sizes to routes to limit frequency of smaller and thereby reduce fuel consumed (Berghofer & Lucey, 2014).

Emirates attribute a one percent reduction in fuel consumption in fiscal year 2016 to implementation of performance-based navigation procedures and flexible flight routes, even though the airline increased overall kilometres flown and sector distance length increased on new routes (Emirates, 2016).

New aircraft orders

According to Boeing Commercial Airplanes, the world demand for aircraft between 2017 and 2030 is forecast will be 41,030 new aircraft worth almost US$6.1 trillion dollars (Boeing, 2017). Fuel efficient technology from engines and airframes delivers sustainable reductions in fuel consumption.

Fuel hedging has enabled volatility of jet fuel prices to be managed with mixed success for many airlines over a tumultuous period of oil price fluctuations. However, the effect of fuel efficient aircraft technology exceeds the gains (or losses) of fuel hedging on the world financial markets for airlines making this investment. This has implications for airlines and indicates a source of sustainable competitive advantage could exist through new aircraft technology

New aircraft technology reduces fuel burn as an airline retires older aircraft and introduces newer more fuel-efficient models. This is a structural cost and efficiency change for fuel consumption. Therefore, on a per kilogram of fuel per ASK (Kg/ASK) basis, it indicates a greater strategic advantage for hedging through technology to decrease fuel cost and consumption.

A technologically advanced aircraft fleet has an embedded advantage of twenty to forty percent less fuel consumption on the same flight sector as a competitor with older aircraft.

5 Recommendations

The literature however does not consider the larger fuel reductions from aircraft technology upgrades as a mechanism for structural hedging in conjunction with financial fuel hedging to provide ongoing competitive advantage.

Airline policy would need to consider fleet age as well as fuel hedging when considering competitiveness of an airline versus competitors and their fleet age and aircraft technology, as well as whether competitors are hedged or not.

New aircraft technology offers a much greater advantage for airlines than has been researched to date in terms of profitability, cost competitiveness, and fuel reductions from efficiency.

Further study using quantitative analysis techniques and data modelling could identify additional trends and more thoroughly sample a larger set of airlines with a focus on aircraft age in fleets plus aircraft order data.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

6 Conclusion

The research has found that fuel consumption and cost management is able to be structured around three themes of:

- Fuel hedging - Jet fuel hedging using oil derivatives on the financial markets – COST/PRICE
- Operational hedging - by airlines to minimise fuel burn – i.e. 1%-3% savings - VOLUME
- Technology hedging – introduction of new aircraft technology with fuel efficient aircraft -up to 40% fuel saving on older aircraft, and forecasts that aircraft will be a further +20% fuel efficient over the following decades – VOLUME and COST

Figure 6- Fuel volume /price sensitivity across three areas of analysis for the research

Area of Analysis	Fuel price (cost)			Fuel volume (consumption)		
Impact ➔	High	Low	Impact/Attributes	High	Low	Impact/Attributes
Jet Fuel hedging	✓	✗	• Fluctuating • Temporary (6-24 months) • Speculative	✗	✗	No change in fuel burn volume
Operational Hedging	✓	✓	• Ongoing • Incremental • Essential	✓	✓	Small improvement in fuel burn 1% - 3%
Technology introduction	✓✓	✓✓	• Capital intensive • Structural cost efficiency • Step change in fuel burn	✓✓	✓✓	Quantum change in fuel burn - up to 20% - 40% on replacement aircraft type

Summarising the analysis and findings in the table above shows the three main findings from the research as; jet fuel hedging, operational hedging, and technology introduction.

The introduction of new aircraft technology has a significant effect during high and low fuel prices as less fuel is consumed overall. There was no literature linking fuel cost mitigation with technology hedging and the effect of reduced fuel consumption on airline's financial performance.

The introduction of new aircraft technology and a structural hedging effect is a key finding from the analysis. New aircraft technology providing competitive fuel advantage in conjunction with hedging has not been covered in the literature to-date.

In conclusion, this research finds the primary research question of whether fuel hedging can create advantage for airlines is valid when a combination of technology introduction and fuel hedging policy can be applied during periods of low oil prices. In terms of the research question on whether price of jet fuel and fluctuations in price affect an airline's cost structure, then this research answers the secondary question that new aircraft technology can create ongoing structural cost competitiveness for airlines. Airlines that hedge their jets through fuel efficiency of new aircraft create a sustainable competitive advantage over those airlines with older aircraft fleets that practice speculative hedging with oil derivatives and uncertain short-term gains or losses on fuel price.

7 References

Adams, Z., & Gerner, M. (2012). Cross hedging jet-fuel price exposure. *Energy Economics, 34*, 1301-1309.

AirNewZealand. (2015). *Annual Report*. Retrieved from https://p-airnz.com/cms/assets/NZ/PDFs/2015-Annual-Financial-Results.pdf

AirNewZealand. (2017). *Annual Report*. Retrieved from https://www.airnewzealand.co.nz/latest-annual-and-interim-results

AirNewZealand. (2018, 14 February 2018). Fuel Hedge position. Retrieved from https://www.airnewzealand.co.nz/fuel-hedging-announcements

Arouri, M. E. H., & Nguyen, D. K. (2010). Oil prices, stock markets and portfolio investment: Evidence from sector analysis in Europe over the last decade. *Energy Policy, 38*, 4528-4539.

Berghofer, B., & Lucey, B. (2014). Fuel Hedging, Operational Hedging and Risk Exposure--Evidence from the Global Airline Industry. *International Review of Financial Analysis, 34*, 124-139. doi:http://www.sciencedirect.com/science/journal/10575219

Bloomberg. (2017, Feb 9, 2017, 5:00 am SGT). SIA bets on oil prices going up as it extends fuel hedging. *Straits Times*. Retrieved from http://www.straitstimes.com/business/sia-bets-on-oil-prices-going-up-as-it-extends-fuel-hedging

Boeing. (2017). *Current Market Outlook 2017-2036*. Retrieved from http://www.boeing.com/resources/boeingdotcom/commercial/market/current-market-outlook-2017/assets/downloads/2017-cmo-6-19.pdf

Bryman, A., & Bell, E. (2015). *Business research methods* (4th Ed.). Oxford, United Kingdom: Oxford University Press

Bullen, J. (2016, Sep2016). Big divide in fuel hedging appetite. *Airline Business, 32,* 19.

Carter, D. A., Rogers, D. A., & Simkins, B. J. (2006). Does Hedging Affect Firm Value? Evidence from the US Airline Industry. *Financial Management*(1), 53.

Cassidy, J. (2015). Why Aren't Airfares Falling? *Fortune, 171*(3), 64-65.

Chin-Yen, A. L., & Jones, K. J. (2016). Integrated Risk Management on Fuel Hedging Program: A Case Study on Southwest and China Eastern Airlines. *Academy of Business Research Journal, 2*, 74.

Derousseau, R. (2017, March 10, 2017). Warren Buffett Loves Airline Stocks. Should You? *Fortune.* Retrieved from \ http://fortune.com/2017/03/10/airline-stocks-investment-advice/

Dutton, J. (2016). CFO interview: Flybe aims for long-term profitability. *Airfinance Journal*, 7-7.
Easyjet. (2017). *Annual Report 2017*. Retrieved from http://corporate.easyjet.com/investors/reports-and-presentations/2017
Emirates. (2016). *Annual Report*. Retrieved from http://content.emirates.com/downloads/ek/pdfs/report/annual_report_2016.pdf
Emirates. (2017). *Annual report*. Retrieved from https://www.emirates.com/media-centre/ek-newsroom-emirates-group-announces-2016-17-results#
EveningStandard. (2009, 01/08/2009). Cathay Pacific has its wings clipped by fuel hedging, Article. *Evening Standard,* p. 10. Retrieved from http://ezproxy.massey.ac.nz/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=nfh&AN=36155324&site=eds-live&scope=site
Ferguson, G., Duflot, Francois. (2018). U.S Airlines 2018 Outlook - Ownership Costs Fall With Interest Rates. Retrieved from https://www.bloomberg.com/professional/product/bloomberg-intelligence
Fortune. (2014). When Delta went gambling on jet fuel. *Fortune*. Retrieved from http://fortune.com/2014/06/02/secret-club-kate-kelly/
Hirs, E. (2016). Delta CEO Admits To $4 Billion Lost In Hedging Fuel Costs. *Forbes*(June 2, 2016).
IATA. (2017a, December 2017). IATA Fact Sheet - Fuel. December 2017. Retrieved from www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-fuel.pdf
IATA. (2017b, December 2017). Strong airline profitability continues in 2018. December 2017. Retrieved from http://www.iata.org/pressroom/pr/Pages/2017-12-05-01.aspx
Jin, Y. B., & Jorion, P. (2006). Firm value and hedging: Evidence from US oil and gas producers. *Journal of Finance, 61*(2), p893-p919.
Karp, A. (2015). Playing the Hedging Game. *Air Transport World, 52*(3), 14-15.
Kelly, K. (2014, 2 June 2014). When Delta went gambling on jet fuel. *Fortune*. Retrieved from http://fortune.com/2014/06/02/secret-club-kate-kelly/
Koopmans, C., & Lieshout, R. (2016). Airline cost changes: To what extent are they passed through to the passenger? *Journal of Air Transport Management, 53*, 1-11.
Korkeamäki, T., Liljeblom, E., & Pfister, M. (2016). Airline fuel hedging and management ownership. *Journal of Risk Finance (Emerald Group Publishing Limited), 17*(5), 492.

Kristjanpoller, W. D., & Concha, D. (2016). Impact of fuel price fluctuations on airline stock returns. *Applied Energy, 178*, 496-504.
Lim, S. H., & Hong, Y. (2014). Fuel hedging and airline operating costs. *Journal of Air Transport Management, 36*, 33-40.
M2Communications. (2018). Boeing, Hawaiian Airlines Announce Purchase of 10 787 Dreamliners. Retrieved Mar 12, 2018, from Airline Industry Information (M2) http://www.m2.com
McCarthy, S. (2017, June 8, 2013). OPEC: The ups and downs of an oil cartel. *Toronto Globe and Mail*. Retrieved from https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/table/article12395259/
McFarlane, I. (2016). Fuel Hedges Limit European Airlines Gain From Lower Fuel to 2016. *Bloomberg Intelligence*. Retrieved from Bloomberg Intelligence website:
McNicol, H. (2017). Air New Zealand just seems to get things right across the board Retrieved from https://www.stuff.co.nz/business/96034926
Mellow, C. (2016). Never Use A Hedge To Bet On Markets. *Global Finance, 30*(8), 58-59.
Melloy, J. (2018, 20 April 2018 10:08 AM eT). Trump blasts OPEC, says cartel is keeping oil prices 'artificially very high' and that 'will not be accepted'. Retrieved from https://www.cnbc.com/2018/04/20/trump-says-opec-is-keeping-oil-prices-artificially-very-high-and-that-will-not-be-accepted.html
Merkert, R., & Swidan, H. (2016). Making Fuel Hedging a Meaningful Strategy - The Case of Airlines. *Academy of Management Annual Meeting Proceedings, 2016*(1), 1.
Morrell, P., & Swan, W. (2006). Airline Jet Fuel Hedging: Theory and Practice. *Transport Reviews, 26*(6), 713-730.
Mufson, S., & Halsey, A. (2016, September 1, 2016). Allegiant Air, with ultra-low fares, draws FAA's attention over safety concerns. *Washington Post*. Retrieved from https://www.washingtonpost.com/business/economy/allegiant-air-with-ultra-low-fares-draws-faas-attention-over-safety-concerns/2016/09/01/08c0f202-28f5-11e6-ae4a-3cdd5fe74204_story.html?utm_term=.de22e19ae48b
Mutzabaugh, B. (2016, Published 9:55 a.m. ET July 29, 2016 | Updated 10:40 p.m. ET July 29, 2016). Allegiant buys new planes for the first time ever. Retrieved from https://www.usatoday.com/story/travel/flights/todayinthesky/2016/07/29/allegiant-buys-new-planes-first-time-ever/87700136/

Naumann, M., & Suhl, L. (2013). How does fuel price uncertainty affect strategic airline planning? *Operational Research*(3), 343.
Norwegian. (2017). *Report for the fourth quarter and full year 2017*. Retrieved from https://www.norwegian.com/en/about/company/investor-relations/reports-and-presentations/annual-reports/
Park, K. (2017). Singapore Air Extends Jet Fuel Hedging as OPEC Cuts Sway Oil. *Bloomberg News*. Retrieved from https://www.bloomberg.com/news/articles/2017-02-07/singapore-airlines-profit-drops-36-amid-weak-yield-environment
PWC. (2017). *IFRS 9 Financial Instruments Understanding the basics*. Retrieved from https://www.pwc.com/gx/en/audit-services/ifrs/publications/ifrs-9/ifrs-9-understanding-the-basics.pdf
Reid, K. (2016, May 1, 2016). To hedge or not to hedge: can hedging work for everyone, and should it? *Fuel Oil News,* 3.
Reuters. (2018, 23 January 2018). Major carriers say no plans to hedge fuel despite rising prices.
Ryanair. (2017). *Annual report*. Retrieved from https://investor.ryanair.com/wp-content/uploads/2017/07/Ryanair-FY2017-Annual-Report.pdf
Sibdari, S., Mohammadian, I., & Pyke, D. F. (2018). On the impact of jet fuel cost on airlines' capacity choice: Evidence from the U.S. domestic markets. *Transportation Research Part E, 111*, 1-17.
Simmons, G. (2015). Does hedging reduce risk? Analysis of large domestic airlines. *Journal of Business Strategies, 32*(1), 1.
SingaporeAirlines. (2017). *Annual report*. Retrieved from https://www.singaporeair.com/saar5/pdf/Investor-Relations/Annual-Report/annualreport1617.pdf
Sturm, R. R. (2009). Can Selective Hedging Add Value to Airlines? The Case of Crude Oil Futures. *International Review of Applied Financial Issues & Economics, 1*(1), 130-146.
Tobben, S., & Summers, J. (2018, April 26, 2018 4:00 PM GMT+12). Oil Futures Signal a Flood of U.S. Exports Is Coming This Summer. *Bloomberg Markets.* Retrieved from https://www.bloomberg.com/news/articles/2018-04-25/oil-futures-signal-a-flood-of-u-s-exports-is-coming-this-summer
Treanor, S. D., Rogers, D. A., Carter, D. A., & Simkins, B. J. (2014). Exposure, hedging, and value: New evidence from the U.S. airline industry. *International Review of Financial Analysis, 34*, 200-211.
Turner, P. A., & Lim, S. H. (2015). Hedging jet fuel price risk: The case of U.S. passenger airlines. *Journal of Air Transport Management, 44-45*, 54-64.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

The worst seems to be over for Cathay Pacific. (2018, Mar 15, 2018 - 5:50 AM). *The Business Times*. Retrieved from https://www.businesstimes.com.sg/transport/the-worst-seems-to-be-over-for-cathay-pacific

Zou, B., Kwan, I., Hansen, M., Rutherford, D., & Kafle, N. (2016). *Airline Fuel Efficiency: Assessment Methodologies and Applications in the U.S. Domestic Airline Industry*: Emerald Group Publishing Limited.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Factors, barriers and attitudes affecting the adoption of digital technologies by NZ cooperative retailers

Mo Aly
alshaaban80@gmail.com

Abstract

This research was conducted with the aim of understanding the different factors, barriers, and attitudes towards the adoption of digital technologies by cooperative retailers. The significance of this research lies in the knowledgeable path it creates for New Zealand cooperative retailers to understand and grasp the importance of retail digitalisation to survive today's cutthroat business environment.

Key findings from this paper emphasized the importance and significance of having digital technologies implemented and utilised within cooperative retail businesses, however there were a number of driving factors and barriers which had a huge effect as to the level of engagement, interest, and actual implementation of such technologies in the researched stores. Retailers must have a more proactive and positive outlook towards digitalisation and adopting efficient technological platforms that will maintain their livelihood in an ever increasingly competitive and digitally driven world.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

1. Introduction

1.1. Background

It is generally safe to assume that technology has helped facilitate our lives in all its facets. The integration of smart phones and technologies have had a substantial impact on, not only today's retailing landscape (Fuentes et al., 2017), but also consumer decision making and purchasing processes in store. (Hagberg, 2017) With the proliferation of digital technology in all its forms (communication, transactions, information transfer), it is no surprise that savvy businesses are utilising digital technologies to get ahead of the game. Digital technologies (DT) are now disrupting the way we do business and changing how customers shop when buying their products. This necessitates more longitudinal studies to be carried out to better understand the long-term effects on retailers as Hagberg (2017) cites both Soutjis et al., 2017; Hernant and Rosengren, 2017 in support of this.

Online shopping in New Zealand, more specifically business to consumer (B2C), is gaining rapid popularity over the last few years. According to BDO (2019), NZ has generated $92.3 billion of sales last year (2018) with figures showing that by 2030, it is expected to reach $120.6 billion per year of sales. (BDO, 2019) This demonstrates an incredible drive and propensity by kiwi customers towards digital adoption which will eventually force and reshape the way businesses interact and reach their customers, further reinforcing the importance of engaging in electronic commerce and digital technologies by retail businesses (of all sizes). (Shaw, 2018).

1.2. Research objectives

Although the adoption and use of digital technologies by retailers has been well and truly explored, much of this research has been focusing on SME businesses with no focus on any particular industry. This has underplayed the significance of retail cooperative business models given the focus has been mainly on standard retailer models such as corporates, franchise, or licensed retailer models. Majority of the articles found and examined for this research identified a significant gap demonstrating an overabundance of antiquated academic articles attempting to examine in isolation the adoption of digital technologies by retailers of all sizes in different industries. However, none have specifically addressed the factors, barriers, and attitudes of cooperative retailers towards these technologies addressing in detail issues such as age, perceptions, or the different resources that maybe required to achieve profitability, store operational efficiencies, or delivering on basic customer service requirements.

The selected business model for this research is based on retail cooperative model and is usually made up of a group of smaller individual retailing businesses (SMEs) that have a common goal as well as financial and industry interests that aligns these smaller businesses together to form one larger group (when compared to the more conventional business models/structures such as corporates franchise, partnerships…etc).

The significance of this research primarily lies in the uniqueness of the business model - given each cooperative's own intricacies and operational challenges – but also in the path it creates for such cooperative retailers to understand: firstly, the

scope and importance of digital technologies, and secondly, the key drivers that are needed to motivate these business owners to integrate technologies into their businesses. Thirdly, developing a strong understanding of the different attitudes and perceptions of said technologies. Fourthly, and finally, the possible implications and repercussions that may arise due to the lack of implementation of such technological initiatives.

If an organisation's mantra and core focus is to be a customer-centric market leader in today's hyper-competitive market that is dominated by a constant struggle to capture and maintain customers' undivided attention, organisations must be willing to learn to work smarter not harder. Businesses must learn to future-proof and learn to capture the existing and upcoming generations of tech-savvy customers. For them to do so successfully, these organisations must take digital technologies into serious consideration.

2. Literature Review

It is critically important to highlight the extreme shortage of literary articles found that specifically addresses the research question with respect to cooperative retailers. Plenty of research articles (both academic and industrial) have been written addressing parts of the question in isolation or without a specific focus on the type of business or industry in New Zealand. However, none have addressed this research's question specifically and in its entirety. Thus, the aim here is to utilise the available literature to draw synergies and identify discords that might be similar and assist in answering the research question.

2.1. What is retail digitalisation?

Retail digital technologies in essence is any group of technologies that have been enabled in store to help enhance customer centricity as well improve store operational efficiencies and resource management. Both elements which have been identified as critical and central themes to this research, and to the understanding of the factors and barriers to adopting digital technologies. These technologies may be used in various ways as Gilliland (2019) notes in her article on the different types and usages of retail technologies: enhancing in-store (and online) customer experience, increase convenience for shopping customers who use their mobile devices, or to promote a retailer's online presence. Therefore, based on the above definitions of digital technologies, we can then conceptualise digitalisation as per Parviainen et al. (2017) citing Brennen and Kreiss (2014) in their article is the "adoption or increase in use of digital or computer technology by an organization, industry, country, etc.".

2.2. Digitisation: way of the future.

So, what does that mean for retail and retailers? The opportunity to move from a tired and traditional model of retail where it was purely product-centric, to one where they are customer-centric and "digitally" in charge of every single step the customer takes in the decision making process towards completing a transaction. Retailers must keep in mind, not only do they face a blistering pace of technological evolution to keep up with, but there's a critical change in shoppers and in the current (millennial) and upcoming generations (Gen Z's). Francis and Hoefel (2018) define Gen Zs as digitally native generations and "… a hypercognitive generation very comfortable with collecting and cross-referencing

many sources of information and with integrating virtual and offline experiences… There are significant generational shifts from baby boomers to millennials to the Gen Z's who have such huge impact and influence on people of all ages and background on how they consume products or relate to brands". (Francis and Hoefel, 2018) .

Adopting technology by retailers and businesses of all sizes therefore, become a matter of survival to try and keep up with the younger generation. However, this remains a matter of acceptance by the decision makers who are considering the technological change. Unfortunately, there remains a large number of retailers that are running with incredibly outdated technologies (hardware and software), and are trading based on absurdly manual and labour-intensive internal operational processes. Findings of this research highlight a number of factors and barriers that include (and not limited to): age, resources, attitudes, and perception which will be elaborated further in later sections.

Baird (2018) argues a great point in her article that in order for retailers to survive this evolutionary process of the traditional retail model of product-centricity – with the help of digital transformation and digitalisation, retailers can optimise their business processes through digitalisation and focus on becoming customer centric. Innovative and successful retailers Baird (2018) argues no longer define ROI through optimising their operational processes, instead they do so by searching and capturing all possible customer data points that can be later synthesized into insights and other points of interest for the same customers (better engagement,

service, or experience). The sooner retailers come to that realisation, the less bleak the future is looking for them.

2.3. Retail transformation

Over the last three decades, the Internet has come a long way for some of the companies who ventured out to try and satisfy some of their customers' needs via sophisticated online websites developed at the time without any form of assurance on how well this will work. More specifically, the emergence of the Internet was primarily used by various industries (banking, insurance, healthcare, and education) used to communicate information almost instantaneously. Soon after, savvy retailers have finally caught onto the benefits of the Internet (free-flowing, two way communication channels to a wide global reach of customers along with the ability to collect and gather rich information about their customers in ways that the traditional retail models couldn't. (Doherty et al., 2010).

Today, retailers' service model has significantly transitioned from singular/offline/brick and mortar channel, to multi-channel strategy-based operation with retailers operating simultaneously online and offline, and more recently into a singular channel [omnichannel] which is supported by Verhoef et al. (2015) in their article citing both Rigby (2011) and Brynjolfsson, Hu, and Rahman (2013) for support.

The significance of understanding the omnichannel retail model is necessary in acknowledging and accepting that retail has been undergoing a transformational

process from a weathered and traditional model of retail, to one which caters to the demands of today's customers.

As such, retailers nowadays can't move forward by solely relying on optimising their internal operations and must look at adopting efficient technological platforms (omnichannels) that will provide and maintain a competitive edge. Retail digitalisation is such a vast topic, however this paper has been designed to attempt answering some of the following questions;

- What's driving cooperative retailers to adopt retail technologies?
- What's deterring some of the same cooperative retailers from adopting retail technologies? Resources? Cost? Or is it attitudes and perceptions?

3. Methodology

3.1. Research design

This research is based on qualitative research utilizing semi-structured interviews with a sample of respondents. This research methodology was chosen as it assisted the author with developing data and associated logical links between the researched topic, data produced, as well as relevant analysis and conclusions drawn for the research question. More importantly, this methodology has not only provided the author with an inside view into the thoughts, attitudes and perspectives that are directly obtained from the studied subjects (which adds an extra level of authority, and credibility), but also assisted in figuring out how to better frame the research question, the problem at hand, and whether it was worth exploring further.

The flexibility and responsiveness of semi-structured interviews proved critical as it helped the author navigate an emotive issue of perception and attitude towards the adoption of digital technologies and consolidate emerging factors and barriers that shaped this research. Despite the flexibility, depth and richness of information this research method has provided, there are weaknesses to this research method that present themselves in the form of irreplicability (due to the unstructured nature of the interviews conducted and responses received from subjects), subjectivity (too much reliance on the researcher's own subjective views on what is important), generalisability (difficulty to which results and findings can be generalised and applied to other settings whilst achieving similar results). (Bryman and Bell, 2018).

3.2. Research sample and recruitment

Bryman and Bell (2018) cite Glaser and Strauss (1967) noting that theoretical sampling is "the process of data collection whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them… " (Bryman and Bell, 2018) As such, the author has employed theoretical sampling given its suitability and focus on analytical data collection, and its relevance in addressing and tackling the research question through identifying and highlighting pertinent codes and themes that have driven the content of this research. Sample of interviewees collected were based on a small sample of 5 stores with an initial count of stores to approach being 10 for a wider representation, however due to certain limitations only 5 were possible. Interviewees recruited included shareholders and operational (or branch) managers, with interviews being carried out over three months (January – March 2019), during office hours of 8.30am – 5pm. The interviews were held at the

interviewees' offices with the aim of providing them with a comfortable, distraction-free environment where they can answer questions freely.

Research participants initially received an email invitation requesting an hour of their time, briefly explaining the purpose behind the interview, the research and approach, their involvement, duration and date of meeting, and finally clearly stating the anonymity of the responses which should address any privacy concerns. To ensure validation and reliability of information provided by interviewees, follow up interviews have been requested and carried out where necessary, and a follow up email sent to the interviewees to further acknowledge and thank them for their time, and reaffirm the anonymity used with regards to the information provided for this research.

To ensure confidentiality, stores and respondents have been assigned symbolic representations S1, S2, S3, S4 (S4.1 and S4.2), and S5. Competing retailers have also been assigned symbolic representations to include R1, R2, R3, and R4 for identification purposes.

Given the unique structure and various sizes of businesses within the cooperative retailer being studied, the roles of the interviewee's varied. To elaborate, researched businesses sat along a wide spectrum of size and governance. Smaller stores that were made up of approximately 1-10 staff, typically were managed and operated by the shareholder directly (juggling two roles: 1 of business owner, and the other being the operational manager). Medium sized stores with approximately 10-30 staff where the shareholder remained as an active operational manager in

store, however was a level removed yet oversees the business from a more holistic level, and at the same time had a dedicated branch manager who manages the store from a day-to-day aspect. Larger stores (employing approximately 30+ staff) have shareholders who sit on a board overseeing the operation of the store from a top/holistic level, in addition to general managers who worked very closely with the shareholder to run the store on a daily basis – in a similar fashion to the medium sized ones.

Store sizes indicated above relate to number of staff (including operating shareholders) and not the physical size of the store or businesses' financial revenues, as the size of the business's' financial return would not give an appropriate reflection – i.e.; a small store that maybe 600m2 and is operated by 1-10 staff may be more profitable than a bigger store 1000m2 that operates and staff 10-30 employees.

3.3. Challenges

The initial count of stores that were expected to carry out the interviews were up to 12 stores, however only 5 were possible. This was due to several challenges:

a. Limited number of keen, willing stores - which forcibly determined the type of interview noted earlier, and how the data was collected.
b. Wide geographic spread across the country and financial means were not available to visit the remaining intended stores.
c. Author's personal major life events that got in the way (hospital, work)
d. Weak engagement of other interview methods – i.e.; responses wouldn't have been as good as those extracted during a face to face interview where

surveys/questionnaires could've been used instead, however the same level of response and engagement wouldn't have been received.

3.4. Data analysis

Data analysis was carried out via inductive thematic analysis to code and decode critical information that will help address the researched topic. Nowell et al (2017) cites Clarke at al. (2006) stating that "… thematic analysis is a qualitative research method that can be widely used across a range of epistemologies and research questions. It is a method for identifying, analysing, organizing, describing, and reporting themes found within a data set [and that] … a rigorous thematic analysis can produce trustworthy and insightful findings" (Braun and Clarke, 2006). This approach has provided "… a highly flexible approach that can be modified for the needs of many studies, providing a rich and detailed, yet complex account of data" (Braun and Clarke, 2006; King, 2004). Also, utilising this method is useful for "… examining the perspectives of different research participants, highlighting similarities and differences, and generating unanticipated insights. Thematic analysis is also useful for summarizing key features of a large data set, as it forces the researcher to take a well-structured approach to handling data helping to produce a clear and organized final report (King, 2004)."

Challenge identified with this approach; "While thematic analysis is flexible, this flexibility can lead to inconsistency and a lack of coherence when developing themes derived from the research data (Holloway and Todres, 2003)." However, this limitation was managed by ensuring coherent relational correlations between the different themes identified and explicitly identifying the position of the author

in relation to the empirical evidence found. The data was analysed based on the interpretation and coding of the interviewees' responses, initially starting with descriptive codes, followed by analytical/thematic codes, then organising these codes into correlating themes, and finally adding analytical memos to help organise and structure the responses and data accordingly.

3.5. Justification of the approach

In line with Fylan (2005)'s sentiments around the use of semi-structured interviews in a qualitative research, this approach has been considered to ensure accuracy of responses with high response rates (effective), as well as substantiated and validated (useful) responses from participants. Furthermore, the flexibility and focus on the 'why' provides a more accurate depiction of what the respondents are actually thinking/feeling, which then will help eliminate assumptions or any guess work. (Fylan, 2005) Given how time-poor the interviewees are, carrying out a face to face semi-structured interview in their offices which gave the researcher the ability to ask a variety of questions related to the topic. This format has allowed for room to adjust the open-ended questions being asked given at the time of the interview. Furthermore, several questions have been developed to probe the interviewees around their perceptions, attitudes, knowledge around digital technologies, and what the impact of digital technologies were on their business.

3.6. Research verification/validity

Jackson et al. (2007) supports establishing trustworthiness in qualitative research through:

- Credibility and Transferability of information - interviewees responses, and themes and codes have been added to the research's appendix.
- Confirmability - the author has explicitly demonstrated how the results, interpretations, and conclusions have been reached through an analytical deep dive into interviewees' responses and the reasonings behind theoretical and analytical choices made.

4. Findings/Interpretation

4.1. Underlying Themes and Findings

This section will outline the findings of this research which includes six themes; customer centricity, age factor, resources, system and information, perceptions and attitude bias, peer usage and adoption. All the aforementioned themes have emerged throughout this research by means of thematic analysis, and coding of the data and responses provided in the semi-structured interviews held with stores.

The table below presents a high-level summary of these themes with a deeper analytical account provided further on.

Themes summary	
Theme	**What does this theme mean?**
System & info	This theme focuses on the different types, usage, and standard/quality of information and systems in place that are either required or already exist and needs to be acknowledged
Customer centricity	This theme focuses on the customer centricity element stores have and how with their engagement of DT has had an impact on these elements (experience, service, and engagement)
Age Factor	This theme relates to age This theme relates to age related aspects that are either considered to be factors or barriers to the adoption of DT
Perception / Attitude Bias	This theme relates to the attitudes, perceptions, or awareness to which these interviewees hold with regards to DT.
Resources	This theme's sole focus is around resources which seemed to be quite a pivotal theme across all interviews whether it was around time and how DT has either saved them time (through efficiency) or people (or lack there of) that are required to be trained and upskilled to know how to use these systems to better service their customers.
Peer Usage + Adoption	Peer usage and adoption is mainly centered around how the interviewees perceieved their peers involvement and engagement of DT in their business. Also includes how they perceive the entire group's approach to DT

Respondents were asked at the start of the interview which types of technologies they have implemented and utilised in store; what encouraged them to use these technologies; what - if any - were the barriers to adopting such technologies, and finally, respondents were asked to share their perceptions around the impact of (not) having these technologies on their jobs and daily tasks in their respective stores. As this was based on a semi-structured interview, responses from all five interviews were fluid with no particular order as to which theme came first. This was encouraged as it allowed for a more natural response from the respondents. Also worth noting that despite having multiple stakeholders as part of this research, only operational managers and branch managers were of interest. Within any retail environment, operational managers and branch managers presence and importance could not be emphasised enough, given their resemblance to captains of a ship. They unquestionably have the vital task of set the strategic direction for any retailer and are the seismologists of the industry/market given how relatively close

they are to the forefront when it comes to customers and market activity – hence why they were selected as the core sample group for this research.

4.1.1. Systems and information

One of the first themes which were identified were systems and information. This focused on the different types, usage, and standard/quality of information and systems in place that are either required, or already exist and needs to be acknowledged. As such, these three sub-themes were classified accordingly as to which were considered as factors and (or) barriers.

Concerns (Barriers)

- *Non-relevant technologies (Quality)* certain social media platforms were discussed and highlighted as one of the technologies used however S1.1 noted that while there are platforms such as Facebook (FB) which may be used to promote offers and contact their customers, other social media platforms like Twitter and Instagram were deemed inappropriate channels of approaching their customers.
- *Outdated computers and technologies (Quality)* outdated technologies was identified as a real concern for S3 noting that the lack of updated technologies has limited the store manager's ability to function in his role at full capacity.
- *Quality - Expected standard/quality – factor (Quality)* system quality standards were also raised as a major concern for some of the respondents given how important that is with respect to the implemented technology. Logic would dictate that the better quality and user-friendly a system is, the

less barriers there will be for adoption and the higher the likelihood of the system being used appropriately.

- *System/info/data Accuracy (Quality)* in managing retail inventories, having access to complete and accurate data is critical, and the lack of such quality data could have severe negative impact on a store's financial viability – i.e.; cash flow which would directly affect its operational efficiencies and practices. S4.1 further supports this argument where several store operations are based on a combination of hand-written notes and manual tasks causing system and data inaccuracies. There are also further benefits to reducing mistakes made due to human error or unreliability, and the true measure of digital technology's success would be in enhancing operational efficiencies and ensuring that the back-end systems and 'basics' are in order.
- *Perceived system restrictions (Usage)* system restrictions were also noted by S3 given the lack of functionality and how much of the system can be used – whether it was due lack of updates or functionality – both reasons were creating barriers for the users and is more of a hinderance than facilitator.
- *Need for centralized system (Usage)* the need for a centralised system was a concern raised by S4.1. This issue is unique to researched cooperative given how all the stores operating within the group are all operating different systems. There is no integration into a singular system that combines all stores' purchasing and inventory data. One would assume that the need for a centralised system to provide accurate and reliable data may be considered as a strong motivating factor to adopt technology.

Assurances (Factors)

- *Operational efficiency (Usage)* for some (smaller) stores, the use of digital technologies such as emails provides a perceived sense of security as it keeps track of information and conversations held. The significance of this is that for a smaller store which is operated directly by a multi-tasking shareholder (with cash-flow being a critical motivator), he/she needs to find cost effective ways of managing the daily operations which has significant financial implications.
- *Data accuracy (quality)* as noted above, the utter significance and importance of data accuracy cannot be stressed enough, and as such, the implementation of digital technologies may be perceived as a strong motivator for stores to adopt accordingly. S4.2 explicitly expresses the need for an iPad to assist with stock control during stock checks, which is a perfect demonstration of awareness by the operational manager, of the benefits of utilising technology which would help him in ensuring data collected remains accurate and useable – thereby efficient.

4.1.2. Customer centricity

The second theme developed was customer centricity which was one of two pertinent and recurring themes for all respondents (customer centricity and attitude bias and perceptions) emerging from the findings. This theme was centred around how stores can provide best in class customer service utilising digital technologies, and how (if applicable) it has had an impact on their operations. Through the findings, there were three sub-themes identified as pillars for customer centricity: customer service, customer experience, and customer engagement.

Assurances (Factors)

- *Best approach to customers (Engagement)* we can appreciate in today's digital world, recognising that available technologies can help facilitate effective customer engagement and approach without it being too intrusive. Having previously tried multiple different ways to approaching his customers such as physical mail, printed newsletters, print ads, however S1.1's finally reached his holy grail of contact - computer generated mass texts - which his customers prefer as a non-obtrusive approach. It is critical nowadays to avoid targeted communication being lumped with junk mail, businesses must ensure their customers' opt-in to the approach selected to communicate news or offers.
- *Communication tool as a vehicle for accessibility (Engagement)* number of respondents have also recognised that digital technologies are incredibly valuable when it comes to marketing and speed of communication. S2 advocates that through the sheer value from approaching large numbers quickly providing a huge advantage of how they market to their customers while capturing new and existing customers.
- *Customer feedback management (Engagement)* social media and in particular Facebook was also perceived by some of the respondents as critical to their customer engagement as supported by both S1.1 and S3.
- *Sales opportunity - after hour opportunity to sell to customers (Engagement)* interestingly, there were respondents who saw beyond digital technology as tools of communication and opportunities to advertise and sell to their customers after hours.

- *Store operational efficiency – ability to track customers and offer visibility of stock (Engagement and Service)* respondents were also quick to point that with the adoption of different technologies, this will allow for more in-store operational efficiencies. The admin work is moved to the customer to do, freeing up the business owner to do other productive activities. Furthermore, in terms of store operational efficiency, having digital technologies that can offer stores visibility of stock not only contributes to the stores' product range credibility, but also offers their customers a higher level of service, which indirectly serves as a way to capture customers at the point of contact (if/when a store engages in such technology).
- *Targeting the right customer and providing them with excellent customer service - (Engagement)* this is essentially the pinnacle of retailing, and its importance for this particular cooperative couldn't be emphasized enough in approaching the 'right' customers and in the 'appropriate' manner, which effectively translates into sales. From a store perspective, one particular respondent (S2) noted that their customers tend to be transient and mobile depending on where their next jobs are, which meant providing their customers with the ability to order regardless where they are, and ensure that they will be getting it on time and in full. This translates to quality service offering in return for loyalty, returning customers = consistent future sales.
- *Competitor advantage / POD (Service)* having a competitive advantage through offering a point of difference is what most businesses strive towards in a hyper-market. Implementing digital technologies has helped enable some of the competing retailers to stay afloat by offering that unique point of difference. Interestingly, some respondents are aware of how well equipped

some of their competitors are, yet the level of technology adopted is still quite basic (even though the business model compared to is a corporate model and not a matching cooperative – still perceived as a competitor).

- *Customer service (Experience/Service)* customer service has also been identified as a key factor in the adoption of technology. In line with having a competitive advantage through customer engagement and point of difference, having a human side to the business was also emphasised as particularly relevant customer service. Face to face interaction, personal service, personal service, and relationships were all essential to the make-up of this humanistic side of the business.

Concerns (Barriers)

- *Not all technologies will apply to the 'right customer' (Engagement)* some respondents have noted that despite benefits attained from retail technology, not all types of technologies maybe suited. One store points out that for example, implementing a self-checkout machine in store will go against every fibre of their being (given their tremendous focus on personalised customer service).
- *Not getting the right customer – man vs machine (Engagement)* not getting the right customer was also perceived as a barrier for some of the stores as they felt despite their best efforts to ensure the right customer turns up at store events or in-store promotions, sending out a broadcast message to the market has ended up in the wrong hands. Unfortunately, this type of communication methods usually leads to disappointment and waste of time and effort.

- *Customer focus/centric, face to face (F2F) / Personal interaction (Service)* stores couldn't do away with human interaction and F2F dealings. One would think that the ability to provide F2F service to customers is the epitome of customer service, however ironically, this has been presented as a limitation to some stores.
- *Lack of interest/engagement in store DT (Engagement)* a noteworthy finding from a number of interviewed stores is that, they all have (indirectly) concluded that getting customers interested in using the technology provided is actually half the battle, while the other half is them using it. Some of the stores have found difficulty in engaging their customers with their implemented technologies (portals) – and some of the reasons identified through the findings include:
    - Either the actual store/shareholder doesn't care enough to push it.
    - Not enough staff have been trained on the system/technology.
    - Lack of interest by the shareholder to push out and train users to engage in the system provided simply because they don't think they'll be getting much returns from doing so or has a big enough customer base.

4.1.3. Age Factor

The third theme developed was 'age factor' which was found to be a recurring theme for most respondents of this research. This theme focused on age related aspects that were considered substantial to the adoption of digital technologies.

Concerns (Barriers)

- *"All it takes is one major life event"* as morbid as this might sound, however the store who has raised this, is indeed quite aware that while the older generation maybe stuck in their old ways and habits (tech-free) which is working for them for the time-being, however, all it would take is a life style change - a death in the family, or they get injured, they'll come off the tools, and most likely (send in their younger apprentice) who's digitally savvy, and you would've lost them straight away with all the manual processes.
- *Generational gap and style of work* with millennials making up a good ratio of the current working population and baby-boomers on their final steps to retirement, there is a huge generational shift in the style of work. S3 stresses how important the age factor is by providing an example with how his younger employees takes a fraction of the time it would from one of his other older staff members.
- *Intimidated/scared; lack of confidence; never had to use it; stuck in old ways; worried it might replace them* are the many ways to describe some of the challenges that aging staff (or customers) are facing – all which pose serious barriers to utilising technologies.
- *Different way of working; older gen brought up on phone calls vs. younger generation that's more tech savvy; teaching and training* as more and more millennials appear on the work force to replace the older generation, it is then no surprise that the way the younger generation does things is different – i.e.; almost everything is done via cell-phones (e.g.; with the younger generation, messaging replaces phone calls – as opposed to the older customer who don't like texting and would much rather a phone call.

Assurances (Factors)

- *Younger generation - way of future and importance of changing with time* keeping up with the younger generation and their technological requirements seems almost necessary in today's world given how technology has proliferated our lives in everything we do. Admittedly, it was almost rather comforting to see - from a number of respondents - their level of awareness with regards to the rise of the younger generation that are coming through the current work force. This demonstrates their aptitude and preparedness and acceptance of the generational gap in their own workforce with a clear understanding of what's required to survive in today's hyper-competitive business environment.

4.1.4. Perception / Attitude Bias

The fourth theme that has emerged from the findings was attitude bias and perception which focused on three sub-themes in particular - attitudes, perceptions, and awareness towards the adoption of digital technologies.

Concerns (Barriers)

- *Cost/Economics - shareholder not vested in the cause (attitudes)* cost of operations is undoubtedly one of the most important motivators for any business owner – more so within a cooperative group. The smaller the business, the more attentive and cautious the shareholder will be in spending his/her hard-earned cash on anything. However, for some shareholders, this attitude and approach has taken a whole new level where the perceived cost of investment in digital technologies is too high that it has had some

negative bearings on in-store operations and the branch manager where manual jobs are taking too long and is far too inefficient due to lack of resources (dedicated staff) but also the process in itself is not automated. Some respondents acknowledged that it's a big cost which can't be returned right away, however for one branch manager felt like he's working in the 18th century.

- *Shareholders' myopic perspective; mis-perception (perceptions)* further to the point above, if stores and shareholders don't see the immediate benefit in investing upfront to cater for the new generation of customers, this will eventually cost them dearly in efforts of trying to catch up where competitors would've already been operating in the 22nd century. One store quotes the mentality of some of the shareholders operating in a small 'ma/pa' family business and is holding them back from investing in these technologies due to certain misconceptions (such as "big-brother syndrome", or their preference of investing in customer service).
- *Operational manager sourcing own tech (attitudes)* possibly one of the most shocking findings out of this research where you can safely assume that the situation is pretty dire when the operational manager has to source his/her own technology to do their job. The shareholders' attitudes towards investing in technology has gone beyond the point of just negatively impact their own business. Not investing in the appropriate technology necessary for staff to carry out their own jobs, is simply dreadful.
- *Varying degrees of interest and engagement (awareness)* some of the issues highlighted during the research from a store managers perspective varied quite dramatically. From one end of the spectrum where shareholders

holding out from investing in basic technology that would allow the operational manager to do his job, to the other end of the spectrum where the general manager has the freedom to implement technologies as he sees necessary to ensure optimum operation of the store (e.g.; cloud based technology and systems that bolt onto existing accounting software), to somewhere in the middle where the shareholder recognises the importance of digital technologies but doesn't place any urgency in terms of priorities and doesn't understand what's out there to be able to implement and bring into the business. So, on a local level there has to be a huge level of engagement from shareholders to buy into the positive effects of digital technologies.

Assurances (Factors)

- *Sacrifice profit for sake of efficiency (attitude/awareness)* having members keenly wanting to sacrifice their own revenue/profit for the sake of efficiency with the implementation of digital technologies, definitely highlights the awareness and positive attitude around wanting to make a change.
- *Cognisance of the younger generation and awareness of the significance and importance of changing with time (awareness)* a positive theme of awareness was emerging from the stores' responses with regards to having to keep up with the times, and acknowledging that technology is the future, and in order to survive, they must start changing their old ways and perceptions on how things are done.

4.1.5. Resources

The fifth theme that has emerged from the findings of this research was resource requirements (time, money, people, systems), all of which the respondents deemed as a necessary requirement for the adoption of digital technologies in some capacity.

Concerns (Barriers)

- *Cost/economics - return on investment* as noted previously, costs and economics of implementing digital technology was found to be a recurring theme with stores fully aware that it's a huge cost to invest in technology, and the returns aren't gained back so quickly, this then became a huge deterrent and barrier for some of these stores. To the extent that one of the interviewed stores who doesn't have the basic level of technologies, had to pay for it for himself as it restricted him from operating in his role at full capacity.
- *Experienced staff required (staff retention/ tech motivated and savvy)* what also transpired through the findings of this research was the seemingly huge demand on reliable staff who were required to not only be technologically smart but also motivated to be trained how to use it.
- *Higher/more critical priorities* some stores have noted that given the lack of resources (time, staff, money), looking after their customers first meant that there was hardly any time left for shareholders to consider technology implementation (even though it would be for their benefit). However, lack of resources was the barrier that was noted time and time again by some of the respondents.

Assurances (Factors)

- *Future planning/scope* the fact that some of the respondents already have started thinking of how their business will evolve over the next 5-10 years in line with technological developments and how customers change their shopping behaviour, this provides the assurance that implementing digital technologies for at least one of the stores is of high priority.
- *Store operational efficiency and reliability of man vs machine (cost saving and efficiency)* intriguingly, one store was arguing for digital technology given its reliability and use as a replacement for experienced staff with machines who can do the exact same thing with less resources required, saving his business plenty of money. Having customers taking the onus on themselves to complete admin tasks via a customer portal, was another way to economically save the store administrative costs of the operational manager from carrying out menial tasks and be more involved in the store's operational efficiency.

4.1.6. Peer Usage + Adoption

The sixth and final theme that has emerged from the findings of this research was the respondents' peers usage and levels of technology adoption.

Concerns (Barriers)

- *Negative peer outlook - non-cohesive front* findings of the research within this theme had demonstrated that the majority of stores interviewed, the cooperative group presents itself in a non-cohesive front in terms of adopting digital technologies across the board. Others believe that the group hasn't

quite grasped the benefits that can be attained from technology – be it operational efficiencies or cost savings. This paints a strong picture towards (a large) group's attitudes and outlook within this cooperative.

Assurances (Factors)

- *Positive peer outlook - adoption and utilisation* despite the barriers noted above, there are still elements of digital technology adoption scattered around the cooperative group noted by some of the respondents (e.g.; social media activity carried out by other (non-interviewed) stores who do it incredibly well).

5. Conclusions

Adopting advanced technologies that can engage customers in stores such as augmented reality (AR), virtual reality (VR), artificial intelligence (AI), or even facial recognition might be quite far-fetched for a lot of the interviewed stores (and possibly customers), but the more comfortable we all get with technologies being so intrusive in our lives that it becomes the norm, then we will see a rise in its usage and the dawn of a new industrial revolution.

The previous chapters have examined in detail the available academic literature that helped support the arguments and assumptions stipulated in this research, the methodology used to carry out this research, and discussion around the findings and emerging key themes identified.

On interviewing stores, there were countless motivating factors as to why they should adopt technologies. However, it was found that most of these factors tended to revolve around three (implicit) points of discussion:

1 *Operational efficiency:* how digital technologies had helped (or was perceived to help) the respondents to do their job better and have a more efficient and profitable store.

2 *Customer centricity:* how these technologies can help them provide better customer service (high quality customer engagement and instore experience).

3 *Perception:* how they perceived technologies in general and what their attitudes were around that. Age was a huge factor, where the age range of respondents varied between early 40s to mid-late 60s.The younger they were, the more encouraging and supportive they were with more urgency due to their awareness of the importance of technology and its impact on how they can better serve their customers. However, the urgency and ability to make changes (that some had), were unfortunately limited by factors outside of their control.

Given the discussed findings and results of this research along with the detailed explication of the factors and barriers identified, the following questions may be raised accordingly:

- Could the identified barriers be due to the current decision-making structure that is governing the cooperative group? i.e., every store is making their own decision as opposed to a centralised governing body?
- Could these barriers be overcome if such decisions were driven from a centralised governing body (whether it was the board of directors, or the supporting office)? Are the factors strong enough to instigate and encourage stores to start leading the way in taking action and changing their stance on technology (for their own betterment) rather than wait for further direction from their peers?
- What measures are required for a change to be made? More so, what would it take to change the shareholders' perceptions and engagement to increase their urgency and prioritisation of tech implementation?
- What technologies should form the baseline for all stores within the cooperative, that must be made available to ensure everyone within the group is operating on the same "technological level"?

Quick search of the internet reveals plenty of practical and industrial examples of technology adoption and how it has benefited retailers who have recognised the importance of technology and taken actionable steps towards it. There is an overabundance of technologies out there that is relatively cost effective yet easy to implement with extensive benefits.

When we examine these initiatives a bit closer from an economic (cost) perspective, they most certainly seem economically viable and sustainable providing stores with cost savings (e.g.; reduction in power bills, cost of printing

tickets, man-power, and all other associated resources involved in maintaining in-store signage).

It's also worth noting that there's a huge gap between cooperatives and corporate retailers in terms of the decision-making process and governance. There are large complexities within the cooperative model and is dramatically different when compared to a "corporate" retailer. Some of these variances exist within the governing structures between the two which has an obvious impact on who adopts digital technology and who doesn't and to what extent/degree. Interestingly, this was an implicit detail identified in this research, yet it wasn't explicitly raised through the interviews, and is certainly worth mentioning as these subtle differences is what makes this research a contribution to the field of retail studies. There are plenty of academic and non-academic articles that examine IT adoption in detail within organizations, however, it has proven rather challenging finding literature that further examines this from a cooperative retailers' perspective. Additionally, being a cooperative retailer has provided the researched organization a significant competitive edge, as the way the company operates is very much in the same manner as a small business - small and nimble enough to make quick decisions to pivot and change direction when necessary with significant (positive) results. However some of the challenges identified within this research is not only dealing with the changing face (and age) of the customers and work force in an environment where technology is advancing at an incredible pace, but trying to bring everyone up to the same level of engagement with technology, and their awareness of its benefits (in all its facets) has proven to be perplexingly difficult. Not everyone wants to have (or can afford) the latest and greatest technologies,

however, it is imperative that regardless of what difficulties or barriers maybe faced, an absolute baseline standard of technology must be established for the sake of creating equitable share of successful performance within the cooperative group.

5.1. Implications

Some of the most prominent implications highlighted as part of this research, is that retailers are currently experiencing a massive wave of disruption that is completely re-shaping the landscape around them to the point where they need to either adapt, or will be bankrupt. Customers' expectations and demands are increasing by the minute, and it's up to retailers to find ways to compete in an incredibly hyper-competitive market with super-demanding customers. 'Time poor' customers are growing more and more demanding with less attention spans, and their tolerance is concurrently decreasing at the same time. As such, retailers must be prepared to engage and transition promptly into a digitally enhanced environment, and provide platforms where customers have the flexibility, freedom and choice, to complete their transactions at their own pace with the same levels of customer experience and engagement they'd expect in store.

5.2. Limitations and future research opportunities

The study has revealed some limitations to the research which could provide a good template for further research.

- Limited number of participating stores which was due to *time poor* respondents; *geographic spread of the stores* with no funds made available

to the researcher to travel around the country to carry out face to face interviews.

- Given this is an individual research paper for the MBA program, peer reviews for research credibility were not possible therefore not carried out. Nonetheless, credibility was provided through the documentation of all material utilised and developed as part of this research and has been provided in a logical, explicit, and traceable manner.

5.3. Recommendations

Research should be carried out with a bigger sample of stores within the cooperative, but also extend the scope to include stores from a wider range of retailers in different industries and businesses (e.g.; automotive, pharmaceutical, grocery) that operate under different business models (i.e.; corporate, franchise, cooperative retailers) which will serve as a good point of comparison. It's also worth including other stakeholders such as suppliers and consider their perspectives (which weren't included in this research) but provides another level of consideration and perspective that needs to be factored from a significant player in the value chain.

6. References

Alba, J., Lynch, J., Weitz, B., Janiszewski, C., Lutz, R., Sawyer, A., and Wood, S. (1997). Interactive home shopping: consumer, retailer, and manufacturer incentives to participate in electronic marketplaces. *Journal of marketing*, *61*(3), 38-53.

Agarwal, R., and Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information systems research*, *9*(2), 204-215.

Baird, N. (2018). *What Digital Transformation Actually Means For Retail*. Retrieved from https://www.forbes.com/sites/nikkibaird/2018/03/13/what-digital-transformation-actually-means-for-retail/#29ecdeed7038.

Bank of New Zealand. (2019), New Zealand Online Retail Sales - January 2019. Retrieved from https://www.bnz.co.nz/assets/business-banking-help-support/online-retail-sales-index/pdfs/NZ-Online-Retail-Sales-in-January-2019-BNZ.pdf?v=1.

Bruque, S., and Moyano, J. (2007). Organisational determinants of information technology adoption and implementation in SMEs: The case of family and cooperative firms. *Technovation*, *27*(5), 241-253.

Bell, E., Bryman, A., and Harley, B. (2018). *Business research methods*. Oxford university press.

Brennen, S. and Kreiss, D. (2014) *Digitalization and Digitization*. Retrieved from http://culturedigitally.org/2014/09/digitalization-and-digitization/

Brynjolfsson, E., and Smith, M. D. (2000). Frictionless commerce? A comparison of Internet and conventional retailers. *Management science*, *46*(4), 563-585.

Brynjolfsson, E., Hu, Y. J., and Rahman, M. S. (2013). *Competing in the age of omnichannel retailing*. MIT.

Choose a business structure. (n.d.). Retrieved from https://www.sba.gov/business-guide/launch-your-business/choose-business-structure.

Colla, E., and Lapoule, P. (2012). E-commerce: exploring the critical success factors. *International Journal of Retail and Distribution Management*, *40*(11), 842-864.

Cook, G. (2014). Customer experience in the omni-channel world and the challenges and opportunities this presents. *Journal of Direct, Data and Digital Marketing Practice*, *15*(4), 262-266.

Coops in New Zealand. (n.d.). Retrieved from https://nz.coop/co-ops-new-zealand/ .

Cooperative identity, values and principles. (n.d.). Retrieved from https://www.ica.coop/en/cooperatives/cooperative-identity#definition-of-a-cooperative.

Dalcher, I., and Shine, J. (2003). Extending the new technology acceptance model to measure the end user information systems satisfaction in a mandatory environment: A bank's treasury. *Technology Analysis and Strategic Management*, *15*(4), 441-455.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Devaraj, S., and Kohli, R. (2003). Performance impacts of information technology: Is actual usage the missing link?. *Management science*, *49*(3), 273-289.

Dibrell, C., Davis, P. S., and Craig, J. (2008). Fueling innovation through information technology in SMEs. *Journal of small business management*, *46*(2), 203-218.

Doherty, N. F., and Ellis-Chadwick, F. (2010). Internet retailing: the past, the present and the future. *International Journal of Retail and Distribution Management*, *38*(11/12), 943-965.

Facts and figures (n.d.). Retrieved from https://www.ica.coop/en/cooperatives/facts-and-figures.

Fromm, J. (2019). *The Evolution Of Retail For Gen-Z*. Retrieved from https://www.forbes.com/sites/jefffromm/2019/06/27/the-evolution-of-retail-for-gen-z/#77681a850c38.

Fuentes, C., Bäckström, K., and Svingstedt, A. (2017). Smartphones and the reconfiguration of retailscapes: Stores, shopping, and digitalization. *Journal of Retailing and Consumer Services*, *39*, 270-278.

Fylan, F. (2005). Semi-structured interviewing. *A handbook of research methods for clinical and health psychology*, *5*(2), 65-78.

Ghobakhloo, M., Benitez-Amado, J., and Arias-Aranda, D. (2011, April). Reasons for information technology adoption and sophistication within manufacturing SMEs. In *POMS 22nd Annual Conference: Operations management: The enabling link. Reno, USA, April* (Vol. 29).

Ghobakhloo, M., Hong, T. S., Sabouri, M. S., and Zulkifli, N. (2012). Strategies for successful information technology adoption in small and medium-sized enterprises. *Information*, *3*(1), 36-67.

Gilliland, N (2019). *12 examples of digital technology in retail stores.* Retrieved from https://econsultancy.com/examples-digital-technology-in-retail-stores/.

Grewal, D., Roggeveen, A., and Runyan, R. C. (2013). Retailing in a connected world. *Journal of Marketing Management*, *29*(3-4), 263-270.

Grewal, D., Levy, M., and Kumar, V. (2009). Customer experience management in retailing: an organizing framework. *Journal of retailing*, *85*(1), 1-14.

Hagberg, J., and Fuentes, C. (2018). Retail formations: tracing the fluid forms of an online retailer. *Consumption Markets and Culture*, *21*(5), 423-444.

Hagberg, J., Sundstrom, M., and Egels-Zandén, N. (2016). The digitalization of retailing: an exploratory framework. *International Journal of Retail and Distribution Management*, *44*(7), 694-712.

Hart, C., Doherty, N., and Ellis-Chadwick, F. (2000). Retailer adoption of the Internet–Implications for retail marketing. *European Journal of Marketing*, *34*(8), 954-974.

Hernant, M., and Rosengren, S. (2017). Now what? Evaluating the sales effects of introducing an online store. *Journal of Retailing and Consumer Services*, *39*, 305-313.

Hoefel, F., Francis, T. (2018). '*True Gen': Generation Z and its implications for companies*. Retrieved from https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/true-gen-generation-z-and-its-implications-for-companies.

Hudson, M. (2018). *Generation Z Retail Shopping Behaviors: What Does the Next Generation Want From a Retailer?* Retrieved from https://www.thebalancesmb.com/generation-z-retail-shopping-behaviors-4140379.

Iyadurai, F. S., and Subramanian, P. (2016, September). Smartphones and the Disruptive Innovation of the Retail Shopping Experience. In *2016 International Conference on Disruptive Innovation*.

Jackson, R. L., Drummond, D. K., and Camara, S. (2007). What is qualitative research?. *Qualitative research reports in communication*, *8*(1), 21-28.

Liu, W., Pasman, G., Taal-Fokker, J., and Stappers, P. J. (2014). Exploring 'Generation Y'interaction qualities at home and at work. *Cognition, technology and work*, *16*(3), 405-415.

Massey University Human Ethics Committee. (2010). Code of ethical conduct for research, teaching and evaluations involving human participants. *Retrieved on*, *1*(3).

New Zealand Retail Sales YOY (2019). Retrieved August 5, 2019, from https://tradingeconomics.com/new-zealand/retail-sales-annual.

Nguyen, T. H., Newby, M., and Macaulay, M. J. (2015). Information technology adoption in small business: Confirmation of a proposed framework. *Journal of Small Business Management*, *53*(1), 207-227.
Nov, O., and Ye, C. (2008, January). Personality and technology acceptance: Personal innovativeness in IT, openness and resistance to change. In *Proceedings of the 41st annual Hawaii international conference on system sciences (HICSS 2008)* (pp. 448-448). IEEE.

Nowell, L. S., Norris, J. M., White, D. E., and Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*(1), 1609406917733847.

Palvia, P. C., and Palvia, S. C. (1999). An examination of the IT satisfaction of small-business users. *Information and Management*, *35*(3), 127-137.

Pantano, E. (2013). Ubiquitous retailing innovative scenario: from the fixed point of sale to the flexible ubiquitous store. *Journal of technology management and innovation*, *8*(2), 84-92.

Pantano, E. (2014). Innovation drivers in retail industry. *International Journal of Information Management*, *34*(3), 344-350.

Pantano, E., and Priporas, C. V. (2016). The effect of mobile retailing on consumers' purchasing experiences: A dynamic perspective. *Computers in human behavior*, *61*, 548-555.

Pantano, E., and Timmermans, H. (2014). What is smart for retailing?. *Procedia Environmental Sciences*, *22*, 101-107.

Pantano, E., and Viassone, M. (2015). Engaging consumers on new integrated multichannel retail settings: Challenges for retailers. *Journal of Retailing and Consumer Services*, *25*, 106-114.

Parviainen, P., Tihinen, M., Kääriäinen, J., and Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International journal of information systems and project management*, *5*(1), 63-77.

Priporas, C. V., Stylos, N., and Fotiadis, A. K. (2017). Generation Z consumers' expectations of interactions in smart retailing: A future agenda. *Computers in Human Behavior*, *77*, 374-381.

Riemenschneider, C. K., Harrison, D. A., and Mykytyn Jr, P. P. (2003). Understanding IT adoption decisions in small business: integrating current theories. *Information and management*, *40*(4), 269-285.

Rigby, D. (2011). The future of shopping. *Harvard business review*, *89*(12), 65-76.

Kiwis spend $4.2 billion online and rising. (2018, April, 30). *NZ Herald*. Retrieved from https://www.nzherald.co.nz/business/news/article.cfm?c_id=3andobjectid=12042091.

Soutjis, B., Cochoy, F., and Hagberg, J. (2017). An ethnography of Electronic Shelf Labels: The resisted digitalization of prices in contemporary supermarkets. *Journal of Retailing and Consumer Services*, *39*, 296-304.

Stylos, N., and Fotiadis, A. K. (2016). The effects of online social networking on retail consumer dynamics in the attractions industry: The case of 'E-da'theme park, Taiwan.

Taylor, S., and Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information systems research*, *6*(2), 144-176.

Thong, J. Y. (1999). An integrated model of information systems adoption in small businesses. *Journal of management information systems*, *15*(4), 187-214.

Thong, J. Y., and Yap, C. S. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega*, *23*(4), 429-442.

Thong, J. Y., Yap, C. S., and Raman, K. S. (1996). Top management support, external expertise and information systems implementation in small businesses. *Information systems research*, *7*(2), 248-267.

Treumann, R. (2014). *Top 15 Barriers to Adopting New Technology.* Retrieved from https://www.linkedin.com/pulse/20140704145017-392712-top-15-barriers-to-adopting-new-technology/

Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Verhoef, P. C., Kannan, P. K., and Inman, J. J. (2015). From multi-channel retailing to omni-channel retailing: introduction to the special issue on multi-channel retailing. *Journal of retailing*, *91*(2), 174-181.

What is the state of New Zealand's retail industry in 2019? (n.d.) BDO. Retrieved from https://www.bdo.nz/en-nz/industries/retail/retail-issues-trends

Willems, K., Smolders, A., Brengman, M., Luyten, K., and Schöning, J. (2017). The path-to-purchase is paved with digital opportunities: An inventory of shopper-oriented retail technologies. *Technological Forecasting and Social Change*, *124*, 228-242.

World Cooperative Monitor 2018 - Exploring the Cooperative Economy. (Report 2018). (2018). Retrieved from https://monitor.coop/en/media/library/research-and-reviews/world-cooperative-monitor-2018en.

Wixom, B. H., and Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information systems research*, *16*(1), 85-102.

Yap, C. S. (1989, April). Computerization problems facing small and medium enterprises: the experience of Singapore. In Proceedings of the Twentieth Annual Meeting of the Midwest Decision Sciences Institute (pp. 19-21). Miami University Oxford, Ohio.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

A new pathway to faster, cheaper and better quality management for organisations - a case study of the NZ roading industry

Russell Troup
Russ278@gmail.com

Executive summary

Quality Management (QM) is more than just a paperwork exercise. To remain competitive or relevant, it is essential for organisations to consistently deliver acceptable quality outcomes and continually improve. This research recommends a model, the Enduring Quality Improvement Model, or EQIM, developed and named by the author. The EQIM model details how to implement QM improvement and incorporate the optimal combination of factors impacting quality.

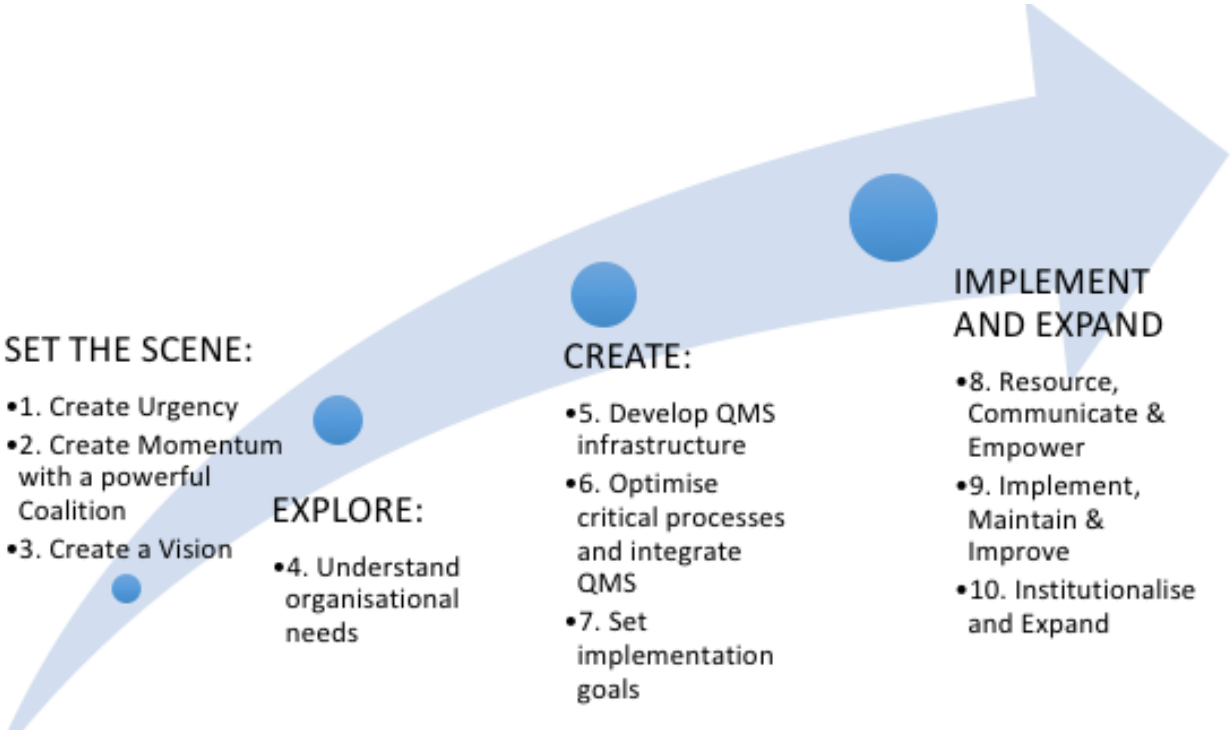
The EQIM model recommended seeks to address a problem of sub-optimal quality outcomes within the road construction industry, where research found 74% of renewal sites constructed did not meet performance criteria. That's valued at $50M, which is 22% of the total renewal investment. The EQIM seeks to reduce that failure rate to 5% and save industry up to $38.7M. It will provide sustainable value and impact through simple and effective integration of QM and continuous improvement into everyday business operations.

The EQIM is founded upon sound secondary and primary source research into best practice implementation methods and critical factors impacting QM. It comprises a practical 10-step framework (refer inset) to improve quality that is a synthesis of findings from research into change management (Garvin & Roberto, 2005; Kotter, 1998) and QM implementation best practice (Sawant, Yadav, & Rokke, 2018). Within each step of the framework the optimal combination of critical factors impacting quality found through research are applied and explained. Based on secondary and primary source research the following factors that contribute to, or inhibit quality outcomes are progressively identified, refined and validated. Contributing factors include: Leadership & Management commitment, Culture, Resourcing, Employees, Systems and Processes, Knowledge of QM, and Process Integration between operational and quality process. Inhibiting factors include: Variability, Commercial pressures, and Conflict between parties
Importantly, this research answers the "how to" rather than just "what is" QM question in a way that is readily implementable. The EQIM provides an effective pathway to achieve faster, cheaper and better quality management.

Introduction: Outline of study

Quality Management (QM) is more than just a paperwork exercise. It is essential for organisations to consistently deliver acceptable quality outcomes and continually improve. How QM is implemented within an organisation can affect customer satisfaction, profitability, market competitiveness and ultimately, it's sustainability. Such problems are increasingly apparent within the NZ road construction industry, demonstrating a need to improve QM. There are a range of

internationally recognised quality standards outlining requirements and answers the question "what is?" QM. Although, effective quality management implementation is essentially a change process and needs a practical method to answer the "how to?" question. To improve quality outcomes, this research aims to provide organisations within the road construction industry with a practically implementable model, founded on sound change management principles that incorporates the optimal combination of factors affecting QM.



To achieve the project aim, the following series of research questions (RQ) were derived:

1. What is the current level of construction quality in road construction projects?
2. What are the prominent factors contributing to, or inhibiting delivery of acceptable quality outcomes in road construction projects?

3. How can the combination of factors with greatest impact on quality outcomes be applied effectively?

In response to those questions, five research objectives (RO) were developed to frame the research. They are detailed in the following section of this report. Firstly, the RO's require secondary source research to confirm the extent of the issue and explore international best practice. Then primary source research was undertaken to validate and refine findings to the NZ road construction industry context. The research culminates in a recommended model (RO 5) for implementing QM improvement that incorporates both change management best practice and the optimal combination of factors affecting QM.

A non-academic literature and data (RO 1) undertaken found high prevalence of sub-optimal QM, with 74% of renewal sites constructed failed quality criteria, equating to 22% of the total funding investment. The implications were twofold, firstly poor QM affects the life achieved by the asset before requiring reconstruction. Secondly, application of contract performance clauses has accumulated circa $50M contingent liability for contractors over a 3-6 year period across 19 NOC contracts. Hence, the value of this research is tens of millions to the industry each year.

A literature review was undertaken to identify factors driving international best practice for QM, including implementation. Critical factors were assessed as either inhibit or contribute to quality outcomes. The validated set of critical factors contributing to quality outcomes include: 1) Leadership and Management

Commitment, 2) Culture, 3) Resourcing, 4) Employees and 5) Systems and Processes. Inhibiting factors include: 1) Commercial Pressures, 2) Variability of process and 3) Conflict between parties.

The review of implementation frameworks found that predominantly they describe, "what is" QM rather than "how to" and very few have been validated and studied through implementation (Yusof & Aspinwall, 2000). One exception was a practical seven-step quality implementation framework (Sawant, 2016) that was useful to inform the eventual model derived through this research. Further, research found that the pretermission of sound change management contributed to unsuccessful implementation. Accordingly, key change management principals from literature including Kotter's 8 step (Kotter, 1998) and persuasive change management techniques (Garvin & Roberto, 2005) are incorporated into the recommended model to assure successful implementation.

Primary research was undertaken to further explore factors in practice and to understand both adherence to QM and the implications of sub-standard implementation (RO 3) and then to validate findings (RO 4). A two-day assurance audit (ISAE, 2013) was undertaken on two road maintenance contracts to explore RO 3. Findings confirmed adherence to QM is varied considerably, but the total of 127 deficiencies found represent opportunity for improvement. The review confirmed the criticality of leadership commitment along with other key factors including knowledge of QM, QM process misalignment with operating procedures, ineffective provision for quality document and records, and the extent of client involvement.

A series of interviews were undertaken to validate and refine findings (RO 4). Interviewees represented a cross-section of contractors, clients and consultants within the NZ road construction industry.

To give effect to these factors and make them more than a list, a realistic and implementable model is required, RO 5. Based on a synthesis of research findings into change management and quality management principles this research recommends a 10-step model to implement quality improvements that the author has called the "Enduring Quality Improvement Model" (EQIM).

The EQIM presents a practical, systematic and easily understood instrument to improve quality that is application to organisations within any industry. It follows a simple structure and provides clear links between elements and critical factors identified through research. As a planning tool for implementation, it is general enough to suit different contexts. Importantly, it answers the "how to" question, not just "what is" QM question and is readily implementable. The EQIM provides an effective pathway to achieve faster, cheaper and better quality management through optimisation and integration.

Project aim:
To develop a practical model detailing how to implement improvement in quality management (QM) that incorporates the optimal combination of factors impacting quality.

Background – definition of the problem

This research uses the New Zealand road maintenance industry as a case study to explore factors affecting QM.

The majority of the suppliers of road construction and maintenance services in New Zealand operate under a certified quality management system such as ISO9001. However even with these systems the industry is experiencing challenges in consistently delivering quality products and services to road controlling authorities.

The New Zealand Transport Agency (NZTA) is a crown entity that is publicly funded exclusively through fuel tax and road user charges. It is tasked with enabling people and freight to make national and regional road journeys effectively, efficiently and safely in accordance with legislation and Government's desired objectives as set out in the Government's Policy Statement (MoT, 2018). This provisions management, operation, maintenance, renewal and improvement of New Zealand's 23,750 lane-km state highway system with a replacement value of $34 billion. The national highway network is segmented into 21 networks, 19 of which are managed under Network Outcome Contracts (NOC) and 2 are managed as an Alliance. The NOC contracts are delivered under a single supplier delivery model, meaning suppliers have both professional services capability (Engineering consultants) and physical works capability (Civil Contractors). The author has 20+ years of civil construction industry experience, particularly contract and asset management.

The problem:

In recent times, some road user groups, NZTA staff and NZTA Board have expressed concern with the quality of road maintenance and renewal works. Their concern is supported by evidence indicating that renewal investment is not achieving the required life (MacDonald, 2017), which results in costs and net asset consumption that is not sustainable in the long run for New Zealanders. Performance data shows that circa 74% of pavement or resurfacing renewals constructed are sub-optimal and do not meet performance criteria. Based on current investment, that 22% failure rate is worth $50M. Hence, this research aims to improve quality and reduce the failure rate from 22% to a more acceptable 5% which would save $38.7M.

If the issue of poor-quality works is not understood and addressed there is increased likelihood that the financial burden will extend to future generations.

Research motivation:

This research was initially motivated to save industry and taxpayers considerable money, unnecessarily wasted due to poor QM. The author is an Engineer with 20+ years' experience in road maintenance and construction in New Zealand (NZ), United Kingdom and Australia. Since returning to the NZ industry 5 years ago the author has had direct and indirect involvement in failed and remedial works and remedial discussions resulting in tens of millions of dollars cost to both contractors and taxpayers. When jobs failed, provision of quality records was typically ad-hoc, always incomplete and sometimes absent altogether. This causes issues with determination of liability but also limits the ability to understand and learn from

the failure. The author was motivated to provide a practical, actionable and achievable solution to improve quality and save industry and taxpayers millions of dollars.

In response, this research synthesises findings from both primary and secondary research from quality and change management best practice into a detailed step by step model that I have called the 'Enduring Quality Improvement Model' (EQIM). The EQIM aligns itself with ISO 9001 requirements, thereby providing either refinement, or a pathway toward a pre-eminent, globally recognised standard.

Practical value:

The immediate practical value is to client and contractor organisations within the roading industry. Further, the model can be used by client organisations to support and clarify quality expectations and specifications.

Although this research focuses on the road maintenance industry, the scope of the research project addresses a contemporaneous issue within multiple industries so has cross-sectional appeal within NZ and globally. Further, the research is beneficial for both client and contractor organisations. In particular:

1. Reduce Cost: physical remedial works and dispute resolution,
2. Simple and effective: A simple yet effective tool that any manager can readily implement and improve quality outcomes,
3. Integrate QM: Integration of QM do it becomes as seamless as possible with operational process.

4. Embed Continuous Improvement: Embedded QM processes enable continual improvement of both business performance and morale of employees
5. Multiple applications: Although its development was focused on the road construction industry, the resulting EQIM can be applied within other industries for both client and supplier organisations.

Research structure and methodology

The research adopts a "Model Building" approach that will produce a set of recommendations in the form of a model, the EQIM, with a detailed implementation plan. It is structured as a series of questions and objectives designed to culminate in the achievement of the project aim. The purpose of each research objective (RO) aligns with a specific research question (RQ) and is achieved through various research activities, detailed as follows:

RQ 1. What is the current level of construction quality in road construction projects?
RO 1: Secondary source: Literature review – non-academic
RQ 2. What are the prominent factors contributing to, or inhibiting delivery of acceptable quality outcomes in road construction projects?
RO 2: Secondary source: Literature review – academic
RO 3: Primary Source: Field research – Assurance audit
RO 4: Primary Source: Field research – Interviews
RQ 3. How can the combination of factors with greatest impact on quality outcomes be applied effectively?

RO 5: Model Building

Objective 1: Understand the prevalence and implications of sub-optimal QM outcomes for the NZ State Highway network.
Objective 2: Identify critical factors driving international best practice for QM implementation in civil construction and other industries
Objective 3: Identify industry specific factors affecting quality outcomes within the road construction industry including the level of adherence to QM.
Objective 4: Validate and refine critical factors arising from research
Objective 5: Develop a practical, implementable model to improve QM that incorporates the optimal combination of factors impacting quality outcomes

Data & literature review – Non-academic (Objective 1)
In the context of the research, a review of non-academic, secondary source literature and data was undertaken to achieve Objective 1;

Objective 1: Understand the prevalence and implications of sub-optimal QM outcomes for the NZ state highway network.

The purpose of this review was to understand the extent of the problem and the implications within industry as well as reconcile and validate the authors observations that were the motivation for this research.

Until relatively recently, research and data collection within the road maintenance industry has historically been focused on network condition with only implicit

consideration given to quality. Annually, NZTA collect data for key pavement and surfacing condition parameters for the entire state highway network that is used to measure the performance of works on NOC contracts.

Contractors face the prospect of refunding part, or all the purchase price for any renewals that do not meet contractual performance criteria. This refund is made at the end of a contract and is carried as contingent liability until then.
Using the NOC contract performance criteria, it is possible to ascertain from road condition data, both the prevalence of sub-standard works and the cost implication.

Prevalence of sub-optimal QM:
Network condition data was reconciled against contractual performance criteria to understand the prevalence of sub-optimal outcomes. Table A below that summarises the current quality performance of NOC's across NZ that range in duration from 2 to 6 years.

Table A: Current quality performance for renewals on NOC's nationally

Summary of 19 NOC regions	Total Sites constructed to date	Sites passed performance criteria	Sites failed performance criteria	%age of sites that failed	Indicative refund due to NZTA
Upper range limit	623	203	540	93	$ 8,869,656
Lower range limit	56	6	50	33	$ 213,120
National total	**5030**	**1249**	**3781**	**74**	**$ 49,967,504**
Percentage of investment failed					**22.1%**

Only 4 of 19 NOC's have failure rates below 70%, excepting one NOC affected by the Kaikoura Earthquake. This is of concern and suggests that the prevalence of

sub-standard quality outcomes is far greater than desired. The findings confirm the authors suppositions that motivated the research.

The failure rate must be taken in context with the refund value, because the refund value considers the degree of failure. For example, a site with minor issues may attract a very small refund value, whereas a catastrophic failure would result in a full refund.

The total investment over the period is $226M. Therefore, $50M arising from poor quality work equates to 22% of investment that has failed requiring repair or reconstruction.

Implications of sub-optimal QM:
The research finds three key implications arising from sub-optimal QM, namely reduced asset life, cost to industry and reduced level of service. Each is discussed in turn below:

1. Cost to industry: contractors, client and taxpayers:
   Table A presents the refund due, or level of contingent liability for contractors, sits at $50M nationally and ranges between $213k up to $8.9M on a single NOC contract. Maintenance contracts such as NOC, are typically low margin, so the liability being carried puts financial viability of some contracts at risk.
2. Reduced Asset Life – clients like NZTA don't get what they paid for:
   For context, NZTA typically allocate funding to renew 4% of its total road pavement asset length (27,350 lane.km) each year. For this investment level

to be sustainable, a nominal return period of 25-years for renewed assets is necessary. Although the average expected life is around 40 years in line with the average pavement age extracted from the NZTA road asset database. This significance of the findings above indicates that 74% of newly constructed pavement sites do not meet performance criteria meaning they prematurely display varying signs of deterioration and are unlikely to achieve the required design life before needing another renewal.

3. Reduced level of service - road users / taxpayers don't get what they paid for: The performance of sub-optimal renewals results in a lower level of service than should be expected by road users, including potholes and uneven roads.

Summary - Data & Literature Review (RO 1)

In conclusion, the authors perceptions that formed the motivation for this research are supported by the data. Further, the data suggests that the prevalence of issues associated with sub-optimal QM is of concern with 74% of works undertaken nationally under NOC contracts do not meet performance criteria. The implications are threefold: Firstly, the cost implication for sub-optimal work is currently valued at $50M, equating to 22% of the total investment into renewals. Secondly, the life of the asset constructed will be compromised and therefore will not meet the requisite expected life before needing further investment and reconstruction. Lastly, the road condition of works that fail creates bumpy and broken road that does not meet a desired level of service for road users, who ultimately funded the works through their taxes.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Literature review – Academic (Objective 2)

The research Project Aim is to develop a practical model detailing how to implement improvement in quality management (QM) that incorporates the optimal combination of factors impacting quality.

In context of the research, the purpose of this literature review is to achieve Objective 2 (refer below) to identify the factors that academic literature has shown to have the greatest impact on delivering quality outcomes both internationally and across a variety of industries. Those factors will be used to inform the 'model building' approach after being validated for the NZ road industry context (refer Objective 4).

Objective 2: Identify critical factors driving international best practice for QM implementation in civil construction and other industries.

The findings dictate that the structure of the review be broken into factors that either, inhibit or contribute to quality outcomes. However, through the course of this research, it became clear the implementation process itself was a very important factor for successful QM (Yusof & Aspinwall, 2000). This is significant in the context of this research because a key element of the practical value the EQIM model is to be practically implementable. This led to more detailed research being undertaken into best practice implementation through change management.

Accordingly, implementation is given its own sub-section within this review. Research findings are synthesised into the following subsections within this literature review:

- Quality management overview
- Contributing Factors (to be enhanced or introduced to the model)
- Inhibiting Factors (to be mitigated, minimised or eliminated from the model)
- Implementation (underpinning structure of the model)

Quality management overview

QM was principally developed within the manufacturing industry and the construction industry lags behind other industry in QM adoption (Ahmed, Coffey, & Xia, 2017). When compared to the availability of research pertaining to QM for manufacturing, it is evident that construction has been given relatively little research and academic focus (Loushine, Hoonakker, Carayon, & Smith, 2004) resulting in a relative lack of relevant studies (Leong et al., 2014). In part, this is likely due to a preference within the construction industry to focus research on project costing and quality outcomes rather than QM systems (Soetanto, Proverbs, & Holt, 2001; Xiao & Proverbs, 2002). The implications of poor quality increase cost through reduced productivity, increase rework and result in reputational damage for both client and contractor organisations (Jha & Iyer, 2006).

Findings from a review of academic literature are synthesised and categorised into key factors that either contribute or inhibit successful implementation of QM.

Contributing factors

This review is constructed such that factors that contribute to delivery of successful QM outcomes should be enhanced or introduced. Key contributing factors derived

from the research were: 1) Leadership and Management Commitment, 2) Culture, 3) Resourcing, 4) Employees and 5) Systems and Processes.

1. Management commitment and leadership:

A key finding of Hoonakker, Carayon and Loushine's (2010) empirical study that leadership and management commitment is an essential factor for successful QM implementation is well supported throughout the literature (Ahmed et al., 2017; Jha & Iyer, 2006; Kumar, Khurshid, & Waddell, 2014; Leong et al., 2014; Loushine et al., 2004; Loushine, Hoonakker, Carayon, & Smith, 2006; Siddiqui, Ullah, Thaheem, & Gabriel, 2016; Sypsomos, 1997). Of note, a study of 92 English and 64 Australian manufacturing companies (Kumar et al., 2014) found that management commitment and leadership was the most critical success factor for QM. On the contrary, where management commitment is lacking, organisations often see QM certification as a marketing tool (Ahmed et al., 2017), or simply a certificate on the wall to satisfy client requirements (Brooks & Spillane, 2017). Some researchers found an interesting relationship between safety and quality implementation (Loushine et al., 2004, 2006; Low & Shiua, 2000). This is particularly relevant for the NZ construction industry because there has been a strong emphasis on safety that has greatly improved safety culture that could possibly be replicated for quality.

2. Culture:

The culture and attitude of an organisation toward quality is a key factor for successful implementation(Ahmed et al., 2017; Brooks & Spillane, 2017;

Hoonakker et al., 2010; Leung, 2017; Tam, Deng, Zeng, & Ho, 2000). In Australia, Roading Agencies associated with Austroads found poor quality culture led to disregard for quality assurance process and allowed manipulation of records and reluctance to notify non-compliance to become commonplace (Balfe, 2018). The linkage between safety and quality leadership (Loushine et al., 2004, 2006) suggests an opportunity to develop quality culture within NZ industry including all management and employees.

3. Resourcing:

Adequate resourcing is necessary to give effect to successful QM system (Cachadinha, 2009; Kumar et al., 2014; Loushine et al., 2004). In their comparative study of 156 manufacturing SME's in Australia and UK, Kumar et al. (2014) found that lack of resources was a common impediment to quality outcomes. Key reasons found include a lack of QM dedicated resource, financial constraints (Cachadinha, 2009) and scarcity (Low & Shiua, 2000). The quality of resource is as important as the quantity, and employees are an important component.

4. Employees:

In a study of 45 construction companies, Patil, Ullagaddi, and Jugati (2012) found that employees play a significant role in successful QM. In particular, their findings that employee empowerment, well-being, motivation and training not only job specific requirements but in QM, all contribute to success are well supported in the literature across industry and country (Ahmed et al., 2017; Hoonakker et al., 2010; Kumar et al., 2014; Leung,

2017; Loushine et al., 2004, 2006; Sypsomos, 1997). In his case study, Cachadinha (2009) makes an interesting observation that employees depended on informal, defacto organisational structures and validation from informal leaders where change was required.

5. Systems and Processes

Hard factors (Sypsomos, 1997) such as systems and processes are also important for successful QM implementation. Hoonakker et al. (2010) empirical study found that systems and processes are necessary to support the implementation of QM, enabling continual improvement, incentivising good performance (Ahmed et al., 2017; Hoonakker et al., 2010; Kumar et al., 2014) and developing the ability to benchmark and adopt a learning cycle (Abdirad & Nazari, 2015).

QM systems themselves are most effective when integrated with existing business processes where possible rather than being a stand-alone or secondary process (Low & Shiua, 2000; Leong et al., 2014) or a non-productive 'paper work' exercise (Ahmed et al., 2017; Brooks & Spillane, 2016). Kumar et al, 2014 found success through integration of QM practices with business strategy and customer, supplier and employee procedures.

Inhibiting factors:

This review is constructed such that factors inhibiting delivery of successful QM outcomes should be minimised, mitigated or eliminated within the model derived from the research. It should be noted that the absence of any 'contributing factor' mentioned will inhibit quality outcomes.

Key inhibiting factors found through the research were:

1) Commercial Pressures, 2) Variability of process and 3) Conflict between parties.

1. Commercial Pressures:

   Commercial pressures introduced through procurement practice incentivising lowest price tenders is found to be a common issue across countries and industry (Ahmed et al., 2017; Hoonakker et al., 2010; Loushine et al., 2004). Adversarial contract models can create an atmosphere of distrust and conflict where protection against litigation (Hoonakker et al., 2010) becomes the primary driver instead of common quality and customer focused outcomes (Loushine et al., 2006)

2. Variability of process:

   A primary factor found to inhibit successful QM effectiveness was variability of process, as in the case of the construction industry (Cachadinha, 2009; Hoonakker et al., 2010; Loushine et al., 2006). Unlike manufacturing or other industries, construction has a high degree of variability through ever-changing locations, equipment where conditions are always different (Bubshait & Al-Atiq, 1999).

3. Conflict between parties:

   Three studies identified differing groups for whom conflict can adversely QM outcomes. Firstly, Abdirad and Nazari's (2015) study in the architectural industry found conflict between constructor and client often arises from poorly articulated expectations of specifications or poor collaboration in decision making. Hoonakker et al. (2010) observed that although the project goal is often shared, parties often differ in what they hope to gain from the

construction process. Another aspect of conflict that is pertinent to QM effectiveness is the interaction between quality and production departments (Brooks & Spillane, 2017; Cachadinha, 2009). Interestingly, Cachadinha (2009) found that the appointment of experienced practitioners, who had the respect of production personnel lead to more constructive quality discussions and better outcomes.

Implementation:

A wide range of guides for implementing QM exists within academic literature (Aniyan, 2002; Berry, 1991; Garza-Reyes, Rocha-Lona, & Kumar, 2015; Kanji, 1996; Lee & Lam, 1997), although most are based on experience within large, well-resourced companies (Sawant et al., 2018). Consequently, they tend to be overly complex, prescriptive or onerous in terms of data and resource, thereby limiting their practicality and applicability to small and medium sized enterprises (SME) (Yusof & Aspinwall, 2000) like those that comprise the NZ industry.

In their research, Yusof and Aspinwall (2000) analysed a sample of 12 existing implementation frameworks. As part of their research they categorise each framework's steps into Deming's (1986) 4 step cycle, Plan-Do-Check-Act. However, they argue that quality gurus such as Deming (1986) or Crosby (1992), did not actually develop an implementatable framework. Although several studies have been undertaken to analyse the success of QM implementation (Chin, Poon, & Pun, 2000), there are few that have reported QM from inception through implementation (Sawant et al., 2018). Yusof and Aspinwall (2000) recommend the following characteristics for future research into QM frameworks that align with this

research's intent to create a practical, intuitive and implementable framework model:

- systematic and easily understood; ·
- simple structure; ·
- clear links between elements which are presented; ·
- general enough to suit different contexts; ·
- represent a road map and a planning tool for implementation;
- answers `how to?', and not `what is?' QM; ·
- implementable.

Sawant (2016) developed a detailed but simple 7 step framework (refer Figure 1) that is exceptional amongst academic literature. Firstly, because meets the criteria Yusof and Aspinwall (2000) prescribe. Secondly, because he subsequently validated implementation of his framework within a small manufacturing company (Sawant et al., 2018). Further, a key finding from Sawant's (2016) analysis of 19 quality implementation frameworks was that where QMS implementation is poorly executed or based on external motivation that it will have a negative effect on an organisations performance. His finding reflects a shortcoming that typical in quality management implementation literature reviewed, that there is limited focus on recognised change management process when implementing QM frameworks.

For companies, QM implementation represents change, often significant, whether systems are being improved or developed from inception. Accordingly, to enhance the chance of success of any QM framework implementation, guidance from change

management best practice should be applied. Kotter (2009) draws upon decades of change management experience to outline key failures to implement change include a lack of urgency, under-communication, short term thinking and failure to get critical people on board. His seminal paper on change management, Kotter (2009) sets out an 8-step process for change management that includes:

1. Establish a sense of urgency
2. Form a powerful guiding coalition
3. Create a vision
4. Communicate the vision
5. Empower others to act on the vision
6. Plan for and create short term wins
7. Consolidate improvements and produce still more change
8. Institutionalize new approaches

Other change management principals applicable to a quality management improvement effort include: setting the stage for acceptance of the change, creating a frame that enables employees to interpret the intent clearly, managing the mood of employees through the change process, and finally, reinforce behavioural guidelines and avoid backsliding (Garvin & Roberto, 2005). The use of change management elements to underpin the structure of this research's model output will improve implementation execution and therefore the chance of success.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Field research – Contract Assurance Audit (Objective 3)

In the context of the research, primary source field research in the form of an audit on two existing NOC contracts held by Tier 1 Contractors was undertaken to achieve Objective 3;

Objective 3: Identify critical factors affecting quality outcomes including the level of adherence to QM within the road construction industry

An assurance audit is an uncommon means to obtain research data. However, this method was selected because it provides direct and objective data on actual QM performance. To demonstrate adherence to their QM system, records from actual completed works were required. This improves the credibility and value of research findings within the target industry. It also provides an opportunity to explore factors specifically affecting the NZ roading industry to validate or add to those found through secondary research.

Research Method:

Although a subtle distinction, an assurance audit as per ISAE3000:2013 was selected in favour of a compliance audit as per ISO19011:2018, because the risk of contractual repercussions would potentially affect the level of openness and engagement from contractors. In practice, this simply means that the audit findings are presented as 'improvements' rather than 'non-compliances'. The audit framework was developed around Denning's Plan-Do-Check-Act cycle (Moen & Norman, 2006). It provides insight into how contractors plan and implement QM and continuous improvement to assure quality outcomes.

Practical Benefits – Field research: Assurance Audit:

Firstly, notwithstanding the audit findings, feedback from participants concluded that the audit itself had unintended value by obligating a focus on QM that would not otherwise have occurred. It promoted healthy introspection and discussion about business processes that identified possibilities for integration and optimisation. Lastly, it was an opportunity to reflect on learnings and how they could be disseminated back into the business.

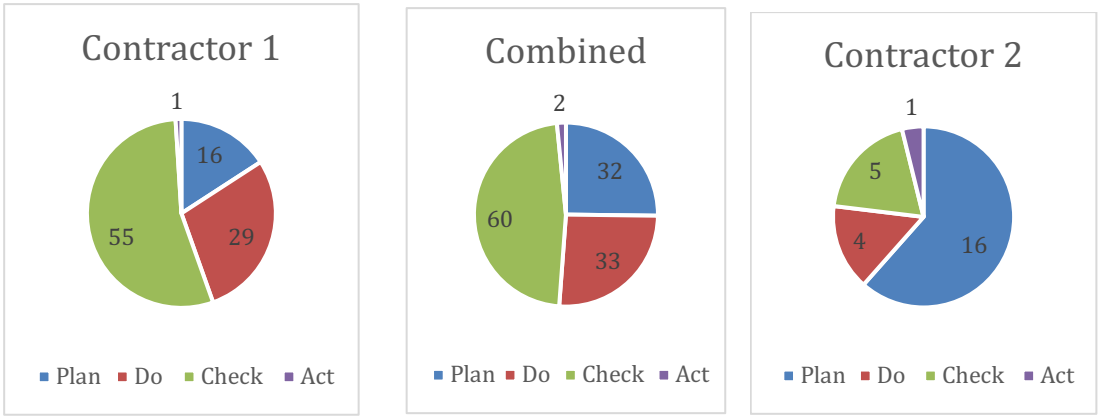
Analysis and Summary – Field Research:

The findings and improvement recommendations of each audit were reported and shared with auditees in accordance with ISEA3000:2013. The reports are detailed to each specific section and are 55 and 57 pages in length.

The audit framework was structured around Denning's Plan-Do-Check-Act cycle (Moen & Norman, 2006). Improvement opportunities arising from the audit were categorised in terms of Denings cycle for both contractors audited respectively.

This enabled interpretation of the level of adherence through each critical phase of QM development and implementation. The following graphs present the audit findings:

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com



In summary, conclusions drawn from this field research are discussed relative to Objective 3. Firstly, level of adherence to QM and secondly it explores the key industry specific factors affecting QM.

The findings find there is considerable opportunity to improve QM and therefore outcomes. The two contractors audited were at different stages of QM maturity. One had very few processes, so opportunity to develop and build. The other had too many processes and forms, so the opportunity exists to clarify, optimise and integrate QM processes.

Interestingly, the level of contingent liability carried by each contractor correlated with the level of adherence to QM. Better adherence resulted in lower contingent liability for poor performing works.

With regard to the factors found in the field to affect quality outcomes, those industry specific factors are reasonably well aligned with those found through secondary literature review (Objective 2). A key observation was that the factors

found to affect QM had a direct relationship with the level of adherence. For example, the 'systems and processes' factor was much lower for one contractor resulting in lower level of adherence.

The audit confirmed leadership commitment is arguably the most critical factor but found that although there was genuine intent toward QM, the reality is that robust implementation is not commonplace.

This was particularly noticeable through the inability to provide succinct, or any, quality records to verify the quality of the work. Although there was generally good discussion on what constitutes QM, there was acknowledgement that the knowledge of QM is limited to relatively few experienced employees. Further, where there was a plethora of forms, or confusion regarding requirements, QM was typically neglected, this highlighted the importance of integrated processes with equally succinct document management provision. This also led to discussions around client involvement and the need for clarity of expectations and requirements. Improvements were identified that could enable the preparation of quality documents comprising realistic QM processes that align or integrate with operating procedures

Field research - interviews (Objective 4)

In the context of the research, the purpose of the interviews was to provide primary source validation of the factors found through this research thus far. The validation enables refinement of the factors that would be considered to shape the model

developed as the output of this research. A series of structured interviews were selected as a source of primary data to achieve Objective 4;

Objective 4: Validate and refine critical factors arising from research

Research Method:
A series of structured interviews (Denscombe, 2017, p. 204) were selected because the data collected could be kept consistent but with opportunity to probe salient points. The interview questions were constructed to gain insight into perceptions of critical factors affecting quality from people with a range of roles and responsibilities within industry.

Taking a pragmatic approach (Denscombe, 2017, p. 47) a sample size that was achievable within the time available and sufficient to give confidence that results are representative. Further, a purposive sampling approach (Denscombe, 2017, p. 41) was used to select 11 interviewees from Client (4), Contractor (4) and Consultant (3) organisations. Within each group interviewees held a range of positions with varying quality associated responsibility: national, regional and local (contract level).

Analysis and Summary - Research interviews (RO 4):
The purpose of the interviews was to validate and refine factors that would be used to develop the model and achieve RO 4. Based on responses, a range of conclusions relative to the critical factors are drawn in the following discussion (for clarity,

salient points or factors are bold). The discussion also extends into the implications for the model development.

Firstly, the research found that an acceptable percentage of failed work ranged from 0 to 10 years, with an average of 4.2%. When this is reconciled with the current rate of 22% (refer RO 1), the value and opportunity presented by EQIM is highlighted.

One key takeaway was the prevalence of commercial pressures cited as the main contributing factor when poor quality occurs by 50% of interviewees, with commentary such as "everything is delivered to absolute lowest cost" or "it's all about time, delays cost money, don't stop". This has been added as a critical factor to be addressed through the EQIM. In response, this supports a focus on optimisation and process integration of operational and quality processes within the model, which will serve to reduce time delay associated with undertaking QM activities thereby reducing commercial pressures.

Discussion around culture provided interesting insight and is certainly a key factor. Although the average score for industry culture was 3.2 (average to good) post interview discussion drew comments such as: "culture is all talk the talk but not walk the walk", "quality is a lot of shallow discussion". The resulting disengagement minimised the perceived value and subsequent implementation of QM. Ironically, the disconnect between the score and the commentary itself suggests a culture issue because individuals are less accepting of their own part in the perceived problem. As well as validation of culture it also highlights the importance of leadership. Only strong leadership by example would drive a change

in culture so individuals are empowered to decide to stop or delay work where time or cost implications will result.

The reliance on experienced, employee knowledge for good quality outcomes was a key finding that gave cause for concern. Firstly, there are decreasing numbers of experienced individuals as reflected by one interviewee's comment that "increasingly need to rely on processes because the skills and experience just aren't there anymore". Secondly, failure to follow best practice process or lack of experience and skill was cited by 80% of interviewees as the main contributing factor of poor quality. Within the model, this highlighted the importance of inclusion of two critical factors; both employees and systems and processes. Further that to mitigate the 'employee' risk as experienced people move on, systems and processes must be improved to reduce reliance on experienced individuals.

An interesting post interview discussion revealed that one interviewee had previously established a quality culture akin to health and safety. It was on a performance-based contract, where all risk for quality and rework is carried by the contractor. Their focus on quality included having quality on every meeting agenda, specific quality meetings, focus on opportunities for improvement (OFI) and lessons learnt. Quality was part of the everyday discourse. However, it fell apart with a change in leadership that exposed the importance of building robust and enduring culture, and the importance of strong and quality-focused leadership. It highlights vulnerability relying on a singular leader to drive culture. In response, adoption of change management best practice particularly Kotter's (1998) concept of a guiding

coalition of influential people should provide resilience and protection against the scenario experienced by that interviewee.

Procurement and contract model were cited by several interviewees as a method by which client organisations could improve quality. Although out of scope for this research it is worthy of inclusion within the 'implications for future research' section of this paper.

Research conclusion:

The purpose of this research conclusion is to consolidate the various research findings and summaries in terms of the research Project Aim, RQ's and RO's. This provides clarity of the salient points that need to flow through to the recommended model.

The Project Aim is to develop a practical model detailing how to implement improvement in quality management (QM) that incorporates the optimal combination of factors impacting quality. The intent is not to restate detail contained within relevant sections of the report, rather focus on the salient points to be carried forward into the recommended model in the context of each research question.

Research Question 1: What is the current level of construction quality in road construction projects?

Understand the prevalence and implications of sub-optimal QM outcomes for the NZ State Highway network. (Objective 1):

Prevalence: The research concludes that sub-optimal quality outcomes are prevalent within industry. This assertion is supported by secondary source research finding that 74% of renewals constructed nationally do not meet contract performance criteria. Primary source research in the form of interviews and discussions during assurance audit.

Implications: The primary implications of the sub-standard quality are considered in terms of cost, asset life and level of service. The data find that cost implication is currently $50M nationally, comprised by all 19 NOC's ranging from $213k to $8.9M per contract. Further, sub-standard quality results in reduced life expectancy before the asset requires renewal investment again, increasing future financial burden on client organisations. Lastly, for every failed site, defects such as potholes and repairs result in a poor level of service for road users.

Research Question 2: What are the prominent factors contributing to, or inhibiting delivery of acceptable quality outcomes in road construction projects?

The response to Research Question 2 utilises both secondary and primary source research to identify and then validate factors affecting quality outcomes. This research is distributed over 3 research objectives that ensured industry specific primary source application and validation was applied to findings of an extensive secondary source literature review.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

Critical factors: Figure D presents the final set of research validated factors that will flow through to the model developed and recommended by this research. In the context of the recommended model, contributing factors are to be enhanced or introduced whereas inhibiting factors are minimised, mitigated, or eliminated.

Figure D: Final set of factors affecting quality derived from research

Contributing Factors	Inhibiting Factors
Leadership & Management commitment	Variability
Culture	Commercial pressures
Resourcing	Conflict between parties
Employees	
Systems and Processes: including document management	
Knowledge of QM	
Process Integration between operational and quality process	

Primary source research was undertaken to validate prior findings and to identify the contribution that QM implementation has on the level of quality performance in road construction. The assurance audit found that the level of adherence to QM within the road construction industry varied depending on QM maturity. The data indicated an inverse correlation relationship, where lower contingent liability was observed where adherence was better.

Implementation:

A key aspect of the Project Aim is to produce a model that is practically implementable, which is distinct from most quality frameworks in the literature. The following characteristics shall guide model development (Yusof & Aspinwall, 2000):

1 Systematic and easily understood; ·
2 Simple structure; ·
3 Clear links between elements which are presented; ·
4 General enough to suit different contexts; ·
5 Represent a road map and a planning tool for implementation; ·
6 Answers `how to?', and not `what is?' QM; ·
7 Implementable.

To achieve these characteristics, the model developed and recommended from this research needs to mould and synthesise the various key elements from both change management and QM implementation best practice. The research found Kotter's (1998) eight steps and Garvin and Roberto (2005) seminal change management methods particularly relevant. Further synthesis with Sawant et. al's (2018) QMS implementation framework will form a sound basis from which to build a bespoke implementation model and meet the research Project aim.

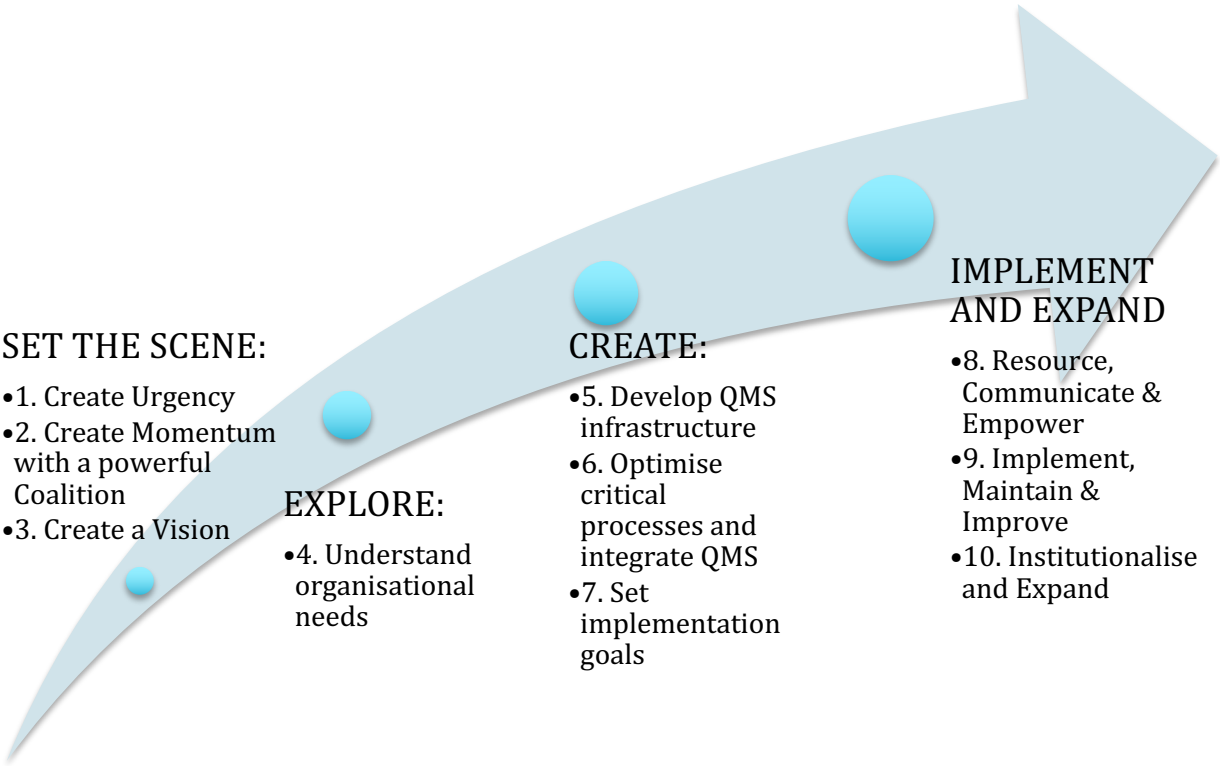
Objective 5: Develop a practical, implementable model to improve QM that incorporates the optimal combination of factors impacting quality outcomes

Based on the research, the EQIM model framework developed has 4 main phases that contain 10 intuitive steps, refer Figure E. The structure deliberately merges best

practice change management with QM framework and implementation findings. Further, the framework is designed to enable incorporation of critical factors that collectively detail the process for 'how' an organisation can implement quality improvement thereby achieving RQ 3 and the Project Aim.

The research found that although QM frameworks articulate the 'why' and 'what' of QM, they typically provide little or no detail regarding the 'how' to implement QM (Yusof & Aspinwall, 2000). This research addresses that and the full thesis provides a detailed implementation plan that includes objective, applicable critical factors, outputs / deliverables and actions for each step.

Figure E: EQIM model (Enduring Quality Improvement Model



For the purposes of this publication it is not possible to include full details. Accordingly, each step in the model is described below in terms of its objective and the context of applicable critical factors. The nuance of some factors vary depending on the context of the particular step within the model:

FIRST PHASE - SET THE SCENE (Steps 1, 2 & 3):

Step 1: Create Urgency.

- Objective:

  Setting the scene for acceptance by develop compelling reasoning that will convince others of the need to improve quality
- Context of applicable critical factor(s) from research:
  - Leadership & management commitment

    Leaders need to recognise and be compelled to support the need to change and improve quality. Without their support, the effort is destined for failure.

Step 2: Create momentum with a powerful coalition.

- Objective:

  Assemble and motivate a group of people with influence through all levels of the organisation
- Applicable critical factor(s) from research:
  - Leadership & management commitment – formation of a coalition identifies key individuals who have influence throughout the organisation to advocate and lead the improvement process. This will include formal and informal leaders from all levels in the organisational structure.

- Employees – Key leaders and influencers within the coalition provide direct, practical input. Further, not limiting the group to senior manager by having informal leaders from all organisation tiers add credibility amongst their employee peers.
- Culture – a coalition provides the emphasis to change 'the way we do things' that will ultimately drive positive culture change
- Reduce conflict between parties – the composition of the coalition should represent all affected parts of the business. Joint participation reduces the chance of conflict because parties are unlikely to want to tear down something they helped build.

Step 3: Create a vision.

- Objective:
  Articulate an ideal future state
- Applicable critical factor(s) from research:
- Leadership & management commitment – leaders need to drive development of the vision to ensure alignment with wider organisational strategy.
- Culture – the vision should become a 'north star' to aspire to, and therefore direct the culture of the organisation.

Second phase – explore (Step 4):

Step 4: Understand organisational needs and processes.

- Objective:
  Analyse operational activities relative to QM processes
- Applicable critical factor(s) from research:

- Systems and processes – in depth analysis of the organisations processes and supporting systems is undertaken, including reconciling any existing QM processes.
- Employees – employee participation is essential to gain robust understanding of processes. Through engagement, employee buy-in and support for the process and is improved.

Third phase – create (Steps 5, 6 &7):

Step 5: Develop QMS infrastructure.

- Objective:
  To build a QMS framework that meets organisational needs and aligns with the Vision
- Applicable critical factor(s) from research:
  - Systems and processes – development of a fit-for-purpose QM system framework that guides and enables the development of the detailed QM processes.

Step 6: Optimise critical processes and integrate QMS principles.

- Objective:
  To prioritise, optimise and integrate critical operational with QM processes as seamlessly as possible
- Applicable critical factor(s) from research:
  - Employees – employee insights and engagement to identify process elements is important to ensure outputs are optimised and fit-for-purpose for use in the field.

- Systems and processes – activities critical to the business are identified, reviewed and optimised. For each activity, supporting QM processes are considered and developed.
- Process integration – importantly the operational and QM elements within their respective processes are mapped and integrated to the maximum extent possible. Further, processes should be adapted to increase integration where possible.
- Reduce Variability – development of clear, integrated and fit-for-purpose systems and processes will improve clarity and repeatability thereby reducing variability.
- Resources – the development of processes must consider and articulate the resource requirements necessary.

Step 7: Set implementation goals.

- Objective:

  Develop long and short-term goals that will track progress and achievements
- Applicable critical factor(s) from research:
  - Leadership & management commitment – setting clear goals will enable leaders to both track performance and improve motivation of employees through regular achievement of goals.
  - Culture – regular recognition of success through the change process will reinforce new cultural behaviours
  - Systems and processes – will need to be structured or established to provision data required to measure achievement of goals.

Fourth phase - implement and expand (Steps 8, 9 &10):

Step 8: Communicate and empower.

- Objective:

  To get employees engaged, supportive and motivated to implement the EQIM
- Applicable critical factor(s) from research:
  - Leadership & management commitment – this is where leaders earn their crust. Reiterating the 'sense of urgency', leaders need to compel and inspire employees to engage and buy-in to the process.
  - Employees – it is important to gain employee buy-in to assure commitment to implementation and enable genuine feedback for improvements. Employees need to feel empowered, see value and have a sense of ownership.
  - Culture – the process will create a change in 'the way we do things around here'. A culture that empowers employees through encouragement of honest feedback and continuous improvement is critical.
  - Knowledge of QM – through the communication of the new, integrated processes developed, employee knowledge of QM will increase dramatically. They will be clear on requirements and expectations as well as how QM relates and integrates with their routine activity.
  - Reduce conflict between parties – joint communication by 'coalition' members who have influence across the organisation will ensure the message resonates authentically. Further, reinforcing inclusion and flexibility assures people that they are empowered to propose and discuss improvements through an established process reducing the likelihood of conflict.

Step 9: Implement, maintain and improve.

- Objective:

  To give effect to the EQIM

- Applicable critical factor(s) from research:
  - Leadership & management commitment – leaders need to be vigilant and ensure that the momentum of the process is maintained. This requires frequent monitoring and commitment to make improvements rapidly.
  - Employees – engaged employees will implement new processes and actively seek opportunities for improvement.
  - Culture – employees contributing improvements that are recognised and implemented quickly by management will create a culture of inclusiveness, empowerment and agility.

Step 10: Institutionalise and expand.

- Objective:

  To expand the successful EQIM to other processes or parts of the business

- Applicable critical factor(s) from research:
  - Leadership & management commitment – leaders will need to recognise the strengths and limitations of the EQIM itself and adjust to enable successful expansion.
  - Systems and processes – as the EQIM expands into other areas or activities, consideration must be given to new systems or the suitability of existing systems.
  - Resources – importantly as the EQIM is expanded, resource levels must be reviewed to meet the organisational needs under EQIM.

Journal of Asia Entrepreneurship and Sustainability
www.asiaentrepreneurshipjournal.com

A detailed implementation plan is outlined within the full thesis that additionally includes: Actions and outputs / deliverable for each step.

Implications for further research

Implications for further research are set out below:

1. Implementation: The model building research approach establishes the basis for an 'action research' cycle (Denscombe, 2017) that would enable analysis, validation and iterative development through implementation of the EQIM.
2. Expand to other industries: Although, the research focuses on the road construction industry the findings are such that the EQIM could be applied to other industry. Further research could be undertaken to test the applicability of this research's findings, conclusions and model to other industries.
3. Contract and Procurement model: Commercial tension arising from contract or procurement model was a common cause for sub-optimal quality stated by interviewees through this research. Further research could be undertaken to determine the optimal procurement and contract models for quality outcomes.

References:

Abdirad, H., & Nazari, A. (2015). Barriers to effective implementation of quality management systems in public design projects in Iran. Architectural Engineering and Design Management, 11(6), 457-474. doi:10.1080/17452007.2015.1049973

Ahmed, M. A., Coffey, V., & Xia, B. (2017). The requirements of developing a framework for successful adoption of quality management systems in the construction industry. International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 11(1), 183-191.

Aniyan, S. (2002). Quality management system implementation at KELTEC-a case study. Defence Science Journal, 52(4), 393-402.

Balfe, P. (2018). Austroads webinar: Guide to project delivery part 5: Road construction quality assurance.

Berry, T. H. (1991). Managing the total quality transformation: McGraw-Hill.

Brooks, T., & Spillane, J. P. (2016). Does inappropriate quality control demotivate workers? A critical review.

Brooks, T., & Spillane, J. P. (2017). Lies, damned lies and quality management systems: a pilot case study.

Bubshait, A. A., & Al-Atiq, T. H. (1999). ISO 9000 Quality Standards in Construction. Journal of Management in Engineering, 15(6), 41. doi:10.1061/(ASCE)0742-597X(1999)15:6(41)

Cachadinha, N. (2009). Implementing quality management systems in small and medium construction companies: A contribution to a road map for success. Leadership and Management in Engineering, 9(1), 32-39.

Chin, K.-S., Poon, G. K., & Pun, K.-F. (2000). The critical maintenance issues of the ISO 9000 system: Hong Kong manufacturing industries' perspective. Work Study, 49(3), 89-99.

Crosby, P. B. (1992). Completeness: Quality for the 21st century: Penguin.

Deming, W. E. (1986). Out of the crisis: Quality. Productivity and Competitive Position, Massachusetts, USA.

Denscombe, M. (2017). The good research guide : for small-scale social research projects (6th ed ed.): McGraw-Hill Education/Open University Press.

Garvin, D. A., & Roberto, M. A. (2005). Change Through Persuasion. Harvard Business Review, 83(2), 104-112.

Garza-Reyes, J. A., Rocha-Lona, L., & Kumar, V. (2015). A conceptual framework for the implementation of quality management systems. Total Quality Management & Business Excellence, 26(11-12), 1298-1310.

Hoonakker, P., Carayon, P., & Loushine, T. (2010). Barriers and benefits of quality management in the construction industry: An empirical study. Total Quality Management, 21(9), 953-969.
ISAE. (2013). International standard on assurance engagements 3000 revised: Assurance engagements other than audits of reviews of historical financial information.
Jha, K. N., & Iyer, K. C. (2006). Critical Factors Affecting Quality Performance in Construction Projects. Total Quality Management & Business Excellence, 17(9), 1155-1170. doi:10.1080/14783360600750444
Juran, J. M., & Godfrey, A. B. (1999). Juran's quality handbook (Fifth edition ed.): McGraw-Hill Education.
Kanji, G. K. (1996). Implementation and pitfalls of total quality management. Total Quality Management, 7(3), 331-343.
Keenan, M., & Rostami, A. (2019). The impact of quality management systems on construction performance in the North West of England. International Journal of Construction Management, 1-13. doi:10.1080/15623599.2019.1590974
Kotter, J. P. (1998). Winning at change. Leader to leader, 10(Fall), 27-33.
Kotter, J. P. (2009). Leading change: why transformation efforts fail. IEEE Engineering Management Review, Engineering Management Review, IEEE, IEEE Eng. Manag. Rev., 37(3), 42-48. doi:10.1109/EMR.2009.5235501
Kumar, M., Khurshid, K. K., & Waddell, D. (2014). Status of Quality Management practices in manufacturing SMEs: a comparative study between Australia and the UK. International Journal of Production Research, 52(21), 6482-6495. doi:10.1080/00207543.2014.948574
Lee, Y., & Lam, K. (1997). Managing quality at an engineering maintenance centre: from QCC to ISO 9001 and beyond. International Journal of Quality & Reliability Management, 14(2), 118-137.
Leong, T. K., Zakuan, N., & Saman, M. Z. M. (2014). Review of quality management system research in construction industry. International Journal of Productivity and Quality Management, 13(1), 105-123.
Leung, C., Destremau, K., Pambudi, D., & Bealing, M. (2017). Benefits from Auckland road decongestion. New Zealand Institute of Economic Research.
Loushine, T. W., Hoonakker, P., Carayon, P., & Smith, M. J. (2004). The Relationship between Safety and Quality Management in Construction. Proceedings of the Human Factors & Ergonomics Society Annual Meeting, 2060-2064.
Loushine, T. W., Hoonakker, P., Carayon, P., & Smith, M. J. (2006). Quality and safety management in construction. Total Quality Management and Business Excellence, 17(9), 1171-1212.

Low, S. P., & Shiua, S. C. (2000). The maintenance of construction safety: riding on ISO 9000 quality management systems. Journal of Quality in Maintenance Engineering(1), 28. doi:10.1108/13552510010311327
MacDonald, J., Cousins, M., Kiriona, K., Hook, T., & McCracken, S. (2017). 2015-16 Looking back review: Operations and maintenance investment achievement. New Zealand Transport Agency.
Moen, R., & Norman, C. (2006). Evolution of the PDCA cycle: Citeseer.
MoT. (2018). Government policy statement on land transport. Ministry of Transport Retrieved from https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/c6b0fea45a/Government-Policy-Statement-on-land-transport-2018.pdf.
Patil, B., Ullagaddi, P., & Jugati, D. (2012). An investigation of factors impelling effective and continuous improvement of Indian Construction Industries Quality Management Systems. Paper presented at the IEEE-International Conference On Advances In Engineering, Science And Management (ICAESM-2012).
Sawant, M. A. (2016). A quality management system implementation framework for small-sized companies. North Dakota State University.
Sawant, M. A., Yadav, O. P., & Rokke, C. (2018). A practical quality management system implementation framework for small-sized companies. International Journal of Intelligent Enterprise, 5(1-2), 173-193.
Siddiqui, S. Q., Ullah, F., Thaheem, M. J., & Gabriel, H. F. (2016). Six Sigma in construction: a review of critical success factors. International Journal of Lean Six Sigma, 7(2), 171-186.
Soetanto, R., Proverbs, D. G., & Holt, G. D. (2001). Achieving quality construction projects based on harmonious working relationships ‐ Clients' and architects' perceptions of contractor performance. International Journal of Quality & Reliability Management(5), 528. doi:10.1108/02656710110392836
Sunk, A., Kuhlang, P., Edtmayr, T., & Sihn, W. (2017). Developments of traditional value stream mapping to enhance personal and organisational system and methods competencies. International Journal of Production Research, 55(13), 3732-3746. doi:10.1080/00207543.2016.1272764
Sypsomos, M. G. (1997). Beyond project controls--the quality improvement approach. AACE International Transactions, 262.
Tam, C. M., Deng, Z. M., Zeng, S. X., & Ho, C. S. (2000). Quest for continuous quality improvement for public housing construction in Hong Kong. Construction Management & Economics, 18(4), 437-446. doi:10.1080/01446190050024851

Xiao, H., & Proverbs, D. (2002). The performance of contractors in Japan, the UK and the USA : An evaluation of construction quality. International Journal of Quality & Reliability Management(6), 672. doi:10.1108/02656710210429564
Yusof, S. R. M., & Aspinwall, E. (2000). Total quality management implementation frameworks: comparison and review. Total Quality Management, 11(3), 281-294.