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Rere Āwhio – Journal of Applied Research and Practice is an open access, peer reviewed journal published annually by Otago Polytechnic Auckland International Campus (OPAIC), Auckland, New Zealand.

Rere Āwhio is concerned with research and current topical issues relating to fields in higher vocational and professional tertiary education which are relevant to our programmes at OPAIC, whether focused on New Zealand or an international context. Of particular interest are submissions concerning applied management, information technology, construction, foundational English and related fields. Submissions regarding transdisciplinary issues are also very welcome, such as bicultural responsiveness in education, sustainability, pedagogical models, classroom practice, and online learning. **Rere Āwhio** may consider submissions outside of those fields provided they are clearly linked to at least one of OPAIC's programmes of study. The journal aims to build a community of practice amongst researchers and students from an array of New Zealand institutions and with wider global networks.

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Submission should include: an abstract of no more than 300 words, with final article submissions no longer than 4000 words (less for other formats); a short biography of no more than 50 words for each author, briefly outlining their professional background and experience; and contact information (postal, email and telephone number). This information should be provided on a cover sheet, with all such information withheld from the body of the submission. Low resolution images with full captions should be inserted into the text to indicate where they would be preferred, and high-resolution images should be sent separately with copyright permissions attached where relevant.

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Bruno Balducci, Bing Dai and Lorraine Skelton

Kia ora koutou katoa, nau mai haere mai, and welcome to Issue Three of **Rere Āwhio**.

In this edition, we are delighted to showcase a diverse selection of collaborative articles and papers that attest to the vibrant research community of staff and students at Otago Polytechnic Auckland International Campus, as well as other New Zealand providers of tertiary education. Encompassing a wide spectrum of research interests, these contributions are interconnected by their practical concerns and real-world applications in technology, management, business, the environment and society at large. Our authors have investigated topics in the construction industry, insurance, tourism, property management, mobile marketing and public transport. From Building Information Modelling (BIM), financial technology, and digital transformation to quantity surveying, employee and company performance, food waste, climate change, sustainable growth and international social work, their writings traverse a broad landscape of issues and contexts.

Many of the themes that emerge from this research reflect the growing impact of technology on a changing world. BIM is explored in two separate articles, the first dealing with BIM adoption by Omer Altaf and the second focusing on integrating BIM and Wearable Technologies for Fall-from-height Management by Indrapriya Kularatne and Joyce Castillo. Indrapriya Kularatne has in fact collaborated on a number of different projects relating to technology: with Sheyda Razizadeh on the adoption of artificial intelligence in Auckland public transport; with Kashmira More on the use of chatbots to improve customer satisfaction and business efficiency; and with Chengyun Wang, Shafiq Alam and Bing Dai on the potential benefits of digital transformation on the structuring processes of organisations. Meanwhile, the strategic integration of mobile marketing in small and medium-sized businesses in Invercargill is the focus of an investigation by Kosala Liyanage, Sanjeev Acharya and Chandra Poudyal.

Management-related topics are also discussed in a range of other studies in the context of the tourism industry, call centres, property management and agency costs. In their literature review, Natalia Tormysheva and Yury Zhukov analyse the customer behaviour of tourists in Aotearoa New Zealand since the 2022 post-COVID reopening of borders. Rashmi Manmohan Acharya and Edwin Rajah delve into current performance review processes in call centres aimed at enhancing employee performance. Seohee Han and Olufemi Omisakin examine how to provide a high level of customer service to tenants and landlords in property management. Finally, Swati Puri demonstrates the impact of leverage on the performance of small and large publicly listed companies.

Environmental problems are addressed by Mary Mendoza and Bing Dai in their article on how the insurance industry is adapting to climate change, and by Rajeev Chawla and Christine Santiago on food waste management in the meal-kit industry. Last but not least, this edition also provides insights into social issues. Si Wai Tong and Lorraine Skelton's inquiry into church growth and sustainability looks at the challenges facing the New Zealand Lutheran Church in a changing society, while Ziaul Jewel's appraisal of international social work in the integration of immigrants highlights diversity and inclusion in the workplace.

This compilation of research papers reflects the dedication and innovation of scholars and practitioners in this country. We hope that their efforts will spark meaningful discussions, inspire further research, and ultimately drive positive change in the future. As we continue to evolve, adapt, and innovate, this journal will endeavour to remain a valuable platform for the exchange of knowledge and ideas.

A REVIEW OF BIM ADOPTION AND BARRIERS TO QUANTITY SURVEYING PRACTICE IN NEW ZEALAND

Omer Altaf

OTAGO POLYTECHNIC AUCKLAND INTERNATIONAL CAMPUS

ABSTRACT

Building Information Modelling (BIM) has been adopted in the construction industry as a collaborative tool for designing, constructing, and managing building projects. The 5D BIM incorporates specification data and other properties that can be used to price construction jobs using relational and parametric models directly. The application can be used by quantity surveyors for a wide range of tasks, including quantity take-offs, cost estimation, and cost management. Despite its many benefits, the adoption of BIM has been slow in New Zealand, especially in quantity surveying practice. This review examines the current state, efforts to accelerate the adoption, and barriers to the adoption of BIM in quantity surveying practice in New Zealand. Some of the barriers to the adoption of BIM in quantity surveying practice in New Zealand include a lack of awareness and understanding of BIM, lack of BIM standards and protocols, lack of interoperability and integration among BIM software, high cost of BIM software and hardware, and the reluctance of construction industry stakeholders to adopt BIM. Overcoming these barriers is crucial for the successful adoption and implementation of BIM in quantity surveying practice in New Zealand. This review also presents recommendations for the facilitation of the cost modelling process to find solutions to these barriers between 3D and 5D BIM.

Keywords: BIM, Quantity Surveying, Construction, Estimation

INTRODUCTION

Building Information Modeling is generating and managing information about a created item. Based on an intelligent model and backed by a Cloud platform, BIM combines structured, multi-disciplinary data to generate a digital representation of an asset throughout its life cycle -from planning and design to building and operations (Autodesk, 2022). The purpose of BIM is generally to address and improve coordination and collaboration between stakeholders in the construction industry (Wood & Samarasinghe, 2020). The construction industry has become increasingly familiar with BIM technology. As a result of its more efficient and effective working practices, it has contributed to the success of many construction projects. A large part of the quantity surveyor's (QS) role in determining a construction project's costs involves the preparation of construction cost estimates. Traditionally, construction project drawings and specifications are used in measuring software, and quantities are taken off. Then, an estimating database is used to price these Schedules of Quantities (SOQs). As an alternative to traditional estimating practices, BIM significantly reduces errors and inaccuracies (Olatunji & Sher, 2010). A BIM is a representation of the different elements in a construction project combined with their associated data. Throughout the life cycle of a construction project, it serves as a reliable, shared knowledge resource (Suermann & Issa, 2010).

In a global survey conducted by National Building Specification (NBS) (2020), clients, practitioners, and professionals were surveyed, providing a holistic perspective on BIM applications worldwide and efficient adoption policies. A BIM Acceleration Committee (BAC) survey of BIM adoption in New Zealand is also conducted every year, providing information on implementation circumstances, benefits, and barriers to adoption. These surveys show that despite the growing interest in BIM around the world in both industrial and scholarly segments, New Zealand's BIM implementation is still modest. The BAC Annual Survey 2021 shows that a total of 89% of architects say they anticipate using BIM by 2024, and more than half of those who use it say they use it for more than half of their projects (BIM Acceleration Committee (BAC), 2021). Therefore, the QS needs to upskill in the same manner and adopt BIM models in quantities and estimating. Digital BIM models allow numerous people to work on the same project simultaneously and create various versions instead of having just one set of drawings, which also facilitates the production of multiple versions. Using Cloud-based technologies like Autodesk's BIM 360, BIM collaboration amongst all project disciplines may be accomplished with ease. The BIM 360 ecosystem ensures

that all design stakeholders have access to the most current information by promoting collaboration and information exchange (Hall, 2018). By encouraging communication and sharing, the BIM 360 ecosystem guarantees that everyone involved in the design process has access to the latest data (Hall, 2018).

The BIM models can be used to design, construct, and manage buildings and facilities as part of an innovative, collaborative environment that offers a variety of opportunities to a wide range of disciplines within the construction industry. With its multidimensional nature, BIM, commonly referred to as nD BIM, can provide modelling in an infinite variety of dimensions, including 3D (object model), 4D (time), 5D (cost), 6D (facility management), 7D (sustainability), and even 8D (safety) (Vidalakis & Oti, 2020).

OBJECTIVES

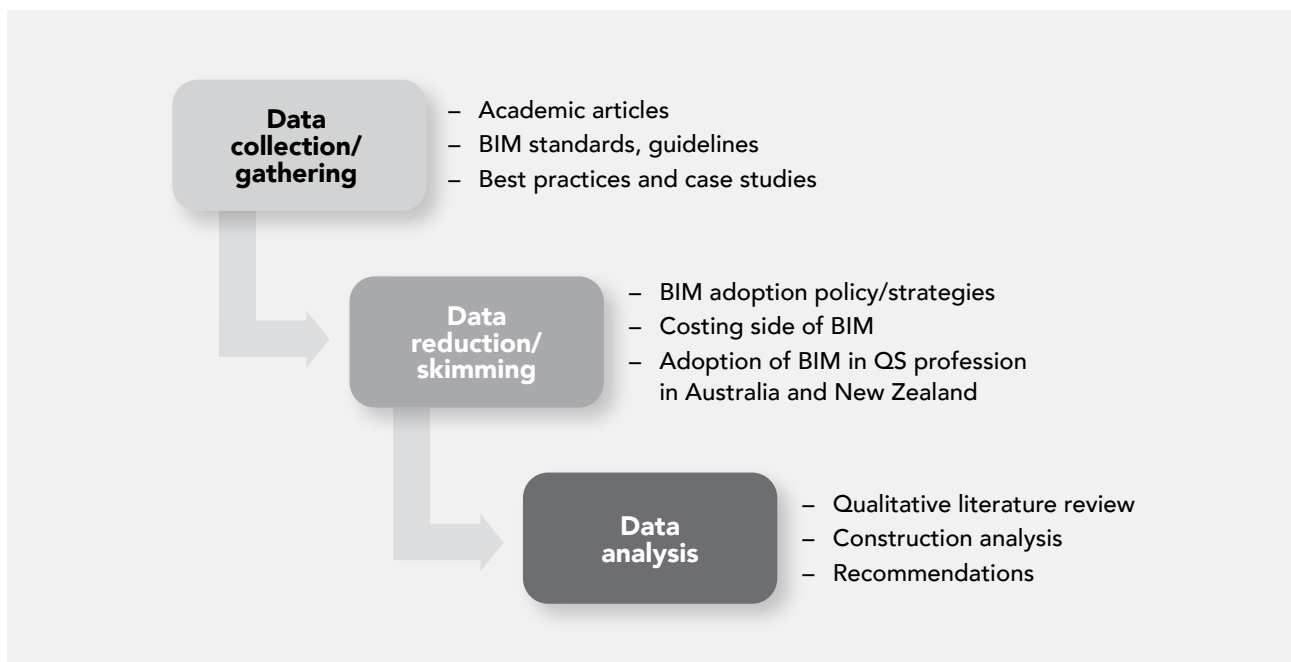
The primary objective of this review is to identify the advantages and barriers to the adoption of 5D BIM by QS in New Zealand and explore some of the strategies to overcome identified barriers.

The conclusions from this review can assist in understanding the current use of BIM in the construction industry in New Zealand, specifically by QS, insights into its adoption in addition to barriers to its implementation and some solutions to overcome these obstacles.

RESEARCH METHODOLOGY

A systematic review method was adopted to identify and analyse relevant academic articles, BIM standards, guidelines, best practices, and case studies. The subject “BIM adoption/implementation” + “BIM in QS practice” + “BIM New Zealand” was searched on Google Scholar and several academic journals, books and reports were found. The following criteria were used to filter the abstracts of articles: BIM adoption policy/strategies, the costing side of BIM, and the adoption of BIM in the QS profession in Australia and New Zealand. After scanning and downloading 12 peer-reviewed articles, they were reviewed critically, and the relevant information was extracted and clustered into relevant summary and analysis matrices. Figure 1 shows the methodology adopted for conducting this review.

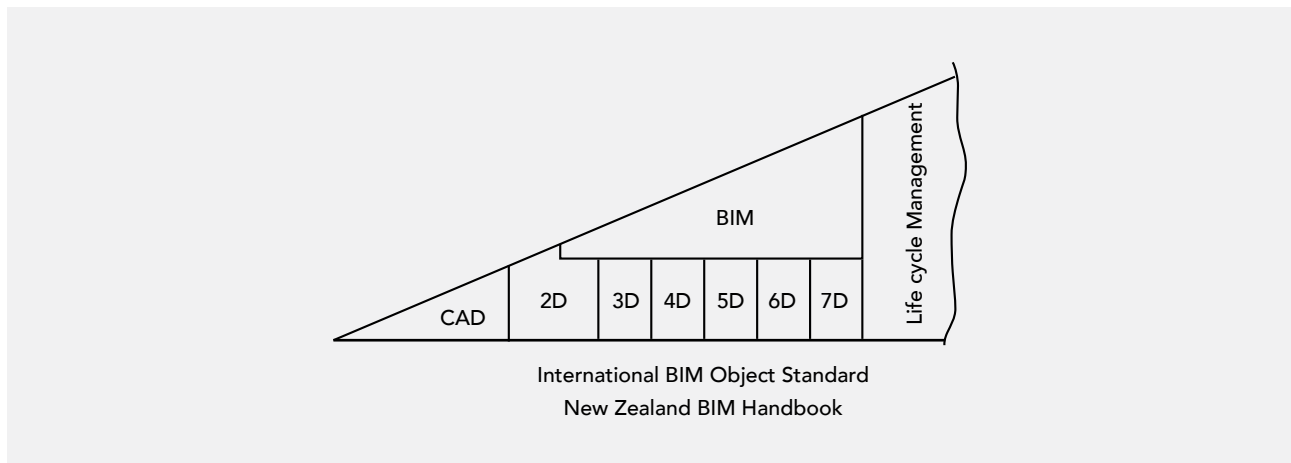
Figure 1: Methodology for conducting this review.



BIM FOR QUANTITY SURVEYORS IN NEW ZEALAND

Figure 2 shows the stages of maturity of BIM adoption in New Zealand. Progression from Computer-aided Design (CAD) drawings to basic 2D BIM, and 3D BIM models were the first stages of adoption. This was followed by the adoption of 4D BIM, which links the 3D BIM design models with the programme schedule, meaning that QS could provide comprehensive commercial advice to planners on labour and plant hire, for instance, as they would on a traditional project. But by better collaboration using BIM, they can foster a lean process that optimises resources. Whereas 5D BIM is not about quantities but about cost. A QS skill set and knowledge are utilised to perform a professional cost management role in this phase or space (Bew & Richards, 2008).

Figure 2: Stages of BIM maturity in New Zealand (Doan et al., 2021).



Harrison & Thurnell (2015) analysed how BIM is applied in quantity surveying practice, Ghaffarian et al. (2017) and Doan et al. (2021) proposed another approach to using BIM in the architectural, engineering and construction (AEC) industries as a sustainable practice. Although the adoption of BIM by QS is slow in New Zealand, the use of BIM in some recent projects has helped the construction industry to overcome many inefficiencies (BIMinNZ, 2023), including cost and time savings and collaboration throughout the organisation has increased. Overall, the quality of construction projects, cost estimates, cost plans, value management, and collaboration have improved using BIM. For example, BIMinNZ, 2023 reported the following projects that have successfully implemented BIM in New Zealand and their benefits:

- The Pukete wastewater treatment plant project proved the value of digitising and centralising asset information using BIM, despite misconceptions about its applicability to existing assets.
- In the New Zealand Defence Force (NZDF) Whenuapai gym project, standard data extraction from BIM models enabled data to be exported to platforms such as Excel quickly and easily. Documentation was tracked, and a common data environment was established with BIM, with metadata standards guiding the BIM data collection.
- Similarly, in the University of Auckland project, in order to ensure teams worked in a coordinated manner, Beca and Jasmx used BIM processes throughout the entire building design of B405 - a highly complex building with 98 research labs.

The costing side of 5D BIM is contained in the model by adding the cost data and relevant information that can be accessed by all stakeholders in the project. Compared to other countries like the United Kingdom and the United States of America, New Zealand is still in the early stages of adopting BIM in the construction industry. The New Zealand government decided not to mandate the use of BIM; however, it has supported the activities of the BAC and encouraged its adoption, especially in all government projects (Pham et al., 2020). Current quantity surveying practices in New Zealand consist of the utilisation of the software that extracts the quantities automatically and then a pricing database is used to prepare estimates (Likita et al., 2022). Working with 3D BIM models, the maturity level of BIM in New Zealand is still slow compared to the rest of the Western world. The New Zealand government's efforts to accelerate the adoption of BIM in the construction industry have resulted in better awareness, and large construction companies have started seeing the benefits. The annual BAC survey (2021) revealed a dramatic increase in project BIM implementation in New Zealand, growing from 34% in 2014 to 70% in 2021.

A one-way collaboration model is being used in New Zealand in the many large construction projects such as Shirley Boys High and Avonside Girls' High School in Christchurch, Fisher & Paykel Healthcare Building in Auckland and the New Zealand International Convention Centre in Auckland. At the concept design stage, a refined project brief and concept approval are usually the outputs following the feasibility and option studies. In this stage, only a single BIM model is shared with other project participants for collaboration, with the update of this model being done in isolation, and there is no connection to other models. Most of these projects follow a linear procurement process, but to achieve the best outcomes from BIM-based project delivery, the construction industry needs to practice integrated project delivery (IPD)R. This allows the whole project team to develop feasible design solutions and ensures that the QS is engaged early in the process. The feedback to the original BIM model author for design and coordination is in traditional formats, and there is no real collaboration between different disciplines within the BIM model (Stanley & Thurnell, 2014).

Many researchers have investigated the key perspectives towards the adoption of BIM in the New Zealand construction industry. Doan et al. (2021) undertook qualitative research to examine the existing state of BIM adoption in New Zealand by conducting 21 semi-structured interviews with 25 interviewees working in a wide range of positions. The findings

revealed that construction practitioners in New Zealand did understand BIM well, especially contractors, quality specialists, QS, supply chain companies, and small businesses, and there was an inconsistent understanding of BIM among them. Most interviewees identified time savings, cost savings, collaboration, coordination, and efficiency improvements as the most significant benefits of BIM adoption. Most of the interviewees identified BIM knowledge and expertise as barriers, along with high economic investment, lack of collaboration, and legal concerns. Only one-third of interviewees believed BIM was mandatory; half said the opposite, but more interviewees agreed with Doan et al. (2021). This shows that construction industry stakeholders may have realised the benefits of BIM adoption but are not yet ready to implement it due to identified barriers. Similar research by Harrison & Thurnell (2015) highlighted that the benefits of BIM for QS are well known, but implementation is hindered by some barriers, which include legal issues, lack of standards and facilities for electronic measurements, lack of support from government and incomplete design and insufficient model object data in the BIM model. Data collected from 146 respondents to a questionnaire in New Zealand and China by Ma et al. (2023) revealed a difference in perceptions of knowledge barriers, technology barriers, internal strategies, and external strategies (legal/technology viewpoint) between New Zealand and Chinese construction industry professionals.

BENEFITS OF IMPLEMENTATION OF 5D BIM

Quantity surveying in the 5D BIM environment has additional benefits, which involves extracting data from models to construct cost estimates. The benefits of the implementation of 5D BIM in the New Zealand construction industry for QS are summarised below:

- Improvement in the process to achieve accuracy, better communication, and information related to design and specifications. Better coding results in fewer errors in the model, and that inherently increases the accuracy of the estimates. Rework is reduced by improving collaboration, coordination, and information management (Likita et al., 2022; Stanley & Thurnell, 2013).
- Through the integration of specifications and clash detection, 5D BIM improves coordination. Unlike traditional methodologies, where the QS had to scan through revised documents in order to identify changes, centralised BIM models have the capability of automatically updating changes and rapidly disseminating this information to stakeholders (Harrison & Thurnell, 2015, Ismail et al., 2016, Stanley & Thurnell, 2013).
- A method for efficiently extracting early-stage (preliminary) estimating data provides a smooth and quick workflow (Likita et al., 2022; Ma et al., 2023).
- Tendering risks in construction projects can be reduced, unforeseen construction issues minimised, project-specific construction methodologies can be developed, sequencing can be optimised, and a sense of confidence in the project can be created (Harrison & Thurnell, 2015, Ismail et al., 2016, Stanley & Thurnell, 2013).
- A better understanding of the configuration of the assets helps to reduce capital costs. The time required to maintain asset records and research the information is generally reduced on projects. The scope of contractors' proposals is better defined, resulting in narrower cost spreads because fewer unknowns are present, and variations between main contractors are reduced because of a better shared understanding of design intent and delivery (Doan et al., 2021, Harrison & Thurnell, 2015, Ismail et al., 2016, Likita et al., 2022, Ma et al., 2023, Stanley & Thurnell, 2013).
- A schedule of quantities can be prepared with a time-efficient and effective data extraction. (Likita et al., 2022, Stanley & Thurnell D, 2013).
- If there are any design changes, these can be rapidly identified and updated for estimating purposes (Doan et al., 2021, Ma et al., 2023, Stanley & Thurnell D, 2013).

BARRIERS TO THE ADOPTION OF 5D BIM

Quantity surveying in the 5D BIM environment also has barriers, such as incomplete design and insufficient model object data in the BIM model. The barriers to the implementation of 5D BIM in the New Zealand construction industry for QS are summarised below:

- Hardware and software investments, changing workstreams, and reshaping service offerings and skills composition of construction companies represent substantial capital investment costs and change management risks (Likita et al., 2022, Stanley & Thurnell D, 2013).
- Although advancements in technology have improved the 5D BIM software compatibility with existing systems software, inter-operability issues are still highlighted by the construction industry; the in-house tool needs to be compatible with BIM models for its compatibility with estimating software programmes (Doan et al., 2021, Ma et al., 2023, Stanley & Thurnell D, 2013).
- There is an incompatibility between the design embedded in the 5D BIM model and the estimating elemental format and quantity scheduling formats used by the QS (Harrison & Thurnell, 2015, Ismail et al., 2016, Stanley & Thurnell, 2013).

- Currently, there is a slow progression in the construction industry standards and there are no construction industry standards and protocols to support 5D BIM implementation. It is up to the New Zealand government and the construction industry to develop these standards in order for 5D BIM to advance in New Zealand (Likita et al., 2022).
- A lack of acceleration for 5D BIM adoption from the New Zealand government. Overall, New Zealand government initiatives have increased the adoption of 3D BIM in the construction sector, but still lacking in utilising the full benefits of costing aspects, i.e., 5D BIM. Most of the projects are still being measured and priced in a traditional way. In contrast to New Zealand, where the government has been passive in promoting 5D BIM adoption, European governments have been politically active in mandating 5D BIM for certain types and stages of projects (Travaglini et al., 2014).
- As opposed to 'Product Procurement Quantities', which are design components present in the BIM model and thus easily quantifiable, such as concrete volumes or steel masses, the 5D BIM models do not include 'Process Construction Quantities'. These quantities are based on construction processes (Ma et al., 2023).
- Changing from traditional quantity surveying methods to 5D BIM is still culturally challenging. People do not want to move from their comfort zone and are not ready to change (Doan et al., 2021, Harrison & Thurnell, 2015, Ismail et al., 2016, Likita et al., 2022, Ma et al., 2023, Stanley & Thurnell, 2013).
- A number of legal barriers related to 5D BIM adoption are also reported in different studies, such as intellectual property, liability, and contractual obligations (Doan et al., 2021, Ma et al., 2023, Stanley & Thurnell D, 2013).
- Increased cost, lack of training, and understanding of 5D BIM for stakeholders. In the early stages of a project, clients do not recognise the value of 5D BIM or have not considered it within a project brief. Therefore, it is not cost (Doan et al., 2021, Ismail et al., 2016, Likita et al., 2022, Ma et al., 2023).

STRATEGIES TO OVERCOME THE BARRIERS OF 5D BIM

Lack of understanding, expertise, and client demand can be mitigated through education and training (Alreshidi et al., 2017); BIM-related courses and topics are incorporated in all construction-related diplomas and degrees, including Bachelor of Construction (Quantity Surveying) (Pham et al., 2020). This will lead to the construction industry understanding and set in motion the adoption of 5D BIM for QS working in the construction industry. Additionally, there is a need to demonstrate the value of 5D BIM to clients in their project briefs and create general awareness among all stakeholders.

It may also be possible to improve New Zealand's 5D BIM adoption by developing an execution plan and investigating technology. As part of its efforts to revise New Zealand's standard measurement method, a technical subcommittee of the New Zealand Institute of Quantity Surveyors (NZIQS) is proposing the use of the Coordinated Building Information (CBI) classification system of the Association of Coordinated Building Information in New Zealand (NZIQS, 2023). The successful adoption of 5D BIM in New Zealand depends upon the government and the construction industry working together to develop these standards. Recently, this collaboration has contributed to the development of the New Zealand BIM Schedule and New Zealand BIM Handbook, both of which could improve things somewhat if adopted (BAC, 2019). Australia and New Zealand BIM Best Practice Guidelines were published in 2018. The Australian Institute of Quantity Surveyors (AIQS) and NZIQS developed these guidelines as a collaboration and are essential guides for QS, cost managers, and cost estimators involved with BIM projects (NZIQS, 2023). These guidelines aim to encourage the adoption of BIM by QS in Australia and New Zealand at all levels and capabilities and further enhance the value of QS in the construction industry.

It is essential to involve QS early on in BIM-enabled projects to provide cost-related alternatives and participate in the whole process. It will also help to remove errors and improve collaboration-related barriers. There is a need to discuss and develop a collaborative approach among the construction industry on how BIM costs will be covered. Also, making sure that the procurement process is integrated with BIM.

CONCLUSION

This review provided valuable insights into understanding BIM in New Zealand in the construction industry, highlighted the current barriers and made recommendations regarding 5D BIM adoption for QS. In New Zealand, the adoption of 5D BIM may not yet have matured in the construction industry, but the success of the stories from many international construction projects and a growing number of local projects demonstrate that it can reduce whole-life costs, improve safety, improve collaboration, and reduce risks in design and construction. The use of 5D BIM in New Zealand is increasing, and its adoption will affect QS in every area, and its adoption will ensure a better future for the QS, including quick and accurate estimates with less rework and better collaboration can help in clash detection early in the project.

Lack of standards in measurements using BIM models, existing tools to be compatible with BIM models and revising the standard practice are some of the identified barriers for QS in adopting the 5D BIM for estimating.

It has been identified that the most important factor in promoting the adoption of 5D BIM in the construction industry is having the early involvement of QS to provide insights on cost and better alternatives.

Collaboration between the New Zealand government and the construction industry is also crucial to developing practical 5D BIM acceleration strategies that are fit for purpose; for example, the 5D BIM acceleration group is working well in this regard. The government also needs to provide a framework to outline the 5D BIM legal processes and procedures to address ownership, sharing, copyright, intellectual property allocation, and insurance issues. Moreover, developing clear definitions of each participant's roles and responsibilities within the new way of working is required in construction companies to promote 5D BIM.

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INTEGRATING BUILDING INFORMATION MODELLING AND WEARABLE TECHNOLOGIES FOR FALL-FROM-HEIGHT MANAGEMENT IN NEW ZEALAND CONSTRUCTION SITES

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ABSTRACT

The New Zealand construction sector is considered one of the most hazardous industries, with fall-from-height being one of the most dangerous hazards. Despite health and safety policies, workplace safety is often overlooked. The lack of implementation of safety regulations and a lack of understanding of the hazards on construction sites are contributing factors to the high numbers of fall-from-height incidents. The construction sector has begun adopting technology-based solutions to manage worker safety better. Building Information Modelling and wearable technology have shown promise in improving construction safety management, but it is not yet widely adopted. This research provides insight into the potential benefits of adopting technology-based solutions in the construction sector to improve worker safety and reduce the number of fall-from-height incidents. The research was conducted using various online databases and publications that focused on developing or applying Building Information Modelling and wearable technologies for fall-from-height management in construction.

Keywords: building information modelling, wearable technologies, fall-from-height, construction safety management, smart helmet, smart vest.

INTRODUCTION

The New Zealand (NZ) construction sector has been identified as a complex and dynamic environment that poses significant risks to workers, particularly from fall-from-height incidents which are one of the leading causes of fatalities and injuries in the construction sector (Auckland Council, 2013; International Labour Organization [ILO], 2023; WorkSafe New Zealand, 2020a; WorkSafe New Zealand, 2020b). Despite efforts to improve safety in the construction sector, fall-from-height incidents remain a significant challenge. Due to the limitations of traditional safety measures in predicting and preventing future mishaps on construction sites, companies have begun to adopt technology-based solutions to improve worker safety management (Walch, 2020; Zhang et al., 2015).

This research investigates the feasibility of combining Building Information Modelling (BIM) with wearable technology to manage fall-from-heights on New Zealand (NZ) construction sites drawn from relevant scholarly publications. The adoption of BIM in NZ has experienced a substantial change (Ministry of Business Innovation and Employment, 2021). The Government has created a BIM Acceleration Committee (BAC), a nationwide alliance of companies and government founded in February 2014 to coordinate efforts to enhance the usage of BIM in NZ (BIM Acceleration Committee, 2020). The BAC promotes the advancement of BIM to benefit the NZ construction sector positively (Ministry of Business Innovation and Employment, 2017). The BAC has developed a BIM execution plan and manual to serve as a consistent indicator or standard way to implement BIM (BIM Acceleration Committee, 2017). From 2014 to 2021, the construction sector's technical adaptability of BIM has increased to 70% (BIM Acceleration Committee et al., 2021).

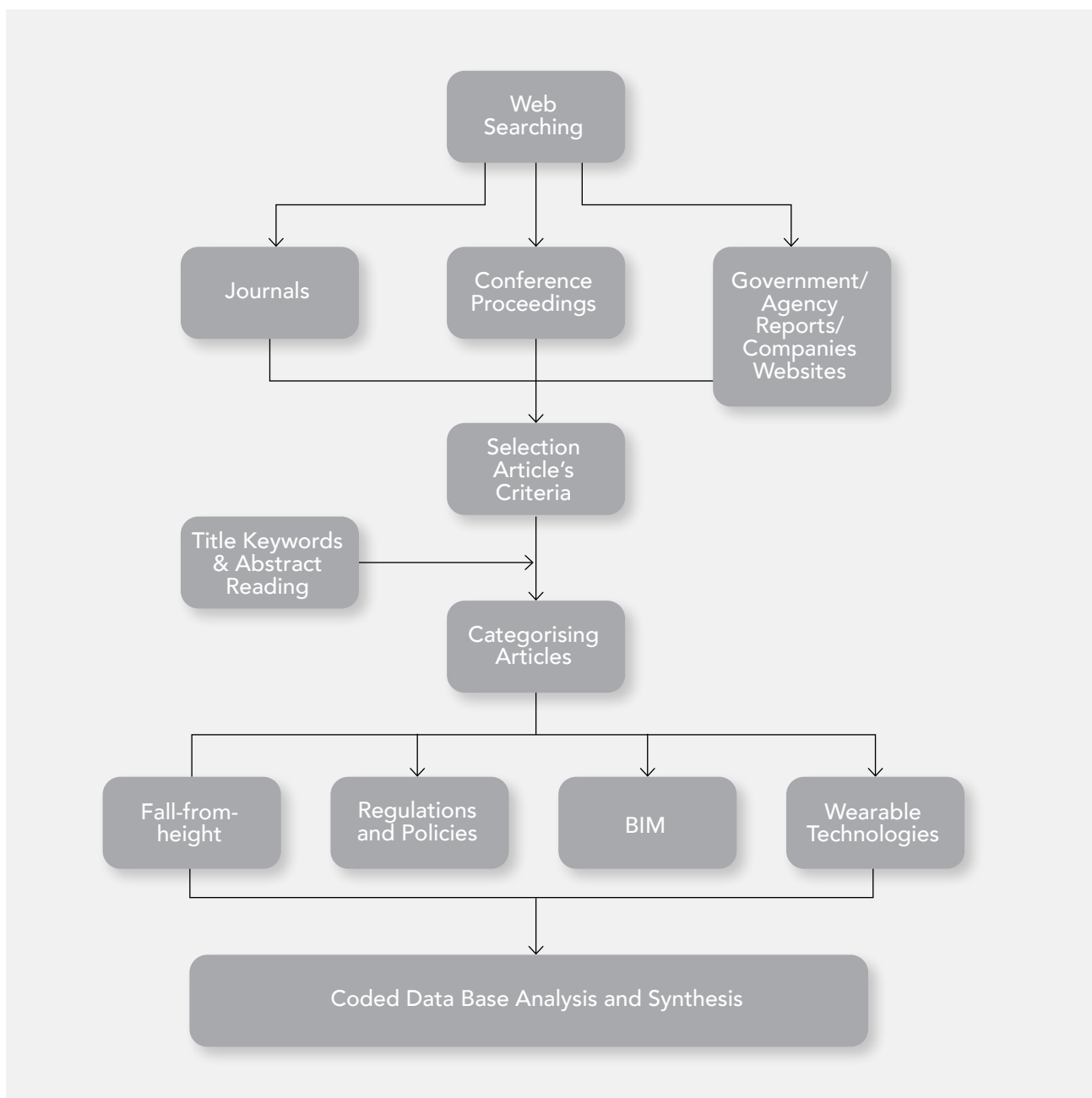
Wearable technology, such as smart helmets and safety vests, can improve construction workers' safety by giving real-time feedback and data collection for analysis (Choi & Kim, 2021). This research aims to provide insight into fall-from-height hazard management on NZ construction sites and technology-based applications to improve construction safety management. In addition, a framework for integrating wearable devices into BIM is proposed to improve fall-from-height mitigation approaches.

METHODOLOGY

This research investigated the construction sector's application of BIM and wearable technology for fall-from-height management. The research approach is depicted in Figure 1. A literature review was conducted using various online databases including Government agencies and companies websites, Google Scholar, Science Direct, Journal Storage (J-STOR), Research Gate, Emerald Insight, Semantic Scholar, and the online Robertson Library. Search terms related to fall-from-heights, BIM, wearable technology, and safety management. Relevant policies and regulations controlling worker safety in NZ were also investigated.

After reviewing numerous publications, relevant selection criteria was used to identify a subset of publications that dealt explicitly with fall-from-height management in the construction sector and developing or applying BIM and wearable technologies for fall-from-height management. Articles that satisfied the criteria of a homogeneous title, bibliographic keywords, and abstracts were included in the database for analysis. The literature review identified 58 publications covering fall-from-height, BIM, and wearable technology. These publications were then grouped into four categories to identify the main variables that served the research aim. However, only 49 subsets of these publications dealt specifically with developing or applying BIM and wearable technologies for fall-from-height management in the construction sector.

Figure 1: Research Approach



LITERATURE REVIEW

Fall-from-height is a critical concern in the construction sector, as it poses a significant risk of injury or death (WorkSafe NZ, 2023; Guo et al., 2018). The Auckland Council (2013) and ILO (2023) noted that fall-from-height negligence could result in serious injuries, fatalities, and severe consequences. The construction sector is searching for solutions to these serious concerns and to revolutionise fall-from-height safety management practices (Guo et al., 2018). Digital technologies have been developed and shown tremendous potential for improving construction safety management, including fall-from-height management (Guo et al., 2021). These technologies include BIM and wearable technology applications, which will be furtherly discussed in this section.

Fall-From-Height in the Construction Sector

Despite the well-known dangers associated with such incidents, some construction companies may be miscalculating the necessary safety measures (WorkSafe NZ, 2019). For example, a lack of knowledge in hazard identification and confusion with the rules and regulations (WorkSafe NZ, 2019). Another possible explanation is management's lack of enforcement of existing safety regulations, as noted by Nadhim (2016) that some construction companies seem to neglect safety precautions due to inadequate monitoring and implementation by regulatory authorities.

According to a WorkSafe NZ (2019) research, the construction sector and fall-from-height incidents are among the top five sectors and incidents that WorkSafe NZ have tracked since this type of occurrence ranked so highly as a cause of work-related deaths and serious injuries among construction workers. WorkSafe NZ (2023) also reported, there were 717 recorded incidents of fall-from-heights in the construction sector between 2016 and 2022. Only 11 of the 717 incidents resulted in warnings, and only 13 were investigated (WorkSafe NZ, 2023). This implies that the construction sector's management may be failing to adequately monitor and enforce safety regulatory rules and regulations, which puts workers at risk. Also, several studies (Aguma & Musonda, 2015; Alomari & Gambatese, 2015; Guo & Yiu, 2016; Hossain et al., 2018) identified potential factors contributing to these statistics: risky construction activities, sites and environmental conditions, human characteristics, knowledge and experience level, behaviours and health, and company safety management, such as lack of safety equipment, training, and project timelines.

The numbers of incidents are a concern given the legal obligations of health and safety (H&S) management. For example, the H&S at Work Act 2015 makes it an offence to fail to comply with a duty that exposes an individual to the danger of death, severe damage, or disease (New Zealand (NZ) Legislation, 2015). To address this issue, the NZ government has implemented workplace restrictions to prevent fall-from-heights. Under the H&S at Work Act 2015 (General Risk and Workplace Management) Regulations 2016, employers must identify, assess, and control hazards associated with working at heights (New Zealand Legislation, 2016). Adopting a technology-based approach can assist construction management in complying with NZ workplace regulations and managing the risk of fall-from-heights. Building information technology and wearable technology, for example, may be utilised to increase worker safety and reduce the frequency of fall-from-height incidents (Fargnoli & Lombardi, 2020).

Another factor contributing to the miscalculation of fall-from-height management is a lack of understanding of identifying hazards. Some companies fail to detect possible dangers on construction sites and may not fully comprehend the risks associated with fall-from-height incidents or the precautions that may need to be taken (Vigneshkumar & Salve, 2020). This lack of awareness and knowledge is a significant concern, as it shows a failure of management to take the necessary steps to protect their workers from harm.

New Zealand construction companies often rely on the three-metre guideline from Health, Safety and Environment (HSE) Act, which incorrectly assumes that no control measures are needed in an area less than three meters high (New Zealand Legislation, 1995; WorkSafe NZ, 2019). However, reports indicated that more than 50% of falls are from less than three metres (WorkSafe NZ, 2019). This leads to a false sense of security and management can neglect its obligations under the H&S Act to eliminate, manage, and monitor workplaces that pose a significant risk to workers' H&S (New Zealand Legislation, 2015).

This situation raises concerns about the effectiveness of current fall-from-height management in the construction sector and the need for a more comprehensive approach to ensure worker safety. While the three-metre guideline may provide some guidance for workers, it should not be relied upon as the sole criterion for determining fall-from-height risk (WorkSafe NZ, 2019). Instead, management must take a more proactive approach and consider the nature of the work, the height involved, and the potential consequences of a fall when assessing the risk of working at height (WorkSafe NZ, 2019). By doing so, they can protect their workers and reduce the incidence of severe injuries and fatalities in the workplace.

Furthermore, cost concerns are a significant impediment to the introduction of innovative safety measures since they frequently need considerable upfront investment in technology, equipment, and training programmes (Manzoor et al., 2021; Wong et al., 2015). As a result, construction companies may be hesitant to commit resources to these, particularly if they believe the estimated costs outweigh the possible advantages (Whitfield, 2018). Table 1 shows the possible cost

construction companies might need to consider for implementing an innovative safety approach. Some companies are unwilling to invest in innovative safety management (Nadhim et al., 2016). This prioritisation of cost over worker safety indicates the construction sector's profit-driven nature (Wong et al., 2015). Considering these efforts, safety management in the NZ construction sector must take proactive steps to reduce the number of fall-from-height incidents. Construction companies are now exploring innovative technologies such as BIM and wearable technology as part of proactive H&S measures (Mihic et al., 2019).

Table 1: Expenses for Technology-based Safety Approach

REQUIREMENTS	AVERAGE BASE SALARY (NZ\$/YEAR)	REFERENCE
Autodesk Architecture, Engineering and Construction (AEC) Collection package	5,297	Autodesk (2023b)
Training or Certification	4,128 – 4,546 (Domestic Fees)	Ara Institute of Canterbury (2023)
BIM Technician	79,310	Indeed (2023)
BIM Coordinator	72,090	Payscale (2023a)
BIM Manager	105,480	Payscale (2023b)
Smart Personal Protective Equipment (PPE)	No data found	Not available

Note: Data collected from different websites on the 4th of April 2023

Building Information Modelling for Fall-from-height Hazard Identification and Risk Analysis

Building Information Modelling is a technology that facilitates creating and managing multidisciplinary data throughout a project life cycle, resulting in a detailed digital representation of the building and project site (Autodesk, 2023a). The advantages of BIM include improved connectivity, workflow, and data management across the entire project life cycle, resulting in increased visibility, decision-making capability, cost savings, and sustainability benefits (Autodesk, 2023a). As a result BIM has emerged as a popular innovative technology solution for hazard recognition in the construction sector (Mihic et al., 2019).

Building Information Modelling simulation enables a complete, profound, and strong interpretation of construction site environments and building stages visualisation as well as project hazard identification and analysis, making it a valuable tool for risk assessment (Rodrigues et al., 2022). It allows clash recognition and evaluation during the design period to detect and resolve the fall-from-height hazard before the execution phase (Rodrigues et al., 2022; Zhou, 2012). The ability to combine structured and multidisciplinary data into construction and safety can provide companies with a comprehensive understanding of the potential safety hazards and risks throughout the project life cycle, from planning and design to construction and operations (Azmy & Zain, 2016; Autodesk, 2023a; Mihic et al., 2019).

Incorporating BIM into safety management provides an additional comprehensive and proactive approach to identifying and mitigating potential safety hazards and risks, including the safety precautions that may be taken (Fargnoli & Lombardi, 2020). This results in a safer working environment for workers and improved collaboration and communication among stakeholders, including architects, engineers, contractors, and safety managers (Autodesk, 2023a; Fargnoli & Lombardi, 2020). Furthermore, BIM technology potentially reduces incidents and injuries and saves costs by eliminating the need for costly modifications later in the construction process (Alizadehsalehi, 2017; Azmy & Zain, 2016). Recent advancement in BIM incorporates different technologies, such as wearable technology, for safety management and real-time worker safety monitoring (Mihic et al., 2019).

Wearable Technologies for Real-time Monitoring

Wearable technologies have become a popular focus in recent years due to their potential to improve safety in various industries, including construction. These technologies, such as smart helmets and safety vests, offer workers real-time feedback and alarms and collect data for analysis (Li et al., 2018). Research has discovered that wearable technology can improve construction site safety by enhancing danger identification, communication, and reaction (Li et al., 2021). Initially, wearable devices were intended to monitor workers' physiological conditions to prevent health-related incidents (Awolusi et al., 2018). Recent studies have investigated integrating wearable devices with other applications, such as BIM to enhance real-time monitoring by integrating the data collected into updated the BIM model based on site conditions for risk and safety hazard detection, registration, and visualisation (Park et al., 2016). Workers can get timely alerts and cautions, allowing them to take preventative actions and avoid incidents, lowering the incidence of on-site injuries and fatalities dramatically (Awolusi et al., 2018).

In the construction sector, wearable devices have been integrated with PPE. It utilises warning systems, proximity detection, and real-time monitoring to mitigate fall-from-height incidents and enhance the posture stability control of workers (Awolusi et al., 2018). This technology utilises gyroscopes, magnetometers, and accelerometers to alleviate fall-from-height incidents and improve workers' posture control. The gyroscope determines body rotation and angular speed, while the magnetometer identifies the body's positioning in relation to the Earth's magnetic north (Awolusi et al., 2018). Adopting technologically based PPE has helped advance worker safety on the job (Awolusi et al., 2018; Li et al., 2021).

Smart helmets, which contain a variety of electronic gadgets and sensors, are being increasingly utilised in the construction sector to identify workplace hazards, location tracking, real-time monitoring, and danger alarms for workers (Choi & Kim, 2021). Smart helmets contain a range of sensor devices that allows construction companies and managers to accumulate real-time data for data analysis to lower job-related risks and enhance safety. Smart helmets can allow for voice contact between safety managers and workers in order to alert them of unsafe behaviour and potential risks or incidents (Choi & Kim, 2021).

Additionally, smart vests, which include sensors and a microprocessor to detect and monitor workers' motions and body position, have been developed in the construction sector to reduce fall-from-height incidents, which are a significant source of injury and death in the workplace (Howard et al., 2022). The accelerometer sensor measures body force along the x, y, and z axes (Barak, 2021). The gyroscope sensor, on the other hand, measures angular velocity along the x, y, and z axes (Barak, 2021). The inertial measurement unit (IMU) sensor provides time-series data for human activity identification, tracking, and navigation (Barak, 2021, Wang et al., 2020). These sensor technologies are low-cost and frequently used, particularly in smartphone devices (Barak, 2021).

Smart vests can recognise when a worker falls and trigger a mechanism that slows or stops the fall (Howard et al., 2022). According to Abainza (2020), smart vests have the potential to lower the risk of injury and death associated with fall-from-height in the construction sector by monitoring the worker's vital signs and alerting emergency personnel if necessary. This is especially useful when the worker is unconscious or unable to summon assistance (Abainza, 2020; Ahmed, 2021; Howard et al., 2022).

Using technology-based PPE, construction workers can adequately monitor workers, reduce operational risks, and improve safety in their work environment (Abainza, 2020; Ahmed, 2021; Howard et al., 2022). However, as with any technology, it is essential to ensure that these devices are used effectively and that they are only part of a comprehensive safety management plan that includes proper training and other safety measures like hazard detection (Azmy & Zain, 2016).

The Efficacy of Building Information Modelling and Wearable Technology Application

Shanghai Tunnel Engineering Company (STEC), a Singapore-based construction company, established a similar technique for construction safety solutions (Shanghai Tunnel Engineering, 2021). The company has built a virtual reality (VR) training centre that uses BIM, VR, and technology-based helmets (Endeavour Magazine, 2023; 2021; The Straits Times, 2018). According to the company, it is the only VR training centre in Singapore (The Straits Times, 2018). The VR simulation centre was designed explicitly for tunnelling operations at the Shenton Way construction site to address dangerous human behaviours and allow workers to experience the construction site environment, including working at heights (Endeavour Magazine, 2023; Shanghai Tunnel Engineering, 2021; The Straits Times, 2018).

In addition, the training facility employs a technology-based helmet that vibrates to simulate any construction site risks when they are near 1.5 metres of heavy gear (The Straits Times, 2018). This technological application has assisted the company in overcoming safety difficulties, with more than four million incident-free hours accumulated (Endeavour Magazine, 2023). Furthermore, the company has received multiple health and safety recognition and construction safety innovation awards, which aid in increasing productivity and the project team's morale as a workplace and H&S champion (Endeavour Magazine, 2023; Shanghai Tunnel Engineering, 2021).

Triax Technologies developed another approach for construction site safety solutions that utilises wearable technology (Triax, 2023). Triax is a United States-based company whose products are utilised in the construction sector, and oil and gas and mining industries. They offer a wearable technology solution for fall detection and prevention (Triax, 2023). They provide workers with a wearable device that monitors their movements, detects workers' risky behaviours, and identifies when they are at risk of falling (Triax, 2023). The device alerts the worker, safety manager, and the site medic, if it detects falls on the job and can also be used to track worker location and generate reports on safety incidents. Real-time monitoring data are sent and managed to a Cloud-based system that gives management access to safety data analytics of different insights. This insight turned into action that improved safety and productivity (Triax, 2023).

Triax and their client's construction company reduced injury claims by 60% while increasing production by 10% (Triax, 2023). It also cut response time by up to 91% and allowed for faster evacuation in an emergency (Triax & Guilbane Building Company, 2023; Triax & Lettire Construction, 2023). They have also been able to respond to and correct dangerous worker behaviours that might result in injuries or incidents using real-time data, avoiding lost time, expenditure, and administrative burdens (Triax & Lettire Construction, 2023).

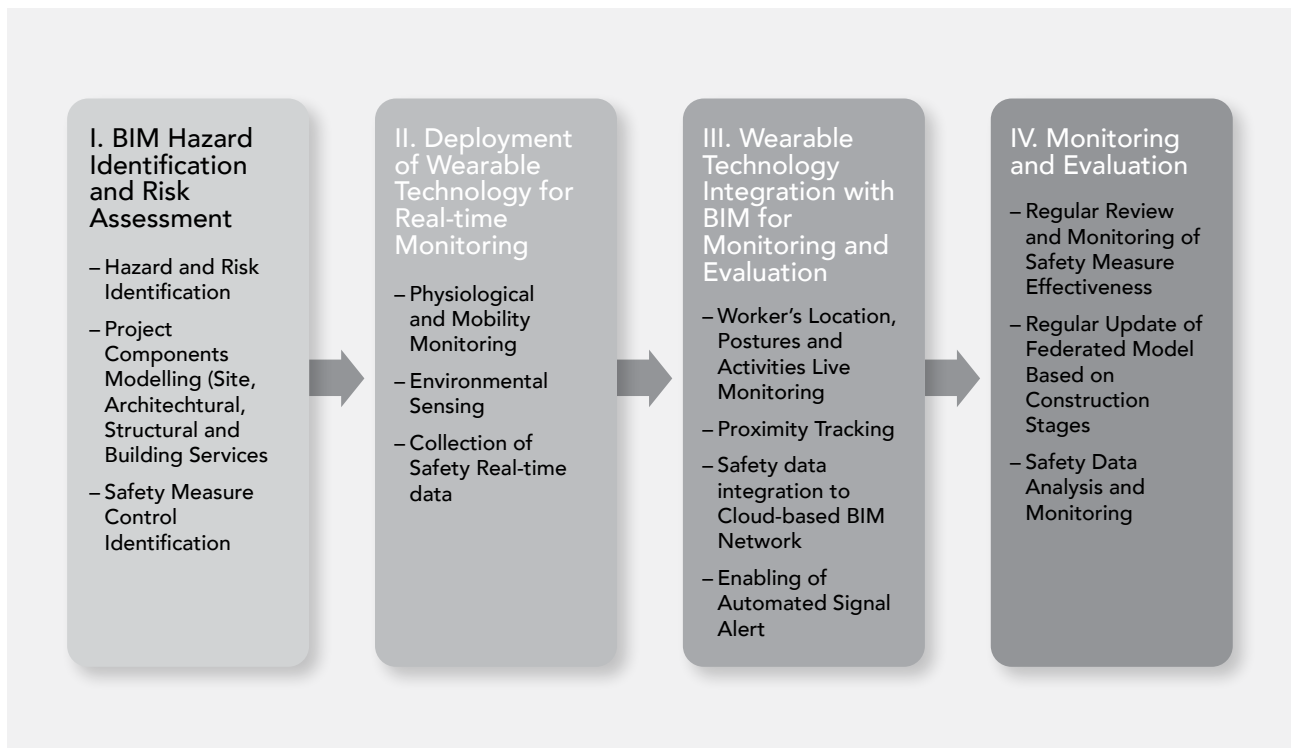
DISCUSSION

This research demonstrates the potential advantages of BIM and wearable technology in fall-from-height management. Additionally, it identified and explored companies who employ BIM and wearable technology for safety management, as well as recommended frameworks for integrating wearable technology into BIM applications.

Building Information Modelling and Wearable Technology Integration for Fall-From-Height Management Framework

This research proposes a framework for a systematic approach for deploying BIM and wearable technologies in fall-from-height management. The framework is divided into four major stages: (1) BIM hazard identification and risk assessment, (2) Deployment of wearable technology for real-time monitoring, (3) BIM integration with wearable technology, and (4) monitoring and evaluation. Figure 2 shows the proposed framework.

Figure 2: Proposed Framework



BIM Hazard Identification and Risk Assessments

The initial stage of the framework is implemented during the design phase, aiming to identify and analyse possible fall-from-height risks on construction sites. This stage involves identifying and visualising the potential fall-from-height hazards on the construction site (Rodrigues et al., 2022). A thorough examination of the construction site and building plans is conducted to create the entire building components using Autodesk Revit Software, including the acquired data from construction site analysis (Rodrigues et al., 2022). The identification of fall-from-height hazards and risks is undertaken to determine safety solutions to prevent fall-from-height (Fagnoli & Lombardi, 2020). Building Information Modelling can detect possible fall hazards associated with building and construction sites, such as exposed edges, insufficient fall prevention measures, and unstable ground (Webb & Langar, 2019; Zhou et al., 2012).

During the design phase, the necessary safety precautions are incorporated into the model to avoid fall-from-height incidents (Rodrigues et al., 2022; Pinto et al., 2018). Construction site access, traffic flow, site barriers, and temporary structures, such as safety railings, scaffoldings, construction platforms, and opening covers, are identified for this purpose and construction planning (Pinto et al., 2018). Following this, federated model is created using Navisworks, a BIM coordination, analysis, and simulation software application (Autodesk, 2023c). The federated model is a combination of models (for example architectural models, structural model, site model and mechanical model) and all project components which every person involve in the project can see and simulate it. The software enables collaboration between project teams collaborating before construction begins to resolve problems and plan initiatives (Autodesk, 2023c). By linking the model in Navisworks, integration issues in the Autodesk Construction Cloud are addressed (Autodesk, 2023c). The Navisworks model integration enables the simulation of the construction evolution, construction, activities, and sequences across time (Kurien, 2018).

Deployment of Wearable Technology for Real-time Monitoring

The framework's second step involves implementing wearable technology to improve fall-from-height management. As indicated in the earlier analysis, wearable technologies make use of several sensing applications for real-time monitoring and location tracking (Awolusi et al., 2018). This incorporates various sensing technologies into PPE, notably a smart safety helmet and a smart safety vest (Awolusi et al., 2018). These sensor systems are utilised for physiological monitoring, environmental sensing, proximity detection, and position tracking of a wide range of construction dangers, vital signals, posture, and mobility monitoring, and can provide construction workers with early warning indicators of safety risks (Awolusi et al., 2019; Kurien et al., 2015; Li et al., 2021).

The smart helmet uses sensor technologies such as radio frequency identification (RFID) for proximity detection and a global positioning system (GPS) for location tracking (Choi & Kim, 2021). The smart helmets also enable voice communication between the safety manager and workers and alert the workers if they are in danger (Choi & Kim, 2021). Smart helmets will also collect real-time data for safety analysis and development of safety measure at a later stage (Choi & Kim, 2021). The smart vest also utilises motion monitoring technology (Barak, 2021, Wang et al., 2020). Accelerometer and gyroscope sensors analyse and identify workers' dangerous postures and IMU devices are used for motion tracking (Wang et al., 2020).

Furthermore, the smart vest features physiological monitoring, which monitors the worker's temperature, heart rate, and oxygen levels, as well as activate an auto alarm system if they fall-from-height and will automatically notify emergency services if the workers become unconscious (Ahmed, 2021; Abainza, 2020; Howard et al., 2022). It will also be used to collect real-time data for safety analysis and control measure improvement (Choi & Kim, 2021).

Wearable Technology Integration with Building Information Modelling for Monitoring and Evaluation

The third stage of the framework involves the integration of technology-based PPE into the federated model generated in the first stage of this framework. The earlier stage identified work fall-from-height hazards and hazard zones on the construction site. The subsequent step involves defining appropriate data collected from technology-based PPE, which will be based on the fall-from-height safety risk (Howard et al., 2022). This data includes the workers' location, postures, and activities (Awolusi et al., 2018; Choi & Kim, 2021; Howard et al., 2022). The data collected will be integrated into a Cloud-based BIM system to enable live monitoring and tracking of workers and an automated alert system (Park et al., 2016).

Once the data is collected, it will be analysed and visualised to identify patterns and trends in fall-from-height risk (Rodrigues et al., 2022). This analysis will use the simulation features of Navisworks to identify areas that require additional safety measures or how to lessen the impact of fall-from-height incidents (Autodesk, 2023c; Rodrigues et al., 2022). For example, management can provide additional safety harnesses or safety nets to mitigate fall-from-height incidents in addition to safety railings (Rodrigues et al., 2022). The federated model will be continuously updated based on the construction life cycle. The Navisworks model integration enables the simulation of the construction evolution, including activities, and sequences across time (Kurien, 2018). Additionally, various scenarios, such as fall-from-height incidents are simulated, and the severity of the fall-from-height is evaluated to assess the potential effects of a fall-from-height and suggests actions that may prevent or mitigate these incidents (Rodrigues et al., 2022). The analysis identifies potential issues and opportunities for workplace changes that are impossible to detect with two-dimensional documentation (Pinto et al., 2018).

Monitoring and Evaluation

The last part of the framework entails tracking and assessing the efficacy of the integrated approach to fall-from-height management. The efficiency of the control measure will be regularly reviewed throughout the construction life cycle based on data collected from BIM and wearable technology. The monitoring and evaluation stage gives insight into the control measures' effectiveness and indicates improvement opportunities. The federated model is constantly updated, and the wearable technologies are also constantly tested to guarantee that they work properly. Data from wearable technology is evaluated continuously to discover new-found trends or patterns, and the integrated system is changed as needed.

CONCLUSION AND RECOMMENDATIONS

To summarise, the NZ construction sector faces challenges in terms of worker safety, notably fall-from-height incidents. Despite attempts to enhance construction safety, fall-from-height incidents continue to be a significant problem. Construction companies began investigating and employing technology-based approaches to improve fall-from-height incident management. Although BIM and wearable technology have shown promise in enhancing construction site safety management, they are not extensively used. Therefore, the following recommendations are worthy of the construction sector considering a technology-based approach for fall-from-height incident management. However, there are still apparent factors that need to be addressed to improve the adaptation of these technologies, especially for small and medium companies. To begin with, the government should enhance its construction sector transition assistance, focussing on the expenses associated with these technologies. Singapore, for example, has adopted a BIM transformation roadmap in the construction sector. This implementation has included training and incentive programmes funded by the Singapore

Government, which cover the costs of training, consulting, hardware, and software for companies (Building and Construction Authority, 2015; BuildSmart, 2015). Although the NZ Government has a BAC strategy plan ready for implementation, the training and expenditure support, especially for small to medium companies, is yet to be approved (Building and Construction Authority, 2015; BuildSmart, 2015).

Industry-academia and E-learning platform collaboration could be used to assist bridge skill gaps and accelerate the rate of adaption required for these technologies (Eagleton, 2021; LinkedIn, 2023). E-learning, as illustrated by LinkedIn Learning and other online courses, has become a widely accepted tool for companies to deliver training and development opportunities to their workers and they can use the portal to enrol in courses. It also supports flexible self-paced learning, allowing workers to take courses in their own time. Progress monitoring capabilities enable workers and managers to monitor completion rates and performance on exams, simplifying the evaluation of worker's and team learning progress. Certificates and badges are issued following successful course completion, allowing workers to showcase their newly gained abilities on their LinkedIn profiles or resumes. Companies will no longer need to create a new role to operate this technology while also upskilling their workers. Lastly, the construction sector must capitalise on technological innovations like the "Internet of Things". With these technologies, the interaction of all wearables, digital devices, and computers that integrate the digital and physical worlds may be utilised to improve site H&S and help in information exchange. Investment in technology-based solutions improves H&S performance on construction sites. However, as with any technology, it is critical to ensure that these technology-based applications are utilised properly and as part of a comprehensive safety management plan and approach that includes sufficient training and the incorporation of other safety procedures.

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ADOPTION OF ARTIFICIAL INTELLIGENCE-BASED SYSTEMS IN DEVELOPMENT OF PUBLIC TRANSPORTATION SYSTEM IN AUCKLAND

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ABSTRACT

The concept of smart cities has gained significant momentum with rapid advancements in Artificial Intelligence-based automation. Public mobility is a crucial component of modern cities, and its development significantly impacts the level of smartness of a city. The application of Artificial Intelligence to the public transportation industry necessitates a continuous reassessment of the factors influencing the design, development, and implementation of the public transportation infrastructure. This investigation aims to explore these factors, their implications for an effective transportation system in Auckland, New Zealand and the significant results that adopting Artificial Intelligence would bring to the system. It includes the integration of an Intelligent Transportation System, an Artificial Intelligence-based real-time data collecting system, and fully automated driverless vehicles that are connected to the Intelligent Transportation System.

Keywords: public transportation, infrastructure for public transportation, intelligent transportation systems, network connectivity, travel time analysis

INTRODUCTION

Smart cities are characterised by their commitment to sustainability and efficiency, utilising innovative technologies to elevate the quality of life for their residents. Smart transportation is a critical component of smart cities, and it involves the use of data analytics to optimise the movement of people and goods within a city (Macke et al., 2018). In Auckland, smart public transportation (PT) systems have been proposed as a way of improving the city's transportation network (Munjal et al., 2020)

Smart PT signifies the use of advanced technologies to promote the efficiency and safety of the PT systems. Smart PT systems use progressive technologies such as the Internet of Things (IoT), Artificial Intelligence (AI) and Big Data Analytics to optimise the flow of traffic, reduce congestion, and provide passengers with real-time information on routes, schedules and delays. Such systems also incorporate other advanced technologies such as autonomous vehicles, electric buses, and intelligent traffic management systems (Costa & Duran-Faundez, 2018).

Auckland Transport is a council-controlled corporation engaged with Auckland's transport services, including roads, public transport, cycling, and walking (Auckland Transport, 2022). Auckland Transport's key priorities are to reduce congestion, improve safety, and increase accessibility and sustainability (Radio New Zealand, 2022; Auckland Transport, 2022). Issues that negatively impact the linkage between Auckland's transportation system and smart PT systems include limited coverage of AI-based smart technology implementation and challenges in data integration and utilisation (Wolken et al., 2018).

The objective of this investigation is to understand the current state of PT in Auckland and what are the potential AI-based solutions to optimise the existing system.

LITERATURE REVIEW

As one of the fastest-growing cities in New Zealand, Auckland's PT system has faced challenges in accommodating increasing demand, addressing congestion, and providing reliable and efficient services. In the process of this literature review, it was discovered three distinct domains of issues concerning the Auckland PT system.

- **Insufficient Infrastructure:** Auckland's PT system requires significant investment in infrastructure to meet the increasing demand for services including upgrading existing infrastructure, constructing new bus stations, and developing integrated transport hubs (Auckland Rapid Transit Baseline, 2021)
- **Poor Network Connectivity:** Auckland's PT network lacks seamless connectivity between different modes of transportation, leading to reduced accessibility and convenience for users. This includes inadequate connections between buses, trains, and ferries, and limited access to key destinations (Jacobson, 2018)
- **Driver Shortage:** Auckland's PT system is facing a shortage of bus drivers, which impacts the reliability and efficiency of services (Scott, 2023)

Critical Evaluation of Public Transportation in Auckland

In modern infrastructure, a properly functioning PT system holds the utmost significance. Evaluating a PT system necessitates a thorough assessment of influencing factors such as reliability, efficiency, and safety (Atombo & Dzigbordi Wemegah, 2021). The PT system in Auckland is a notable feature of the city's urban infrastructure (Arora, 2023). Arora stated that it is comprised of multiple modes of transportation, including buses, trains, and ferries, which provide people with an array of options to navigate the urban landscape. The AT HOP card system is an addition to the PT system, which enables passengers to conveniently pay for fares and transfer between modes of transportation (Arora, 2023). Auckland Transport has been proactive in its efforts to improve the reliability and frequency of services, utilising initiatives such as bus priority lanes and rail electrification as well as providing real-time features such as real-time bus and train arrival information through the Auckland Transport website and app (Hyde & Smith, 2017). As Chowdhury et al. (2018) stated, the Auckland City Rail Link, a substantial infrastructure project currently under construction, is expected to significantly enhance the efficiency and capacity of the public mobility system.

However, the quality of PT services has been the subject of complaints, with delays, cancellations, and overcrowding being common issues (Horsnell, 2023). A lack of integration between different modes of transportation has also been noted (Jacobson, 2018). There are concerns regarding accessibility, particularly for those residing in areas with limited PT options or those with mobility issues. Furthermore, some suburbs and rural areas are underserved by the PT system, with limited access available (Imran & Pearce, 2015). On the other hand, Campbell, (2023) identified the shortage of bus drivers in Auckland which has emerged as a persistent issue in recent years.

Overall, Imran and Pearce (2015) stated that while the PT system in Auckland has various strengths, it is evident that there is scope for improvement. They also identified that addressing issues such as reliability, accessibility, and coverage will be vital for the system to cater effectively to the needs of Auckland residents, sustain growth, and promote the city's sustainability (Imran & Pearce, 2015).

The Issues

According to the report published by Fleming (2019), Auckland has the world's eleventh worst PT, based on scores in accessibility, reliability, and affordability. Hence, this section will be followed by detailing the identified issues in relation to insufficient infrastructure, poor connectivity, and the bus driver shortage.

– Insufficient Infrastructure

The contemporary issue of traffic congestion and air pollution caused by urban expansion and increased transportation usage has garnered significant attention from scholars and policymakers alike. Private vehicles, in particular, have been identified as a major contributor to traffic congestion and air pollution in urban areas worldwide (Lu et al., 2021).

Cilliers (2023) quoted that "residents that rely on public transport are forced to endure atrocious trip lengths and infrequent services" and also emphasised the necessity of PT development especially in Westgate, Auckland. Williams (2022) reported a striking rise in traffic congestion in Auckland, which is believed to be primarily driven by population changes in the region. Furthermore, it was also noted that the likelihood of an individual driving to work and the length of their commute increases with distance from Auckland city centre. The author quoted that a report published in April 2022 by an Auckland Transport spokesperson indicated that only 26% of morning trips to Downtown Auckland were made using PT, compared to 67% using private transportation such as their own vehicle (Williams, 2022).

In addition to the environmental and logistical consequences of traffic congestion, Wild et al. (2021) have identified the negative psychological impacts on drivers. Their study at the University of Auckland revealed that residents in Auckland are excessively reliant on their vehicles, which has led to increased stress and anxiety among drivers. The authors represented the findings of a study in an urban planning programme at the University of Auckland, that argued addressing this issue will require a shift in New Zealand's socio-cultural values that have historically placed a high value on private vehicle ownership (Wild et al., 2021).

Given the above information, it is evident that the efficient expansion of the PT infrastructure is critical to addressing the transportation challenges facing Auckland. However, the infrastructure needs of PT systems can be complex and require careful planning and resource allocation (Williams, 2022).

– Poor Network Connectivity

Ceder (2009) argued that insufficient connectivity can be a deterrent to passengers utilising public transit network connectivity refers to the degree to which different modes of PT, such as buses, trains, and subways, are integrated and connected. To consider this issue, they proposed a methodology for measuring the performance of mass mobility connectivity in Auckland. Their research found that the PT network in Auckland generally performs at a medium level in terms of overall connectivity. However, certain areas exhibit lower connectivity to employment centres and universities. Ceder (2009) suggest the use of a connectivity index to evaluate the number of potential journeys that can be made within a certain travel time threshold, while also considering the frequency and reliability of services.

Chowdhury et al. (2018) asserted that integrating different modes of PT, such as buses, trains, and trams, can lead to a seamless and efficient network that allows users to move from one mode to another without the need for additional tickets or transfers between different transport providers. Nevertheless, they declared coordinating and integrating different transport modes can be challenging, particularly in terms of ensuring that they are all running on time and that they are connected in a way that is convenient for users. For instance, if a bus arrives late at a train station, it may cause users to miss their connecting train, leading to frustration and inconvenience. It is important to ensure equitable access to integrated PT systems, including accessibility for users with different mobility needs. For example, disabled individuals may require additional accessibility features such as ramps or lifts to navigate the system (Chowdhury et al., 2018).

– Bus Driver Shortage

Campbell (2023) reported New Zealand's largest cities were having difficulty in managing the bus driver shortage, which is making passengers impatient and late for work. Furthermore, cancelled buses, three years of impending rail closures, and staff shortages on ferries are all contributing to the weakening of Auckland's PT system.

Chandiran et al. (2023) mentioned that the bus driver shortage can result in several issues, such as delays and cancellations, overworked drivers, increased costs, safety concerns, and decreased morale. The shortage can disrupt PT services, leading to inconvenience and disruptions for users specially students and their parents who are taking them to schools. Overworked drivers can compromise safety, increase the risk of accidents, and is a cause of fatigue and burnout due to the need to take on extra routes. Chandiran et al. (2023) showed how higher transportation costs leads companies to invest in new technology or equipment to improve efficiency and reduce the need for drivers.

In light of the above, it is apparent that Auckland's PT system is hampered by a cycle of interconnected problems. Increased use of private vehicles as a result of inadequate infrastructure creates traffic congestion and ineffectiveness of PT due to the weak network connectivity increasing people's reliance on their private vehicle. On the other hand, the lack of bus drivers raises the need for alternate modes of transportation. In order to increase the overall effectiveness, dependability, and accessibility of PT in Auckland, it is imperative to address each of these problems in detail.

DISCUSSION

Urban mobility planning is a comprehensive process that involves analysing transportation demand, identifying gaps and inefficiencies in existing systems, developing policies and plans, and implementing and monitoring transportation systems in urban areas (Ceder, 2021). It is a multifaceted and dynamic process that requires collaboration and coordination among various stakeholders to create sustainable, efficient, and equitable transportation systems that can address the complex social, economic, and environmental challenges faced by cities. The process utilises various tools, techniques, and methodologies to inform decision-making and ensure the planning process is inclusive, participatory and transparent (Ceder, 2021). However, according to Nieuwenhuijsen (2020) urban transport planning involves consideration of various actionable factors depending on the context of the planning activity such as urban planning, business planning, strategic planning, etc. that may interact with each other in complex ways, and planners must consider them carefully to develop effective plans.

Gao & Zhu (2022) determined that the effectiveness of PT hinges on various city attributes that necessitate careful consideration during the design and implementation of PT systems. Considering these factors, more efficient, accessible, and dependable PT systems that cater to the needs of all users, regardless of their geographic location or socio-economic status can be developed (Gao & Zhu, 2022).

On the other hand, the concept of AI-based automation has led to the development of powerful technology in various fields able to carry out operations like sensing, thinking, and decision-making that ordinarily need human intellect (Kar et al., 2019). Kar sated that the AI branch of machine learning is concerned with developing algorithms and statistical models that can learn from data and improve over time. Therefore, Ang et al. (2022) suggested upgrading the urban mobility planning of the cities is of great importance to adopt data analytics and machine learning in processing and interpreting large volumes of transportation-related data, such as traffic patterns, travel behaviour, and road conditions.

Recently, smart cities have been utilising Deep Learning (DL); a machine learning method to extract complex features based on artificial neural networks and Internet of Things (IoT) data analytics to support the development of smart cities Atitallah et al. (2020). For instance, DL and IoT big data analytics can be used to analyse traffic patterns and optimise traffic flow, reducing congestion and emissions (Heidari et al., 2022). Reis Da Silva (2023) examined how big data analytics would enhance PT efficiency in the city of Natal, Rio Grande do Norte (RN), Brazil. The same author published the applicable outcomes that could significantly enhance the efficiency of PT in the target city by implementing big data analytics solutions including DL and IoT (Reis Da Silva, 2023). However, there are several challenges associated with the use of DL and IoT big data analytics in smart cities (Reis De Silva, 2023). These include concerns around data privacy and security, the need for more interpretable and explainable DL models, and the development of more efficient and scalable DL algorithms. According to Atitallah et al. (2020), big data analytics based on DL and IoT have enormous potential to aid in the creation of smart cities and enhance residents' quality of life in several ways including improvements to the PT system. However, further research and innovation are needed to overcome the current challenges and fully realise the benefits of these technologies.

Nevertheless, there are challenges associated with implementing emerging technologies in smart transportation systems. According to Ang et al. (2022), firstly, data privacy and security are crucial issues that need to be addressed. Smart transportation systems rely heavily on collecting, processing, and analysing large amounts of data, including personal and sensitive information about individuals. Hence, it is crucial to make sure that data is gathered and utilised properly and that the proper steps are taken to preserve people's security and privacy. Secondly, the implementation of smart transportation systems requires collaboration between different stakeholders, including government agencies, the private sector, and citizens. The authors also state that, as smart transportation systems involve multiple components and systems, such as traffic management, PT, and vehicle technology, collaboration between different stakeholders is necessary to ensure that these systems work together seamlessly and that they meet the needs and expectations of all stakeholders.

Data Analytics and Artificial Intelligence for Public Transportation Infrastructure Expansion

As discussed in previous sections, the enhancement of the PT infrastructure network constitutes a crucial aspect of urban mobility planning, which can be effectively optimised through the utilisation of AI and data analytics (Ang et al., 2022). The adoption of data analytics methodologies enables PT agencies to acquire and process large volumes of data, thereby gaining invaluable insights that can facilitate informed decision-making regarding infrastructure design, optimisation, and maintenance (Ang et al., 2022). Zou et al. (2014), stated that several key areas can be measured and analysed, such as user flow, traffic patterns, travel time analysis, user behaviour analysis, and environmental factors in the design phase of PT infrastructure.

The utilisation of big data analytics allows the prediction of demand, optimisation of routes and schedules, and enhancement of service quality through the analysis of user flow data. This data assists PT agencies in identifying high-demand routes and allocating resources, such as additional vehicles or increased service frequency, to meet user needs (Welch & Widita, 2019). Furthermore, such insights can aid in the optimisation of transportation layouts to better align with user preferences and requirements (Abduljabbar et al., 2019).

The Massachusetts Bay Transportation Authority in Boston, United States of America, uses data analytics to monitor user flow in realtime, allowing the agency to optimise service frequency and capacity based on actual demand (Chen & Zegras, 2016). Public Transportation agencies use travel time analysis to evaluate PT performance and pinpoint areas for improvement (Ang et al., 2022). By gathering data on travel times and comparing them to expected times, PT agencies can identify and prioritise routes with frequent delays or bottlenecks, thus improving service reliability and reducing travel times (von Mörner, 2017). Das et al. (2017) explained that infrastructure improvements like road widening or signal optimisation can help alleviate congestion and reduce travel times, and using data analytics to identify areas where these improvements would have the greatest impact can help PT agencies efficiently allocate resources and provide better PT services to the users.

The New York City Department of Transportation, United States of America, uses travel time data to evaluate the performance of bus services and identify areas for improvement, such as bus lane prioritisation and signal optimisation (Yazici et al., 2012). Liu et al. (2021), claimed the importance of user behaviour analysis for understanding the required PT infrastructure. They noted the analysis help agencies identify improvement areas and meet the needs of their users. Finally, the analysis of environmental data, such as weather patterns, natural disasters and topography of an area can improve the resilience, effectiveness, and responsiveness of PT infrastructure (Liu et al., 2021).

In summary, the application of data analytics can provide valuable insights for PT agencies to make informed decisions about infrastructure design, optimisation, and maintenance, thereby optimising their operations and improving user experience in PT systems. Investment in data analytics methodologies is the recommendation of this study to address the insufficient PT network issue in Auckland. The recommended approach involves the collection and analysis of data on user flow, traffic patterns, travel time, user behaviour, and environmental factors to gain insights and facilitate informed decision-making in PT infrastructure design, optimisation, and maintenance. Despite the potential benefits of data analytics, concerns exist over data privacy and security, and the possibility of biases in data collection and analysis. Additionally, cost and feasibility issues may pose barriers for some transportation agencies.

Data Analytics and Artificial Intelligence for Network Connectivity

Transfer synchronisation plays a crucial role in providing the best possible travel experience for users by coordinating the arrival and departure times of linked services (Ibarra-Rojas & Rios-Solis, 2012). Gkiotsalitis et al. (2023) have emphasised that real-time control, a critical phase of transfer synchronisation, involves making timely adjustments to the timing of services based on real-time data such as user demand, delays, and disruptions. Their predictive models and optimisation algorithms to determine the best course of action and resulted successful implementation of real-time control for transfer synchronisation. These models require accurate and timely data, reliable communication systems, and effective coordination among stakeholders such as transport operators, traffic managers, and users.

Sumalee & Ho (2018) examined the combination of AI with technological advances like the IoT, which has the potential to transform PT systems. One of the key functions of AI in this domain is the development of Intelligent Transportation Systems (ITS), which can optimise PT networks by analysing real-time data on user demand, traffic conditions, and route schedules. This optimisation can reduce wait times and enhance operational efficiency by allowing for the optimisation of the routes and schedules of PT. Furthermore, the integration of emerging technologies can enable a more connected and intelligent PT system, facilitating real-time monitoring and control of traffic flow, as well as predictive maintenance of vehicles and infrastructure. Notably, explored ITS how can facilitate the development of smart cities, where PT is seamlessly integrated with other aspects of urban life, such as energy management and public safety. However, they observed that the implementation of ITS also presents significant challenges, including data privacy and security, the digital divide, and ethical implications (Sumalee & Ho, 2018).

This study endorses the realisation of the full potential of ITS requires collaborative efforts between industry, government, and academia, as well as investment in research and development. Ultimately, the investigation offers insightful information on the potential of cutting-edge technology to improve PT infrastructure.

The interconnection of rising technologies such as AI, big data analytics and IoT in the development of ITS are effective strategies for enhancing the optimisation of PT networks. Given the increasing importance of transfer synchronisation in PT operations and the potential benefits of the integration of emerging technologies in the development of ITS, findings of this investigation indicate and highly recommended policymakers in the PT industry to practice the application of real-time control in Auckland PT.

Data Analytics and Artificial Intelligence for the Bus Driver Shortage

The use of AI in PT automation has expanded the idea of driverless vehicles in PT systems. Artificial Intelligence-powered driverless vehicles, such as buses or trains, can navigate and make decisions without human intervention, and optimise routes based on real-time data on user demand and traffic conditions (Caballero Galeote et al., 2023). Artificial Intelligence algorithms can also analyse data on traffic patterns and predict congestion or other road hazards that may affect PT, enabling PT agencies to adjust routes and schedules in realtime. Bharadiya, (2023) reported that AI can be used to monitor the health of PT vehicles and predict when maintenance is required. By analysing data from sensors and diagnostic systems, AI algorithms can identify potential issues and schedule maintenance before a breakdown occurs, thereby reducing downtime and improve the overall reliability of PT services (Bharadiya, 2023).

Nikitas et al. (2021) explored the potential effects of driverless vehicles on employment in the urban PT industry and identified three potential scenarios: job creation, job displacement, or a mix of both. They suggested that the impact of driverless vehicles on employment will rely on a number of variables, including the rate of adoption, the type of vehicles utilised, and the state of the labour market. While there is a lack of consensus in the literature on the topic, the authors proposed policy recommendations, such as investing in skills and training programmes for employees, developing new business models for the PT sector, and implementing policies that support job creation and the growth of new industries. They stressed the need for proactive policy-making to ensure that the benefits of driverless vehicles are maximised while minimising potential negative consequences (Nikitas et al. 2021).

The EZ10 shuttle is a driverless vehicle that transfers users and has been undergoing testing on a medical university campus in Toulouse, France since early 2021 (Bateman, 2021). It is the first driverless vehicle in Europe to be authorised to operate on a public road in mixed traffic without a human attendant, and operates at Level 4 autonomy, making it the most intelligent driverless shuttle provider in the market. In contrast, Tesla's Full Driving Feature Car is classified as a Level 2 Society of Automotive Engineers (SAE) vehicle, which requires human supervision to some degree. The comparison highlights the EZ10 shuttle's technological advancements and potential for significant changes in the PT industry (Bateman, 2021).

Consequently, this investigation recommends further research on the potential impact of AI-powered driverless vehicles on employment, job creation and job displacement in the urban PT sector, particularly in the context of the scenarios identified in the Nikitas et al. (2021) study. It is important to consider the various factors that can affect the impact of driverless vehicles on employment, such as the speed of adoption, the type of vehicles used, and the labour market conditions. This investigation may help to develop strategies to maximise the benefits of driverless vehicles while

minimising potential negative consequences. Additionally, investing in skills and training programmes for PT employees and developing new business models for the PT sector could help mitigate any negative effects on employment and support job creation and the growth of new industries. This could involve retraining PT drivers and other PT employees to work in areas such as vehicle maintenance, data analysis, software development and customer service (Nikitas et al. 2021).

CONCLUSIONS AND RECOMMENDATIONS

Based on the information provided, it is recommended that PT agencies in Auckland invest in data analytics methodologies to optimise the design, maintenance, and performance of PT infrastructure networks as a solution to address the insufficient PT network issues. The use of data analytics can provide PT agencies with valuable insights to make informed decisions about infrastructure design, optimisation, and maintenance. This would involve the collection and analysis of data on user flow, traffic patterns, travel time, user behaviour, and environmental factors to gain insights that could facilitate informed decision-making.

Correspondingly, the development of ITS can benefit from the incorporation of cutting-edge technologies like AI, big data, and IoT, which could improve the optimisation of PT networks through the analysis of real-time data. This article discusses information on the integration of emerging technologies in the development of ITS providing valuable insights into the application of real-time control and emerging technologies in increasing the operational quality of public transportation. It is recommended that scholars, practitioners, and policymakers in the PT industry consider this investigation to inform their decision-making and strategies.

Finally, another important development that could be used to improve the public transportation levels of Auckland PT users is the use of driverless vehicles. These vehicles are fully automated and connected to a real-time database, enabling them to make the best decision dependent on time and cost. This technology can further enhance the efficiency of PT systems by reducing the need for bus or train drivers, minimising human error, and allowing for more effective route planning and scheduling.

There is also a need for further research on the potential impact of AI-powered driverless vehicles on employment in the urban PT sector. This should focus on the three scenarios identified in the present study namely job creation, job displacement, or a mix of both. Various factors can affect the impact of driverless vehicles on employment, such as the speed of adoption, the type of vehicles used, and the labour market conditions. It is recommended that policymakers use the results of this investigation to develop strategies that maximise the benefits of driverless vehicles while minimising potential negative consequences. It is suggested that policymakers invest in skills and training programmes for PT employees and develop new business models for the PT sector to mitigate any negative effects on employment and support job creation and the growth of new industries. This could involve retraining bus and train drivers and other PT employees to work in areas such as vehicle maintenance, data analysis, and software development. Additionally, new business models might also be established to open new job prospects in sectors like fleet management and customer service.

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EXPLORING THE IMPACT OF CHATBOTS ON CUSTOMER SATISFACTION AND BUSINESS EFFICIENCY IN NEW ZEALAND'S FINANCIAL SERVICES INDUSTRY

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ABSTRACT

The emergence of Artificial Intelligence has disrupted the conventional ways of dealing with customers. Artificial Intelligence-powered chatbots are one of the outputs of this technological disruption. Although the capabilities of a chatbot have been widely recognised, its adoption in financial service institutions has caused arguments over data protection. Customers tend to become comfortable with the human-like chatbot due to it being non-judgmental. The research method used was secondary qualitative research techniques based on literature reviews. The objective of this investigation is to evaluate the rise of chatbot adoption in customer services in the financial service institutions of New Zealand. The findings of the research indicate a rise in chatbot adoption has also led to data privacy issues in customer services. The research intended to objectively evaluate chatbots, to determine their merit at the expense of data protection and recommend solutions to address data privacy problems with chatbots.

Keywords: Artificial Intelligence, Financial Technology (FinTech), Chatbots, Data Privacy, General Data Protection Regulation, Personal Information.

INTRODUCTION

The efficiency and effectiveness of chatbots in business have offered unique customer service opportunities. Conversational agents driven by Artificial Intelligence (AI), such as chatbots, have revolutionised customer service, notably in financial service organisations throughout the world (Singh, 2022). Technological improvements are inescapable, and the financial service institutions will constantly strive to improve its customer service via innovation (Bairy & Rashmi, 2021). Natural Language Processing (NLP) technology built on machine learning has been widely employed in the creation of AI-powered chatbots (Bairy & Rashmi, 2021).

The objective of this research was to evaluate the rise of chatbot adoption in customer services in financial technology (FinTech) in New Zealand (NZ). This article is divided into four components, the first is the emergence of chatbots in FinTech services, notably in customer services in NZ. Second, it examines whether the advent of chatbots has positive or negative impacts on FinTech in NZ. Furthermore, the research focuses on chatbot-related challenges such as data protection and chatbots being sentient. Finally, the research critically analyses alternatives to the data privacy vulnerabilities associated with AI-powered chatbots and makes recommendations to address these issues.

METHODOLOGY

Exploratory qualitative research techniques based on secondary information were used to dig deep into the data and analyse responses, patterns, and connections. Secondary data was gathered from various online databases such as Google Scholar, Research Gate, Emerald Insights, Science Direct, ProQuest and SpringerLink. This method is cost-effective because all data used in this research was collected from published sources. No primary data was collected for this research. The collection of contemporary and relevant data is important for the validity of research based on secondary data (Asenahabi, 2019). The majority of the resources used in this research are not only current but were published in the last five years in peer-reviewed journals.

LITERATURE REVIEW

RISE OF CHATBOTS IN CUSTOMER SERVICE

In the early 60s while AI evolved, a chatbot named 'ELIZA' was introduced to conduct simple conversations with humans (Carter & Knol 2019; Paliwal et al., 2020). However, this technology has gained momentum in the past decade (Suta et al., 2020). For instance, the journey of chatbot evolution from ELIZA to Artificial Linguistic Internet Computer Entity (A.L.I.C.E) in 1995, Siri in 2010 and lastly ChatGPT in 2022 has been under the domain of AI, using NLP and Machine Learning Techniques (MLT) (Suta et al., 2020). In other words, chatbots have evolved from being able to respond to simple human conversations to complex human interactions which are currently contributing to enhancement in customer service (Murphy, 2023).

Chatbot is an application developed with the help of AI and machine learning techniques to interact with humans (Shawar & Atwell, 2007). For instance, Siri was developed by Apple, Alexa was developed by Amazon, Google Assistant and Chat GPT by Open AI (Shawar & Atwell, 2007). With the rise of AI via Machine Learning and Deep Learning Algorithms, chatbots have gained tremendous momentum in the service industries (Carter & Knol 2019; Sugumar & Chandra, 2021). Research evidence shows that AI has significantly altered the service industries by enhancing customer services and engagement (Carter & Knol 2019; Misischia et al., 2022; Sharma et al., 2022).

The service industries have been customer-facing since their inception (Misischia et al., 2022). However, the traditional customer-facing roles have been taken over by chatbots and have changed the theme of customer services over the past decade (Misischia et al., 2022). Conventionally, the role of customer services demands five vital functions namely interaction, problem-solving, customisation, trend, and entertainment (Misischia et al., 2022). Taking into consideration customer service in financial institutions, chatbots are used in the claim submissions process which provides room for claim managers to focus on more productive activities and minimise tedious tasks (Sugumar & Chandra, 2021). This leads to better customer service overall.

CHATBOT ADOPTION FOR FINTECH FIRMS IN NEW ZEALAND

Regarding the adoption of chatbots in customer services, studies have shown that it is highly influenced by a research model developed by the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Sugumar & Chandra, 2021). This model is called the Belief Desire and Intention (BDI) model (Sugumar & Chandra, 2021). The model explains that the adoption of chatbots not only depends on the beliefs of customers but also on the desire to interact with a non-human agent. For instance, chatbots in financial advisory firms have experienced a high preference for chatbots by customers to resolve financial queries if the chatbot is friendly and always ready to help (Sugumar & Chandra, 2021).

According to a report published by AI Forum New Zealand (2018), investments in AI-based chatbots will rise to 99.5% in financial accounting firms which could support not only customer services but also financial analytics and reporting. This research also sheds some light on the top five drivers of the adoption of AI in NZ which are managing big data, automation, fast decision-making, cost reduction and optimisation of processes (AI Forum New Zealand, 2023).

AI Forum New Zealand (2018) forecast the AI adoption capacity of various sectors in NZ and out of the sectors presented, financial service institutions showed an estimated adoption of 71%. This means most of the FinTech firms in NZ would potentially restructure to substitute customer services with AI (AI Forum New Zealand, 2018). These statistics are strongly supported by Kapsis (2020) who stated, unlike small and medium-sized FinTechs, large-size FinTechs were in support of AI-based customer services and regulators.

Even though a number of studies have been published on chatbot adoption in other service industries like tourism, healthcare and higher education, limited research has been published on chatbot adoption by FinTech (Alt et al., 2021). In this regard, it could be inferred that the finance service institutions has been a late adopter of this technology as compared to other service industries. The adoption of chatbots in the form of robo-advisors can be traced back to 2008 when a United States-based FinTech company Wealthfront and Betterment was established (Dietzmann et al., 2023). The popularity of chatbots strengthened significantly in the 2014 when the biggest FinTechs in the European market began adopting AI-based chatbot models as robo-advisors (Dietzmann et al., 2023).

New Zealand typically has small and medium size business enterprises in a plethora of sectors that include FinTech (Clutch, 2023). Apart from Deloitte, Pricewaterhouse Coopers International Limited (PwC) and Accenture, the rest are small and medium-sized business enterprises (Clutch, 2023). Although the adoption of chatbots depends on various factors such as the technological capabilities of the end users and competition in the market, it has been widely adopted by many firms in NZ (AI Forum New Zealand, 2023). Moreover, the Asia Pacific region which includes NZ has been facing digital disruption in the wealth management field. Private financial firms have been compelled to relook at their existing customer services approach and rebuild on a technological platform (Deloitte, 2023).

In support of the growing popularity of chatbots in FinTech, a detailed study by Jung et al. (2019) reported varied reasons for the rise in chatbot adoption. One of the notable reasons was a bare minimum investment in chatbots which is

comparatively lower than an actual human advisor who charged 3% of the project cost. Another significant reason is the increased dependency on smart gadgets and ease of use. Chatbots on smartphones are easy to use and provide logical resolutions (Jung et al., 2019). Likewise, Misischia et al. (2022), stated that chatbots are becoming more popular in FinTech due to the targeted solutions offered to result in better decision-making for customers.

TECHNOLOGY ACCEPTANCE - CHATBOT ADOPTION BY CUSTOMERS

Chatbot adoption by customers in FinTech can be analysed in terms of the Technology Acceptance Model (TAM) (Lai, 2017). Although this model continued to evolve until the late 2000s, the original model developed by Davis (1985) critically evaluates the behavioural factor that influences customers' acceptance of technology. According to Davis (1985), a customer's propensity to accept technology is highly influenced by its 'Perceived Usefulness' and 'Perceived Ease of Use'.

Although various studies have been conducted in support of these behavioural indicators of usefulness and ease of use being vital factors for customers to adopt a technology, some contrasting studies provide non-supporting evidence (Alt et al., 2021). In contrast, the same study argues that ease of use has a limited effect on technology acceptance compared to usefulness (Alt et al., 2021). Despite these arguments, Chan and Leung (2021) have shown supporting evidence that customers' acceptance of chatbots is highly influenced by 'Ease of Use'.

As per the Deloitte report, Eggers et al. (2019), states the early adopters of AI-based technology of chatbots was the public sector. The private sector is now gradually adopting chatbot technology. Based on this, it could be inferred that the financial service institutions in the public sector has been an early adopter of chatbot technology (Eggers et al., 2019). The adoption of chatbots for customer services has risen to 31% (Accounts Recovery, 2022). FinTech is expecting a steep rise in chatbot usage by customers to 109 million users by 2025 (Accounts Recovery, 2022). While the chatbot adoption rate by customers in the financial service institutions was slower in the early 90s, there has been an increase in demand from millennials who have been raised in a digital age (Abe, 2016). Moreover, the Coronavirus disease (COVID-19) pandemic has accelerated the adoption (Abe, 2016).

A supporting study by Fernández (2019), states similar findings in the financial service institutions, where chatbot adoption has extended to verticals such as payments, capital markets, banking, investment management and insurance. One of the significant reasons for the adoption of chatbots is that they are non-judgemental and make zero errors (Le & Rajah, 2022). In the same vein, Misischia et al. (2022), states that chatbots are the preferred means of customer service due to their ability to show persistent empathy and kindness while dealing with customer queries. According to Debecker (2016), chatbots could potentially continue to grow because customers expect businesses to answer their questions 24/7. It has also been determined that 45.9% of customers agreed that they prefer text over email and phone while communicating with businesses. Oruganti (2020) justifies the adoption of chatbots in financial service institutions with various facts, one of which is the chatbots' ability to gather data about competitors from the customers. It specifies financial service institutions prefer chatbots as virtual assistants over a human for supporting queries related to a loan, policies, and accounts (Le & Rajah, 2022). Similarly, Bhatti (2019), supports the growth of chatbots in the financial service institutions due to the collection of feedback from customers. The same author reported that chatbot adoption is on the rise in nations like USA, UK, India, and Canada particularly in the financial service institutions. Based on this evidence, it could be inferred that NZ would also follow the path of these countries in the adoption of chatbots in NZ FinTechs (Bhatti, 2019). Although FinTechs in NZ are open to adopting chatbots, the acceptance of customers is questionable.

IS CHATBOT ADOPTION FOR FINTECH FIRMS IN NEW ZEALAND HELPING OR BACKFIRING?

Artificial Intelligence is gradually being adopted by the private sector in NZ and NZ customers, which means private financial service institutions should consider deploying AI-based chatbots to enhance their customer service experience (AI Forum New Zealand, 2023). For instance, NZ customers are already familiar with AI agents like 'Josie for Auckland Savings Bank (ASB)', 'Union Bank of Switzerland (UBS) for Southern Cross', 'Jamie for Australia and New Zealand (ANZ) Bank', 'Hiko for Mercury' and 'Koa for NZ Post' (Newman, 2022). The NZTech (2019) states, growing humanness in the conversations with virtual assistants could result in improved sales and greater customer loyalty. Virtual assistants in the NZ financial service institutions have progressed beyond fielding routine inquiries. For example, 'Jamie,' an ANZ Bank chatbot, was optimised to avoid robotic replies and was able to react to 60% of customer enquiries (NZTech, 2019). There is a large amount of support and advantages promoted by major financial institutions in favour of chatbot adoption (Ravi & Kamaruddin, 2017). Over 80% of worldwide financial service institutions consider chatbots quite useful since they serve to increase corporate efficiency; however, just 16% consider chatbots to be genuine risks (Ravi & Kamaruddin, 2017).

Kruse et al's. (2019) analysis supports potential cost savings and increased productivity utilising chatbots in FinTechs, drawing on a wide range of sources. They claim that chatbots have improved customer service and engagement to a greater level (Kruse et al. 2019). Weißensteiner (2018) discovered that chatbots could not only recognise customer expectations but also discern their opinions. With AI technology underlying chatbot development, FinTechs such as robo-advisors are gaining popularity (Lui & Lamb, 2018). Investment banking and wealth management verticals of financial advisory firms advocate having robo-advisors as trusted agents in place of a human advisor who often tends to be selfish

(Lui & Lamb, 2018). Moreover, managing wealth is a delicate issue for everyone; thus, chatting with robo-advisors reduces the unpleasantness of the conversation for customers because of the absence of self-interest (Lui & Lamb, 2018).

Global financial service institutions like Barclay, Honkong and Shanghai Banking Corporation (HSBC), Santander Bank, Bank of America, Swedbank and Deutsche Bank have robo-advisors in the form of chatbots and strongly believe chatbots have been offering their customers easy, economical, and non-judgemental financial advice (Lui & Lamb, 2018). However, they raised questions about the ability of robo-advisors in complex verticals of tax planning which could lead to severe losses to the FinTechs. Although there are mixed opinions on this, International Business Machines (IBM) Watson has preferred an approach of not disclosing to the customers whether they are conversing with a human or a chatbot. To overcome the fear of customers chatting with a non-human agent, IBM Watson has adopted 'Augmented Intelligence' in place of 'Artificial Intelligence' where humans train the chatbots. For instance, humans store the answers to the various scenario-based questions of customers in an electronic library, then Chatbots search the library to respond to customer queries and if they cannot find the answers, they refer the customers to human agents. In this manner, IBM Watson has overcome the issue of human versus chatbot and is able to provide flawless customer service. Inspired by IBM, several other FinTechs such as MortgageGym and Habito have executed a blend of chatbots and human advisors for complex wealth management verticals (Lui & Lamb, 2018).

In the past decade, there has been rapid development in integrating customer service via chatbots in FinTechs. Artificial Intelligence-inspired chatbots have gone beyond round-the-clock customer support and have helped FinTechs in improving compliance and regulatory requirements with 'Know Your Customer' (KYC) and 'Anti-Money Laundering' (A3Logics, 2023). A few success stories of AI-inspired chatbots in FinTechs are as follows: the Bank of America released their AI-inspired chatbot Erica in 2016, and it has since become very popular with customers on their mobile app and offers 24/7 service. Erica supports customers by providing financial advice and managing their accounts. It has inspired several other FinTechs to invest in chatbots and reap the benefits of cost savings and enhanced customer service. Unlike Erica, Capital One's Eno is an NLP-based chatbot that gives a real-time service to the customers of Capital One. Eno, unlike Erica, provides help via text messaging and communicates with customers via User Interface (UI) technologies. Eno has contributed to a significant reduction in operating costs, allowing the Capital One team to focus on strategic projects (A3Logics, 2023). It could be inferred that chatbots have been beneficial in the FinTechs not only in NZ but also globally.

While the use of chatbots in FinTech supports achieving a competitive edge and substantial cost savings in the long term, most FinTechs would not want chatbots to take over discussions about claims for a customer's death (Lui & Lamb, 2018). This is a highly sensitive issue, and financial service institutions cannot afford to bypass an in-person approach in such instances; nonetheless, this requires distinct research (Lui & Lamb, 2018). However, other authors have speculated that the rise of chatbots, particularly in FinTech, has also given rise to concerns related to data privacy (Alt et al., 2021; Sugumar & Chandra 2021). Moreover, contemporary arguments against chatbots include the fact that they are sentient (Tiku, 2022). Although, opponents now warn that if AI-based chatbots are given the same access and rights to make decisions as humans, computers may become more powerful than humans (Sugumar & Chandra 2021).

DATA PRIVACY ISSUES WITH CHATBOTS

Apart from chatbots being racist, biased, and manipulative, the problem of data privacy with chatbots is a source of discomfort for customers when interacting with them (Chaves & Gerosa, 2021; Lui & Lamb, 2018). For instance, Microsoft (MS) Twitter's chatbot named 'Tay' turned out to be making racial and offensive remarks within a couple of hours of its inception, which raised serious concerns about the morality of using chatbots (Chaves & Gerosa, 2021). Lui and Lamb (2018), have raised an interesting argument on the bias which could occur during the unsupervised training phase wherein the developer has the liberty to feed data that could be biased from a developer's perspective. Therefore, the main source of concern has been the rigid design of chatbots, which mostly lacks mechanisms to avoid data breaches (Calvaresi et al., 2021). Moreover, non-traditional data entry methods for chatbots may result in false resolutions and data privacy concerns for customers (Lui & Lamb, 2018).

On the other hand, customers regard chatbots as more intimate, which leads to stronger ties and the exchange of Personal Information (PI) (Le & Rajah, 2022). This relates to the adoption model and chatbots' lack of judgement, which makes customers more comfortable with communicating their concerns (Le & Rajah, 2022). The same authors have highlighted concerns regarding data privacy while using chatbots. Customers, on the other hand, choose to provide PI because they like interacting with chatbots. The data could be compromised with the simplest of security breaches such as unencrypted chats, failure to use Hypertext Transfer Protocol Secure (HTTPS) protocol and absence of Intrusion Detection and Prevention Systems (IDPS) (Sajan, 2022). Data privacy issues with chatbots are not only confined to sharing PI but also to storing and accessing data (Garkel, 2023; Pearce, 2021).

One of the data privacy concerns which could shift the ground beneath our feet is the privacy policy of the companies which develop AI-based chatbots. Chatbots collect PI from customers as a part of their job (Ferraro, 2023). However, customers have no choice on how this information is used or distributed once they share it with chatbots (Ferraro, 2023). For instance, the privacy policy of Chat Generative Pre-Trained Transformer (ChatGPT) developed by Open AI states that

it gathers a customer's IP address, browser type, and preferences, as well as data about the customer's interactions with the site and surfing behaviours over time and across websites, which it may share 'with third parties without customer's consent (Open AI, 2023).

If customers refuse to share the required PI, the chatbot goes out of service (Ferraro, 2023). Moreover, if customers share PI and later want to delete it, there is no such option to remove it (Ferraro, 2023). These data privacy breaches often result in targeted advertising which customers may not be comfortable with (Garkel, 2023). The data privacy breach due to AI-powered chatbots could potentially result in cyber threats (Ferraro, 2023; NZ Herald, 2023). For instance, chatbots are designed to conduct a fluent conversation and replicate human emotions convincingly which could provoke attackers to recreate phishing emails or texts and initiate a malicious attack via fake advertising leading to identity theft and ransomware attacks (Ferraro, 2023; NZ Herald, 2023). In other words, cyber attackers may utilise chatbots to execute cyber-attacks using the PI kept by chatbots (NZ Herald, 2023). According to an article published in the New Zealand Herald (2023), cyber thieves may use chatbots such as ChatGPT to mimic financial service institution chatbots and obtain access to customers' PI.

Data privacy issues with chatbots are a growing concern and to combat the privacy risk, an ethical guideline for trustworthy AI set-up has been implemented. The General Data Protection Regulation (GDPR) which came into force in May 2018 is a significant initiative by the European Commission (Kapsis, 2020). The GDPR ensures provisions for data privacy related to transfer and process in relation to AI-powered technological developments (Kapsis, 2020). 'The Right to Erasure' (refer to articles 17 & 19 of GDPR) establishes the right of customers to be excluded from search engine data; in other words, the right to withdraw consent from processing any PI collected by AI-based technologies that includes chatbots (Data Protection Commission, 2023). Sadly, simply enacting GDPR is not enough to address data privacy issues. According to an assistant professor at the University of Colorado, USA GDPR may obstruct future technological innovation (Greengard, 2018). Nevertheless, approaches to address chatbot data privacy issues will be considered in a later section.

ARE CHATBOTS SENTIENT?

Serious concerns have been raised about AI-powered chatbots being sentient, which means they can feel emotions and pain just like humans do (Almanzar et al., 2022). A group of authors with their research and testing have drawn attention towards making chatbots sentient with machine learning algorithms using different NLP modules (Tellols, 2020). Their research indicates that chatbots could be developed that are as sentient as humans and be more engaging for customers while conversing (Tellols, 2020). In contrast, Paul (2023) argues, chatbots at present are not sentient but statistical learning machines without an inner experience or a personality like a human. It is, after all, the humans behind these machines who modify the models and systems to make them work (Paul, 2023). In support of this argument, Eliabayev (2022) explains that chatbots are not yet artificially conscious and strongly advocates chatbots based on statistical models which are exposed to massive data creates the illusion of being sentient every time it provides responses which are intelligent.

Williams (2022) supports this view, claiming Google chatbot LaMDA has not passed the Turing Test and may not be called sentient. Therefore, it is hard to claim chatbots are conscious. On the contrary, chatbots are designed from language models to analyse words produced by humans online and generate language patterns in the form of responses. The theories about chatbots being sentient would intensify if debates about this topic were published more often, resulting in the creation of a large amount of data about AI becoming sentient. The more material there is about this topic, the more content AI chatbots will produce about it (Williams, 2022).

CRITICAL EVALUATION OF SOLUTIONS

Financial service institutions and FinTechs are among the world's most vulnerable to data security breaches (Whitman & Mattord, 2021). Financial service institution system cyber-attacks have recently flourished and are now ubiquitous (Doerr et al., 2022). A lack of authentication processes and poor authorisation has resulted in data breaches for FinTech in NZ (Ahmad et al., 2010).

The GDPR 2018 lays down extensive obligations for companies to become GDPR compliant. This means introducing AI-powered chatbots, whether in-house or via a third party, need to be GDPR compliant to protect the PI of their customers (Lishchynska, 2022). However, there is an argument as to what extent GDPR protects the data privacy of customers. For instance, AI-powered chatbots like ChatGPT and MS's Bing Chat, developed simply as a language model, may delete data without the customer's consent if the data is deemed to be not relevant (Stewart, 2023). This contradicts the GDPR of the 'Right to be Forgotten' (Stewart, 2023). As a result, being GDPR compliant is not enough to have chatbots protect the personal data of the customers (Stewart, 2023).

One of the greatest data privacy breaches in FinTech while using chatbots could be identity theft. This is when customer's data is leaked, and someone is impersonating or pretending to be the customer by using their PI (Te Tari Taiwhenua Internal Affairs, 2021). Chatbots are connected to the internet and customers tend to share PI such as credit card numbers, and bank account numbers to these chatbots to process their queries. If this information is not secured with a chatbot, it creates opportunities for hackers to steal PI in the absence of security measures such as firewalls, multifactor authentication

and zero trust framework (Garkel, 2023). A survey conducted by Norton (2022) on identity theft in FinTechs in NZ states that 21% of New Zealanders have experienced financial identity theft (Gorrie, 2022). Moreover, this identity theft has risen by 86% since 2020 in NZ (Chiang, 2022). Identity theft in NZ as recent as 2020 with NZ-based FinTech Latitude Financial facing a severe identity theft wherein more than 97% of its personal data was compromised (McIlraith, 2023). According to a leading NZ-based IT software services company, one of the major reasons for security threats with chatbots has been poor coding practices, lack of encryptions, and absence of security layers (Venugopal, 2023).

Nonetheless, these data security breaches could have been avoided with cyber security mechanisms for chatbots (Shalimov, 2022). The NZ-based FinTechs should adopt security mechanisms implemented by other global FinTechs to make chatbots cyber secure for customers. For instance, the chatbot used by Capital One banking 'Eno' is designed with anomaly detection to identify suspicious transactions, creates a virtual card number for each customer to protect them from identity theft (Shalimov, 2022). Another significant example of secured chatbots was launched by a US based company 'AlgoBot', being an intelligent chatbot used to monitor network securities and firewall administration (Barker, 2018). 'AlgoBot' is designed to monitor network traffic between Internet Protocol (IP) addresses, analyse connectivity problems between networks, identify a secure IP address, determine which application is affected due to security threats, and manage server traffic (Barker, 2018). Global FinTechs like American Express have machine learning fraud detection systems in place to detect anomalies (Mixon, 2021). Based on these security measures, it could be inferred that American Express have multi-layered security for its chatbot (Mixon, 2021).

RECOMMENDATIONS AND CONCLUSIONS

FinTechs in NZ could implement chatbots with security layers to protect customers' data privacy with multiple cybersecurity solutions. The first solution is 'Voice Biometric Technology' which can detect malicious voices of hackers across the networks (Pickup, 2022). In other words, 'User Behavioral Analytics' is an alternative which is developed with statistical algorithms to identify abnormal activities with conversational agents such as chatbots (Argus TrueID, 2023; Chotia, 2022). The second solution is 'End-to-End Encryption' of the conversations for customers which is also a responsibility under the GDPR (Preveil, 2022). Like WhatsApp chats, which are encrypted, FinTechs in NZ might adopt 'Public Key Encryption with Keyword Search (PEKS)' which enables customers to exchange information in an encrypted way but allows only the private key holder on the server end to decrypt the information (Biswas, 2020). Moreover, the third solution could be 'Two-Factor Authentication' which is a preventive measure for data leaks while conversing with chatbots (Chotia, 2022). Additionally, the fourth solution would comply with the GDPR of 'Self Destructing Messages' whereby FinTechs in NZ could implement a feature for customers to delete the messages after the chatbot session is over. The last solution could be a 'Web Application Firewall (WAF)' to stop any malicious code from being inserted into the customer's chatbot network from an intruder (Sajan, 2022). Chatbots based on the internet are vulnerable to malicious attacks (Fortinet, 2023). To prevent these threats and compromise customers' personal data security, WAF could act as an additional layer of security above network firewalls that are implemented to protect against unauthorised access (Fortinet, 2023).

Many FinTechs in NZ including banks like ANZ, ASB and BNZ have been using 128-bit Data Encryption Standard (DES) key encryption which is a security measure to protect against information leaks (Mills, 1997). However, there is no evidence of other security measures implemented to resolve data privacy issues. The main reason for not disclosing the chatbot design data protection mechanisms could also be to protect customer information from hackers. On the basis of the solutions recommended in the above, the researchers insist FinTechs in NZ implement a blend of all these solutions. For instance, although the network via which chatbots will have conversations with customers is encrypted, a WAF would provide protection from any malicious code being inserted into the customer's chatbot network (Fortinet, 2023; Sajan, 2022).

Moreover, Khan (2017) has recommended a blend of security measures to ensure adherence to data privacy for chatbots. For example, other than encryption and WAF, 'Self Destructing Messages' and 'Two-Factor Authentication' could be added as additional layers of security to protect the customer's personal data in chatbots (Khan 2017; Shaqiri, 2021). Lastly, 'Voice Biometric Technology' could represent a final layer of high-level security for chatbots. Implementing this technology itself could reduce multi-authorisation for customers (Argus TrueID, 2023; Raj, 2021). Chatbots are at the lead of innovation and therefore, FinTechs should invest in securing these conversational agents to protect data for their brand image as well as their customers' privacy.

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IMPACT OF DIGITAL TRANSFORMATION ON ORGANISATIONAL STRUCTURE

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ABSTRACT

Digital transformation has significantly changed organisations' operational functions and processes, further impacted organisational structures and improved operational efficiencies. However, many expected benefits are not yet fully embraced by employees, some even feel resistant. Therefore, this research examined New Zealand employees' perceptions of the impact of digital transformation on the structuring processes of their organisations and makes recommendations for effective transformation. A post-positivism research paradigm was adopted to guide the design of mixed methods approach to this research, which included a survey and semi-structured interviews. The targeted participants were employees working or having worked in at least one New Zealand organisation where they experienced digital transformation. Purposive and snowball sampling methods were used to recruit 65 survey participants, with follow-up interviews undertaken from agreeing participants. The participants were moderately satisfied with the improved productivity, product and service quality, and positive financial outcomes that digital transformation brought to them and their organisations. The comparison between the findings from the two data sets suggests that resources including technology, talent and equipment were the most critical factors for effective digital transformation DT. This research recommends that New Zealand organisations should focus on a six-factor model to achieve the drivers, goals, and benefits of digital transformation.

Keywords: Digital transformation, organisational structure, post-positivism, and productivity

INTRODUCTION

More than half New Zealand organisations would become 'digital' by 2020, and by 2023, digitalisation will be fully embedded in organisations and will no longer be regarded as a particular aspect of organisational change (Corner 2020). Digital transformation (DT) has changed the market with new organisational models and has also developed digitally enhanced products and services. Adopting new and innovative approaches necessitates digital transformation. Digital transformation is the process of fundamental transformation using digital tools (Gartner, 2020). It refers to improving or replacing existing resources through cultural and technological change. On a tangible level, organisations enact digital transformation by purchasing certain products or solutions.

Digital transformation is a multifaceted and complex process (Gartner, 2020). Many of the potential benefits of digitalisation are not yet fully realised by organisations. A potential reason for this is that organisations do not entirely understand the impact digital transformation might have on their organisational structure. The models of digital transformation and organisational structure have been studied extensively, each on its own aspect, in the literature. However, there is a lack of research on the effectiveness of digital transformation processes for improving organisational structures. Case studies have been conducted in Europe (Soltanifar et al., 2021; Stalmachova et al., 2021), the United Kingdom (Correani et al., 2020), Italy (Pirola et al., 2019), Malaysia (Withaneachi et al., 2019) and Australia (Troshani et al., 2018). However, there has not been extensive research in New Zealand although digital transformation is common here (Corner, 2020; Wrycza & Maślankowski, 2020).

This research aimed to investigate how New Zealand employees perceive the influences of DT on organisational structure and the critical factors for effective DT. This research intended to offer insights into structural design for managers, owners and primary stakeholders when planning DT in their organisations.

Based on the research aim, this research seeks to answer the following questions (RQ):

RQ 1. What are the factors for evaluating the effectiveness of DT on organisation structures?

RQ 2. How effective are DT processes on organisation structures in New Zealand organisations?

Research question 1 will be answered by a thorough Literature Review of the DT and organisational structure (OS) model published in the prior research for the identification of the factors for the effectiveness evaluation of DT.

Request question 2 will be answered by analysis of the primary data collected from a survey and semi-structured interviews (interviews). For a better understanding of the perceived effectiveness of DT by New Zealand employees, the challenges and benefits of adopting DT were also investigated.

LITERATURE REVIEW

This section comprehensively reviews and summarises published articles, research and other academic documents related to the research topic.

Digital Transformation

Before discussing any DT or OS model in depth, it is necessary to recognise the terms digitisation, digitalisation and DT. Digital transformation is a high-level conversion, in accordance with digitisation, that touches an organisation's core business. Digitisation is described as the process of switching from analogue information to digital information. Digitalisation, on the other hand, is considered the work processes of digital systems, like enterprise resource planning (ERP), customer relationship management (CRM) and supply chain management (SCM), which can influence the efficiency of teamwork and resource deployment, and generate valuable information for an organisation (Gartner, 2020).

Furthermore, several articles in the literature maintain that there are two types of DT. The first type is cumulative DT, which transforms physical operations into online digital operations step by step; for example, gradually converting from traditional paper to e-books. The other type of is called rapid DT (Atta & Talamo, 2020; Imran et al., 2021), in which, new digital technologies are rapidly applied to completely change an organisation's business operations, processes and organisational structure (Kretschmer & Khashabi, 2020). Furthermore, DT also includes the process of an organisation redefining business strategy, innovation, and governance mechanisms. This is done to develop a framework that guides an organisation in effectively implementing digital strategies and developing digital business models (Cennamo et al., 2020).

The popularisation of digital technology empowers organisations to optimise their scope and value frequently, reduce cross-industry barriers, develop products and services, and promote cooperation, connections, and exchanges in various industries (Remes et al., 2018). For example, Google, Huawei, and Apple have shown concern for the automotive industry's development of self-driving cars using digital technology (Correani et al., 2020).

In addition, DT has been applied to various sectors, such as accounting (Troshani et al., 2018) banking (Stalmachova et al., 2021), consulting (Gerth & Heim, 2021), construction (Arabshahi et al., 2021; Daniotti et al., 2020), education (Kooskora, 2021), electrical and industrial agricultural equipment manufacturing, and telecommunications (Correani et al., 2020).

In brief, DT is a process of fundamental transformation using digital instruments to improve or replace current resources through technological change. It refers to the specific solutions and impacts of technical resources within and across different industries (Talamo & Bonanomi, 2020).

Organisational Structure

The OS is a system that outlines how certain activities are directed to achieve an organisation's goals. It can also be understood as the looking glass or perspective (Kidschun et al., 2019) that allows individuals to see an organisation and its environment.

For example, an organisation applied a rapid DT in finance. They used the quick application of technologies such as Cloud computing, Artificial Intelligence (AI), the Internet of Things (IoT), and Big Data to improve business operations. Nevertheless, if an employee cannot adopt the new system smoothly, the organisation will take it step by step. Agile organisations, however, will move from being hierarchical to holistic to fulfil the need for agility. This allows the organisation to adapt quickly to emerging opportunities and to acquire potential profits resulting from the extreme changes brought on by DT (Schwer & Hitz, 2018). In other words, many organisations' internal operations and processes, due to the widespread implementation and adoption of DT, have triggered large-scale transformations.

Kretschmer & Khashabi (2020) confirmed that an organisation must respond sensibly and authoritatively to the inevitable evolution of DT. Their findings as the result of their analysis of the impact of DT on an organisation's internal output creation, and the analysis process was performed through the microstructure method of OS to examine the overall situation. Specifically, it was found that, while the tasks were all monitored and completed successfully, the vital step in creating the output sequence was to achieve completion of the tasks by the employees. Then, increasing the information available to decision makers who make decisions regarding task determination, division and grouping became the factor essential to ensuring successful performance and appropriate employee-task matching. Overall, organisations should make sure the OS can run smoothly and have no critical errors in order to achieve effectiveness.

Extant research has no dedicated model for evaluating the effectiveness of DT on organisation structural changes. Therefore, identifying essential factors via a comparative analysis of relevant DT and OS models is necessary. As presented in Table 1, five models for OS and five DT models were selected from prior studies for review (Kidschun et al., 2019; Kotarba, 2018; Sanchez, 2017; Sia et al., 2021).

Table 1: Organisational Structure and Digital Transformation models.

NO.	MODELS	REFERENCE
OS Models		
1	St Gallen Management (SGM) Model	Rüegg-Stürm, 2005
2	St Gallen Model for Destination Management (SGDM) Model	Klimek, 2019
3	Sustainable Hybrid Business Model	Ferlito & Faraci, 2022
4	Competitive Advantage	Porter, 1998
5	Business Model Generation	Johnson, 2012
DT Models		
1	Evaluation Model for the Derivation of a Sustainable Digitisation Strategy	Knothe et al., 2018
2	Digital Readiness Assessment	Pirola et al., 2019
3	Digital Readiness Check	Withaneachi et al., 2019
4	Digital Maturity Model	Deloitte, 2018
5	Digital Maturity & Transformation Studies	Back et al., 2015

Important Organisational Structure Models

Rüegg-Stürm (2005) integrated the pioneering work of Hans Ulrich and the ideas of language philosopher Ludwig Wittgenstein in his work at the University of St Gallen. The St Galler Management (SGM) Model contributes to systematic management theory and practice. This model provides a solid understanding of the central management domains, which influence decision making and action. Therefore, the proper strategy can embody a form of thinking, and a search grid promotes the understanding of the complex challenges of managing purpose-oriented social systems in a universal context. Consequently, while organisations are tackling complex management challenges, they can deepen their understanding of the fundamental issues and challenges of business management, in order to be effective.

Klimek (2019), on the other hand, developed a model based on the SGM Model, adapting it for various environmental and social issues. Hence, the new model, called the St Galler Model for Destination Management (SGDM), was the result of an innovative approach implemented under a shared vision at the community and regional level. With customer satisfaction as the key destination, the model enables customers to access a holistic destination-management process that is expected to provide tangible effectiveness to the organisation (Klimek, 2019).

In addition, Porter (1998) presents a model that lists a catalogue of factors using competitive advantage (CA). On the other hand, Osterwalder & Pigneur's (2010) model is a business concept map. These two models use a customer base process, which includes the product's value proposition; communication, distribution, and sales channels; customer relationships; revenue sources; essential resources; key activities; key partnerships; and cost structure.

Finally, Ferlito & Faraci's (2022) Sustainable Hybrid Business Model uses a case-study approach. The attractive point is that they based it on customer, employee and investor critiques of business practices that have a negative impact on society or the environment. This model examines business models that rely on hybrid organisations to achieve effectiveness. Furthermore, this model makes researchers aware that the size of an organisation affects business models and DT.

Important Digital Transformation models

Firstly, Knothe et al. (2018) concurred that manufacturing organisations tended to view DT as a challenge more than an opportunity. They explored the capability of an assessment concept that supports a practical and integrated approach to the core elements of a thriving digital strategy. This model is a quick and easily categorised assessment of digital strategies, which derive an integrated transformation roadmap at the strategic level (Knothe, 2018).

Secondly, one of the main issues preventing an organisation from making broader progress in DT is the lack of a clear, industry-oriented roadmap. Several other digital maturity models exist because the scope, perspectives and metrics that

measure DT success vary (Back et al., 2015; Deloitte, 2018). Nevertheless, a digital maturity model will empower organisations at process, resource, and strategic points. Therefore, the digital maturity model is a useful tool that provides a clear path to follow throughout the effectiveness of the transformation process.

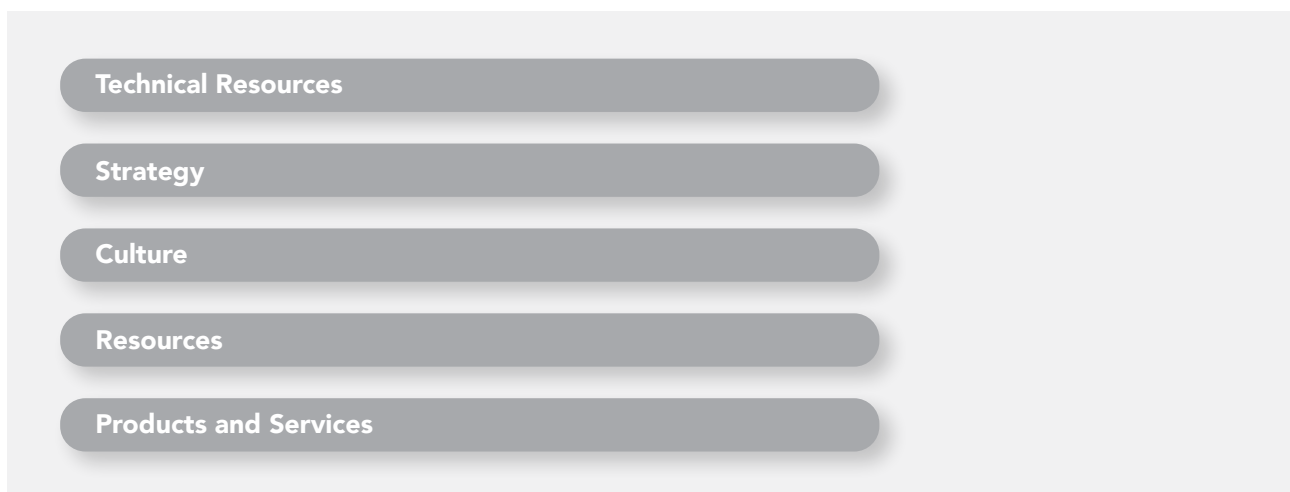
Finally, Pirola et al. (2019) and Withaneachi et al. (2019) present digital readiness assessments for different regions. This is case-study research that took place in Italy and Malaysia respectively. Pirola et al. (2019) proposed a comprehensive assessment model suitable for assessing the digital readiness of small and medium-sized enterprises (SMEs). The model for was developed and validated with two pilot case-studies, and the final model was used in a case study of 20 enterprises. This model highlights a list of priorities: Information technology (IT), process, customer, strategy, human and culture. Meanwhile, Withaneachi et al. (2019) examined the digital readiness of non-profit organisations (NPOs) for community development related to the ongoing development of skills in various fields. They conducted in-depth interviews with selected NPOs in the Klang Valley, Malaysia, and analysed digital platforms using ethnomethodological analysis. Their results demonstrate that when managing NPOs, without digital-related priorities, organisations were at a lower level of effectiveness in community development. Thus, this model shows the effectiveness of the organisations’ ability to change (from financial to human resources) through digital platforms (Withaneachi et al., 2019).

Overall, these models have their own factors for evaluating the effectiveness of DT on organisation structures. However, for research purposes, the comparative analysis of the selected models was conducted by counting the frequency of occurring factors included in the models (Table 2). They are recorded in the form of binary code (1 = included). From the analysis, the five factors were identified: Technical Resources, Strategy, Culture, Resources (combination of human resources and equipment), and Products & Services. Each factor will be critically discussed below. Figure 1 illustrates the factors for the assessment of the effectiveness of DT in organisations used in this research.

Table 2: Aggregation of Most Occurring Factors in Organisational Structure and Digital Transformation Models

	COUNT	OS1	OS2	OS3	OS4	OS5	DT1	DT2	DT3	DT4	DT5
Technical Resources	9		✓	✓	✓	✓	✓	✓	✓	✓	✓
Process	8	✓		✓	✓		✓	✓	✓	✓	✓
Customer	7		✓	✓	✓	✓			✓	✓	✓
Strategy	6	✓	✓					✓	✓	✓	✓
Human Resources	6		✓	✓			✓	✓	✓	✓	
Culture	5	✓						✓	✓	✓	✓
Equipment	3	✓						✓			✓
Products & Services	2						✓				✓
Service Supplier	1							✓			
Partner	1					✓					

Figure 1: Factors for the Assessment of the Effectiveness of Digital Transformation in Organisations



Technical Resources. Considering that the entire OS is increasingly being redefined by digital technology, Technical Resources is the most important factor. Technical Resources in this context stands for any DT technical resource that can be applied in the business operation (Back et al., 2015; Deloitte, 2018; Ferlito & Faraci, 2022; Johnson, 2012; Klimek, 2019; Knothe et al., 2018; Pirola et al., 2019; Porter, 1998; Withaneachi et al., 2019). For example, budgeting, costing, security management and communication software are involved in both the OS and DT models. Only in Rüegg-Stürm's (2005) model, is there no mention of Technical Resource, as it focused on the core management area.

Strategy. In this context, refers to decisions related to DT implementation, whether technical resources related or business related (Back et al., 2015; Deloitte, 2018; Klimek, 2019; Pirola et al., 2019; Rüegg-Stürm, 2005; Withaneachi et al., 2019). Through an organisational strategy that is constantly adapted to new market and socially relevant developments, organisations could embed DT across functions and levels, ensuring cross-functional collaboration and controlling technology in line with the desired strategic direction. Stand-alone business strategies are obsolete. 'Digital' must become a core component of business strategy to achieve effectiveness.

Culture. Organisational culture includes the values, norms and attitudes that influence the behaviour of members of an organisation. Loyalty to rules, freedom to be creative, dos and don'ts and the handling of mistakes are all important aspects (Back et al., 2015; Deloitte, 2018; Pirola et al., 2019; Rüegg-Stürm, 2005; Withaneachi et al., 2019). Therefore, organisations should adapt to external changes and foster innovation in order to keep the organisation agile enough to adapt to its near and far environment. Employees should then be involved in the DT process to ensure that the process is unhindered and effective. Overall, culture in combination with the DT model is essential for the sustainable implementation of transformation.

Resources (Employees and Equipment). Resources include human resources (employees) and equipment. The organisation uses resources as factors of production in the process/performance of tasks when achieving its goals effectively (Deloitte, 2018; Ferlito & Faraci, 2022; Klimek, 2019; Knothe et al., 2018; Pirola et al., 2019; Withaneachi et al., 2019). Therefore, both employees and equipment should be continuously developed and improved in a synchronised pattern to ensure that their capabilities are always harmoniously integrated with technological progress.

Products and Services. Products and services, as a result of the value chain, must meet the needs of customers according to certain characteristics (Back et al., 2015; Knothe et al., 2018). Therefore, in this model, the distinction between products and services becomes blurred, as physical products are increasingly complemented by digital services.

RESEARCH METHODOLOGY

The philosophical stance for this research is post-positivism, which is a shift in the positivist paradigm. It continues with most of the key philosophical assumptions of positivism, but in a way that is more than positivism's belief that effects have identifiable causes and actions have predictable outcomes. Rather than assuming a linear causal process, post-positivism recognises outcomes as a mixture of a complex set of factors interacting with each other (Giddings & Grant, 2006). Thus, mixed methods research, as a research methodology that combines qualitative and quantitative methods, was used to collect and analyse data (Giddings & Grant, 2006).

According to Holden & Lynch (2004), the research should not be driven by method. Instead, the philosophical stance of the researcher should determine how the investigation is conducted. The RQs cover a wide range of organisational issues such as organisational operations, facilities management, and many other changes that have occurred as a result of previously unexperienced situations. In this regard, the researcher acknowledges that the research participants produce unevenness, which means that different organisations experience different DT challenges.

Ciesluk et al. (2022) and Yardley & Bishop (2015) suggest mixed methods research to fill the evidence gap and they also confirm that this method could collect empirical data and provide evidence through pragmatic solutions. The mix of a survey and interviews were designed under a sequential basis, using interview data to support and confirm the survey results.

The survey was the main data collection method, and it was designed based on the results from existing studies (Liu et al., 2022; Lowe et al., 2020). Questions included demographic questions and participants' understanding of OS, experiences of DT and perceptions of DT satisfaction. Each factor in the survey was given a score from 1 to 7, with 1 representing "Strongly Disagree" and 7 representing "Strongly Agree". The decision to use a 7-point score was based on research conducted by Dawes (2008) and Linacre (2002). Additional spaces were also added for the participants to add their opinions. Qualtrics was the platform used for publishing the survey and collection of survey responses. The participants qualified only if they had experienced digital transformation while working for at least one organisation in New Zealand. The participant recruitment information with a Qualtrics anonymous link was reposted on Facebook groups, Reddit forms and Pollpool. In addition, 246 emails were sent out to potential participants who met the recruitment criteria, using a snowball sampling method. Due to time and resource constraints, after cleaning up 65 raw survey results (removal of abnormal values), 51 qualified as providing data. These were collected and analysed. The sampling method could have led to a limitation on the basis of subjectivity to some extent, but the post-survey interviews added validity to the findings.

The interviews were arranged based on the interested survey participants who signed their agreement and left their personal contact details. Each interview was about 30 minutes to one hour depending on the participant's availability. Three were completed with narrative data of the participant's personal experiences. After the interview, the written materials were confirmed by the participant. The question selection contained targeted and open-ended questions to obtain more focused and descriptive answers (Galletta, 2013).

Descriptive analysis was used for analysing the survey data. A simple qualitative coding method was used for analysing the participants' experiences and perceptions. The results of the survey and interview data were compared with prior research for enhancing the reliability of the findings.

Furthermore, it is essential to note that this research adhered to ethical guidelines with approval obtained from the Otago Polytechnic Auckland International Campus Research Ethics Committee (AIC108), ensuring that it was conducted with the utmost consideration for ethical standards and participant welfare.

In the interest of transparency and data protection, stringent measures were taken to safeguard the privacy of our participants. These measures included, such as, anonymization, secure storage, and data access restrictions. These steps were taken to ensure the utmost integrity and confidentiality of the research process.

RESULTS

For DT effectiveness the 7-point Likert scale (score 1–7) was used, which means greater than 4 indicates effectiveness (Table 3). A one-sample t-test was used and one-tail P-value was checked, which were all less than .001, which means the data were statistically significant.

Table 3: Participants Responses to Digital Transformation Effectiveness

EFFECTIVENESS	MEAN	VARIANCE
Digital transformation will improve our customers' experience.	5.9	1.42
Digital transformation will improve the whole organisation's productivity.	5.65	1.52
Digital transformation will improve the productivity of other employees in my team/department.	5.63	1.02
The new system will improve our organisation's products and services.	5.62	1.50
Digital transformation will improve my productivity.	5.58	0.92
Digital transformation will improve an organisation's return on investment.	5.5	1.86
The new digital system will be more secure.	5.48	1.78
All resources will be easier to access in the new system.	5.25	1.21

Note: 1. Number of observations = 51

For Challenges, as the researcher used the ranking options, the raw data should be added to the number together for analysis and is summarised in Table 4. The lower number means a more critical challenge was recognised by the participants.

Table 4: Participants Perceived Challenges Responses

CHALLENGES	CUMULATIVE CHALLENGES
Over-reliance on legacy technology	180
Lack of dedicated budget	209
Lack of appropriate technology/tools	228
Lack of suitable in-house skills	244
Internal politics	248
Cultural resistance	292
Data security	334
The preference for short-term thinking over the long-term planning	414
Lack of central co-ordination/ownership	425

CHALLENGES	CUMULATIVE CHALLENGES
Lack of formal strategy/plan	459
Lack of senior management sponsorship	489

For Benefits, the researcher used multiple choice, then converted the participants' choices into 0 or 1, and then added the numbers together (Table 5). The larger number means more critical benefits were recognised by the participants.

Table 5: Participants Perceived Benefits Responses

BENEFITS	CUMULATIVE BENEFITS
Increased revenue	33
Improved customer satisfaction	39
Reduced operating costs	22
Increased business speed and agility	19
Increased market share	15
Improved talent pool and retention rate	15
Reduced development time (product & services)	13

The interview data were analysed based on the six themes presented in Figure 1. The analysis of the interviews mainly sought explanations for the findings from the survey data. Technical Resources has been identified as the driver to DT in New Zealand organisations. One participant stated that the changes in DT affecting OS were mainly seen in the consulting process. This process includes "communication with patients, distributing work content among colleagues, and the management of medication and prescriptions. In the context of the Coronavirus disease (COVID-19) pandemic, new technology was adopted to improve the clinic's ways to communicate the patients. "I can see improved efficiency and patient satisfaction". Another participant confirmed this point with a discussion of the use of online video conferences. "My team pursued live or video streaming online as the offline service was hampered. The technology maintained our communication." An IT technician stressed this point also "My job emphasises technical development, so Technical Resources is an obvious factor. Each time there is a different project requirement, different programming software may be required, even though the core coding remains common." These quotes also explained the top three rated benefits from DT as indicated in Table 3.

However, one participant mentioned the challenge arisen from such adoption of technology: "Moving from traditional face-to-face services to PowerPoint and live-streaming software for services, my team struggled with the use of the functions built into the communication software". While another participant similarly suggested that "People with relevant Technical Resources knowledge were recruited, or additional training was required for the staff". Therefore, DT is costly for organisations as the training employees and testing the technology are unavoidable. Other resources such as software, fibre cables, consultancy were also mentioned by the participants.

Strategy is another factor rated important for DT in the participants' organisations. The discussion about strategies was mostly concerned the COVID-19 which further impacted on their organisations' selection of work modes. Transition to work from home was the most common example.

Products and Services improvement was justified in the adoption of e-documents and addition of service time. One participant suggested that "Our clinic adopted e-prescriptions and e-laboratory referral forms for online patients". Another participant said that "The change in work mode made our working time flexible, and the organisation started offering Sunday services later on."

The interviews provided explanations to four factors which are essential for DT. The other two factors, Culture and Suppliers were not discussed much. One participant speculated the reason was the post COVID-19 influence on those who mostly worked via distance. Culture of an organisation would be not so significant for them. Similarly, the Supplier factor was largely role dependent, for instance if a participant does not have a connection to the suppliers in their organisations, they could not possibly make comments on it.

DISCUSSION AND RECOMMENDATIONS

This research focused on factors for evaluating the effectiveness of DT on OS. The primary data findings were analysed and evaluated to determine their relevance to the literature review. During the literature review, six factors were identified

based on the comparative analysis of OS and DT models. The DT factors in New Zealand organisations were identified as Technical Resources, Strategy, Culture, Resources, Products and Services, and Suppliers. The significant effectiveness of the DT process on OS is validated as aspects of Customer Satisfaction, Finance (revenue, operating costs, and budget), and New Technologies. Based on the findings, a number of recommendations for New Zealand organisations in relation to the six factors are presented:

- Digital transformation is a key topic for organisations. From large financial services institutions, governments, and telecommunications to retailers, all are considering DT. In order to have a successful DT, it is recommended that New Zealand organisations invest in the right technology. For example, financial services and retailers need budgeting and costing software. Government and telecommunication services need security management and communication software.
- It is recommended that New Zealand organisations develop DT strategies that involves all departments. Stand-alone organisational strategies are obsolete. Through an organisational strategy implementing DT across all levels will ensure cross-functional collaboration and control.
- It is recommended that New Zealand organisations adapt to innovation and involve employees in the change process to ensure that DT flows freely through the organisational structure. The combination of culture and DT facilitates the sustainable implementation of transformation which will make an organisation agile enough to adapt to its immediate environment.
- It is recommended that New Zealand organisations invest in the right equipment and employee training. Employees need to be trained and build capability while equipment needs to be improved as DT is implemented, ensuring that human capabilities are always harmoniously integrated with technological advances.
- With the implementation of DT, Products and Services can become indistinguishable. This is because physical products are increasingly complemented by digital services, so New Zealand organisations require a renewed emphasis on the above factors of Technical Resources and Human Resources in order to improve customer satisfaction.
- It is recommended that New Zealand organisations develop Products or Services jointly. Organisations must use the results of DT to integrate their suppliers and adapt various systems in the supply chain, bypassing intermediaries and simplifying communication with suppliers.

In summary, after comparing results from the surveys and interviews with the findings from the literature review, it is suggested that New Zealand organisations focus on a six-factor model to achieve the drivers, goals and benefits of DT such as Customer Satisfaction, Finance (revenue, operating costs and budget) and New Technologies. For example, it was revealed during the analysing of the interview questions that traditional New Zealand organisations focused more on DT during the COVID-19 pandemic. Therefore, specifically, those New Zealand organisations should be more interested in communication and process-management software.

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FACTORS INFLUENCING USE OF MOBILE MARKETING STRATEGY AMONG SMALL-TO-MEDIUM ENTERPRISES IN NEW ZEALAND

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ABSTRACT

Small-to-medium enterprises are generally regarded as the most significant source of drive for innovation and transformation in both emerging and developing economies. Mobile marketing is one of the evolving modern direct marketing communication channels, rapidly gaining popularity among businesses due to its many advantages to both potential customers and businesses. This research aims to investigate the attitudes and practices of small and medium-sized business (SME) proprietors in Invercargill regarding the strategic integration of mobile marketing. Specifically, the study is structured around three key objectives: firstly, to gauge the comprehension and familiarity with mobile marketing concepts among SMEs in Invercargill, New Zealand; secondly, to discern the motivating factors that prompt SMEs in Invercargill, New Zealand, to adopt mobile marketing as a fundamental marketing tool; and thirdly, to analyse the array of mobile marketing channels utilized by SMEs in Invercargill, New Zealand, for the promotion and dissemination of their products and services. To better understand factors influencing small-to-medium enterprises' adoption of mobile marketing, eight in-depth interviews were conducted with small-to-medium enterprise owners in Invercargill, New Zealand. The data was analysed using narrative analysis. It was found that conceptual knowledge, motivational factors, and multichannel platforms influenced mobile marketing adoption by small-to-medium enterprises in New Zealand. The findings provides useful information for small-to-medium enterprises owners on how to better engage with their target customers through mobile marketing, and perhaps bridge a gap in marketing literature on small-to-medium enterprises and mobile marketing in the New Zealand context.

Keywords: mobile marketing, marketing strategy, motivational factors, mobile marketing channels, small-to-medium enterprises, New Zealand

INTRODUCTION

Marketing is the process of attracting customers to a product or service. Kotler and Keller (2015) define marketing as satisfying customers' needs while making a profit. Promotion, advertising, sales, product delivery and after-sales support, are all examples of marketing activities (Hazelden, 2019). This research explored various techniques small-to-medium enterprises (SMEs) use to sell their products and services using mobile marketing. Furthermore, the research was confined to SMEs only, i.e., businesses with nineteen or fewer staff, as specified by the New Zealand definition of SMEs (Small Business Council, 2019).

Mobile marketing is an emerging and relatively new marketing strategy and has become very useful across all countries, industries, businesses, and markets (Gao et al., 2020). Mobile phones have become a staple device of modern society due to the ubiquitous existence of the Internet, advanced mobile technology with manifold features and, obviously, the ease of communication and connectivity (Hounmanou et al., 2016; Ishii, 2011). Furthermore, the emergence of more sophisticated mobile devices such as smartphones, feature phones, and tablets has increased a richer customer experience, especially given the ability to shop irrespective of time and geographical location (Goode et al., 2005; Parise et al., 2016). According to Huss (2022), 40% of all purchases in New Zealand takes place on smartphones, 87% of Internet users are now smartphone users, and 81.5% of mobile phone users conduct product research online before purchasing.

Small-to-medium enterprises are the backbone of the economy in most of the developed countries including New Zealand. They also contribute significantly to the growth of the global economy (Pandya, 2012). Similarly, SMEs significantly contribute to the New Zealand economy (New Zealand Foreign Affairs & Trade, 2021a). Small-to-medium enterprises account for 28%

of New Zealand's gross domestic product (GDP) and employ over 630,000 workers. Furthermore, there are approximately 487,602 SMEs in New Zealand, representing 97% of all New Zealand businesses (New Zealand Foreign Affairs & Trade, 2021b). Considering the contemporary phenomenon, i.e., the rapid use of smartphone technology (Ismail et al., 2021; Tong et al., 2020; Yin et al., 2019), this research explored the factors influencing the uptake of mobile marketing as a strategy by SMEs in Invercargill, New Zealand.

Research on use of mobile marketing on SMEs has been conducted previously, however, there is limited research on the factors influencing the use of mobile marketing in New Zealand. Likewise, it is noted that the bulk of the previous research was conducted from the customers' perspective, i.e., on user behaviour and attitudes towards mobile marketing (Gao et al., 2020; Jebarajakirthy et al., 2021; Leppäniemi et al., 2006). Although there is literature from other countries on the factors influencing mobile marketing adoption, there is limited research in New Zealand, particularly with SMEs, and the existing literature is fragmented. This research is, therefore, an attempt to fill this gap and better understand the factors influencing SMEs' use of mobile marketing strategies.

LITERATURE REVIEW

Several types of mobile devices facilitating mobile marketing are available in the market; however, this research was predominantly confined to mobile marketing via mobile phones (smartphones and feature phones) and tablets. The literature review related to mobile marketing and SMEs and is discussed in the following subsections.

Mobile Marketing

Mobile marketing has become a catchphrase in the modern business world and is gaining recognition and acceptance for its efficacy. Mobile marketing is proliferating; due to this very reason, it is emerging as a topic of interest in the research world since its early adoption (Leppäniemi et al., 2006).

Marketing is one of the sectors that has been considerably transformed due to technological innovations in mobile-based marketing; consequently, traditional marketing has, to some extent, been reduced by mobile marketing, which is popularly known as m-commerce. Nevertheless, mobile technology is very fragmented, and as a result, mobile-based marketing has become multi-faceted and multichannel. As such, the target audience can be reached using smartphones, tablets, or other handheld devices via short message service (SMS), multimedia message service (MMS), websites, e-mails, and mobile applications. Huang (2012) defines mobile marketing as simply a process of delivering a marketing message to a mobile device through a mobile communication platform (p. 12). However, Ismail and Razak (2011) criticised the lack of consensus on the definition of mobile marketing; researchers are seemingly ever forced to define it within the context of their studies.

The most significant aspect of mobile marketing is its capacity to use push and pull marketing strategies simultaneously (Armstrong & Kotler, 2017). Kumar and Mittal (2020) noted that the smartphone had aggregated the process of searching for information, shopping, social networking, communication, and leisure. A new term, mobile moments, has emerged, referencing a person using their smartphone to instantly get anything they want. Business enterprises, including SMEs have been motivated to embrace mobile technologies to connect with customers and enhance their competitive advantage. Minelli et al. (2013) state that mobile analytics provides a framework for developing a holistic understanding of customer behaviour. As a consequence, the adoption of mobile marketing offers a framework for ensuring that a brand can align its advertising strategies with its business goals. Effective mobile marketing can result in improved business performance by optimising brand awareness and recognition.

Mobile Marketing and Customer Retention

Prospective customer acquisition is key in as much as SMEs can engage, retain, and upsell to a customer. Considering their limited resources, SMEs priorities activities that generate a high return on investment (ROI) at the least possible cost (Dairo & Beyioku, 2022). A customer focus is paramount to SMEs because of the pressure they face to create positive outcomes as soon as possible. Shareef et al. (2016) reported that mobile marketing offers SMEs the opportunity to reach customers at an affordable cost.

The adoption of mobile marketing by SMEs is determined by multiple factors such as cost, alignment with the business model, efficacy, and target customers (Saeed & Bekhet, 2018). For example, young customers appear to be willing to engage with mobile marketing messages when there is a positive perception of ease of use, usefulness, entertainment value and personal attachment (Saeed & Bekhet, 2018).

There is an obvious need for SMEs to connect with their target customers. As such, their target customers' location is an essential consideration in shaping mobile marketing utilisation (Yousif, 2012). The author stated that mobile marketing is distinguished from other forms of marketing because of its personalisation, interactivity, localization, and ubiquity. Many SMEs, however, may lack the competence or awareness of how to use mobile marketing optimally. As a result, they must rely on the professional services provided by digital marketing agencies. In this regard, a SMEs' owner's knowledge and attitude towards digital technology becomes an important factor in shaping any decision to utilise the services.

Mobile phones have offered marketers a new platform to connect with customers. They offer organisations 24/7 access to individual customers, enabling them to build interactive relationships and cultivate positive relationships (Lu et al., 2019). Rodriguez and Boyer (2020) states that increased interaction between the SME and customer allows them to develop a more intensive relationship. Besides, it provides businesses with the customers' identity, commercial behaviour, communication patterns and geographic location.

Likewise, Eze et al. (2019) states that access to mobile phones is expected to increase due to falling costs and rising income levels. The state mobile marketing enables brands to reach and acquire customers faster than traditional marketing because of the technology's omnipresent nature. When mobile marketing is executed appropriately, it allows customers to access personalised and time and location-sensitive information. Besides being useful, it is also easy to measure its impact through data analysis (Sezgin, 2016). As a result, it is easy for business owners to determine the return on investment on their investment in mobile marketing.

As highlighted by Dairo and Beyioku (2022), mobile marketing generates value for both customers and businesses, especially SMEs. However, many businesses provide limited support to this powerful and versatile platform. Additionally, their existing knowledge regarding the adoption of mobile marketing is limited to their interactions with customers.

Mobile Marketing and Small-to-medium Enterprises in New Zealand

Mobile marketing is increasingly gaining popularity in New Zealand as a direct marketing strategy. It is gradually becoming mainstream among SMEs due to its various advantages to its customers (Basagre, 2022). This literature review explores the benefits of integrating mobile marketing into a business's marketing campaign strategy, especially New Zealand direct advertising processes (Bakopoulos et al., 2017). The use of mobile marketing by SMEs is slowly and gradually increasing in New Zealand. The Coronavirus Disease (Covid 19) pandemic has also sped up the momentum to shift to mobile marketing from 2021 to 2023. During this time the mobile marketing gap in the SMEs community has closed by 1% (NZME, 2023). Another reason behind this is the ability to personalise and optimise the experience for the customers (Basagre, 2022).

In New Zealand, mobile marketing techniques, channel propagation and usage, especially regarding SMEs, have aroused great interest among researchers. Due to limited human and financial capital, these technologies have brought considerable benefits to SMEs since mobile marketing channels are affordable compared to mainstream advertising. Mobile marketing strategies help New Zealand SMEs improve their sales and promotional performance (Berman, 2016). Even so, there is a continued lack of focus on building a usable marketing framework and a lack of clarity regarding the factors determining New Zealand SMEs' adoption of mobile marketing techniques. This research investigated mobile marketing's impact on New Zealand SMEs and endeavoured to formulate a theoretical base model for mobile marketing.

Moreover, mobile marketing campaigns are vulnerable to being copied by a competing business, despite the prospect of a lawsuit (Yurovskiy, 2014). Proprietary trademarks and logos can likewise be appropriated to deceive target or potential customers, with an obvious risk to market share. It might well be possible for a competing mobile marketing campaign to disseminate negative and inaccurate information about a reputed brand, product, or service, to tarnish its online reputation and distance potential customers (Yurovskiy, 2014).

There is the added potential for such a campaign to overwhelm and clutter the market with too many advertisements, pop-ups, pop-unders, banners, etc. (Yurovskiy, 2014). In a customer's mind, such advertisements might originate from a real business or a dubious entity; spammers and scammers are ever-present in the digital sphere, including mobile marketing. This kind of doubt leads some customers to ignore marketing messages and advertisements wholesale, regardless of source, resulting in revenue loss to any bona fide business (Taherdoost & Jalaliyoon, 2014). The content of mobile marketing should therefore be streamlined, rich in the business sense but professional; otherwise, the customers will not perceive the marketing advertisements or SMS or MMS as serious.

On a separate note, mobile marketing is not the solution for all promotional endeavours because it cannot reach out to all target or potential customers. Accordingly, mobile marketing channels may be less relevant where some products and services or the target market are concerned; for example, for the aged (elderly) population, where only a small percentage will be tech-savvy, while the majority have little familiarity with mobile marketing, or indeed mobile technology (Taherdoost & Jalaliyoon, 2014).

An analysis of the available literature would seem to urge researchers to focus on the regulating of mobile marketing and on the responsiveness of customers according to age group. It also points to a greater effort being made to examine the effectiveness of mobile marketing in other business sectors. Addressing these knowledge gaps will enable better understanding of the SMEs mobile marketing experience.

RESEARCH METHODS

This research aimed to establish an in-depth and detailed understanding of various factors influencing the use of mobile marketing strategies for SMEs in Invercargill, New Zealand. The case study method provides a more profound understanding and can be applied to various disciplines (Crowe et al., 2011). The data was collected using a semi-structured interview with eight participants who own and manage SMEs in Invercargill, New Zealand. The samples were selected by using purposive sampling techniques to obtain greater depth and insights (Saunders et al., 2019). The data was collected only after receiving ethical approval from the Southern Institute of Technology Human Research Ethics Committee. The interviews were conducted for about an hour and aimed to collect participant demographics, business characteristics, and perceptions of mobile marketing's importance, effectiveness, implementation, and impact on the business. It also explored participants' awareness of mobile marketing, their current usage, preferred channels, and the feedback from customers. Additionally, it also aimed to understand participants' potential future usage and desired improvements for mobile marketing strategies.

According to Saunders et al. (2019), the researcher should design and conduct such an in-depth interview to better understand certain actions occurring in the situational context and their effects. This justifies adopting a case study approach, including the interview process as a tool for data collection.

The data were analysed and interpreted using the narrative enquiry method. Saunders et al. (2019) found that a narrative enquiry method is more appropriate when the participants' view of their experiences can only be understood by accessing their entire story. Thus, this research aimed to investigate the attitudes and practices of small and medium-sized business (SME) proprietors in Invercargill regarding the strategic integration of mobile marketing.

RESULTS AND DISCUSSION

Eight SME owners from different types of businesses from Invercargill, New Zealand, were interviewed to learn about their personal experiences and business practices related to mobile marketing. The participants were selected using a purposive sampling method, the contact information of the participants were found from the New Zealand company register office's website and were contacted via phone, or email. The information sheet was provided to the participants and only those interviewed gave permission to participate.

The findings are presented by topic, starting with the participants' demographic information, followed by themes linking to the research objectives. This is followed by a discussion of the findings in relation to existing literature.

Demographic Details of the Participants

In the first part of the interview, demographic and personal details were gathered from the participants; questions 1 – 6. Table 1 summarises the participants' demographic information, while the subsequent Figures 1 and 2 summarise the participants' gender and age. All participants' names have been anonymised; each was assigned a code.

Table 1: Participants' Information

PARTICIPANTS	GENDER AND AGE	SME TYPE	SME HISTORY
Participant 1 (P1)	Female, 35 to 45	Grocery	2 to 3 years
Participant 2 (P2)	Female, 30 to 40	Mobile Accessory Shop	1 year
Participant 3 (P3)	Female, 40 to 45	Saloon and Hairdressing	2 to 3 years
Participant 4 (P4)	Female, 50 to 55	Bakery and Confectionary	20 years
Participant 5 (P5)	Male, 35 to 45	Car Sales	2 to 3 years
Participant 6 (P6)	Male, 35 to 40	Mobile Phone Repairing	1 to 2 years
Participant 7 (P7)	Male, 45 to 50	Dairy	1 to 2 years
Participant 8 (P8)	Male, 30 to 35	Grocery	3 years

Figure 1: Gender Classification of the Participants

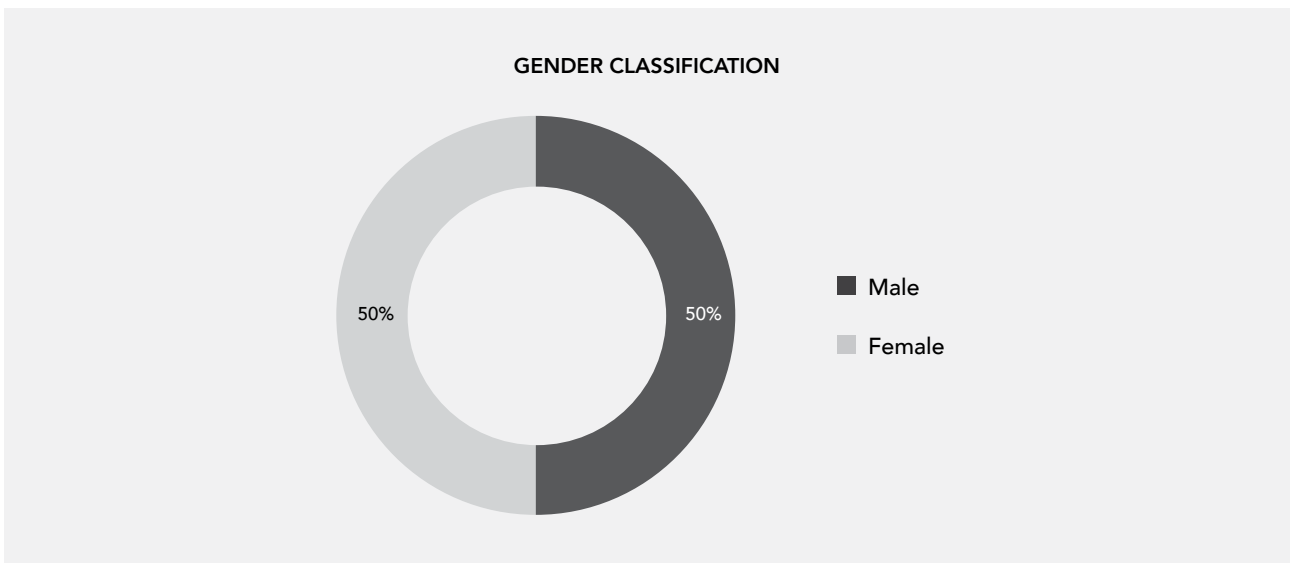
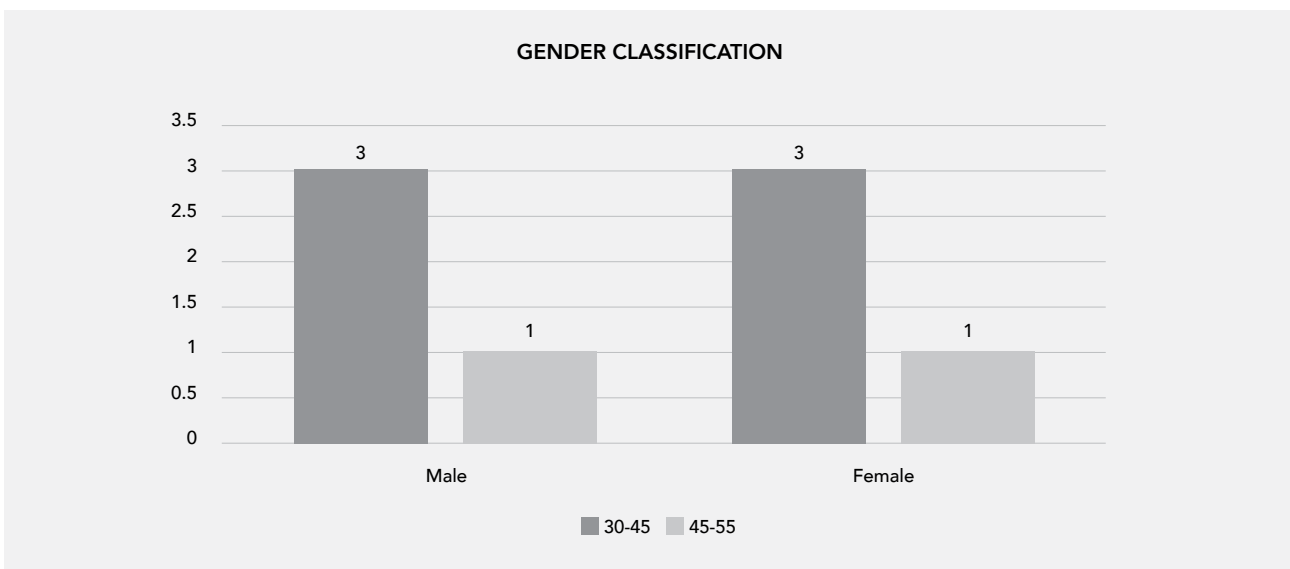


Figure 1

When reviewing the age groups (Figure 2), 75% of the participants were between the ages of 30 and 45, and the remaining 25% were between the ages of 45 and 55, i.e., a group of relatively young entrepreneurs.

Figure 2: Age Groups and Number of Participants



No sensitive business information, ethnic or cultural information was requested or obtained. The interview questions were formulated in such a way that it gets and answers to all three objectives thoroughly. Some relevant follow-up questions were also added to gain a deeper insight and aid in understanding of each aspect separately. The questions are presented in the following Tables 2 and 3, respectively, linking the interview questions to the research objectives.

Commonalities and differences between participants' responses were soon discovered. Interestingly, in addition to the initial themes identified through the literature review, many other themes emerged from the participants' responses, and the researcher was able to recognise trends among the responses. The researchers also identified the phases of business development as the starting phase, growth phase, maturity phase, and renewal or declining phase based on the trends and initially identified factors. Each phase was interconnected, but the influence of key factors such as SMEs' knowledge and understanding, encouragement to use mobile marketing, and availability of multichannel channels differed from phase to phase.

As indicated in Tables 2 and 3, the questions are organised according to the research objectives, which are discussed next.

Table 2: Linking Interview Questions and Research Objectives

RESEARCH OBJECTIVES	INTERVIEW QUESTIONS
Knowledge of the concept (Objective 1)	Are you aware of a concept called mobile marketing?
	How would you describe or explain mobile marketing?
	How did you get to know about this concept?
	Do you think that mobile marketing is important/effective for the success of a business? If yes/no, then why?
	Have you identified any weaknesses or disadvantages of using mobile marketing? Could you please briefly discuss it.
Motivational factors (Objective 2)	What changes / new features you would like to see in mobile marketing?
	Are you using mobile marketing in your business?
	What factors led to your decision to use mobile marketing in your business?
	How do you market or promote your products to your customers?
	Have you identified any positive changes/progress after the introduction of mobile marketing? If yes, could you please briefly discuss it?
	Have you identified any weaknesses or disadvantages of using mobile marketing? Could you please briefly discuss it.
	Would you continue using mobile marketing in the future for marketing activities?
Type of mobile marketing channels (Objective 3)	What traditional marketing or advertising channels you are using to promote your business?
	What are the mobile marketing or advertising channels you are using to promote your business?
	Which is your most preferred mobile marketing channel, and why?
	Do you think that mobile marketing is effective compared to the other methods of marketing used currently for your business?

Table 3: Linking Research Objectives to Key Research Findings

RESEARCH OBJECTIVES	KEY FINDINGS
Knowledge of the concept (Objective 1)	The following factors were identified. <ul style="list-style-type: none"> – Awareness / Effectiveness – The difference between conventional marketing, mobile marketing, and synergy effect – Current trends / Advantages and Disadvantages / Developments.
Motivational factors (Objective 2)	The following factors motivated the participants to use mobile marketing as a marketing strategy, the ubiquitous nature of mobile devices, the ease with which companies can raise awareness of their existence, the ability to reach new markets, the ability to provide a personalised and contextual experience, and high customer engagement and interaction.
Type of mobile marketing channels (Objective 3)	The following mobile marketing channels were heavily used by the participants: <ul style="list-style-type: none"> – SMS / Push notifications / Mobile applications / Company websites The following social media was not used: <ul style="list-style-type: none"> – WhatsApp / Facebook messages / Facebook The following mobile marketing channels were seldom used by all the eight participants to promote their products and services: <ul style="list-style-type: none"> – MMS / YouTube / LinkedIn.

KNOWLEDGE OF THE CONCEPT

All eight participants used mobile marketing in their capacity to meet their personal needs; however, two were unaware of the terminology of mobile marketing. Six participants were well-versed in mobile marketing and had considerable experience.

Mobile marketing helps deliver highly interactive content with compelling formats. Further, due to the one-on-one personal nature of mobile devices, mobile advertisements are more effective than traditional marketing. The findings are similar to

Kumar and Mittal (2020) research on mobile marketing, suggesting that most business organisations are motivated to use mobile technology to connect with their customers. This can be further ascertained from the participants' awareness of mobile marketing, as indicated in Table 4 below.

Table 4: Participants Awareness and Effectiveness of Mobile Marketing

PARTICIPANT QUOTES	PARTICIPANT
AWARENESS	
"I was not aware of the term mobile marketing; however, I have used all the tactics that you explained under mobile marketing."	P1
"Yes, of course, I am very much aware of the concept mobile marketing."	P4
EFFECTIVENESS	
"It is a cost-effective marketing method for our business."	P3
"It helps our business to consistently send content to our target customers"	P7

To understand the participants knowledge regarding current trends and developments in the marketing field, especially as regards mobile marketing and other technological advancements. All the participants were well informed about the new trends and developments as above, suggesting that a mobile marketing strategy is fitting well with their marketing mix model, simplifying overall marketing campaign planning (Xi et al., 2019). The participants' responses to current trends and developments in relation to their experiences and business practices, are illustrated below in Table 5.

Table 5: Current Trends and Developments

PARTICIPANT QUOTES	PARTICIPANT
CURRENT TRENDS AND DEVELOPMENTS	
"Artificial intelligence (AI) will be a groundbreaking phenomenon after mobile marketing."	P1
"I would say mobile marketing because it facilitates one-to-to-one, interactive dialogue between retailers and customers using the various platforms that suit the customer best."	P2
CURRENT TRENDS AND DEVELOPMENTS	
"I think video marketing is one of the most significant marketing trends today."	P3
"Social messaging apps can be very useful, which is part of mobile marketing. The customers believe businesses should be on social media apps like Facebook, WhatsApp and Instagram. This is what I've learned after doing business for many years."	P4
"Artificial intelligence will have the greatest potential and commercial value over the next decades."	P5
"The use of data from social media platforms, and mobile analytics can assist businesses in discovering where customers go and what they look for."	P6
"I am excited about chatbots. According to me, that is the latest development in the marketing arena."	P7
"Personalised marketing means personalised content, products, product information and promotional messages."	P8

During the interview, the participants' feedback and responses were obtained on the advantages and disadvantages of mobile marketing by posing the following two questions:

- Have you identified any weaknesses or disadvantages of using mobile marketing?
- Have you identified any positive changes after the introduction of mobile marketing?

Participant 1, who is running a grocery business, described the positive changes they have seen in adopting mobile marketing as follows:

"The benefits are numerous; for example, through mobile marketing, a retailer can reach millions or even billions of people to sell their product. A single advertisement in multiple formats makes it simple to use. Furthermore, since mobile marketing is direct marketing, it allows you to have a direct conversation with your potential customers and receive immediate feedback. User responses can also be easily tracked with mobile marketing" (P1).

Despite these numerous positive changes, P1 described the weaknesses and disadvantages they have faced as a business when using mobile marketing:

“There are drawbacks as well; the most significant downside is false negative customer feedback. We have had some bad experiences that have negatively impacted our brand. Another drawback is that navigation on a small mobile screen can be difficult, resulting in the advertisement going unnoticed. Customers are also reluctant to log in to new sites due to privacy concerns, which poses a challenge to retailers like us because we will not be able to fully leverage the potential platform.” (P1).

These responses from the participants are similar to Huang et al. (2022) arguments that mobile marketing is vulnerable to being copied by a competing business and possible for them to disseminate negative and inaccurate information. However, some of the participants indicated that such a weakness is being overshadowed by the benefits they offer. For example, P2 and P6 are in the mobile accessory business, and they tend to get more customer feedback regarding mobile marketing due to the nature of their business. According to them, the following two weaknesses also negate the benefits mobile marketing has to offer.

“Since mobile advertisements are fast, it’s difficult to correct or fix a mistake before it’s noticed” (P6).

“User costs must also be considered; standard data and texting charges may apply to some of those who review mobile advertisements, causing them to avoid watching them, so causing retailers to miss out on the full potential available” (P2).

Participants P3, P4, and P5 gave feedback on another aspect of the concept knowledge. All three agreed that mobile marketing was not a complete replacement for traditional marketing but that businesses should reap the benefits of both platforms by leveraging the synergy effect. These findings align with Yousif’s (2012) argument that mobile marketing needs to be used as a tool to improve SMEs’ marketing via their personalisation, interactivity, locational, and ubiquity features.

Table 6: The Difference Between Conventional Marketing, Mobile Marketing, and the Synergy Effect

PARTICIPANT QUOTES	PARTICIPANT
CONVENTIONAL MARKETING, MOBILE MARKETING, AND THE SYNERGY EFFECT	
“I own a saloon and dressmaking business, and word-of-mouth is how I get most of my customers. Mobile marketing is useful for spreading the word about a company’s presence, whereas word of mouth attracts loyal customers.”	P3
“I’ll tell you what I did. I used traditional marketing platforms to inform about my digital presence. I first mentioned our Facebook and website details in paper advertisements.”	P4
“I believe that SMEs should combine traditional and mobile marketing methods to provide a comprehensive customer experience.”	P5

Based on the participants’ responses, it is evident that awareness of mobile marketing is one of the prerequisites influencing mobile marketing adoption. This means customers will be willing to engage with mobile marketing when they perceive its easy use, entertainment, and personal value (Saeed & Bekhet, 2018). Because SMEs can organise their knowledge into a coherent whole, this allows them to learn new concepts by connecting them to what they already know. This means mobile marketing provides a more holistic understanding of customer behaviour as Minelli et al. (2013) argue and an opportunity to reach more customers (Shareef et al., 2016).

Motivational Factors

The participants all agreed that various motivational factors encouraged their use of mobile marketing, and many different factors went into a mobile marketing strategy. The findings revealed that among SMEs, motivation was found to be an important factor in mobile marketing adoption in New Zealand, or at least in Invercargill. The following themes were identified from the participants in response to the motivational factors.

Omnipresent

Participant 2, who runs a mobile accessory, elaborated on their views regarding motivational factors and the omnipresence of mobile technology, stating.

“That people carry mobile phones all the time and retailers can keep in touch with customers all the time” (P2).

Participant 5, who represents the car sales industry, agreed with P2, and said.

“that not only the pervasiveness of mobile phones but also the addictive nature of smartphones had opened a new range of business opportunities for them” (P5).

Similarly, P4 and P7 emphasised the benefits that retailers can derive from the omnipresence of mobile phones, serving as a driving force for retailers to integrate mobile marketing into their marketing strategies and to promote their products. These findings align with Shareef et al's. (2016) research suggesting mobile marketing allows businesses to reach more customers at affordable prices.

“We chose mobile marketing because of this feature of mobile phones; all other benefits are secondary to us. As a retailer, you want to be everywhere, and this magical device facilitates that.” (P4).

“In my opinion, this has made things easier and is a convenience to both merchants and customers.” (P7).

These views from the participants align with the Watson et al. (2013) argument that mobile marketing is a direct marketing tool that establishes immediate contact. This is because mobile devices are widely available and can reach customers at any time and at any location.

Increasing awareness of products, their existence, and reaching new audiences

In addition to the advantages of mobile technology's omnipresence, participants highlighted the motivation to use mobile marketing from the prescriptive of reaching new customers. This supports the arguments of Rowles (2017) that the proportion of people using mobile technology has dramatically increased, such that mobile technology has become an eminently viable option for businesses to attract new customers. For example, P3, who runs a saloon and hairdressing business, response regarding increasing product awareness and the possibility of reaching out to new audiences:

“Because small saloons and hairdressing shops do not typically advertise on television or in newspapers, I had to rely on word of mouth to attract new customers. However, since introducing Facebook and Facebook Messenger, I have noticed a significant increase in customer traffic.” (P3)

Similar viewpoints were shared by P5 and P8 on the ability of mobile marketing to attract new customers and increase awareness of their products:

The responses from P2, P3 and P7 to the questions relating to motivational factors are listed below.

PARTICIPANT QUOTES	PARTICIPANT
ABILITY TO OFFER PERSONALISED AND CONTEXTUAL EXPERIENCE	
“Customers expect businesses to be available when they need them the most. I believe that mobile marketing channels, especially social media channels provide a valuable source of information that businesses can use to personalise customer interactions.”	P2
“Customising content and product details is simple with mobile marketing; all it takes is a single SMS.”	P3
“The ability to collect reviews through mobile marketing channels provides an opportunity for companies to learn what customers think companies should do differently. If used correctly, we can personalise, our level of customer service to the fullest extent possible.”	P7

These responses from the participants are similar to the (Aschoff, 2020) research that suggests that the United Kingdom has become a smartphone society and that New Zealand is no different. Given this situation, it has become easier for businesses to use mobile technology to provide customers with personalised and context-specific services.

Viswanathan et al. (2017) argue that branded mobile applications and access to websites via smartphones or tablets are constantly changing how customers interact with a brand. Similar views were expressed by the participants to the questions related to motivational factors.

PARTICIPANT QUOTES	PARTICIPANT
CUSTOMER ENGAGEMENT AND INTERACTION	
"Mobile marketing is often a two-way communication, so it is quite easy to interact and engage with customers."	P1
"With mobile marketing, getting customer feedback is only a click away. It is a pleasure marketing via mobile because of this interaction."	P4
"You can get immediate customer feedback with mobile marketing; It is personally rewarding and exciting to interact with customers using mobile marketing."	P8
"As to customer engagement and interaction, the first impression is critical. You can develop enticing content and make your company's website or mobile application captivating with mobile marketing."	P5

Type of Mobile Marketing Channels

The participants had mixed views about using mobile marketing channels. All participants were familiar with the AI platform, Facebook, and Facebook Messenger, company websites, and company-owned mobile applications for marketing campaigns. Responses indicated that P1, P7 and P8, all in the grocery business, were knowledgeable about push notifications and their benefits and functionality however they had never used the push notification medium.

All the participants asserted the importance of having their mobile applications and a company website whereby businesses can upgrade product content 24/7, plus the customer's ability to work offline and online, and that mobile apps presented a seamless experience.

PARTICIPANT QUOTES	PARTICIPANT
SMS AND PUSH NOTIFICATIONS	
"SMS is a very fast and efficient method of communication."	P1
"Marketing messages will hit the target audience almost instantly and are easy to disseminate and less complex."	P2
"The customer will feel it because an SMS is delivered directly to their mobile phone. It is very personal."	P3
"By delivering the right message to the right group of people, businesses like us can boost sales."	P4
"Easy to use." "Since we have our own mobile application, we are making good use of push notifications."	P5
"Most popular mobile marketing method." "Push notifications will increase the customer experience."	P6
"Simple and easy."	P7
"SMS can be easily tracked using the delivery reports."	P8
MOBILE APPLICATIONS AND COMPANY WEBSITES	
"It increases customer acceptance and a positive reputation when the business has both app and website."	P3
"Can bring the consumer closer to the company's products or services."	P4
"Paves the way for more seamless customer experience."	P5
"According to my view, mobile applications and company websites enable customers to interact and transact with ease."	P7
"Can delight the customer if the business has both app and website. The more, the merrier."	P8

Among the participants, the most popular social media messaging apps were Facebook, Facebook Messenger, and WhatsApp, all free to use and have a user-friendly interface. Small-to-medium enterprises might well be advised to use these social media apps to engage with their target audience.

PARTICIPANT QUOTES	PARTICIPANT
WHATSAPP, FACEBOOK AND FACEBOOK MESSENGER	
"Cost-effective method of marketing."	P1
"Convenience."	P2
"The most popular mobile marketing channel."	P3
"Most potent and interactive channel."	P6

None of the participants were using MMS, YouTube or LinkedIn for mobile marketing campaigns to promote their goods and services. Apart from P5 and P6, the other six participants were not aware that LinkedIn could be used to promote their goods and services.

CONCLUSION

This research investigated the factors influencing New Zealand SMEs' uptake of mobile marketing. Using a qualitative case study approach, it was found that omnipresence, the ability to increase visibility and reach new markets, the ability to deliver personalised and contextual experience, ability to provide extensive customer engagement and interaction were the key factors influencing New Zealand SMEs in using mobile marketing. This research may act as a starting point for taking a broader view of mobile marketing for SMEs, especially from the perspective of business owners themselves.

Finally, the research found that mobile marketing is the most effective tool for advancing the business objectives of SMEs and the ever-present need to stay ahead of the competition. Small-to-medium enterprises can produce unparalleled results by successfully integrating mobile marketing at the right moment. By embracing mobile marketing and going digital, SMEs all over the world have reached new heights and achieved outstanding results. More emphasis could well be placed on promoting mobile marketing as a versatile and sophisticated marketing method for SMEs.

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FACTORS INFLUENCING CUSTOMER ACTIVITY IN THE CONTEMPORARY TOURISM INDUSTRY IN AOTEAROA/NEW ZEALAND

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ABSTRACT

This exploratory study aims to categorise the factors affecting customer activity in the tourism industry of Aotearoa/New Zealand post-Coronavirus Disease (COVID-19) and the 2022 reopening of borders. The significance of the study can be explained by the fact that tourism is a substantial part of Aotearoa/New Zealand's economy. Annual international tourism revenue before COVID-19 pandemic was \$17 billion, contributing 20.1 per cent to Aotearoa/New Zealand's total exports of goods and services. As the tourism industry recovers, it becomes increasingly important for the tourism and hospitality sector to identify factors influencing customer activity and new tools to attract tourists. A systematic literature review explored the theoretical frameworks of efficient management, examined effective global customer management practices, and analysed various management tools available for stimulating customer activity in tourism and hospitality. The study explored different aspects of the tourism industry from the perspectives of decision-makers in the travel companies, governmental agencies, local communities, and customers of tourism services. Critical evaluation of the literature highlighted the importance of systematic engagement of local communities in the development of tourism products and fostering meaningful integration of community networking with digital word-of-mouth networks informing the awareness and knowledge of customers. Authenticity of interaction at the intersection of local communities, service providers, customers, and government agencies may be particularly impactful for reviving and reinforcing tourism in Aotearoa/New Zealand in post the COVID-19 pandemic.

Keywords: tourism industry, management in tourism, interaction in tourism, tourism stakeholders, management tools, Word-of-Mouth concept.

INTRODUCTION

Tourism adds value to the international economy by producing jobs and encouraging the creation of new enterprises (Femenia-Serra et al., 2019); therefore, conducting scientific research into tourism can, among other things, shed light on the economic and social aspects of our world (Scheyvens & Cheer, 2022). Tourism has a dual nature (Chepras, 2013): it has both a commercial and social aspect. Understanding it reveals the needs and resources of communities and individuals, their development, and, at the macro level, acts as a source and tool for the redistribution of national income within regions and countries (Kostina & Chepras, 2013). Prior to the COVID-19 pandemic, the interest in enhancing tourism management was consistent, and the industry had stable growth in various location across the world. According to the World Travel and Tourism Council (2023), According to the World Travel and Tourism Council (2023), antecedent to the onset of the COVID-19 pandemic, the tourism sector, encompassing its direct, indirect, and induced ramifications, constituted a pivotal source, contributing to one in every five newly generated employment opportunities on a global scale during the period spanning from 2014 to 2019. Furthermore, this sector played a substantial role, accounting for 10.3% of the overall workforce, equivalent to 334 million jobs, and contributing 10.4% of the worldwide gross domestic product (GDP), amounting to US\$ 10 trillion in 2019. Besides, international expenditure by tourists globally reached a substantial figure of US\$ 1.9 trillion in the same year (World Travel and Tourism Council, 2023).

Before the COVID-19 pandemic, the tourism industry played a significant role in Aotearoa/New Zealand's economy, contributing substantially to its financial growth. According to Stats New Zealand (2022b), annual spending by international tourists at that time were \$17.5 billion. This robust flow of revenue was a crucial pillar of Aotearoa/New Zealand's economic stability in the years preceding the COVID-19 pandemic.

However, the emergence of the COVID-19 pandemic brought about a shift in Aotearoa/New Zealand's tourism industry (Roberts, 2022). With the closure of its borders for 23 months, the tourism industry underwent drastic and unprecedented transformations (Anthony, 2021). According to Tourism Industry Aotearoa (2023) (TIA), the tourism workforce was reduced by more than 72,000 employees, or about a third, in the first year of the COVID-19 pandemic. However, one benefit was a slight increase in domestic tourism spending, which grew by 2.6% on pre-COVID-19 pandemic levels (Tourism Industry Aotearoa, 2023). Nevertheless, this did little to offset a 91.5% decline in international tourism spending to just \$1.5 billion, compared to the pre-COVID-19 pandemic annual spend of \$17.5 billion (Stats NZ, 2022b). In just one year, \$15.6 billion of the Aotearoa/New Zealand economy was lost, including a drop of \$1.7 billion in goods and services tax (GST) revenue from international tourists (Anthony, 2021). In addition, Aotearoa/New Zealand Stats NZ (2022a) states in 2021 the number of people crossing the border was the lowest in 50 years, underlining the magnitude of the COVID-19 pandemic impact.

The post-COVID-19 period was noted by a cautious yet progressive revival of the tourism industry, which commenced in measured stages as the borders were reopened in stages. On February 28, 2022, vaccinated tourists from Australia were allowed to cross the border; on March 13, 2022, they were reopened to tourists worldwide who did not require a visa to enter the country (Tourism Industry Aotearoa, 2023). A significant milestone was reached in August 2022 when Aotearoa/New Zealand recommenced visa processing, effectively opening its borders to international tourists again.

Tourism Industry Aotearoa Chief Executive Rebecca Ingram (2023) expressed an optimistic outlook for the tourism industry, affirming its readiness to contribute significantly once again to Aotearoa/New Zealand's economy. Pre-COVID-19 (year to March 31, 2020) tourism directly contributed 5.6% of GDP, falling to 3.0% through the COVID-19 pandemic (year to March 31, 2022) as the industry focused on domestic tourism alone. With international tourists returning, the tourism industry would start to recover some of the 2.6% of GDP lost during the COVID-19 pandemic (Tourism Industry Aotearoa, 2023).

The study explored articles researching the tourism industry before, during, and after the COVID-19 pandemic across different countries. The purpose is to leverage the knowledge to recommend ways Aotearoa/New Zealand could maintain its tourism industry in case of 'black swan' events like the COVID-19 pandemic. The study explored government regulations of the suppliers/customers relationship, determining the demand for tourism services. It also analysed relationships between actors in the field of tourism and identifies the features of their interactions in the tourism industry. This study may be of value to most tourism companies and government agencies because of the need to identify factors influencing customer activity and look for new tools to attract reemerging tourists.

LITERATURE SELECTION

Three key actors are involved in managing the tourism industry: public authorities and local governments, service customers, and service providers. The management system in the tourism industry can be analysed through the interactions between these three actors, the result of which is the functioning of the tourism industry, which should, in principle, ensure sustainability, flexibility, and high-quality services for customers (Chepras, 2013).

The management of the tourism industry aims to streamline the interaction between these actors to find the optimal state, in which the interests and needs of all actors are maximally satisfied (Kostina & Chepras, 2013). A necessary condition for achieving such a state is communication which allows the exchange of information and coordination of actions between the groups of actors (Scheyvens & Cheer, 2022). During this study, the selected articles were grouped to highlight the features of these interactions and their influencing factors.

Twenty-one articles were selected based on keywords: "tourism industry," "management in tourism," "interaction in tourism," "tourism stakeholders," various regions, source, and date of publication. The selection was limited to peer-reviewed articles published between 2013 and 2023. These articles represented a variety of research methods, the complementarity of which has made the analysis more multifaceted and complete. Since the use of specific methods of data collecting and analysis affects the results (Olya, 2023), the choice was made in favour of articles that were diverse in methodology and allowed for more comprehensive coverage of the question posed. The articles chosen for this literature review use qualitative, quantitative, and mixed research methods to justify and address different aspects of the topic.

Since the articles investigated the mechanisms for effective interaction between external and internal stakeholders of the tourism industry, the first basis for classification was different interaction groups. Due to the wide range of stakeholders, the articles chosen informed different sides of the travel process – actors of the travel businesses, governmental structures, residents of the territory developing tourism, and tourism services customers, which also made it possible to evaluate the features of cooperation between the actors of the tourism industry.

The approaches and views of tourism underwent a significant change during the COVID-19 pandemic (Ionescu et al., 2022). Therefore, the articles were differentiated according to publication time relative to the COVID-19 pandemic. Pre-COVID-19 pandemic articles could only be considered somewhat relevant, yet the theoretical analysis of social networks and word-of-mouth theory retained their relevance (Huo et al., 2021; Litvin et al., 2018). The number of articles depending on the type of interaction between actor groups and time interval is presented in Table 1.

The third basis for classifying the articles was the geographical region of the countries where the research was conducted. Since some articles examined the actions undertaken by countries with earlier border reopenings, this provided insights into factors influencing customer activity in the tourism industry, evaluating, and implementing these experiences in Aotearoa/New Zealand was possible.

Table 1: Number of Articles According to Their Actor Groups

INTERACTION TYPE	PRE-COVID-19 PANDEMIC	DURING COVID-19 PANDEMIC	POST-COVID-19 PANDEMIC
Suppliers and customers	4	1	9
Government agencies and the tourism companies	1	1	4
Companies and residents	1	0	1

Interaction Between Actor Groups

The management tools presented in the chosen articles were based on theoretical frameworks, models, and practical observations of tourism industry actors.

Due to the complexity of the tourism industry, the following vectors of interaction between key actor groups were analysed:

- the interaction between suppliers and customers of tourism services;
- the interaction between government agencies and the tourism industry;
- the interaction between companies and residents of the territory developing tourism.

The vectors-of-interaction classification is founded on activity-based and systemic sociological approaches (Chepras, 2013). The first concept evaluated the managerial functions performed by each of the three interacting actors. The crucial idea of the approach was that the effectiveness of the tourism industry management system is the product of the integrated implementation of various actor-specific activities by suppliers, customers, and government agencies (Chepras, 2013). A systemic approach, the second of the two used to identify interactional vectors, emphasises the interdependence of the key actor groups (Bertalanffy, 1968). Only the coordination of their activities ensures the effective functioning of the tourism industry, its stability, and its adaptability to changing environmental conditions (Kostin, 2003). These two approaches formed the basis for identifying the vectors of interaction between actors in the tourism industry. Applying these concepts to the chosen articles emphasised the importance of finding a harmonious balance among actors within Aotearoa/New Zealand’s tourism industry. This balance is a potential solution for overcoming the COVID-19 pandemic challenges and the recovery of the tourism industry. Achieving this balance involves collaboration and addressing the needs, concerns, and interests of all the actors involved, including government agencies, residents of the territory developing tourism, tourism suppliers, and customers.

Significantly, the interaction between customers of services and agencies regulating the tourism industry was not explicitly explored in the chosen articles. The reason for this was that this interaction is primarily concerned with the legal framework of tourism. An article by Yoopetch et al. (2022) provided an example of government interest in Thai service customers to develop programmes to support the tourism industry. Noticeably, only international tourists were the focus of that study, and information about their needs was collected using the Delphi method from industry experts (Yoopetch et al., 2022), allowing us to see the unidirectionality and limited communication of that interactional vector.

Fourteen articles were devoted to analysing effective interactions between customers and service providers and offered tools for the improvement of these interactions. Other interactions of the tourism industry received much less attention, which indicated high interest in this type of relationship. This study focus aligned well with the dominant neoliberal perspective of the market economy and policy development across multiple developed and developing countries in the last few decades since the inflation crisis of the 1970s (Barry et al., 1996) and with the approach to policy formation in Aotearoa/New Zealand (Shaw & Eichbaum, 2011). This also reinforced the role of the government’s managerial role, focusing on monitoring and accountability functions, therefore making the interactional vector between the government and customers less meaningful as the government would try to remove itself from direct involvement in the market interactions in line with the New Public Management paradigm (Hood, 1991). Whether or not the merits of such an approach outweigh its associated issues is beyond this scope of this study. However, this conceptual framework helped understand the significant imbalance of research into various interactional vectors in the tourism industry.

Interaction Between Service Customers and Suppliers

According to Muniz (2021), tourism experience and customer knowledge should further improve and develop tourism products. The tourism industry can implement specific data-based modifications, primarily because of the development of communication technologies and the access to customer knowledge they provide (Gretzel et al., 2016). Ivars-Baidal et al.

(2019), Jovicic (2019), and Gretzel et al. (2016) confirm that the development of the Internet, social media, and websites are the principal factors responsible for these transformations. Various other personal social media, such as Facebook, Instagram, YouTube, and tourism-specific platforms like Booking.com and TripAdvisor, have altered how tourism experiences are constructed and consumed (Muniz et al., 2021). In the tourism industry, technologies facilitated a change in the sales and communication channels, which reduces third-party participation and enhances competition (Yin et al., 2022). Gretzel (2016) believed that we had witnessed the dawn of an age of smart tourism. Cloud computing, big data, mobile apps, location-based services, geo-tag services, virtual reality, augmented reality, and social networking services are all cutting-edge examples of smart technologies enhancing tourism experiences and services (Wang et al., 2012). Moreover, Yin et al. (2022) offers to intelligently support international tourists using the Tourism Cloud Management System (TCMS) can enhance and improve their tourism experience. The authors considered a mobile app that could be used to sell tickets for the transport of tourists, using a quick-response (QR) code as an identifier for validation and gives tourists access to the digital form of their travel reservations and makes it easy for them to find destinations (Yin et al., 2022). As a result, without using digital technologies to enable adequate public-private-customer collaboration, achieving a thriving market is almost impossible nowadays (Jovicic, 2019). These factors have led to a transformation in the external environment of the tourism industry, influencing the adoption of technological solutions for creating and delivering tourist services (Gretzel et al., 2016). Additionally, they have reshaped the dynamics of engagement among the tourism industry actors, resulting in a shift towards greater customer autonomy and reduced reliance on suppliers.

One of the mechanisms for increasing trust in interaction between service customers and suppliers is the word-of-mouth (WOM) concept, which was considered by Litvin et al. (2018) and Huo et al. (2021). Word-of-mouth is based on the hypothesis that proximity to customers emphasises the perceived value of service, while the perceived cost of services and company image determine customer loyalty (Huo et al., 2021). Based on the conducted in China and Pakistan research, Huo et al. (2021) identified that brand image and destinations' uniqueness enhance customer loyalty as perceived benefits are closely correlated with customer satisfaction and thus enhance the effects of WOM and the commitment of customers to engage with digital and analogue communication channels acting as image ambassadors to the service providers. Moreover, service providers can improve the tourism experience by offering personalised products and services to users (Buhalis & Amaranggana, 2014), facilitating the transition from regular customers to brand ambassadors discussed by Huo et al. (2021).

According to Litvin et al. (2018), WOM is defined as an assortment of forms typical individuals use to interact online via blogs, websites, product reviews, and other channels. Therefore, the researchers highlight the importance of interaction with tourists' online reviews for service providers (Litvin et al., 2018). They view social media as a tool for segmenting potential customers and stress that interpersonal or social contacts are the most meaningful and practical source of customer data (Litvin et al., 2018). The general transformation of the tourism industry to incorporate information and communication technologies (ICTs) (Gretzel et al., 2016) is significantly more topical following the COVID-19 pandemic. Consequently, post the COVID-19 pandemic, it is crucial to pay particular attention to the quality of interaction between customers and suppliers of tourist services and the ability to maintain communication channels.

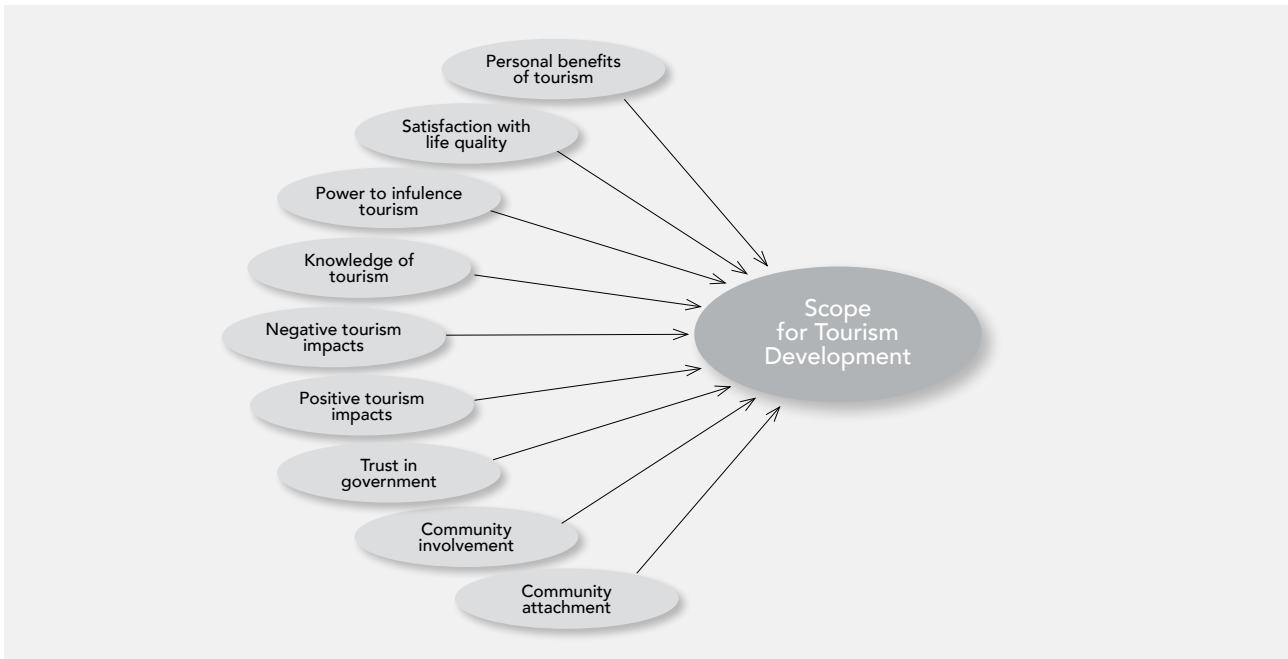
Word-of-mouth has significantly altered the interaction dynamics between suppliers and customers in the tourism industry (Litvin et al., 2018). The advent of social media and online platforms has made customers co-creators of tourism services and increased the requirements for these services (Litvin et al., 2018). This shift has led to a more customer-centric approach in the tourism industry and has forced suppliers to prioritise customer satisfaction (Dodda, 2023). Moreover, WOM has transformed the tourism industry's interaction between suppliers and customers from a one-way communication model to an interactive system (Huo et al., 2021).

Valeri & Baggio (2021) considered a similar question but in the context of a different methodology - social networks and tools for improving the information flow along the customer/supplier interaction vector. The authors conducted a quantitative study to measure the networks' distribution and reach of targeted marketing activities when applied to tourism-oriented communities in digitally facilitated networks. To assess tourism networks, they offered such measurements as density and cohesion of group and degree of centrality between customers since it has been found that the main participants were usually located in the centre of the network. This means that the overall control of a tourism destination is governed by a restricted number of actors, confirming once more the need for a cooperative tourism network (Valeri & Baggio, 2021) and, therefore, these groups of customers with intensive connections had more effective connections for WOM brand representation. Social network analysis identifies patterns and provides managers with a wealth of information about company's qualitative and quantitative connections and organisational dynamics (Valeri & Baggio, 2021). Consequently, companies can use these information channels to receive customer feedback, rank the factors influencing tourists' activity, and form an attractive image of the proposed service (Dodda, 2023), improving the effectiveness of interaction with the customers and significantly increasing their competitiveness (Muniz et al., 2021). This study emphasises the role of digital networks and social tools in shaping the interaction between tourism suppliers and customers. The study by Valeri & Baggio (2021) highlights how companies can leverage social network analysis to enhance their interaction with customers and strengthen their position in the competitive tourism market.

Interaction Between Companies and Residents

According to Olya (2023), the sustainability of tourism growth relies on the aid of local communities and residents. Consequently, the perceived favourable and unfavourable influences, individual benefits of tourism, community attachment, and trust in the government are all predictors of residents' approval for tourism expansion. At the same time, this study identified residents' complex behaviours toward tourism development and identified necessary predictors to achieve the residential support of tourism development which are presented in Figure 1. The results of this research are essential for prioritising and ranking the factors influencing residential behaviour. Olya and Gavilyan (2017) have found that residents who have experienced negative impacts from tourism still express their support for tourism development. Therefore, this study conducted a multiple factor analyses to provide deeper insight into the analytical approaches used for modelling residents' support for tourism development (Olya, 2023).

Figure 1: Predictors of Residents' Support for Tourism Development (Olya, 2023)



Olya (2023) emphasised that personal benefit, the positive impact of tourism, and community involvement significantly and positively affect residents' support for tourism development. It is crucial to underline that a community attachment mainly raises residents' approval for tourism growth (Lee, 2013; Olya, 2023). Community attachment is explained as "people's strong positive feelings, rootedness, and sense of belonging toward the community" (Eslami et al., 2019, p.1063).

Boes et al. (2016) explored the core components of smart technologies concerning the tourism industry through a case study analysis of well-established smart cities and their residents' characteristics. They concluded that the smart components within a service-logic ecosystem hold the potential for sustained competitive advantage and enhance residents' and tourists' quality of life in smart tourism destinations. Consequently, residents' closeness to the local community and the level of adoption of smart technologies in the destination positively influence the aptitude and likelihood of developing local tourism (Boes et al., 2016).

These articles highlight the importance of local communities and residents in sustaining tourism growth because residents' approval and support are crucial for expanding the tourism industry. These insights can be leveraged to recommend ways for Aotearoa/New Zealand to maintain and grow its travel industry, since understanding and addressing the concerns and preferences of local communities could be a key strategy (Olya & Gavilyan, 2017). Encouraging community involvement in tourism development and building trust between the travel companies and the residents can contribute to residents' approval, which supports the industry's growth and sustainability (Olya, 2023). Government regulations can be designed to ensure a balance between economic benefits and minimising negative impacts of the tourism industry, taking into consideration residents' concerns and preferences (Eslami et al., 2019).

Interaction Between Tourism Services Suppliers and Government Agencies

The crucial part of the tourism industry is the government since it might stimulate tourist activity, ensure the tourism system achieves pre-determined objectives, and control all the parties of the travel process (Chepras, 2013). Besides, as an actor in the tourism system, the government can participate in the market directly through its auditing functions or through investments in infrastructure and providing information or process support to the national tourism community (Roberts, 2022).

Zhou et al. (2022) consider the issue of government involvement in regulating the tourism industry, noting that government guidelines and the "trust" in them are essential for developing the post-COVID-19 tourism industry. Another aspect of state regulation in tourism is forecasting the development of the tourism industry to ensure maximum market competitiveness, which connects back to the government function of infrastructure planning and development (Yoopetch et al., 2022). Tourism forecasting is vital for private service providers, allowing companies to analyse and plan for market developments (Yoopetch et al., 2022). On the other hand, tourism forecasting also supplies necessary data for the government to plan (World Tourism Organization (UNWTO), 1989, p. 6) and develop ongoing international tourism information strategies (Zhertovskaya & Saak, 2011). An example of how this data could be gathered and utilized is the research of Yoopetch et al. (2022), who conducted tourism forecasting using the Delphi technique to accumulate information from experts in hospitality, supplying government agencies with data about the trends in Thailand's tourism.

These articles emphasise that government guidelines, trust in them, and their involvement in regulating the industry are crucial in post-COVID times. In the context of Aotearoa/New Zealand, the government's active involvement in providing guidelines and regulations for tourism post the COVID-19 pandemic can stimulate customer activity, influence suppliers' expectations, and change travel market dynamics (Roberts, 2022). The insights from the articles highlighted the importance of collaboration, strategic planning, and alignment between tourism companies and government agencies to ensure the recovery of the tourism industry.

Theoretical Frameworks and Models

According to The World Tourism Organization (1989, p.1), it is in the interest of all countries to facilitate both individual and group tourist travel. Tourists "contribute to economic, social, and cultural development, foster the creation of a climate of confidence and mutual understanding between the members of the international community, and the development of international cooperation"

This definition emphasises the role of tourism and such crucial industry features as complexity and the necessity of partnerships (Scheyvens & Cheer, 2022). As an integrated activity, tourism includes the activity of actors at different levels and can be aimed at achieving different results (Chepras, 2013). The issues of organising effective interaction between them should be the focus of the tourism management process in coordinating the actions and implementing joint programmes for the development of the tourism industry, which is reflected in the topics of the selected articles (Muniz et al., 2021; Valeri & Baggio, 2021; Zhou et al., 2022).

It is worth noting the importance of the synergy effect in tourism since the results of the joint activities of the tourism industry actors are more than the sum of individual results (Valeri & Baggio, 2021). The existence of the sphere of tourism services is impossible without the organised performance of certain functions by various actors since, in essence, the provision of tourism services is a complex activity, and the formation of a tour package involves the combination of a whole range of services (Chepras, 2013). Therefore, it would be reasonable to consider the tourism industry, among other things, as a system of tourism services, all elements of which are functionally interconnected, and their activities are ordered in a certain way (Chepras, 2013).

International experience testifies to the diversity of management models, in which the government's role and power structures can take a lot of different forms (Yoopetch et al., 2022; Zhertovskaya & Saak, 2011). Today, we can distinguish three models of interactions (Chepras, 2013) within the framework of the provision of tourist services:

1. A unilaterally directed model that explores the influence of one of the actors of the tourism industry (customers, suppliers, and government agencies) on others to satisfy their interests (Chepras, 2013). This model was not directly represented in the selected articles. However, the work of Yeoman et al. (2022) has some references to this model. It focused exclusively on the behaviour of tourists and the changes in their tourist activity during and after the COVID-19 pandemic.
2. A bilaterally directed asymmetrical model that explores "the interaction of two actors to achieve common goals, taking into account the interests of each other in the absence of coordination of interests on the part of the third" (Chepras, 2013, p. 79). Such a model is shown in the articles of Huo et al. (2021), Muniz et al. (2021), and Litvin et al. (2018), where the relationship between customers and providers of tourism services is displayed, but government structures are not represented. Also in Yoopetch et al. (2022) the relationship between travel companies and government agencies were explored but customer are completely omitted.
3. A bilaterally directed symmetrical model that characterises the interaction of the actors in the process of achieving common goals and considering each other's interests (Chepras, 2013). This model describes the relationships presented in the articles by Valeri and Baggio (2021), Roberts (2022), Zhou et al. (2022), and Ionescu et al. (2022).

The social partnership model implies an equal interaction between all tourism industry actors (Scheyvens & Cheer, 2022). At the same time, it is essential to remember that tourism is directed by the needs of customers, who determine the activities of suppliers (Muniz et al., 2021). This interaction aspect is expressed in the presence of feedback as a partnership model implies that all actors in the management process (customers, suppliers, and government agencies) build relationships with each other on the principles of cooperation and consistency (Kostin, 2003; Muniz et al., 2021; Yoopetch et al., 2022).

This kind of communication makes sense in the tourism industry (Ghanem et al., 2022; Scheyvens & Cheer, 2022; Tourism New Zealand, 2023), where all activity actors interact to create and implement a tourist product, each performing various functions (booking hotels, performing air transportation, providing insurance, and issuing visas to the country of arrival) (Ghanem et al., 2022). As a result of their interactions and the exchange of results of activities, a package of services can be implemented in the tourism market.

Since Aotearoa/New Zealand's existing model of interaction is stated to be symmetrical (Tourism New Zealand, 2023) and is intended to be based on the concept of partnership, it is crucial to identify two main issues that are relevant to this model in the current realities and can be distinguished in the articles:

1. Cooperation in the tourism industry. The issues of organising effective interactions between actors at different levels should be the focus for all tourism management companies interested in coordinating their actions and implementing joint programmes for the development of the tourism industry (Valeri & Baggio, 2021). During the analysis of the management systems in the selected articles, it was noted the need to organise interactions between all actors in the tourism industry (Roberts, 2022). This was based on the interests of each of them and built on reciprocal partnerships in an industry that is a pathway to sustainable development (Movono & Hughes, 2022). It is important to remember that the actors' equality in practice is illusory, if at all attainable (Kostina & Chepras, 2013). However, the mechanisms to express their opinion on the development of the tourism industry, the weight and importance in the market, and many other factors influencing the possibilities of cooperation can vary significantly (Movono & Hughes, 2022; Scheyvens & Cheer, 2022). The relative influence of the main actors involved in the interactions - authorities, customers, suppliers and government agencies – is vastly different (Yoopetch et al., 2022).
2. Customer knowledge. This topic is quite logically explained by the need to obtain the most accurate and relevant (especially post the COVID-19-pandemic) knowledge about customers (Ionescu et al., 2022) to design a popular tourist product effectively. Firstly, the non-primary nature of tourism services means they have a very high price elasticity of demand (Chepras, 2013). Therefore, the change in the population's purchasing power affects tourism services, and timely customer information allows for adjusting the volumes and price levels and the overall territory industry goals in view of the local market and as part of the broader international market (Muniz et al., 2021; Yoopetch et al., 2022). Secondly, marketing is vital for the tourism industry (Dodda, 2023). The seller of tourism services, intangible and delayed by consumption, must find arguments in favour of their product, which can only be done with well-established marketing (Chepras, 2013; Litvin et al., 2018). Due to the variability of the quality of services, the same tourism experience can be perceived very differently by different customers (Litvin et al., 2018). In this regard, tourism management should be focused on creating a system for collecting, processing, and disseminating customer knowledge (Muniz et al., 2021). Consequently, the alignment of regular two-way communications and coordinated cooperation between the tourism industry's actors make it possible to respond to changing conditions of the external environment (Litvin et al., 2018). This is especially important because partnerships allow for performing tourism's social function and reducing tourism industry risks (Ionescu et al., 2022).

Since these two topics are the focus of attention in almost all articles, it is worth dwelling on them in more detail.

Frameworks and Models of Cooperation

The first group of articles considers the tourism industry as a complex system that operates using management models based on cooperation and aims to analyse the factors for building effective interactions between industry actors. The significance of the cooperation framework is due to the complexity of the tourism product itself and the current external conditions for providing tourism services, including the uncertainty and risks of travel (Ionescu et al., 2022; Litvin et al., 2018; Zhou et al., 2022). The nature of the tourism industry implies the need for trust, strengthened through the systematic interaction and exchange of information between providers and customers of tourism services (Zhou et al., 2022). The necessity of considering and improving organisational processes in tourism was highlighted by Baggio et al. (2020), who emphasised that through the availability of information, perceived transparency and analysis of customer knowledge increases the trust.

One of the conceptual frameworks and strategic tools that seek to make use of tourist knowledge and enhance destination management through understanding is SMARTUR (Baggio et al., 2020; Boes et al., 2016; Buhalis & Amaranggana, 2014; Gretzel et al., 2016; Hunter et al., 2015; Muniz et al., 2021). This framework states that smart tourism requires an ecosystem where actors must collaborate in developing smart goals that satisfy the current tourism industry needs (Muniz et al., 2021). Notably, electronic social media now plays a crucial role in developing smart tourism destinations, and influencing customer activity and supplier behaviour (Jovicic, 2019). Consequently, one can see the significance of striving for collaborative action in tourism governance (Muniz et al., 2021). The term "smart" has been added to a whole lot of different constructs, including cities, to describe efforts aimed at using technologies innovatively to achieve resource optimisation, effective and fair governance, sustainability, quality of life, and, importantly, integrated and efficient infrastructure for tourism (Gretzel et al., 2016; Shafiee et al., 2019). In business, smart tourism allows for new ways of managing tourist flows, better tourist services, new advertising models, and new collaborative ventures that build on Cloud services and open data to innovate beyond traditional tourism industry boundaries (Gretzel et al., 2016).

This idea is supported by the hypothesis of commitment, according to which trust and connection marketing one ought to concentrate on brand impression, perceived services, client loyalty, and favourable WOM because these are the fundamental drivers of customer attitudes (Huo et al., 2021).

In addition, Hunter et al. (2015) proposed the constructivist framework based on the belief that through smart tourism ecosystems, experience and image formation are increasingly self-perpetuating, autonomous, and organic social constructions.

After the COVID-19 pandemic, Ionescu et al. (2022) presented a decision-support model to specify and execute quick actions for European tourism industry recovery. Since the tourism decision-makers needed a new approach, the authors developed a smart management model that assessed the effectiveness of the suggested steps on the tourism economy in response to the health crisis. They critically analysed the health crisis effects on tourism customer activity using Eurostat and European Commission data to establish a causal relationship and develop a causal matrix. Demonstrating the causal relationship between the model factors allowed for the analysis of the strengths, weaknesses, opportunities and threats to evaluate the tourism industry management, which quantified the value of these for each Member State of the European Union (Ionescu et al., 2022).

Since a traditional “non-smart” managing concept which does not examine the collaborative connection between multiple actors, is no longer appropriate for contemporary requirements, Zhou et al. (2022) developed a model that contains multiple decision-makers as actors of its enquiry established on a standard four-dimensional evaluation strategy. This study examined the expansion of the decision-makers and the inclusion of public companies and residents in the decision-making process linked to tourism projects. A novel large-scale group decision-making (LSGDM) algorithm was proposed to incorporate the trust–distrust asymmetric connections between decision-makers (Zhou et al., 2022). The data presented showed that the trust–distrust value between decision-makers differed and influenced the clustering result (Zhou et al., 2022). The authors believed that the decision-maker first assigns trust and distrust values to other decision-makers. Then, the trust relationship network is constructed based on the trust values, and the clustering algorithm is applied. The key elements of this methodology are to apply a scientific clustering algorithm, reasonably decompose the decision-making actors into small groups, integrate the most information for each small group, and then summarise the information. As a result, the authors posit that collaboration among interested actors, including the government, companies, and the public, might be crucial in creating a multiagent cooperative governance model (Zhou et al., 2022).

Another fundamental feature of tourism cooperation is its systemic nature (Kostina & Chepras, 2013; Valeri & Baggio, 2021). According to Valeri & Baggio (2021), tourism is a complex system and can be comprehended only by examining it as a whole. The components of a complex system interact in a non-linear way. There are seldom straightforward cause-and-effect connections between segments, and a little impulse may generate significant or no influence. On the other hand, tourism can demonstrate a fast recovery since the system is moderately insensitive and can return to a balanced state without external inputs (Valeri & Baggio, 2021), which explains the tourism industry recovery after the COVID-19 pandemic. Due to the systemic nature of the tourism industry, it makes sense for interacting actors to pay special attention to building high-quality connections and cooperation.

The concepts of cooperation between actors in the tourism industry highlighted in the considered articles have clearly shown that the recovery post the COVID-19 pandemic and development of the tourism industry in Aotearoa/New Zealand are possible only with the active participation and systemic interaction of suppliers and customers using tourism services, government agencies and residents of the territory developing tourism.

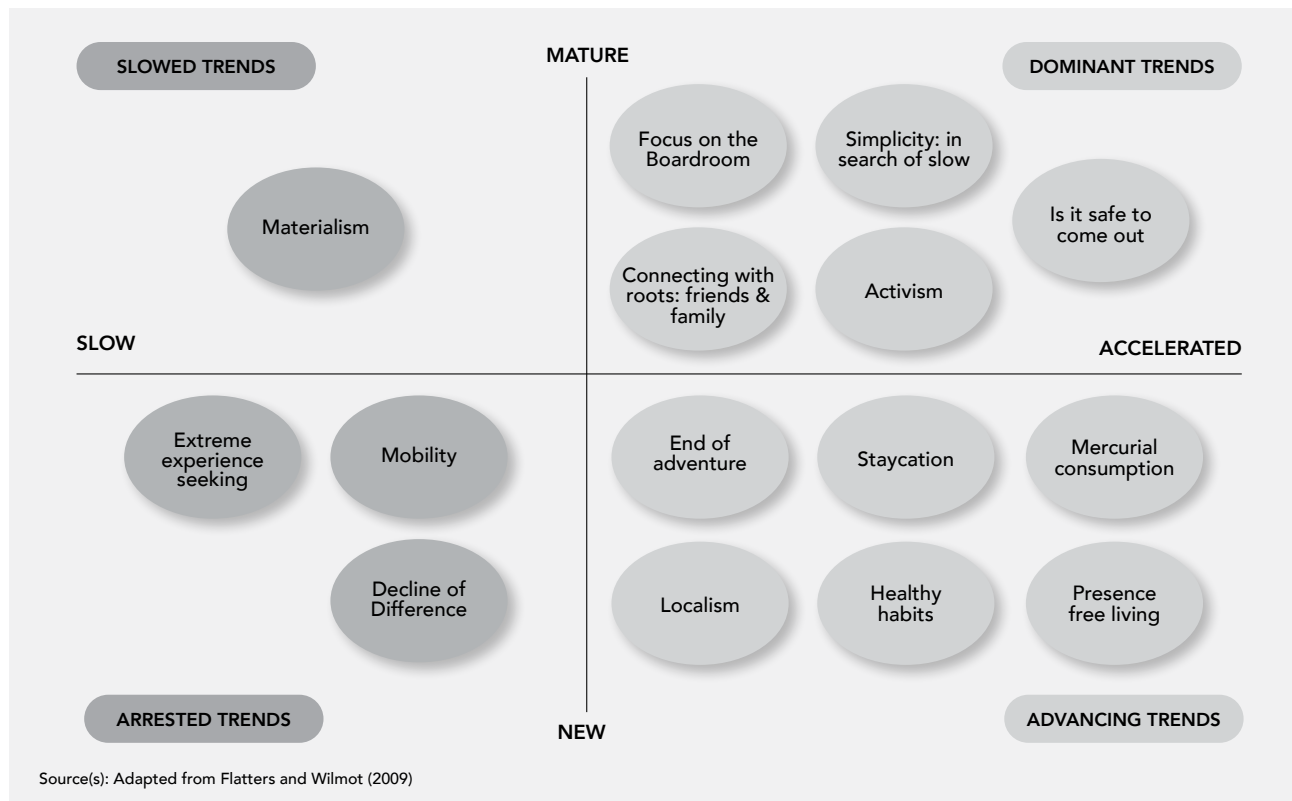
Customer Knowledge Frameworks

The second block of articles was devoted to the knowledge about current customers. It is valuable to examine the Muniz et al. (2021) article, which presents the customer knowledge management (CKM) model of the tourism industry. Since information technologies have transformed the pattern of how tourism knowledge is produced and transmitted, actors in the tourism industry have to use various individual media. Therefore, the authors highlighted that CKM is a key approach for tourism services and defined it as: “a continuous and bilateral process that consists of processes and activities for acquisition (capture, collection, creation), storage (conversion, coding, classification), sharing (dissemination, distribution, transfer) and use (utilisation, application, implementation, verification, validation, testing) of customer knowledge”, categorised into ‘for,’ ‘about,’ ‘from’ and ‘with,’ which aims to generate value, innovation and other benefits for customers and organisations” (Muniz et al., 2021, pp. 1337–1338).

Since the COVID-19 pandemic has significantly affected not only the economy of the tourism industry but also changed the portrait of a typical customer of tourism services, special attention should be paid to information about current changes in the customer activity of tourists (Ionescu et al., 2022). In this regard, the article by Ionescu et al. (2022) highlighted that rather than viewing tourists as reasonable risk evaluators, tourism actors should identify the customers’ fears exerted after the COVID-19 pandemic. Thus, this study revealed another factor influencing tourist’s activity in post COVID-19 pandemic and analysed conditions for the tourism industry’s recovery. The proposed smart management model in tourism (SMMT) is innovative because it quantifies the effect of endogenous and exogenous factors that have altered tourists’ activity and influenced the market post the COVID-19 pandemic.

Yeoman et al. (2022) provided a matrix evaluation framework that helped to capture the effect of the COVID-19 pandemic on the Aotearoa/New Zealand tourism industry. In May 2020, using the trend matrix (Figure 2), the authors showed the anticipated customer behavior trends. The matrix identified 15 tendencies based on customer activity shifts and clustered them into four groups: dominant, slowed, advanced, or arrested (Figure 2). The trends identified were based on a combination of official government statistics, consumer panel surveys, media reports, expert interviews, and academic publications (Yeoman et al., 2022).

Figure 2: Trends Matrix (Yeoman et al., 2022)



This matrix allows users to assess changes and tendencies in the tourism industry and clarify the factors influencing the customers (Yeoman et al., 2022). The authors predicted that tourists would seek the comfort and security of what was familiar during a crisis. However, they did not foresee in May 2020 a trend of “the desire for new experiences” (Yeoman et al., 2022, p. 167). New experiences are about sampling new and aspirational experiences that allow tourists to develop new skills, acquire knowledge, and do something unusual or something they have always wanted to do (Yeoman et al., 2022).

Contemporary research demonstrates that the mix of sentiment analysis and geo-location knowledge might allow for more precise planning of travel destinations (Paolanti et al., 2021) and the method was used to analyse a dataset of travel-related tweets. Paolanti et al. (2021) demonstrated and tested an approach to data analysis at the intersection of sentiment analysis and geo-location to describe spatial, material, and demographic tourist segments. Social media content analysis allowed companies to understand the trends in tourist perceptions better and obtain a more nuanced semantic analysis. Thus, Paolanti et al. (2021) considered that mapping tourist sentiment could permit service providers to receive beneficial knowledge about the online reputation of the destination designed as a brand. In addition, Solazzo et al. (2022) gathered data from two sources, Flickr and Twitter, in textual and visual ranges to complete analytics on tourist activity and the affective characteristics of the destination image. These demonstrate how the data collected from tourists can underline factors influencing customer activity and enhance the process of creating value for a tourism destination.

It is valuable to present the point of view of tourism companies’ representatives as they are vital to communication in the travel industry (Yoopetch et al., 2022). Roberts (2022), a Chief Executive of the Tourism Industry Aotearoa, suggested that the Aotearoa/New Zealand tourism industry needs to diversify services to attract tourists. He believes that the best method to provide the long-term financial sustainability of the tourism industry is to support an invariably high customer perception of the significance they have provided. Although it is typically assumed that the Aotearoa/New Zealand tourism product is so stimulating that attracting tourists back is not a problem, however the Aotearoa/New Zealand tourism industry certainly needs a balanced scorecard approach (Roberts, 2022). Better integration of actual customer knowledge becomes critical in the attempts to revitalise the tourism industry undermined by the COVID-19 pandemic.

CONCLUSION

This literature review contributes to understanding efficient management and the interactions between the actors in the tourism industry, offering various tools to stimulate customer activity. Introducing the systemic approach signifies a considerable change in understanding the tourism industry driven by the dynamic evolution of tourism practices and advancements in tourism management theory (Jovicic, 2019). In the analysis of selected articles, the authors consistently referred to the effectiveness of a system based on constant interaction between all actors in the tourism industry, fulfilling the interest of each as part of a stable and sustainable development of the tourism industry built on reciprocal partnerships (Zhou et al., 2022). Therefore, in tourism, the two-sided symmetrical model seems to be consistently recognised as more effective as it emphasises the importance of compensatory ties due to the interdependence of the actors.

The uniqueness of the tourism industry is displayed in the fact that customers with their needs, value systems, and mentality, appears at the core of this entire system (Chepras, 2013). The theoretical model of interaction based on social partnership shows that a bilateral symmetrical model makes sense in the tourism industry since the network of mutual communications between all market entities allows us to track the state of the industry, stimulate the development of priority elements, implement a set of anti-crisis measures and preventative actions to reduce risks (Ionescu et al., 2022).

Due to the increasing levels of risk associated with tourism in modern society and the openness of tourism to the impact of external factors of an economic, political, environmental, and technogenic nature, the actors in tourism activity are interested in the sustainable development of the industry and the search for mutually beneficial cooperation options to ensure the stability of their functioning in the tourism services market by strengthening partnerships and increasing the degree of trust in each other (Olya, 2023; Zhou et al., 2022).

Since the tools and theoretical frameworks presented from the chosen articles can help minimise risks and enhance interactions in New Zealand tourism industry, they provide valuable insights for managers seeking to leverage interactions with external and internal stakeholders. Considering the disruption caused by COVID-19, it is critical to ensure that future policies, strategies, and operational decisions take into account the findings of academic research and analysis of empirical evidence to reduce the perceived and real risks in the industry and ensure its sustainable development.

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ROLE OF PERFORMANCE REVIEWS TO ENHANCE CALL CENTRE AGENTS' PERFORMANCE

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ABSTRACT

An effective performance review process supports the manager to establish clear performance expectations for their employees to support individual accountability to meet the company's objectives. The aim of this research was to explore current performance review processes in New Zealand call centre, and to suggest strategies to improve current performance review processes. Qualitative data was collected from 14 call centre agents and 5 call centre managers from two call centres (inbound and outbound) in New Zealand. The findings of this research revealed differences in performance review processes for the inbound and outbound call centres in terms of performance criteria, frequency of performance reviews and feedback type. Insufficient training and development, clarity of definition of performance indicators, and lack of call centre quality monitoring processes were identified as areas for further improvement. This study aims to provide insights for call centres to enhance operational efficiency of call centre agents.

Keywords: Call centre, performance review, assessment or monitoring, feedback, key performance indicators, inbound, outbound

Over the last two decades the call centre industry has experienced rapid growth around the world (Burgess & Connell, 2004). This growth trend is similar to the New Zealand call centre industry (IBISWorld n.d.). Like call centres internationally, New Zealand call centres also face challenges such as skill capabilities, performance and commitment of employees, high employee turnover, ongoing recruitment, and training challenges (Holman et al., 2007).

There are reports that 65% of the customers are not satisfied with the services of call centres in New Zealand (Consumer NZ Survey, 2016). Hence, it is important for call centre businesses to understand the drivers affecting service quality (Anderson & Zemke, 2003). To improve levels of service it is imperative to understand the on-floor performance issues in call centres to improve customer experience (Chawla & Smutkupt, 2019). For example, the tasks carried out by call centre agents can be challenging or frustrating if they have to interact with angry or frustrated customers on a daily basis (Dollard et al., 2003). The stressful task context call centre agents encounter is one explanation for call centres experiencing high call centre agent turnover (Samson & Daft, 2012).

Hence, an effective performance review or monitoring process can support call centre businesses to support its operations to improve overall customer experience, call centre agent performance and well-being (Boyte, 2009). These benefits contribute to reduced call centre agent attrition and improve the profitability of the call centre. This study explored the challenges faced by the New Zealand call centre industry and reports findings for two small and medium call centres in New Zealand. The first part outlines the literature review, the research aims and questions. The next section outlines the methods adopted and in the last section we present the findings, discussion, and conclusion.

LITERATURE REVIEW

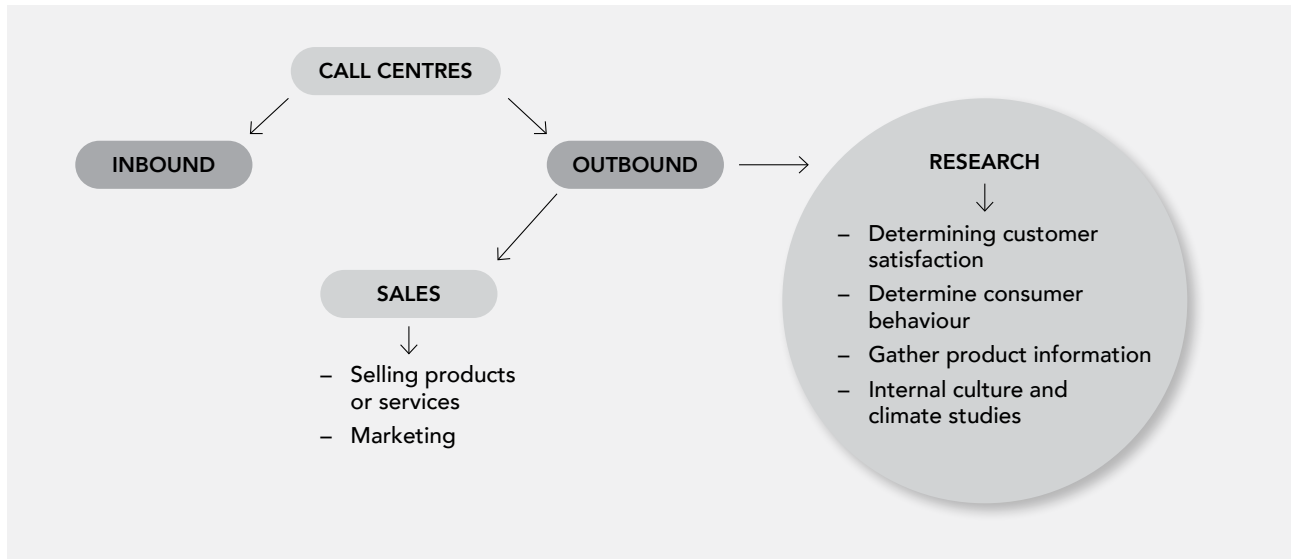
Overview of a Call Centre:

In a contemporary business environment call centres play an important role in facilitating multi-channelled service functions to support customer business communication and complaint resolution (Hinton, 2018). Taylor and Bain (1999) stated that a call centre is a dedicated service operation in which call centre staff interact with customers (through inbound calls or outbound calls) mediated through communication technology.

Figure 1 below shows that call centres have a range of functions such as help desk, customer service, telemarketing, and emergency help to support business-customer interactions (White, 2005). In general, there are two types of call centres; inbound call centre service is when transactions are initiated by the customers and resolved by the call centre, while an

outbound call centre service is when the call centre initiates the call to the customers regarding transactions related to sales, queries, complaints (White, 2005). Inbound call services mainly provide customer assistance, help desk, product, or service information. (Gans et al., 2003), whilst outbound call services calls are made to customers for promoting products or services, telemarketing, or surveys (Gans et al., 2003).

Figure 1: Types of Call Centres Source: (White, 2005, p. 8)



Call centre managers are responsible for monitoring different types of key performance indicators (KPIs) of call centre agents such as the number of calls taken, average call handling time, after-call work time, occupancy of the agents, the service level, the calls waiting in a queue (Dollard et al., 2003; Rose & Wright, 2005; Witt et al., 2004). The managers also track qualitative KPIs such as call quality, first call resolution, accuracy of wrap-up, customer satisfaction ratio, and net promoter score. Key performance indicators of the call centres can be categorised into three groups: service level, quality, and efficiency (Brown et al., 2005). With a broad range of performance indicators, it is crucial for managers and supervisors to build effective performance management strategies to support the day-to-day work practices of call centre agents (Loukidou et al., 2009). This study aimed to explore current practices, and challenges two small and medium-sized call centres in New Zealand encounter in the context of call centre agents' performance, retention and attrition (Hunt & Rasmussen, 2007).

Benefits of Effective Performance Review Process

Extant literature supports the role of an effective performance review process for successful call centres operations. A summary of the benefits of performance reviews follows: -

- Proper monitoring empowers call centre agents to develop their proficiencies and performance which has a positive impact on their well-being (Holman et al., 2002).
- Performance evaluation and monitoring facilitate the call centre to review and improve call centre agent performance, reduce costs and enhance customer experience and satisfaction (Johnston & Kong, 2011).
- Effective performance assessment provides benefits to call centre agents with accurate and timely feedback, recognition for work, fair performance assessment and development of skills (Carroll et al., 2006).

Types and Characteristics of Performance Review Process

The performance review process includes monitoring, recording performance against targets, and observing employees' behaviours (Stanton, 2000). Effective performance monitoring or review process requires performance data on criteria such as: (Holman et al., 2002; Perkins, 2013; Stanton, 2000).

- **Frequency:** frequency relates to whether the performance reviews are conducted regularly, continuously, or occasionally (Perkins, 2013; Stanton, 2000).
- **Performance Criteria:** relates to types of performance criteria adopted to assess performance such as quantitative and qualitative (Holman et al., 2007; Perkins, 2013).
- **Feedback Type:** refers to how feedback or performance reviews are undertaken such as one-on-one feedback, mentor-mentee approach, corrective feedback, preventive feedback, group sessions and feedback (Perkins, 2013; Stanton, 2000).

- **Purpose:** relates to how performance review data is applied for correction, prevention, professional development or reward and recognition (Stanton, 2000).
- **Source:** refers to how performance data is collected and who conducts the performance reviews, for example, whether the performance reviews are conducted by the supervisor or other manager (Holman et al., 2007; Perkins, 2013).
- **Target:** this is in reference to whether the performance review is conducted at an individual level or group level (Perkins, 2013; Stanton, 2000).

There are two approaches to performance reviews: - "Traditional" and "Electronic" (Holman et al., 2002). The traditional form of performance review process involves observation of performance, listening and monitoring of calls, self-reporting, and work sampling, and using a mix of qualitative and quantitative performance data (Holman et al., 2002). This approach requires a human observer to monitor or measure the performance of the call centre agents (Perkins, 2013). Electronic performance reviews, on the other hand, adopt remote monitoring and computerised collection of quantitative data such as the number of calls answered, average call handling time, abandoned rate, and call times. This latter approach supports continuous performance monitoring (Perkins, 2013). Electronic monitoring provides more real-time information on call centre agent performance. The literature shows call centres internationally adopt either traditional, electronic or a mixed monitoring approach. In mixed monitoring, the call centres apply technology to collect call centre agent performance data and adopt traditional monitoring to provide feedback.

RESEARCH AIM AND QUESTIONS

Since effective performance review or monitoring is critical to enhancing employee work commitment and performance, this research aimed was to evaluate the current performance review processes in two New Zealand call centres and to suggest strategies for further improvements.

To address the research aim, two research questions were posed.

1. How are the performance reviews conducted by the call centre managers to assess the performance of the call centre agents?
2. What improvements can be identified in the performance review procedure to improve the performance of the call centre agents?

METHODS

Given that this is exploratory research a qualitative research method was adopted to collect the primary data to evaluate call centre agents' and call centre managers' perceptions of performance review experiences. The rationale for a qualitative approach is twofold: first, qualitative research is suitable when collecting opinions, and perceptions to delve and probe deeper into issues (Patton, 2005). A second reason was that the literature supports qualitative methods in the context of call centres (Carroll et al., 2006; Nikolaos et al., 2006; Sayers et al., 2003; Waldeck, 2012).

The primary data collection was confined to two call centres; one call centre dealt with customers purchasing electronic appliances for their home, while the other call centre dealt with customers purchasing well-known newspapers. The coronavirus disease (COVID-19) lockdown limited the data collection to the Auckland region. Nineteen participants comprising of 14 call centre agents and five managers provided the data points for this research. The average tenure of the call centre agents was 24 months. The average tenure of call centre managers was 32 months. We adopted a minimum of a six-month tenure as a selection criterion for call centre agents and managers for our study. Table 1 and 2 show participants interviewed had a minimum of six months of experience.

Qualitative data was captured from call centre agents and call centre managers using a semi-structured interview. Semi-structured interviews are appropriate to obtain participant perceptions, mindsets, and behaviour (Raworth et al., 2012). Semi structured interviews also enhance the potential of more detailed discussion to obtain a wider range and more in-depth information from interviewees (Patton, 2005). This research also adopts purposive sampling to ensure the participant sample represents a specific target group of participants for the call centres context (Etikan et al., 2016; Tongco, 2007).

Sample size and participants

Data was obtained from the participants approximates to 18% of the staff from the two call centres. The data collection activity was conducted by interviewing employees of two different types of call centres. Two groups of participants were interviewed. Call centre managers were interviewed to obtain their views of the current process of performance review, its effectiveness, challenges, business objectives and current performance, while call centre agents were interviewed to obtain their perspectives with regard to experiences of performance review. The tenure of a minimum of six months for call centre agents and managers were used as selection criteria for them as shown in Table 1 and 2. Ethics approval was granted by the Otago Polytechnic Auckland International Campus Ethics Committee dated 17/04/20, reference number AIC45 for this research.

Table 1: Sample Description Summary – Call Centre Agents 'Tenure

CALL CENTRE AGENTS		
TENURE	OUTBOUND %	INBOUND %
0- 6 Month	0%	0%
6 Month - 1 Year	57%	14%
1 - 2 Year	14%	29%
2 - 5 Year	14%	14%
More than 5 Years	14%	43%
TOTAL	100%	100%

Table 2: Sample Description Summary – Call Centre Managers' Tenure

CALL CENTRE MANAGERS		
TENURE	OUTBOUND %	INBOUND %
0-1 Year	50%	0%
More than 1 Years	50%	43%
TOTAL	100%	100%

Interview Questions Design:

Open-ended questions were used for conducting semi-structured interviews (interviews). Two sets of interview questions were developed one for the call centre managers and, the other for call centre agents. To obtain a clear perspective of the current processes of performance review in the call centres, the interviews were developed to include each of the following categories:

- **Performance Criteria:** to obtain information on the key performance indicators used for performance reviews (Perkins, 2013; Stanton, 2000).
- **Frequency:** to obtain information on the frequency of performance reviews (Perkins, 2013; Stanton, 2000).
- **Current Performance Review Strategy:** to obtain information as to who was conducting the performance reviews and the type of feedback (Perkins, 2013; Stanton, 2000).
- **Motivational Aspects:** to obtain information related to reward and recognition for the levels of performance (Perkins, 2013; Stanton, 2000).
- **Improvement Areas:** to obtain improvement areas or recommendations for current performance review processes (Perkins, 2013; Stanton, 2000).

The interviews for call centre managers adopted the same categories as call centre agents, however, two additional categories were added:

- **Standard Operating Processes:** to obtain information on the defined processes for performance review.
- **Challenges:** to obtain information on the challenges from a management perspective of the performance review process.

Data Analysis:

Qualitative data analysis involves the process of reading, understanding, categorisation and discovering relationships within data points in the dataset (Mason, 2010). Data analysis was completed using a thematic coding process. Thematic coding is a method to identify categories of textual data each relating to a particular theme in the context of the research objectives (Gibbs, 2007). The aim of thematic coding is to analyse patterns, ideas, and codes in the qualitative data in relation to the research questions (Braun & Clarke, 2006).

Braun and Clarke (2006) recommend a six-step process for conducting qualitative data analysis. This research adopted the six-step data process to analyse the qualitative data collected from the interviews with both group participants.

1. **Familiarisation of data:** Step 1 - reading the interview transcriptions to become familiar with the data.
2. **Initial Coding:** Step 2 - coding the data in meaningful and a structured manner.
3. **Generating Themes:** Step 3 - codes were developed into distinct themes relating to the research questions.
4. **Validity and reliability of themes:** Step 4 - the researcher reviewed, modified and created preliminary themes identified in step three.
5. **Defining and Naming Themes:** Step 5 - focused on recognising specific meanings of and finding relationships with other themes.
6. **Interpretation and Reporting:** Step 6 - this is the end point of the data analysis process wherein the findings of this research are presented in the form of article.

FINDINGS

Findings for Theme 1 - Performance indicators (Research Question 1)

The operation of the outbound call centre is dominantly sales driven, so the key performance indicator adopted was sales targets. However, other indicators such as number of calls made, or accounts checked were monitored when required. The inbound call centre adopts a more balanced approach, using both qualitative and quantitative performance indicators (refer to Table 3).

Table 3: Examples of Participants' Responses for Theme 1

	OUTBOUND	INBOUND
Call-centre agents	"Our main KPI is 3 sales in a day and 15 sales in a week. No particular targets have been given for number of calls and average talk time as our call centre is driven mainly on sales." (Participant 1)	"My main KPIs are availability, call quality, email collection, e-billing. Sometimes, they- do monitor some specific campaigns performance like digital promotion on call." (Participant 7)
Call centre managers	"As it is sales driven call centre, we have main operational KPI which is sales number. Other than we do monitor number of calls made, system accuracy, paperwork after sales." (Manager 1)	"As an operational KPIs, we have service level, availability, call quality, email promotions. Also, we are monitoring call disconnection and average call handling time as well." (Manager 2)

Findings for Theme 2: Frequency of Performance Reviews (Research Question 1)

The frequency of performance feedback varies for both call centres. Feedback typically occurs on a weekly or monthly basis for the outbound call centres, while monthly, half yearly and annual feedback are more prevalent in the inbound call centres. In both call centres, immediate performance reviews occur when there are incidents of customer escalations, or inappropriate behaviour observed on the operational floor (refer to Table 4).

Table 4: Examples of Participants' Responses for Theme 2

	OUTBOUND	INBOUND
Call-centre agents	"I am getting feedback on my sales target achievement on weekly basis." (Participant 2)	"Mostly they review the performance and give feedback on monthly basis. Also, in the middle of the month if they found any mistakes then they give feedback on errors so the same mistakes will not happen again." (Participant 3)
Call centre managers	"There is no particular guideline for conducting review. However, as a supervisor of the call centre I am conducting weekly reviews." (Manager 1)	"The defined process is that we need to conduct monthly, half yearly and yearly reviews on defined performance indicators." (Manager 3)

Findings for Theme 3 - Feedback Type (Research Question 1)

Call centre agent participants from both call centres received feedback from managers on the performance indicators which indicates the call centres are adhering to Corrective Action and Preventive Actions (CAPA) feedback processes. The main purpose of feedback is to make call centre agents' aware about their performance on the performance indicators against set targets. For the outbound call centres, the managers largely focus on sales targets. The findings show that call centres agents participants indicate they are dissatisfied with sales as the dominant focus and expect other qualitative feedback from the management (refer to Table 5).

Table 5: Examples of Participants' Responses for this Theme 3

	OUTBOUND	INBOUND
Call-centre agents	"The review meeting is getting conducted one-on-one wherein all the achievements and failure reasons being discussed. Similarly, at the end of the meeting mutually the agent and the manager are finalising final action points and changes on which they both need to work in future. As, we are working on sales only, the manager is emphasizing on sales numbers only." (Participant 6)	"In our performance review process, they assess how many calls I have taken, how many I have converted in e-billing, how many times I am available on call, call quality, proper actions has been taken or not. These are the things that they assess during the month. Based on those findings and one-on-one feedback has been given by the manager in our monthly performance review meeting." (Participant 1)
Call centre managers	"At the end of the week or in between of the week I am analysing lowest performer based on sales numbers. I am conducting one-on-one review with low performer in which i am discussing his/her sales numbers and trend." (Manager 1)	"Performance review has been done on the performance of each KPIs. The manager is also looking all other aspects which are sickness, attendance, behaviour in the office, retention%, upgraded service, key areas to improve the performance, call quality, availability and so on. On every monthly we meet with the agents and giving positive and negative feedback on each point discussed above." (Manager 1)

Theme 4 Findings - Areas for Improvement (Research Question 2)

For both the call centres, both groups of participants report a lack of training or coaching for performance reviews and indicated this as an area for improvement. Both outbound and inbound call centre agent participants reported the need for more frequent performance reviews. Alongside this expectation, call centre agent participants prefer that supervisors share the results of their performance reviews regularly to support real-time performance improvements. Outbound call centre agent participants reported that performance reviews were predominantly sales-driven with a focus primarily on revenue. They suggested adopting both qualitative and quantitative performance indicators to improve outputs such as sales number, number of calls made, accuracy of data, call quality, connectivity and so forth. Outbound call centre agent participant also indicated a general lack of call monitoring or listening processes were in place. They alluded to it being important for managers- / -supervisors to listen in to calls to identify errors and to identify operational tactics for improving overall customer call experiences. Inbound call centre agent participants reported similar issues with the process of call quality monitoring and suggested concerns in two areas. Firstly, managers/supervisors were only listening in on some categories of calls resulting in biased sampling of monitored calls. Secondly, managers/supervisor were also reported to listen in on calls partially resulting in an incomplete view of the call. The suggested improvements were to sample all call types and listen in on every sampled call in its entirety (refer to Table 6).

Table 6: Examples of Participants' Responses for Theme 4

	OUTBOUND	INBOUND
Call-centre agents	<p>"...management needs to acknowledge the employees' issues related to sales performance and support them by providing proper training. Instead of focusing only on sales targets, the company needs to analyse on why sales are not being achieved and accordingly actions need to be taken." (Participant 2)</p> <p>"Well, the only thing that matters to management is the number of sales, if they can include other factors like the quality of the data, call quality, attendance and the chance of change in prices of the products, this can bring in a different aspect to the performance assessment" (Participant 3)</p>	<p>"In terms of performance review, they are conducting the same on every month. However, I would recommend if they do have time and expertise to do it then they should do it on fortnight basis because the call centre is taking almost 500 to 1000 calls in a day, it will be good to get feedback on fortnight basis so that we will not make same mistake for different customers." (Participant 1)</p> <p>"I think the manager needs to listen the variety of the calls as sometimes they listen only 2 or 3 types of the calls only. If they listen all types of sample calls, then I will get overall feedback on my performance as currently I am getting feedback on same call types repeatedly" (P5)</p> <p>".....think the call quality audit process needs improvement as my supervisors are listening to the calls which are 3 or 4 min. long. Also, they are giving all the feedback of our call listening at the end of the month. Call centre is dynamic industry in which you cannot wait for month to complete." (Participant 6)</p>

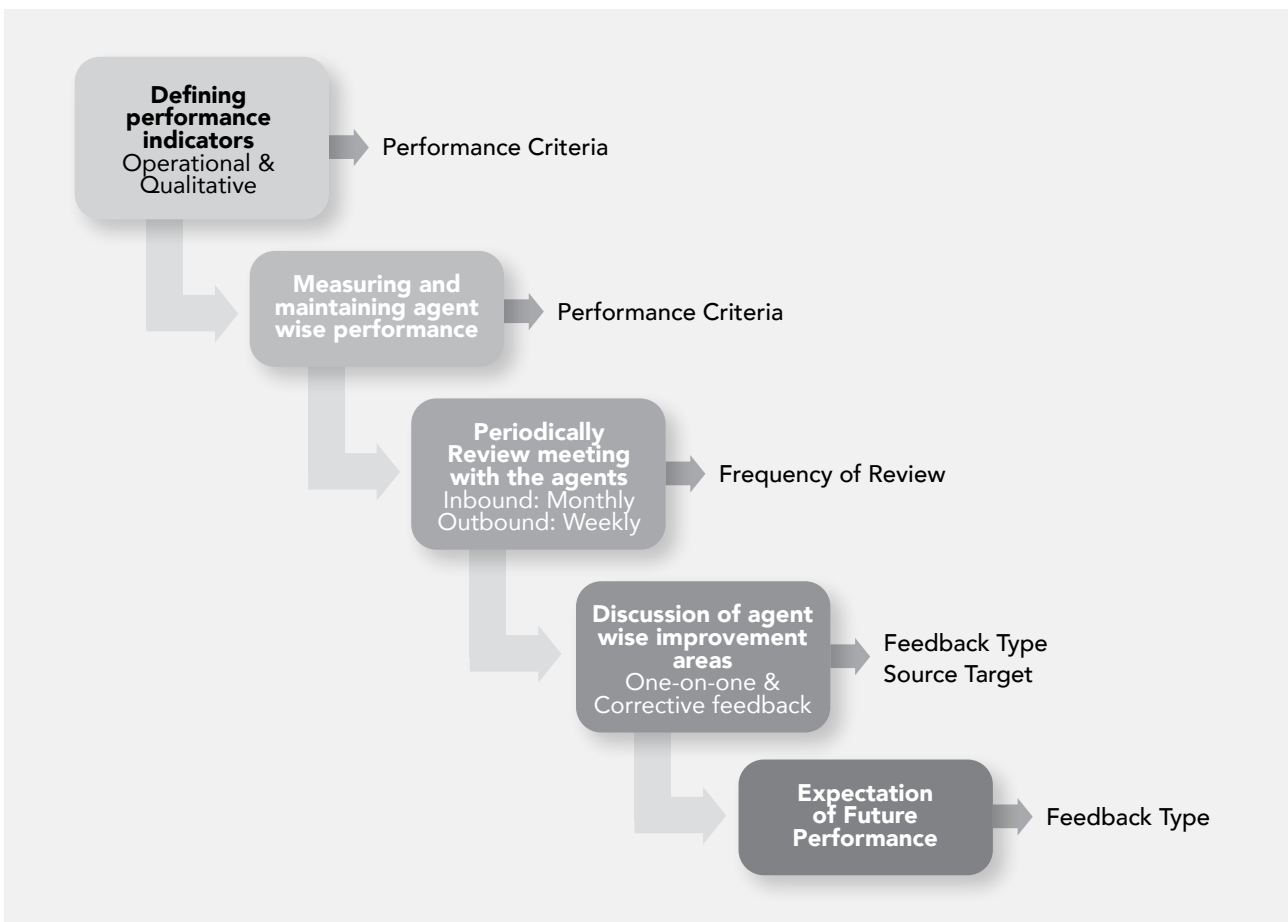
	OUTBOUND	INBOUND
Call centre managers	"....., I am strongly recommending that the supervisors need to provide feedback at the time when he/she is listening to the calls and if possible, agent and manager needs to listen the call together." (Manager 2)	".....recommending that the supervisors need to provide feedback at the time when he/she is listening to the calls and if possible, agent and manager needs to listen the call together." (Manager 2)

DISCUSSION

Performance Review Process:

In general, the performance review approaches adopted by both call centres broadly adopt the CAPA feedback methodology (refer to Figure 2). The New Zealand call centres sampled adopted regular performance reviews where performance was measured on defined performance indicators against agreed targets.

Figure 2: The Performance Review Process of New Zealand Call Centres Source: (Holman et al., 2002)



One finding reported in Theme 1 shows that the outbound call centres were focused primarily on revenue generation performance criteria, while the inbound call centres adopted a more balanced approach to performance criteria applying both quantitative and qualitative performance criteria. The extant literature presented supports adopting a range of criteria such as availability, number of sales, service level, and number of calls taken or made to measure performance efficiency (Marr & Neely, 2004). The outbound call centre agent participants focus mainly on quantitative sales target performance and appears to be more stressful work compared to the inbound call centre agent participants who are providing and supporting customer services. The higher levels of stress for outbound call centre agent participants may have implications for high employee turnover rates in call centres which primarily focus on sales targets resulting in higher levels of stress and reduced well-being. Another finding was both the call centres undertook performance reviews on a weekly or monthly basis. This differs to performance reviews in call centres internationally which adopt more real-time performance reviews. The lag in providing timely feedback may contribute to reduced efficiency of call centre agent participants over time. Unchecked recurring errors between the periods of performance review feedback are costly to call centres (Marr & Neely, 2004; Waldeck, 2012). Additionally, call centre agents might experience reduced motivation levels

over time as a consequence of not being supported in their jobs (Waldeck, 2012). Providing more frequent or even real-time feedback can have the effect of more motivated call centre agents which in the longer run can reduce staff turnover and support staff retention (Waldeck, 2012). Retaining experienced call centre agents might in the longer term be beneficial in terms of performance efficiency and meeting set targets (Marr & Neely, 2004). In this context, several studies support conducting more frequent and real-time performance reviews to improve operational efficiency and staff well-being (Alferoff & Knights, 2003; Carroll et al., 2006). Other studies also echo that one-on-one performance reviews and feedback encourage two-way communication between call centre agents and supervisors (Boyte, 2009; Carroll et al., 2006). Based on these findings and other supporting evidence, we surmise that both the call centres sampled were applying a more traditional based approach to performance reviews.

Improvement Areas of Performance Review:

Both groups of participants reported that lack of training and development, less frequent performance reviews, call quality monitoring processes are areas for further improvement. Research question 2 aimed at addressing areas for improvement in the performance review processes. Although both call centres adopt corrective feedback approaches for performance reviews, the participants from both call centres mentioned that their call centres need to provide more training and development initiatives in this area. For example, the outbound call centre agent participants mentioned that management is not providing proper training to support skill development, and yet had expectations of high sales numbers. Similarly, the call centre agent participants in the inbound call centres indicated that the training and development programmes were inadequate. The study conducted by (Sawyer et al., 2009) indicates that proper training and development of the employees would ultimately benefit the call centres in reducing costs, improving overall performance, and enhancing wellbeing.

RECOMMENDATION

Although the sampled call centres of New Zealand met the performance review frequency guidelines (Holman et al., 2002; Perkins, 2013; Stanton, 2000) both groups of participants indicated that the frequency of reviews was an area for further improvement. For example, call centre agent participants expressed dissatisfaction at getting feedback at the end of the month or week. With the high volume of customer call interactions, quicker turnaround of feedback would contribute to minimising errors and mistakes. Thus, the lag in continuous untimely feedback time was contributing to delayed performance improvement of the call centre agent participants.

Call quality monitoring process was another area for improvement for both the call centres studied. It was observed that regular call listening, and feedback were lacking in outbound call centres, while inbound call centres were drawing biased samples as a consequence of partial call listening audit processes. Real-time monitoring and feedback support the call centre manager/supervisors to track the performance of their call centre agents and immediately alert them to any discrepancy that requires intervention (Urlings et al., 2005). One study concluded that focused call quality monitoring processes helped the call centre agents understand the process of call-taking, and improved overall efficiency and customer service (Chawla & Smutkupt, 2019). Another study found that when call listening occurred at least twice a week by managers/supervisor that this helped in creating a supportive environment for coaching and feedback (Chawla & Smutkupt, 2019; Preece et al., 2018). Literature reviewed suggests that call centres must aim to adopt a balance between the production-line and a customer orientation approaches for performance reviews (Gilmore, 2001). The production line approach adopts quantitative performance criteria while the customer orientation approach focuses on qualitative criteria (Gilmore, 2001).

LIMITATIONS

The research sample was limited to two call centres, one call centre serviced newspapers while the other dealt with home and kitchen appliances. A second limitation is that as a result of the COVID-19 pandemic lockdown, the sampled call centres studied were drawn from the Auckland region.

CONCLUSION

The results show that both the call centres studied veered towards a traditional approach in their performance review processes. Both the call centres were lacking in training and development, real-time feedback on improvement areas and call quality monitoring process. To overcome the deficiencies, it is suggested that call centres adopt best practices from well-known call centres such as "Concentrix" a highly ranked outsourced call centre (Simon, 2019). Two best practices Concentrix adopts for its performance review are as follows:

- applying the five-why root cause analysis process to identify the root cause of low performance by an employee. The intent here is to identify the root cause of the problem to help in systematic problem solving which enhances problem-solving (Serrat & Serrat, 2017).

- implementing the “CUAIRS” (Commit, Understand, Automate, Implement, Review and Sustain) framework for sustainable improvement (CMMI Institute, 2019). This latter approach helps in developing and standardising the input processes to help drive performance improvement. By applying these best practices Concentrix was able to improve overall customer service and operational efficiency (CMMI Institute, 2019).

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CUSTOMER SERVICE CHALLENGES: CASE STUDY REVIEW OF THE NEW ZEALAND PROPERTY MANAGEMENT SECTOR

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ABSTRACT

This research examines the key challenges to delivering sufficient customer service, factors that influence service quality and customer satisfaction to tenants in the New Zealand rental market. This research reviewed data collected by Consumer New Zealand from its nationwide survey of 1062 tenants renting properties in New Zealand and found that property owners (landlords) provide better services than property service managers, bad communication between tenants and landlords or property service managers led to breaching of tenants' rights, and often tenants were unable to demand for their rights due to lack of tenure security. This research opines that adopting consumer-oriented business tactics would successfully solve the challenges between property service managers and customers (tenants and landlords). To enhance quality customer service and customer satisfaction, this research recommends that property service management organisations and property service managers conduct in-depth SERVQUAL style surveys among their customers, that using a balanced Scorecard approach would help set goals, focus on customer needs and related internal processes, and measure progress according to customer service improvement needs.

1. INTRODUCTION

Nowadays customers are more informed of and are concerned about the quality of the service they seek (Vatjanasaregagul & Wang, 2007). Property service managers (PSM) should be able to pay attention and respond to both tenants' and landlords' needs and concerns. This research investigates customer service challenges in the New Zealand (NZ) rental market. It examines how the property management (PM) sector could provide better tenant services and identifies reasons why real estate customers are dissatisfied with their property management services. It also considers the need for PM companies to provide sufficient customer service to tenants in the NZ rental market and considers factors influencing service quality and customer satisfaction in the real estate sector. Major rental market issues are communication difficulties between tenants and PSM (Wilson 2018). As a result, the government made changes to tenancy rules effective from 26 November 2022 to secure tenants' rights (TenancyService, n.d). This is structured into the following sections: introduction, literature review, service quality model, data collection, data analysis, findings, discussion, and conclusion.

On review of the study carried out on 1062 tenants renting property in New Zealand Consumer NZ's (2018) report revealed that 35% of tenants rated their PM service high and 42 % of tenants reported PM response delays to their requests and needs. Further, the study indicated that 37% of tenants worried that complaining would lead to a rent increase, 41% believed their request would be rejected, and 39% were concerned about getting bad references when moving to a new rental property. Considering this information, recommendations are provided around the best methods the PM sector could adopt to assist in alleviating the tenant- landlord customer relationship.

Keywords: customer service, customer satisfaction, customer loyalty, customer dissatisfaction, service quality.

Research questions

1. What are the barriers to delivering sufficient customer service and the factors that can enhance service quality and customer satisfaction in the New Zealand rental market?
2. Which possible managerial tools could be used for addressing tenant customer service challenges in the PM sector?

2. LITERATURE REVIEW

Service Quality Concept

Service quality and customer satisfaction are important aspects of business growth and development. Business growth and development are dependent on how well an organisation maintains its customers through service and how customers are kept satisfied (Edward & Sahadev, 2011). The term quality refers to the totality of structures and characteristics of a product or service that bears on its ability to please certain needs (Lindsey & Evans, 20013. Ennew & Waite (2007) argue that defining the quality of services is more complicated than the quality of material goods. This research opined that this is because the quality of the service is defined from the customers' perspective, based on their needs and desires. However, Omisakin et al., (2020) argue that understanding customer needs and desires enhances quality service and when excellent service is provided organisations will attain customer faithfulness. That is why it is necessary to recognise the service quality concept from the consumers' viewpoint in the NZ PM sector. Gronroos (1990) suggested that the probability of a company making a profit/loss is dependent on consumer estimation and the quality perceived the study was done through modern-day online reviews.

According to Zeithaml & Parasuraman (2004), service quality as a concept involves reliability, assurance, empathy, responsiveness, and tangibles features. Evans & Lindsey (2013) suggested people and technology as the key drivers of service quality. For instance, customer contact staff in a PM company need access to the right technology to improve their performance such as increased productivity, communication, and different communication channels to handle almost any customer problems. This research argues that customers evaluate service mostly by the quality of human interactions. As a result, service workers must be experienced in managing customer interactions and be customer focused. However, providing appropriate training to service workers is important. In the property management service industry, delivering a quality service is essential to retain tenants and good service should be a criterion upon which customers differentiate one property management company from another (Baharum et al., 2009). Delivering quality service helps companies to achieve and sustain a competitive advantage and helps determine business success or failure (Baharum et al., 2009).

Customer Satisfaction Concept

Kundu & Datta (2015) argue that customer satisfaction is the buyer's cognitive state of being adequately or inadequately rewarded for the sacrifice undergone in a buying situation. Similarly, customers will be satisfied if expectations are met or surpassed, and dissatisfied if the expectations are not met (Narteh 2015). According to Hui and Zheng (2010), service quality is one of the tools for determining customer satisfaction and these two concepts are obviously related to each other and important in the service industry. Hui and Zheng (2010) further claim that the customer satisfaction concept is generally considered as a post-choice evaluative judgment of a specific transaction, the overall feeling, and a function of perceived quality. Customer satisfaction appears when the value and customer service provided meets or goes beyond the consumer's expectations. Meeting customer expectations is an essential aim of every service-oriented business.

The property management sector is purely service-oriented involving varied service relationships with long-term contracts (palm, 2015). As a result, it must engage and ensure its customers attained the expected satisfaction from the services provided Pinder et al., (2003). Pinder et al., (2003) suggested that property management companies should focus on providing excellent service for their existing customers rather than attracting new ones, as it can be more rewarding if existing customers with long-term contracts attain excellent service. Similarly, Matzler & Hinterhuber (1998) argue that the cost of attracting new clients in the PM sector is considerably greater than retaining existing clients. Therefore, retaining existing clients through the provision of excellent service will lead to growth (Palm, 2015). Delivering good service is crucial to tenant customers' satisfaction leading to a better relationship between the tenant renter and the organisation (Karna, 2004). Quality service is of high importance for PMs and cultivating good relationships with customers is a priority (Lindholm, 2000). Nowadays, tenants are more demanding and concerned about the services they are receiving, and PMs must satisfy customers' expectations (Baharum, et al., 2009). However, meeting PM customers' satisfaction requires effective communication, while meeting tenants' needs will influence tenants' overall satisfaction (Sanderson, 2014). However, the issue of tenants attaining their expected satisfaction during the Coronavirus disease (Covid-19) pandemic, especially during lockdown was minimal (Baker & Daniel, 2020). For instance, Baker & Daniel (2020) found that the only concerns for tenants during Covid-19 were the lockdown measures leading to skipping meals, inability to pay rent and other bills, retrenched tenants struggling with household finance, tenants demanding a rent reduction from their PMs and or landlord. During the same period, in 2020 23% of tenants found their home not warm enough during spells of cold weather, 27% had problems with mould, and 21% reported problems of dampness (Baker & Daniel, 2020). Yet all these were not addressed by either the PMs or the landlord (Yiu, 2021). Despite these issues, housing prices in NZ increased by about 20% in 2020, one of the highest in the world (Yiu, 2021). Contrary to this, McKnight (2023) found the NZ property market was falling consistently. The author claimed that it fell 12.4% between the price peak in November 2021 and October 2022 (Yiu, 2021). According to Jagun, et al. (2022), to ensure that property developments continue to be profitable ventures trusted by property consumers relative to the property management industry, the government must constantly intervene in housing policies and promote constant market-driven practices. Similarly, Bragaglia & Caruso (2020) opined that being constantly intervening in housing policies and promoting market driven practices roles would help the government expand control over public and private property developments and management.

SERVQUAL service quality model

According to Parasuraman, et al. (1985), service quality is connected to the customers' perceptions and expectations and can be evaluated by the degree of difference between customer expectations or desire and their experience of what they received as described by the SERVQUAL model. The SERVQUAL model was created by Parasuraman et al. (1985) and is the most widely used tool for service quality measurement and quantifies service quality as a discrepancy between the perceived and expected service.

Parasuraman et al. (1988) stated that the SERVQUAL model delivers a basic outline through expectations or perceptions, with a structure covering five service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This model defines service quality as a difference between perceived and expected service. The service is considered excellent, good, or bad according to the perceptions met by comparing results (Parasuraman et al., 1985). This research evaluates how the five dimensions of the SERVQUAL model could be used in the PM sector to attain positive perceptions of services provided to tenants by PMs.

SERVQUAL models five dimensions

According to Parasuraman et al. (1994), the SERVQUAL model is based on five service quality dimensions:

1. **Tangibles:** the appearance of the physical facilities, communication materials, equipment, and personnel appearance. A PM company should conduct surveys among customers about their feelings about the physical layout and facilities offered to their customers.
2. **Reliability:** the capability to perform the promised service dependably and precisely. A reliable PM company must deliver on agreements to provide service, delivery, problem resolutions and prices. A PM company should conduct surveys relative to questions about billing, challenges, and documentation.
3. **Responsiveness:** the willingness to help and provide prompt service. APM company must be responsive to customer requests and compliance. This requires PSM company to conduct surveys on client knowledge of approvals and legal processes in property management.
4. **Assurance:** the PM company employee's knowledge of courtesy and the organisations capability to inspire trust and confidence. This dimension defines an employee's credibility and competence. For instance, employees that link customers to the PM must continuously create trust and confidence towards attaining customer loyalty. However, surveys should be conducted on the competency of the PM, quality of services, security, health, and safety topics and meeting government legislation.
5. **Empathy:** the caring individualist attention to the customer. This is about individual attention and communication leading to customer loyalty. To attain this, PM companies should survey to gain an understanding of their customer needs and how efficient their communication is with tenants.

The SERVQUAL five dimensions examine the quality of service in terms of the process, interaction, and service outcomes for PM companies' customers (Sanderson, 2014). Chen et al., (2016) argue that for the PM sector to realise significant revenue and growth, attaining service quality and consumer satisfaction must be prioritised.

Table 1 presents how the SERVQUAL five service quality dimensions could be applied to property management services.

Table 1: Application of the Five SERVQUAL Dimensions to Property Management Services

SERVQUAL DIMENSIONS	OCCUPIER SATISFACTION STUDIES
Tangibles: the appearance of the physical facilities, communication materials, equipment and personnel appearance	Physical Aspects ✓ Location ✓ Property Specification ✓ Estate ✓ Parking ✓ Public Transport ✓ Tenant mix Service Aspects ✓ Marketing & Events ✓ Amenities ✓ Lifts ✓ Reception
Reliability: the capability to perform the agreed service without fail and precisely	✓ Maintenance ✓ Cleaning ✓ Billing and documentation ✓ Waste management

SERVQUAL DIMENSIONS	OCCUPIER SATISFACTION STUDIES
<p>Responsiveness: the willingness to provide prompt service in a helpful manner</p>	<ul style="list-style-type: none"> ✓ Responsiveness ✓ Approval & legal processes
<p>Assurance: the employee's knowledge of courtesy, credibility, and competence to inspire trust and confidence. The employee who links the consumer to the company should create and gain the trust from the consumer to gain customer loyalty</p>	<ul style="list-style-type: none"> ✓ Security ✓ Health & Safety ✓ Professionalism & customer service ✓ Leasing process
<p>Empathy: the caring individualised attention to the consumer, It is derived from communication and understanding the consumer and increases enhanced loyalty</p>	<ul style="list-style-type: none"> ✓ Understanding needs ✓ Communication

Source: Sanderson (2014)

3. DATA COLLECTION AND METHODS

This research adopted two main research methodologies. The qualitative research method was used to conduct a systemic review of relevant literature related to the research, service quality concept, customer satisfaction concept and SERVQUAL service quality. The quantitative method was used to review data collected by Consumer NZ from its nationwide survey of 1062 tenants of rented properties in NZ between December 2017 and February 2018. Consumer NZ collected the data through the distribution of survey questions to the PM customers and online reviews for the PM organisation (Brannen, 2016). The combination of quantitative and qualitative research methodologies in this research helped with improved research findings, generalisability and provided a better understanding of research problems (Gunnel, 2016). The data was collected, analysed, and interpreted to connect information with the research questions, literature, and theoretical concepts of the research. Category C Ethical Consideration was approved by the Otago Polytechnic Auckland International Campus (OPAIC) Ethics Committee 27/10/2020.

4. DATA ANALYSIS, FINDINGS, AND CONCLUSION

Data was analysed from 1062 tenant participants who completed the nationwide survey by Consumer NZ in 2017 to 2018, using a descriptive statistic chart. The analysis indicated that 37% of the tenant participants in the survey rented through a PM company and 59% of tenant participants rented through a private property owner. According to the survey 4 out of 10 tenant participants reported living in quality warm and cosy properties. Similarly, 4 out of 10 tenant participants reported they were getting great value from their landlords. Challenges were drastically reported by tenants who rent through a property company rather than private landlords (Consumer NZ, 2018).

Tenant satisfaction

Figure. 1 shows tenant participants' satisfaction level on the condition of the property, provided service and overall value for money from PM companies and property owners.

Figure 1: Tenant Participant Satisfaction Scores



Source: Consumer NZ (2018)

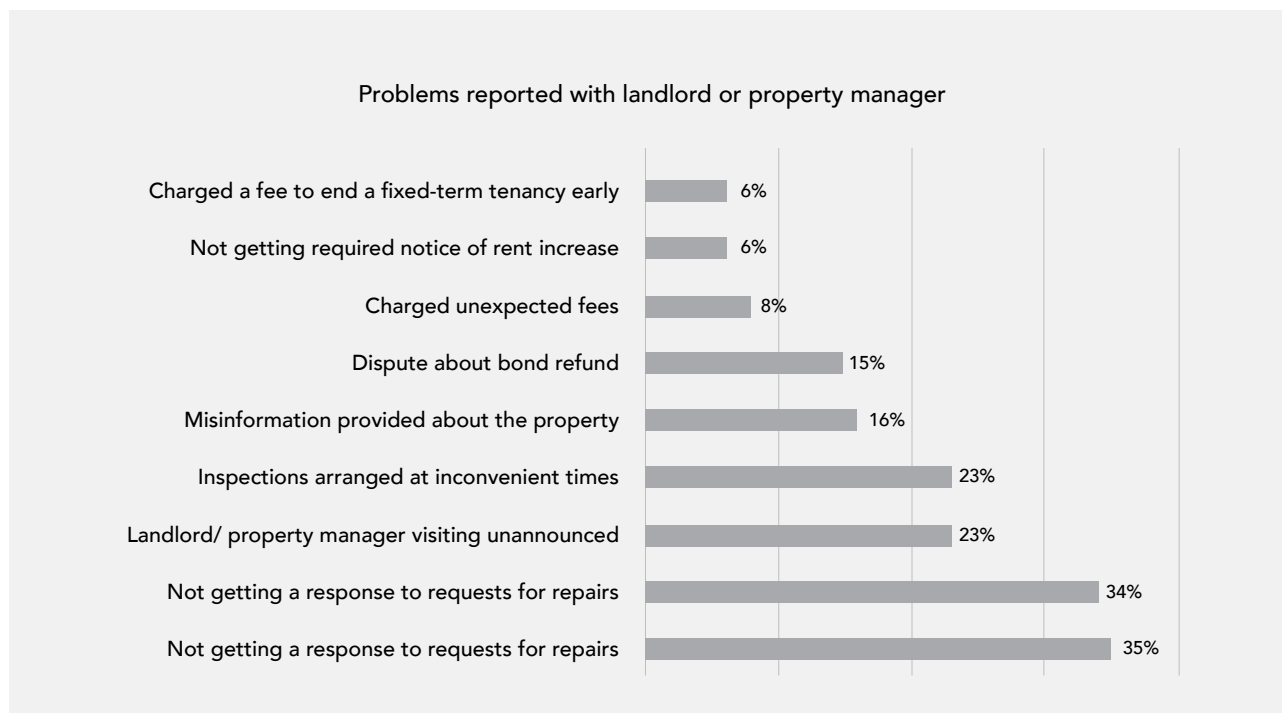
Figure.1 introduces Consumer NZ survey data of 1062 consumers rating service from PM and landlords. Satisfaction scores show the percentage of tenant participants who gave a rating of 8, 9 or 10 on a scale from 0 (very dissatisfied) to 10 (very satisfied). Only 35% of tenant participants rated their PMs service highly. In contrast, 54% of tenant participants renting from a private landlord were happy with the service. Just 36% of tenant participants rated the condition of the property highly. In comparison, 51% to those who rented from the landlord directly. The figure 1 illustrates that tenant participants received better value for money from private landlords (51%) than PM companies (32%). Value for money in this context is beneficial improvements that help the tenants. This reveals that most tenant participants consider dealing with the landlord to be satisfactory in relation to the provided service, condition of the rental property and benefits they received from property owners. While tenant participants were happy with the PMs services provided, the condition of the rental property and beneficial improvements received during the tenancy. The conclusion drawn from the analysis was that private property owners (landlords) provide better tenancy services than professional PM companies.

Issues reported by tenant participants

Consumer NZ survey found that PM companies were more likely to delay requests for repairs than landlords. 42% of tenant participants reported that the PSM ignored their request for repairs and did not respond, while 1 in 4 tenant participants said their landlord or PSM visited unannounced and breached tenancy legislation and 1 in 10 reported being charged unexpected fees. (New Zealand Herald, 2018).

Figure. 2 shows that tenant participants perceived reliability, communication, and responsiveness, as aspects of service that could be improved.

Figure 2: Problems reported by Tenant Participants with the Landlord or Property Service Manager

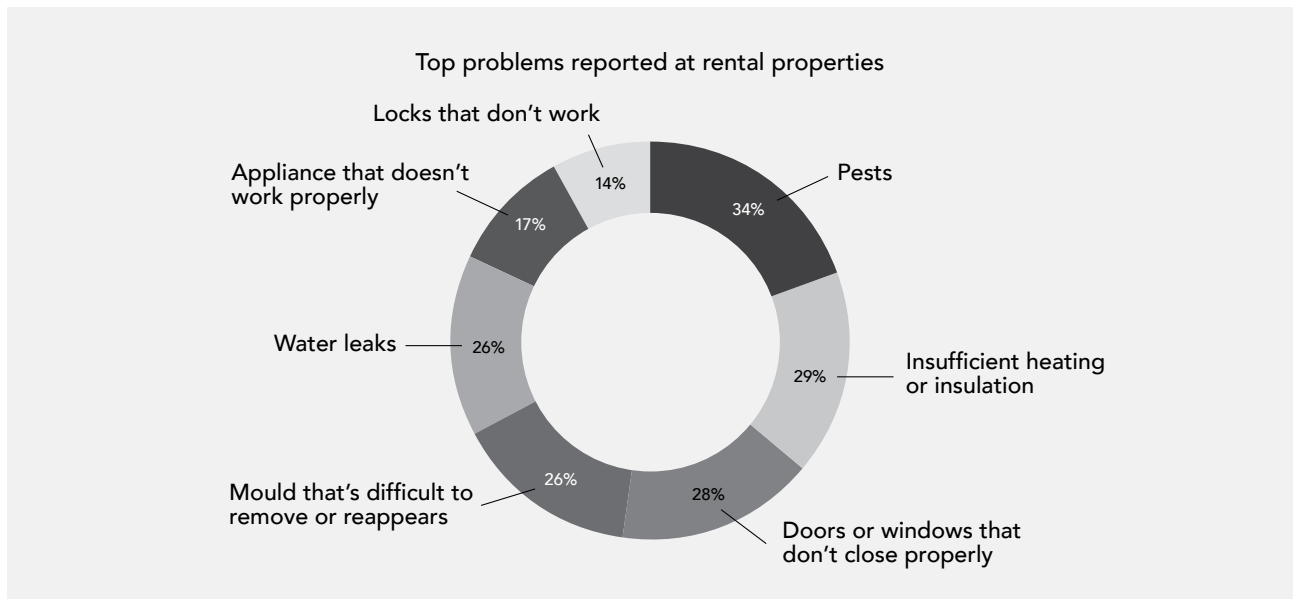


Source: Consumer NZ (2018)

Figure. 2 represents issues reported by renters with property owners and PM. 35% represent promised repairs have not been done, also 34% of tenants did not get a response to repairs requests. 23% of tenants complained about property owner or PSMs unannounced visits and inspections at inconvenient times. 16% reported misinformation provided about the property and 15% said they had a dispute about the bond refund. Furthermore, 8% said they were charged unexpected fees. 6% said they did not get the required notice of a rent increase and were charged a fee to end a fixed-term tenancy. It is found that renters reported on issues related to performing the agreed service by the landlord or the property manager, such as promised repairs not being done. These issues are related to the company's trustworthiness, misinformation about the property, bond refund issues and unexpected fees. Tenants were not happy with the landlord/PSM's unannounced visits and inspections at inconvenient times. This indicates a poor communication style and breaching of tenants' rights.

Figure. 3 provides insights to improve such aspects of service as understanding needs. It shows the top problems reported by tenant participants of rental properties.

Figure 3: Top Problems for Tenant Participants of Rental Properties



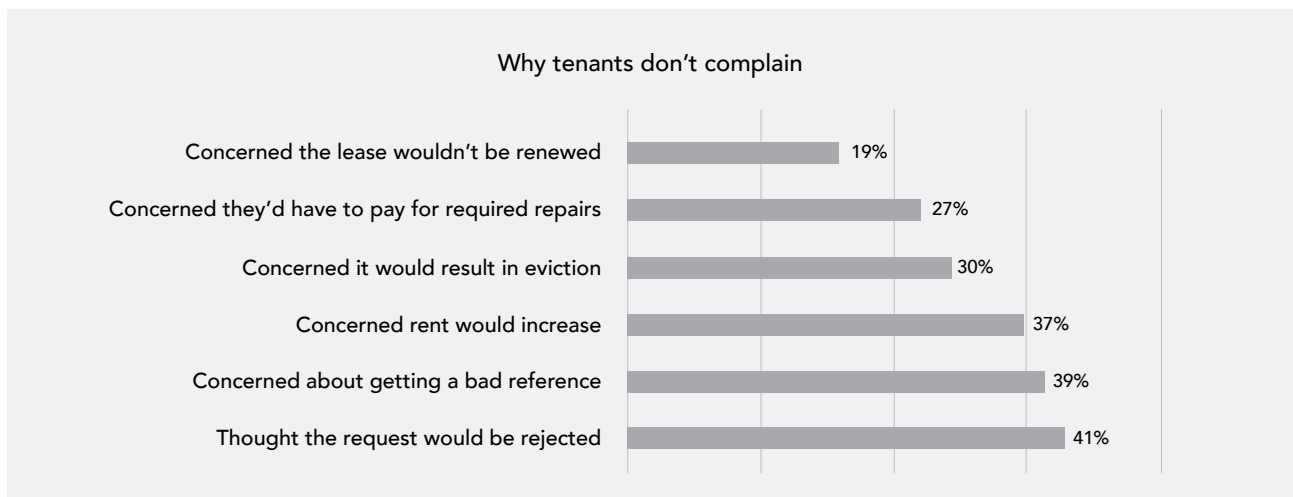
Source: Consumer NZ (2018)

According to Figure 3, 34% of tenant participants reported pest issues at the property, 29% insufficient heating or insulation, and 28% reported doors or windows that did not close properly. While 26% said they had trouble with mould at the property and water leaks, 17% reported appliances that did not work properly and 14% reported lock issues at the rental property. Consumer NZ (2018) identified that tenants who have direct dealings with PMs are more likely to complain about heating, insulation, and mould issues at the rental property. This finding is synonymous with Nadkarni (2018) who argued that PM companies are more likely to have home heating and mould issues compared to renting direct from the property owners, landlords. Newton (2018) argues that NZ rental properties are in significantly worse condition compared to owner-occupied homes and 32% of rental houses in NZ are poorly maintained.

Reasons tenant participants do not complain

The findings indicated tenant participants renting through PM companies were more likely to worry about the repercussions of complaining.

Figure 4: Reasons Tenant Participants do not Complain



Source: Consumer NZ (2018)

Figure 4 indicates that 41% of tenant participants did not complain about issues because they thought their complaint would be rejected; 39% worried about getting a bad reference, 37% worried about their rent increasing, 30% thought it would result in eviction and 27% were concerned they would have to pay for the required repairs. However, 19% of tenant participants are concerned the lease would not be renewed. These findings indicated that the major challenge for tenant participants in being able to fight for their rights is due to the lack of tenure security.

5. RECOMMENDATIONS

Survey

Customer satisfaction is a priority for the PM industry. It is crucial for them must know how tenants and landlords feel about their experience using PM agency services. Seeking feedback from PMs to elicit complaints and compliments should be completed with approaches involving interviews, focus groups and surveys. Questionnaires should be commonly administered to measure customer satisfaction. This recommendation is synonymous with organisations such as Uber, Airbnb, and Facebook which access customers' feedback through customer surveys to build loyalty (Pelican, 2020). According to Pelican (2020) on every Uber ride, there is a real-time customer satisfaction survey completed by the driver and client. Also, every six months, Uber drivers are invited to rate the Uber company directly to determine the level of employees' job satisfaction (Alexander et al., 2022). Adopting this strategy PM companies with the chance to identify opportunities for improvement to allow them to grow and improve.

SERVQUAL-style survey for the Property Management sector

Property management companies should regularly invite customers to write Google reviews for the company. To better integrate consumer voices into service improvement, easy-to-use and in-depth surveys help PM companies identify issues, as customer satisfaction is vitally important for PMs in a successful business operation. However, this research implores PM companies to perform SERVQUAL-style surveys among their customers at PM offices as well as online on their company's website. This will help PM companies to work toward tenant satisfaction using the SERVQUAL model tool. This tool is commonly used for service quality evaluation. Using this, PM companies will be able to measure customer attitudes. Typical SERVQUAL-style survey questions to be used by PMs companies should be based on assurance, empathy, reliability, responsiveness, and tangibles. (Bebko, 2000). The questionnaire should be designed by a PM company and must consider the five dimensions relative to service as listed below in Table 2 with questionnaire examples.

Table 2: Dimensions in relation to service aspects in a questionnaire

DIMENSIONS	ASPECTS OF SERVICE	EXAMPLE OF ITEM FROM QUESTIONNAIRE
Assurance	Competence, respect for customers, effective communication, and attitude conveyed to customers.	How would you rate the level of communication from us?
Empathy	Approachable service representatives, And staff who understand customer needs.	What could we do to improve our service for you?
Reliability	Complete the service on time, consistently, and error-free.	Have there been any undertakings made to you that have not yet been fulfilled?
Responsiveness	Ability to respond promptly.	How would you rate the level of responsiveness to requests for service?
Tangibles	Appearance of the physical facilities.	How would you rate the quality of our facilities?

A questionnaire will help elicit consumers' opinions on services such as communication, understanding needs and value for money satisfaction.

The Balanced Scorecard approaches

In addition to the survey, this research recommends the use of a Balanced Scorecard approach for PM companies. According to Graetz et al. (2014), the Balanced Scorecard concept (BSC) is a visual approach to examine and evaluate a company's performance by four key indicators: mission, customer, internal business processes, learning and growth metrics. The BSC identifies drivers of a company's performance and outcomes. The application of BSC will help PM companies evaluate their strategic management performance from four perspectives: mission, customer, internal business processes, learning and growth. The mission perspective will enable PM companies to identify areas that impact performance and overall achievements. The customer perspective will help with market share, customer satisfaction, customer service and brand awareness objectives. Internal business processes will help PM companies improve their process performance and metrics for efficiency. It represents the main operational issues and processes effectiveness for review. This involves process improvements, quality optimisation and capacity. Learning and growth will help PM companies with their intangible drivers of performance, such as leadership, capability, skills, people satisfaction and technology objectives (Burghall et al., 2014). According to Kaplan & Norton (1992) adopting BSC will help PM companies monitor and improve aspects of their performance by setting goals based on its strategy, focusing on customer needs and the development of internal processes.

Table 3: Balanced Scorecard Approach for Property Management Companies

PERSPECTIVES	OBJECTIVES	MEASURES
1. Mission level	Achieving excellence in customer service	1. Number of initiatives implemented in the company's' operations to service improvement 2. Increase positive feedback from customers
2. Customer	1. Communication with customers 2. Gathering and acting on customer feedback 3. Understanding the customer's viewpoint	Monthly present reports on company's customer feedback.
3. Internal process	1. Being responsive in terms of quality 2. Being responsive in terms of speed 3. Selecting the right staff	Number of employees aware of a set of guidelines in terms of quality and quick service should be the blueprint to be followed by having a clear standard.
4. Learning and growth	1. Training and development of employees in soft skills 2. Empowering staff	1. Number of employees attending and passing training courses on service excellence 2. Monthly meeting for staff and to discuss their individual responsibility/ies towards a particular customer service initiative

Table 3 above represents the BSC approach designed by the researcher considering the most important aspects of customer satisfaction relative to the PM sector. According to the United Kingdom Institute of Customer Service (2011), the most essential factors of customer satisfaction from the perspective of PM companies are: understanding the customer's viewpoint, gathering, and acting on customer feedback, training, and developing of staff soft skills, selecting the right staff, being responsive in terms of quality, empowering staff, and being responsive in terms of speed. The approach will assist PM companies to improve and control business functions regarding customer service United Kingdom Institute of Customer Service (2011).

CONCLUSION

This research examined the key challenges of tenants and what factors NZ PM companies could adopt to enhance service quality and customer satisfaction. Data collected by Consumer NZ from its nationwide survey of 1062 tenant participants of rented properties in NZ was reviewed. The research found the following challenges faced by tenant participants were landlords providing better services than professional PSMs, poor communication styles between tenant participants and landlords or the PSMs leading to breaches of tenant participants' rights. These challenges left tenant participants feeling as though they were not able to fight for their tenancy rights for lack of tenure security. Overall, to attain customer satisfaction in the PM sector, this research recommends:

1. customer satisfaction feedback completed through surveys and interviews.
2. customers are requested to provide reviews via platforms such as Google; and
3. PM companies to use SERVQUAL-style surveys circulated to customers and available online via the PSM's website.

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INTERACTIONS OF LEVERAGE AND FIRM PERFORMANCE: THE MODERATING EFFECTS OF AGENCY COSTS

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WHITIREIA AND WELTEC

ABSTRACT

This research aims to investigate the impact of leverage on the performance of small and large publicly listed firms in New Zealand. Further, it explored the moderating effect of agency costs on the association between leverage and firm performance. The research sample includes quarterly data from New Zealand firms from 2010 to 2021. To test the hypotheses, univariate and multivariate methods were used, such as correlation and panel data regression. The empirical results show that leverage has a significant positive impact on the performance of small firms, but a negative impact on their market value. In large firms, the opposite trend occurs, with firms having a higher market value when they have a higher level of debt in their capital structure. Additionally, the findings show that agency costs have a considerable impact on the relationship between leverage and firm performance. Regardless of the size of the firm, the market value and performance of firms improve when agency cost is introduced as a moderating variable. This study supports the theory that agency costs contribute to enhancing firms' market value by allowing managers to allocate their discretionary spending to more profitable, value-enhancing projects, leading to fewer agency conflicts. The insights can be instrumental in improving the overall performance of firms by achieving an optimal debt structure and utilising debt effectively.

Keywords: Agency problems, agency costs, leverage, corporate performance, market value

INTRODUCTION

Capital structure determinants are often used in studies to analyse how finance decisions impact a firm's performance and profitability. According to Modigliani and Miller (1958), capital structure is irrelevant in perfect markets and does not influence firm value. However, in 1963, Modigliani and Miller revised the irrelevance theory, stating that since interest expenses are tax deductible firms with higher debt ratios have a higher value. Due to the imperfect nature of real economies, numerous finance decision theories have been developed over time to demonstrate the importance of capital mix (Modigliani and Miller 1963). According to capital structure theory, an optimal mix of capital should increase market value per share by ensuring a low average cost of capital (Modigliani and Miller 1963). Akintoye (2008) argues that firm performance is affected by business risk, taxes, managerial behaviour, and financial flexibility. It is further asserted that the most crucial aspect of determining an optimal capital mix is balancing risk and expected return, which is determined by capital structure (Akintoye 2008). Using this objective, firms can maximise their value and minimise their cost of capital by combining debt and equity in the optimal way by rationally combining debt and equity (Abdullah et al., 2021). Kinsman and Newman (1999) emphasize the significance of exploring how capital structure choices (e.g., debt level) influence firm performance. Kinsman and Newman (1999) emphasise the importance of examining the relationship between capital structure choices (e.g., debt level) and firm performance. They assert that the main reason managers study debt level and firm performance is to examine the relationship between debt level and shareholder wealth since their primary goal is to maximise shareholder's wealth (Kinsman & Newman, 1999).

Several researchers have followed Jensen and Meckling (1976) hypothesis that capital structure can affect firm performance and conducted numerous studies exploring this relationship. However, research findings demonstrate that this relationship tends to be contradictory and mixed. A large body of evidence indicates that leverage is positively correlated with firm performance (Champion, 1999; Ghosh et al., 2000; Hadlock & James, 2002; Roden & Lewellen, 1995; Taub, 1975). On the other hand, several studies have shown that leverage is negatively correlated with firm performance (Fama & French, 1998; Gleason et al. 2000; Simerly & Li, 2000).

The economy of New Zealand shares many similarities with other developed countries, but also exhibits unique features due to its unique geography, industry composition, policy priorities, and other attributes (Ministry of Business, Innovation and Employment (MBIE), 2022). Due to its economic structure and sensitivity to external factors, New Zealand's leverage-performance dynamics may differ from those in larger and more diversified economies (MBIE, 2022). Despite extensive research on capital structure choices and their effect on firm performance in developed markets, few studies have been undertaken to determine the about impact of leverage on performance in New Zealand firms. It could be helpful to gain insight into how factors specific to New Zealand, such as industry composition, regulatory environment, and market structure, contribute to the relationship between leverage and firm performance. To address this gap, this research examined the impact of leverage on the value of firms and their financial performance for both small and large firms in New Zealand. Secondly, it examined how agency costs moderates the relationship between financial leverage and firm performance. More specifically, this research addresses the following four research questions:

1. What is the relationship between financial leverage and a firm's return on equity (ROE) for both small and large firms?
2. What is the relationship between financial leverage and a firm's return on assets (ROA) for both small and large firms?
3. What is the relationship between financial leverage and a company's Tobin's Q for both small and large firms?
4. Do agency costs moderate the relationship between financial leverage and ROE, ROA, and Tobin Q for both small and large firms?

This research contributes to the literature in two ways. Firstly, it adds to the theoretical literature on the impact of leverage on the performance and market value of New Zealand firms. Since the amount of leverage can differ between small and large firms, there are variations in performance results between small and large firms (Murray & Goyal, 2001; Rajan and Zingales, 1995). Secondly, there is robust evidence that agency costs play a critical role in moderating the relationship between leverage and a firm's performance (Jensen and Meckling, 1976). It is possible for firms to mitigate the conflict of interest between managers and shareholders by implementing measures that reduce discretionary expenditures by managers (Fama & French, 1998; Servaes and McConnell, 1990). This research contributes to understanding how financial leverage and agency costs affect market value and performance of firms, emphasising their relevance to businesses of all sizes in New Zealand, as well as how management can maximise the performance of their firms through optimal debt management.

LITERATURE REVIEW

Effect of Financial Leverage on Firm Performance

According to the financing constraint literature, financial measures, including profitability and financial leverage, are critical to explaining firm growth dynamics (Oliveira & Fortunato, 2006). However, there are contradictory views in the literature regarding the relationship between financial leverage and firm performance.

Several empirical studies reveal a positive correlation between debt level and firm performance. According to Taub (1975), there is a significant positive correlation between debt and profitability for firms from the United States of America (USA) after studying factors affecting debt-equity ratios. In addition, Grossman and Hart (1982) and Williams (1987) find that high leverage encourages managers to act more in shareholders' interests. Using leveraged buyouts as an example, Roden and Lewellen (1995) find that profitability is significantly correlated with debt as a percentage of total buyout financing. The same results are documented by Hadlock and James, (2002) in a study on USA-based firms. According to Margaritis and Psillaki (2010), higher leverage is associated with improved efficiency. In their study, Cheng and Tzeng (2014) find that leverage and firm value were positively correlated until a firm reached its optimal capital structure. Taking a sample of seven firms listed on both the Bombay Stock Exchange and the National Stock Exchange, Vijayalakshmi and Manoharan (2015) examined the impact of leverage on the market value of firms and indicated that leverage had a significant positive impact on the market value of firms.

According to Gleason et al. (2000), capital structure is negatively related to performance in a set of European retail firms. A similar set of results was reported by Booth et al. (2001) for ten developing countries, among them Brazil, Mexico, South Korea, Zimbabwe, and Malaysia. Based on a set of manufacturing and service firms in Belgium, France, Italy, and the United Kingdom, Goddard et al. (2005) find a negative correlation between a firm's gearing ratio and profitability. Additionally, Nunes et al. (2010) find a negative relationship between leverage and performance for Portuguese service firms. They suggest that as leverage levels increase, losses increase due to negative net present value projects leading to higher costs of financial distress, bankruptcy, and/or liquidation. Similarly, Kester (1986) report a negative relationship between leverage and profitability for the USA and Japan.

Firm Size and Financial Leverage

According to Rajan and Zingales (1995), there is a positive correlation between leverage and profitability, as well as firm size with leverage. Antonious, et al. (2008) validated this finding and concluded that leverage ratios are positively associated

with firm size. Murray and Goyal (2001) suggest that bigger firms have a greater capacity for debt and can, therefore, have a higher tax shield, supporting the static trade-off theory that proposes a positive relationship between profitability and financial leverage. However, Syed et al. (2006) examined determinants of capital structure and concluded that firm size and leverage were negatively correlated. This finding aligns with pecking order theory of capital structure which suggests that managers prioritize firms' financing operations using first retained earnings (internal financing), then debt financing, and finally equity financing (Myers, 1977). Considering that firm size impacts firm performance and that the relationship between leverage and firm performance is controversial, firm size may provide some explanation for the relationship between leverage and firm performance. Based on this hypothesis, we conducted empirical analysis and investigated whether the firm size is relevant in explaining the ambiguous relationship between leverage and firm performance.

The current research examined the relationship between leverage and performance of both small and big firms. It tested whether the relationship between leverage and firm size is invariant to sample splitting, assuming the firm size represents the threshold variable when the sampling is based on firm size. Based on the discussion thus far, it can be concluded that there is a negative relationship between financial leverage and firm performance. Therefore, the following hypotheses is proposed:

- H1: There is a positive relationship between financial leverage and firm performance (ROE and ROA) in small firms.
- H2: There is no positive relationship between financial leverage and firm performance (ROE and ROA) in small firms.
- H3: There is a positive relationship between financial leverage and a firm's market value Tobin's Q in small firms.
- H4: There is no positive relationship between financial leverage and a firm's market value (Tobin's Q) in small firms.
- H5: There is a positive relationship between financial leverage and firm performance (ROE and ROA) in large firms.
- H6: There is no positive relationship between financial leverage and firm performance (ROE and ROA) in large firms.
- H7: There is a positive relationship between financial leverage and a firm's market value (Tobin's Q) in large firms.
- H8: There is no positive relationship between financial leverage and a firm's market value (Tobin's Q) in large firms.

The Moderating Effects of Agency Costs on the Relationship Between Capital Structure and Firm Performance

The agency cost theory propounds that agency costs occur due to 'principal-agent' relationships between managers and shareholders or between creditors and shareholders (Jensen & Meckling, 1976). Further, Jensen and Meckling (1976) contend that debt influences agency costs. As a firm's shareholders' interests diverge from its managers' interests, agency costs associated with equity can be reduced through leverage. In firms with higher debt levels, debt holders closely monitor the firm and managers are less free to engage in non-value-maximising activities (Servaes and Connell, 1990). According to Kalash (2019), shareholders-managers' agency theory can reduce agency problems and boost firm performance. Servaes and McConnell (1990) argued that an increase in debt proportion may increase investments in high-risk projects to cover interest payments. Thus, as debt grows, lenders will be more inclined to improve monitoring, thereby reducing agency costs. In small firms, unrestricted risk sharing, and specialisation of management may be less beneficial than controlling the agency problems that arise in these businesses (Servaes and McConnell, 1990). Using this method, managers and owners have fewer conflicts of interest, thus eliminating costly control mechanisms (Fama & French, 1998). By assessing how agency costs influence the relationship between capital structure and firm performance, Sdiq et al. (2022) concluded that agency costs have both positive and negative impacts on the correlation between capital structure and firm performance. Various researchers (Abdullah et al., 2021; Grossman & Hart 1982; Hoang et al., 2019; Jensen 1986; Jensen & Meckling 1976; Williams 1987) have suggested that firms can raise capital via debt financing when leverage is low. This reduces agency conflicts and costs, since managers are less likely to act in their own interests, resulting in an improved performance for the firm. Based on the above discussion, it can be concluded that agency costs play a significant role in moderating the relationship between capital structure and financial performance. Consistent with the above arguments, the following hypotheses is proposed.

- H9: Agency costs positively moderate the relationship between leverage and performance (ROA and ROE) in small firms.
- H10: Agency costs do not positively moderate the relationship between leverage and performance (ROA and ROE) in small firms.
- H11: Agency costs positively moderate the relationship between leverage and market value (Tobin's Q) in small firms.
- H12: Agency costs do not positively moderate the relationship between leverage and market value (Tobin's Q) in small firms.
- H13: Agency costs positively moderate the relationship between leverage and performance (ROA and ROE) in large firms.
- H14: Agency costs do not positively moderate the relationship between leverage and performance (ROA and ROE) in large firms.
- H15: Agency costs positively moderate the relationship between leverage and market value (Tobin's Q) in large firms.
- H16: Agency costs do not positively moderate the relationship between leverage and market value (Tobin's Q) in large firms.

DATA AND METHODOLOGY

Data

The research sample includes quarterly data of non-financial publicly listed New Zealand firms from quarter 1, 2010 to quarter 1, 2021. The dataset is an unbalanced panel consisting of 11 years or 44 quarters of 69 New Zealand firms. This research excluded all financial firms because the nature of their liabilities is different from non-financial firms (Fama & French, 1992). This research used data from the Thomson Reuter DataStream database to obtain firm-level financial variables. It is one of the leading providers of financial data, and analytics to economists and research communities (Thomson Reuters Datastream Economic). All selected continuous variables are winsorised at 5% to eliminate the effect of outliers.

3.2. Methodology

This research examined how leverage impacts corporate financial performance and market value using indicators (ROE, ROA, and Tobin's Q) for both small and large firms. Using the median value of assets, the sample was divided into small and large firms to analyse the impact of variables on each group. Firms with assets below the median are classified as small firms while firms with assets over the median were classified as large firms. Multiple regression techniques are used to assess the objectives and test the developed hypotheses. The model uses heteroscedasticity-robust standard error estimates to verify the heteroscedasticity assumption of regressions.

The model is constructed as follows:

$$Y_{it} = b_0 + b_1 Lev_{i,t} + b_2 S_{it} + e$$

Where Y represents the dependent variable ROE, ROA, and Tobin's Q, and *Levi,t* is the firm's financial leverage. *Levi,t* is the ratio of total debt to total assets for firm *i* at time *t*. *S* represents firm size as the control variable. A second set of regressions was conducted to determine the effect of moderator agency costs on leverage and firm performance in both small and large firms. The analysis was performed using the baseline equations with agency costs as a moderating variable.

Measurement of Variables

Dependent variables

Three variables were used to determine the performance and market value of firms. Prior studies have used ROA as an indicator of profitability since it is the most comprehensive measure of a firm's performance (Russo et al. 1997; Puri, 2022). It measures how effectively a firm generates income from its assets. Additionally, ROE was used as an indicator of corporate shareholder returns (Artiach et al. 2010). The ROE measures how efficiently firms manage the shareholders' capital (Abdullah et al., 2021; Li et al., 2018, Puri, 2022). Following various researchers (Albertini, 2013; Garg, 2015; Yu & Zhao, 2015) the third variable used extensively to measure market value was Tobin's Q. Tobin's Q is calculated as the market value of equity plus the book value of debt divided by total assets (Tretiakova et al., 2021; Puri, 2022). Several studies have confirmed that Tobin's Q measures market value accurately as it reflects a firm's performance as well as its expectations for its future (Diab et al., 2019; El Ghouli et al., 2017; Li et al., 2018)

Independent Variable

Leverage is the use of borrowed funds by a firm. A firm's financial leverage was measured as the ratio of total debt to total assets. Several scholars (Detthamrong, 2017; Margaritis & Psillaki, 2010) have used this variable as a measure of financial leverage.

3.3.3. Moderating Variable

Several proxies can be used to measure agency costs. Following previous studies, the asset utilisation ratio was used to determine the agency costs (Ang et al. 2000; Kontuš, 2021). This ratio measures how efficiently management uses the firm's assets and evaluates the ability of management to make optimal use of assets. It is important to note that the asset utilisation ratio is the only inverse proxy for agency costs meaning that agency costs increase as asset utilisation decreases. A high asset utilisation ratio indicates efficient use of assets, and this inversely correlates with agency costs (Tian and Estrin 2007; Vijayakumaran 2019).

Control variables

This research used firm size as the control variable. It has been proposed by Ibhagui and Olokoyo (2018) that firm size plays a significant role in determining the relationship between capital structure and firm performance. Additionally, larger firms have the advantage of generating internal funds and accessing external capital more easily (Puri, 2022). This research measured firm size as the natural logarithm of total assets (Puri, 2022; Garca-Meca et al. 2015)

Figure 1: Descriptions of Variables

SUMMARY VARIABLES	MEASUREMENT
ROA	The ratio of a firm's net profit to total assets
ROE	The ratio of net income to shareholders' equity
Tobin's Q	The market value of equity plus book value of debt divided by total assets
Leverage	The ratio of a firm's total debt to the book value of its assets
Agency costs	The ratio of the firm's sales to total assets
Size	The natural logarithm of the book value of a firm's asset

EMPIRICAL RESULTS

Univariate Analysis

Table 1: Summary Statistics for all Continuous Variables

VARIABLE	N	MEAN	SD	MIN.	MAX.
ROA	2,561	5.01	9.98	-26.47	20.73
ROE	2,595	8.32	14.41	-32.51	32.16
Tobin's Q	2,670	1.60	2.06	0.20	8.50
Lev	2,521	24.52	15.09	0	55.59
Firm Size	2,879	13.50	1.54	10.34	15.84
Agency Cost	2,864	0.61	0.58	0.048	1.99

Table 1 presents the summary statistics showing all continuous variables of 69 New Zealand firms evaluated over 11 years. For the sample firms, the average ROE was 8.32% which indicates that, on average, the firms in the sample are generating 8.32 cents for every dollar invested. The ROA of 5.1 indicates that, for every unit of total assets owned, the firms in the sample generated an average profit of 5%. According to Tobin's Q, the average market value of firms is 1.60 which indicates that the market values of the firms is 1.60 times their replacement cost of assets. Based on the mean values in the sample, it can be concluded that the firms in the sample are profitable. On average, agency costs were 0.6, which means that the firms generated 60 cents of sales for every dollar the firms held in assets. Furthermore, the mean values for firm size and leverage are 13.8 and 24.5, respectively which suggests that the selected firms have debt in their capital structure.

Table 2: Correlation Matrix for all Variables

	ROA	ROE	TOBIN'S Q	LEVERAGE	FIRM SIZE	AGENCY COSTS
ROA	1					
ROE	0.847	1				
Tobin's Q	-0.293	-0.224	1			
Lev	0.184	0.077	-0.4173	1		
Firm Size	0.195	0.281	-0.1478	0.402	1	
Agency Cost	0.184	0.206	0.147	-0.191	-0.319	1

Table 2 presents correlation coefficients of key variables for the final sample. As the correlation coefficients between explanatory variables are below 0.50, the issue of multicollinearity is not of great concern. Among independent variables, there was no significant correlation. There is no significant correlation among independent variables, As expected, ROE and ROA are highly correlated ($r = 0.84$), thereby indicating that they can be used interchangeably as a proxy for firm performance.

Multivariate Analysis

Table 3: Panel Data Regression

	SMALL FIRMS			LARGE FIRMS		
	ROA (1)	ROE (2)	TOBIN'S Q (3)	ROA (4)	ROE (5)	TOBIN'S Q (6)
Lev	0.0452***	0.0447**	0.0253***	-0.041**	-0.046*	-0.004
	0.004	0.046	0.000	0.028	0.093	0.617
Firm size	1.409***	2.132***	-0.714***	1.585***	2.319***	-0.844***
	0.000	0.000	0.000	0.000	0.000	0.000
Constant	-14.52***	-21.20***	11.19***	-15.91***	-22.65***	12.88***
	0.000	0.000	0.000	0.000	0.000	0.000
Observations	2,389	2,424	2,350	2,389	2,424	2,350
R-squared	0.11	0.08	0.07	0.10	0.13	0.12

Table 3 presents the results of the panel regressions for three different outcome variables: ROE, ROA, and Tobin's Q. The regression in the specification controls for firm fixed effects. It shows the estimation outcomes for leverage on financial performance and market value. All variables (except for the dummy variable) are winsorised at 5%. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. p-values are reported in parentheses.

Finally, a fixed effect multi-regression was performed to test the posited hypotheses. Table 3 presents the results of the panel regressions for three different outcome variables: ROE, ROA, and Tobin Q. In small firms, financial leverage positively impacts the performance of firms and market value as measured by ROE and ROA, and Tobin's Q. Columns 1, 2 and 3 show that the increase in leverage in small firms has increased the performance indicated by ROA and ROE by 4.5 % and 4.4 % and the market value by 2.5 %. Therefore, we accept the first and third hypotheses. However, in large firms, the increase in financial leverage has a significant negative effect on the performance of firms and no impact on the market value of firms. Columns 4 and 5 show that the increase in leverage has led to a decrease in ROE and ROA by 4%. The results contradict hypotheses five and seven, which suggest a positive relationship between leverage and firm value and performance. Hence, the null hypotheses six and eight are accepted.

Table 4: Panel Data Regression with Agency Costs as a Moderating Variable

	SMALL FIRMS			LARGE FIRMS		
	ROA (1)	ROE (2)	TOBIN'S Q (3)	ROA (4)	ROE (5)	TOBIN'S Q (6)
Lev with Agency cost as a moderating variable	-0.005	0.134***	0.011***	0.0357**	0.120***	0.0286***
	0.737	0.000	0.030	0.300	0.000	0.000
Firm size	1.110***	2.488***	-1.159***	1.023***	1.479***	-1.190***
	0.000	0.000	0.000	0.000	0.000	0.000
Constant	-9.952***	-26.65***	17.68***	-9.021***	-12.59***	17.83***
	0.000	0.001	0.001	0.000	0.001	0.000
Observations	2,389	2,424	2,350	2,389	2,424	2,350
R-squared	0.114	0.123	0.182	0.114	0.143	0.189

Table 4 presents the results of the panel regressions for three different outcome variables: ROE, ROA, and Tobin's with agency cost as a moderating variable. The regression in the specification controls for firm fixed effects. All variables (except for the dummy variable) are winsorised at 5%. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. p-values are reported in parentheses.

Table 4 reports the empirical results of taking agency costs as the moderating variable. The performance of small and large firms as measured by ROE is improving when agency costs are considered as a moderating factor by 13.4% and 12% as shown in columns 2 and 5. ROA increases by 3.5% in large firms as indicated in column 4. The researchers reject the null hypothesis and accept hypotheses nine and eleven based on our findings, which suggest that agency costs positively moderate the relationship between leverage and profitability. It is noteworthy that the moderating effects of agency costs

increase the market value of both small and large firms by 1.1% and 2.8% respectively. Consequently, null hypotheses are rejected and hypotheses thirteen and fifteen are accepted, which indicate that agency costs positively moderate the relationship between leverage and market value.

DISCUSSION

The purpose of this research was to investigate the relationship between financial leverage and firm performance for publicly listed firms on the New Zealand stock exchange. There is convincing evidence in the results indicating that financial leverage has a considerable impact on the financial performance and market value of firms. There is further evidence that agency costs moderate the relationship between leverage and firm financial performance. Key findings can be summarised as follows.

Firstly, financial leverage is positively associated with the profitability of small firms. Taub (1975), Grossman and Hart (1982) and Williams (1987) confirm that with the increase in debt, managers engage in value-maximising activities, thereby increasing the efficiency of firms (Margaritis & Psillaki, 2010) and encouraging managers to maximise shareholder's wealth (Kinsman and Newman, 1999). The positive relationship between debt and performance in small firms signifies that with the increase in debt, managers aim at optimal debt structure (Akintoye, 2009). Additionally, a positive relationship between market value and leverage in small firms suggests that investors consider firms with debt as efficient firms. This aligns with previous studies which suggest that there is a significant positive impact of leverage on a firm's market value (Vijayalakshmi & Manoharan, 2015). Furthermore, the empirical findings indicate that high leverage encourages managers to act more in shareholders' interests. Margaritis and Psillaki (2010), Grossman and Hart (1982) and Williams (1987) found that leverage and firm value were positively correlated until a firm reached its optimal capital structure (Cheng & Tzeng, 2014).

Secondly, for large firms, financial leverage has a negative association with the performance of firms and no significant relation with the market value of firms. An explanation for the negative relationship is the non-management of debt funds by the managers of firms leading to inferior performance (Antoniou et al., 2008, Syed et al., 2006). A key takeaway is that it is important for these firms to strike a balance between leverage and equity to sustain their performance outcomes (Kinsman and Newman, 1999). The empirical findings align with pecking order theory for financing. According to this theory, debt capital is more expensive to use than retained earnings due to the interest charges associated with it which impacts profitability, Myers (2011). This leads to a conservative attitude of managers with respect to leverage considering leverage to be a risky and expensive proposition (Goddard et al., 2005).

Thirdly, agency costs, moderate the relationship between financial leverage and firm performance, for both small and large firm sizes (Jensen & Meckling, 1976). The empirical findings indicate that with agency costs as a moderating variable, leverage positively correlates with firm performance and market value. An increased asset utilisation ratio indicates efficient use of assets and reduced agency costs. The findings relate to previous research findings which propound that when there is additional debt in the capital structure, managers pay greater attention to the firm's performance, invest in profitable projects, and engage in value-maximising activities. This aligns with the principles of agency theory outlined in seminal works such as Berle and Means (1932), Jensen (1986), and Jensen and Meckling (1976). Furthermore, an increase in asset utilisation can indicate a firm's ability to monitor and control its assets. It indicates that managers are being held accountable for their decisions, reducing the possibility of agency-related issues (Abdullah et al. 2021; Grossman & Hart 1982; Hoang et al. 2019; Williams 1987).

Furthermore, the results show that with the increase in leverage, there is a reduction in agency costs. In agency theory, shareholders and managers may have conflicting goals and motivations, thus creating conflicts of interest and leading to agency costs shareholders (Jensen & Meckling, 1976). By incentivising managers to maximise firm performance, conflicts are mitigated, thus eliminating costly control mechanisms (Fama & French, 1998) and thereby reducing agency costs (Servaes & McConnell, 1990). These results support the theory that debt reduces agency-related conflicts by reducing the cash flow available for manager discretionary costs.

Overall, integrating agency cost considerations into capital structure decisions may result in more effective monitoring, better management control, and enhanced firm performance (Abdullah et al., 2021; Grossman & Hart 1982; Hoang et al., 2019; Jensen 1986; Jensen & Meckling 1976; Williams 1987e). It is more likely that managers will choose a capital structure that balances the benefits of debt (such as tax shields) with the costs (such as financial distress and agency costs) (Servaes and McConnell, 1990). Investors may also use this finding when making investment decisions to consider how much impact asset utilisation has on corporate performance.

SCOPE AND LIMITATIONS

This research was based on published data from firms from New Zealand, resulting in a small sample size. It is possible to conduct future studies using a larger sample size and a broader range of countries. There is a considerable difference between different industries regarding their capital structure decisions and agency costs, so expanding the research to

include other industries such as banking, telecommunications, and insurance would be of significant value. Furthermore, the research could be conducted using other measures of capital structure and agency costs, such as the operating expenses ratio and free cash flow ratio. The findings may not be relevant to emerging economies or other countries whose economic conditions, regulatory environment, or business practices differ from those of New Zealand.

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THE INSURANCE INDUSTRY'S ADAPTATION PRACTICE TO CLIMATE CHANGE

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ABSTRACT

Climate change increases the risks of natural hazards. The latest report of the United Nations Environment Programme (UNEP) released last October 2022 alleges the increasing climate change is contributed to by anthropogenic, that is, human-made activities. Its projected global temperature increase will severely affect everyone's living conditions and economy. As the most critical operation for managing and transferring climate risks and supporting climate action, the insurance industry is confronting the significant challenges arising from the foreseeable climate change in the next decades. Appropriate adaptation practices from the insurance industry are, thus, vital for its resilience and sustainability. However, there is a lack of an understanding of the climate actions the insurance industry is taking. More importantly, no systematic assessments of insurers' latest adaptation practices to better respond to the risks and opportunities arising from climate change exist. Therefore, this research aims to fill this gap by conducting a structured literature review and proposing a typology for differentiating the types of insurers' engagement in responding to climate change. Aiming to precisely identify the most influential literature, bibliometrics, a quantitative analysis of 927 articles on climate change and the insurance industry was conducted to determine the main topics, authors and associations, major publication countries and highly cited papers. Twenty-five articles were subsequently selected for the structured literature review. Three adaptation types: a climate change advocate, a risk management expert, and an innovative solution provider, were developed as the findings. The benefits and challenges encountered by each type of adaptation practice were discussed in depth to imply the future enhancement of the industry's role as a sustainable partner in battling the challenges of climate risks.

Keywords: insurance industry, climate change, bibliometrics, literature review.

INTRODUCTION

The concept of climate change, as defined by the United Nations, encompasses long-term alterations in both temperatures and weather patterns. Historical records indicate that global surface temperature measurements date back to the 19th century. These figures have steadily risen by approximately 1.1°C compared to the late 1800s (United Nations, n.d.). In October of 2022, a report from the United Nations Environment Programme (UNEP) indicated an increase in anthropogenic activities responsible for contributing to climate change. It projects a rise between 2.4°C and 2.6°C in temperatures by the end of this century, even under stringent compliance with adaptation policies (United Nations, 2022). This far surpasses some pre-determined goals like those outlined under guidelines at the Paris Agreement negotiations in 2015, which aimed to limit the average temperature increase to 1.5°C and 2.0°C before the century's end. Failure to attain the long-term objectives of the Paris Agreement may lead to a deterioration in living standards and ultimately result in an economic crisis on a global scale (Lenaerts et al., 2022).

The implications of climate change have far-reaching consequences, including human health (Filho et al., 2022), severe economic losses (Botzen & Van Den Bergh, 2008) and threats to the sustainability of the insurance industry (Mills, 2005). As the largest aggregator of such risks, accounting for 7% of the global economy, the insurance industry faces immense challenges adapting to changing environmental conditions (Deloitte, 2022). The World Health Organization warns that worsening climate conditions will increase deaths caused by malnutrition, diarrhoea, heat strokes and malaria between 2030 and 2050. This trend will negatively impact health insurance programmes by United States dollars (USD) two to four billion annually (Filho et al., 2022). Furthermore, catastrophes like floods, wildfires, droughts and earthquakes continue unabated alongside pandemics such as Coronavirus disease (Covid-19) outbreaks persisting indefinitely into our future (Stechemesser et al., 2015).

Along with the increasing risks, there are increasing opportunities in the insurance industry (Botzen & van den Bergh, 2009;

Mills, 2009). Not only proving evidence of potential profit that can be generated from offering insurance services, but the industry also has a crucial function in facilitating recovery for individuals and businesses affected by natural catastrophes (Botzen & Van Den Bergh, 2008; Thirawat et al., 2017). Therefore, the insurance industry must adapt to better respond to the risks and opportunities climate change represents for the industry.

According to the Principles for Sustainable Insurance (PSI) developed by the UNEP, the insurance industry must take proactive measures to mitigate environmental, social and governance (ESG) risks posed by climate change. Insurers can achieve this by performing roles that facilitate organisational transformation (United National Environmental Programme (ENEP) Finance Initiative, 2012). Table 1 illustrates these principles in detail. By adhering to PSI guidelines, insurance industry can expand their knowledge and understanding of sustainable practices that safeguard against potential ESG threats while leveraging opportunities for long-term growth.

Table 1: Principles for Sustainable Insurance

PRINCIPLES	
1	We will embed in our decision-making environmental, social and governance issues relevant to our insurance business.
2	We will work together with our clients and business partners to raise awareness of environmental, social and governance issues, manage risk and develop solutions.
3	We will work together with governments, regulators and other key stakeholders to promote widespread action across society on environmental, social and governance issues.
4	We will demonstrate accountability and transparency in regularly disclosing publicly our progress in implementing the principles.

Note. Adapted from <https://www.unepfi.org/insurance/insurance/the-principles/>. Copyright 2012 by UNEP Finance Initiative.

Against the backdrop of the catastrophic losses caused by climate change, the urgent need for industrial sustainability and the UNEP's initiative, insurance practitioners responded to climate changes variously (Mills, 2009). This literature review intends to assess the insurance industry's adaptation practices in response to climate change that are published in journal articles. The indicative features, effects and challenges of the identified adaptations in the literature are also analysed for implying future research and industrial practices.

LITERATURE REVIEW METHODS

This research deployed a combination of the quantitative and qualitative approaches of literature review for developing the typology for classifying insurance industries' responses to climate change. The quantitative approach is a scientific mapping method, namely Bibliometrics, used to assess the associations between the elements such as topics, concepts, fields, keywords, authors, affiliations, co-citations, journals, and countries of published articles (Aria & Cuccurullo, 2017; Zupic & Čater, 2015). This analysis clusters article connections bibliographically and presents the results by visualisations (Aria & Cuccurullo, 2017; Zupic & Čater, 2015). On the other hand, the qualitative approach compares the qualitative codes developed from reviewing the narratives in selected articles to present structured themes for in-depth interpretations (Zupic & Čater, 2015). Bibliometrics is dominantly descriptive, but a structured review is criticised as subjective (Zupic & Čater, 2015). Therefore, it is logical to apply Bibliometrics to confirm the research gap and identify the most influential literature and improve the efficiency of the qualitative review process. The subsequential structured review enhances the findings with in-depth interpretations.

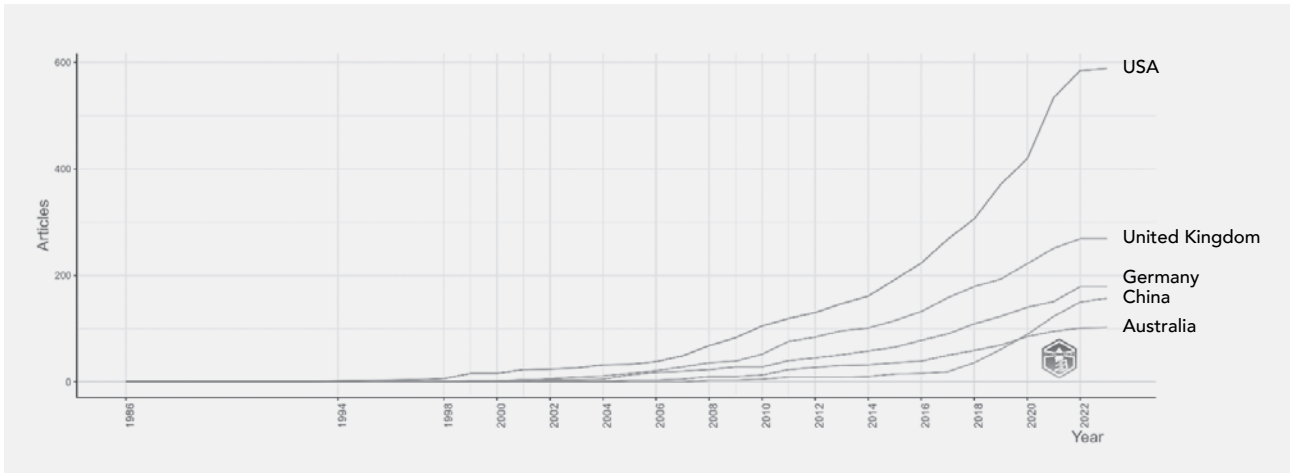
BIBLIOMETRICS AND FINDINGS

A total of 927 peer-reviewed journal articles were extracted from Scopus using "climate change*" and "insurance" as the search words. All information fields of the 927 articles were extracted in a BibTex file, which was analysed using Biblioshiny (an R-tool). The key results from the clustering analysis are presented in Figure 1 to Figure 4.

Figure 1 depicts the country-based accumulated publications over time. The research on insurance for climate change burgeoned from the late 1990s and grew significantly after 2000, especially among scholars from the United States of America (USA). The top five research productive countries, by descending order, include the USA, United Kingdom (UK), Germany, China and Australia. Figure 2 presents the cluster connections between the top ten authors, ten countries and twenty keywords presented in the 927 articles. Botzen and his European and USA co-authors (refer to Figure 3) were the most influential authors in publishing articles focused on insurance for climate change, with a special interest in flood insurance. Botsen, Aerts and Mills' articles have the highest score of citations compared to the others. The theme cooccurrence network (refer to Figure 4) demonstrates that the theme "Climate Change" is more closely connected to risk assessment, adaptation, flood, natural disaster, food, agriculture, and related themes. The top list of journals that published

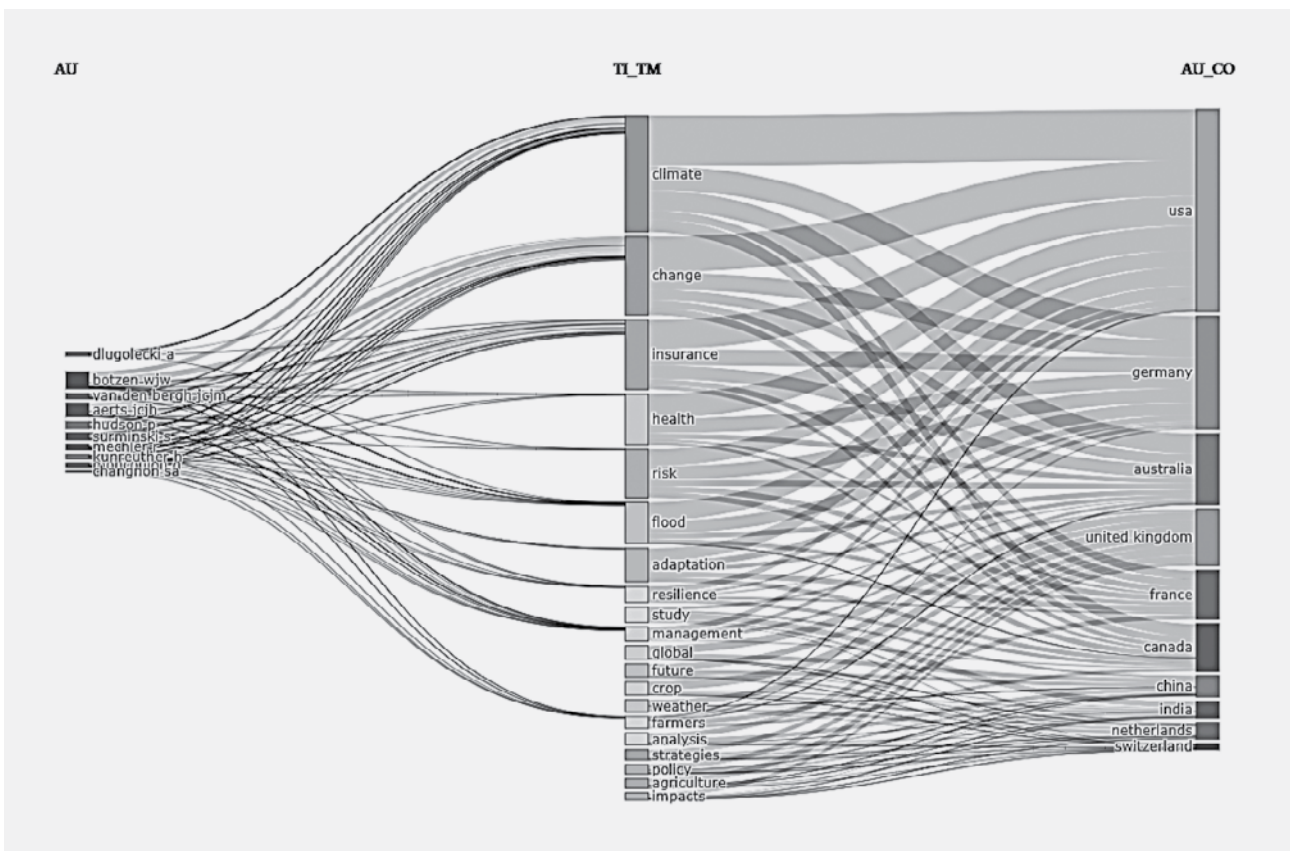
these articles include Geneva Papers on Risk and Insurance, Sustainability, International Journal of Climate Change Strategies, Climate Change, and Ecological Economics.

Figure 1: Country Production Over Time



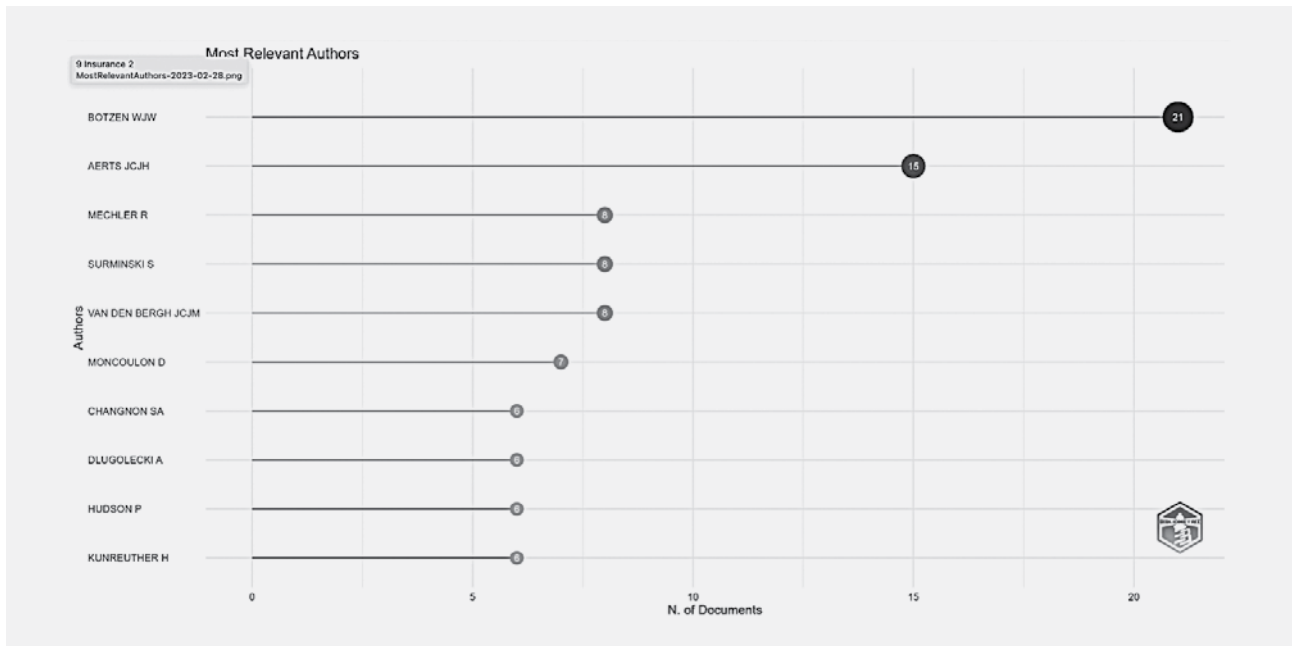
Note. Figure generated by Dai using Biblioshiny. Own work.

Figure 2: Three Field Plot



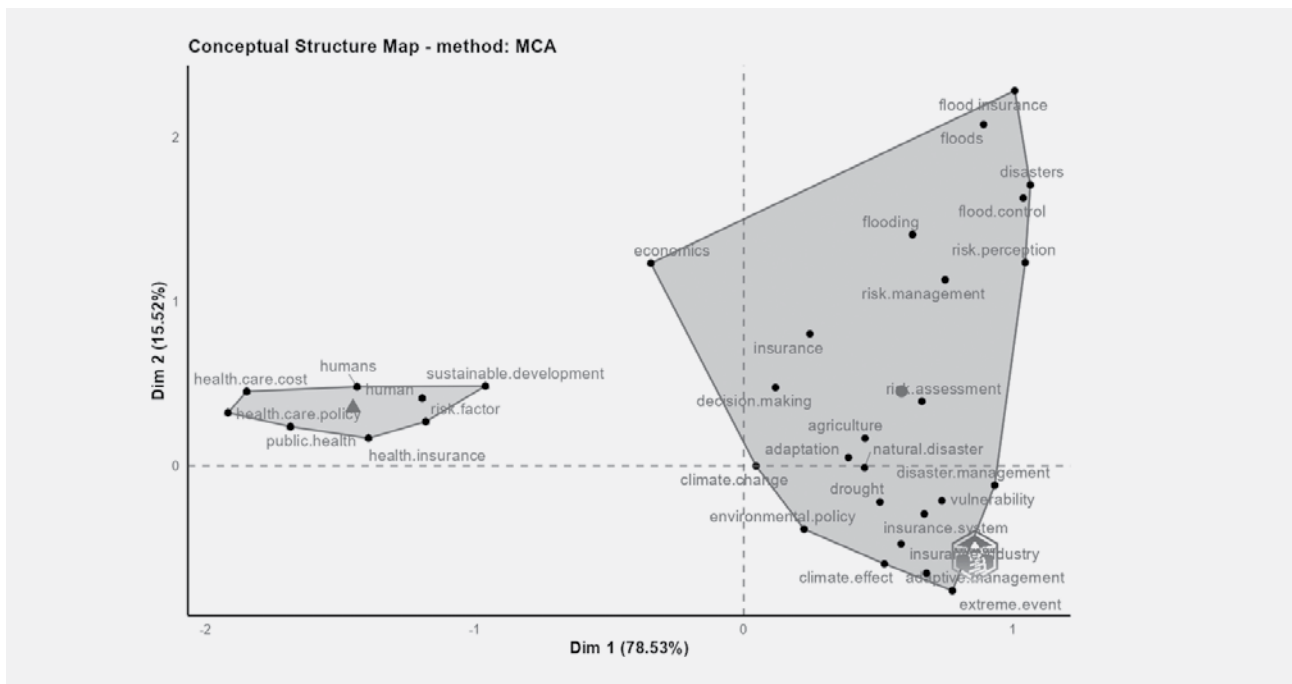
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Figure 3: Most Relevant Authors



Note. Figure generated by Dai using Biblioshiny. Own work.

Figure 4: Theme Cooccurrence Network



Note. Figure generated by Dai using Biblioshiny. Own work.

The findings from Bibliometrics clearly identified the leading authors, key themes and top journals for further investigation of articles for the structured review. It was relevant to select articles published after 2010 with a research focus on the insurance industry’s adaptation practices for climate change. Twenty-five articles were selected with the refined criteria, which were deemed highly representative sources for review.

The structured review utilised the ten categories of insurer climate activities published in Mills’ (2009) study as the initial codes (refer to Table 2) and added new codes while reviewing the later articles. Twelve codes were finalised and further categorised based on insurers’ attitudes and engagement. Code 1, understanding the climate change problem, was not discovered. The plausible explanation is that such activity may not be necessary after more than a decade of promotion of climate change. As presented in Tables 3, 4 and 5, three new codes including incorporating ESG agenda, tailoring risk measurements for

enterprise clients, and repackaging insurance products were added. After several iterations of the code refining process, the three adaptation types were determined: a climate change advocate, a risk management expert, and an innovative solution provider. The following section discusses the key features, benefits and challenges summarised from the reviewing articles.

Table 2: Insurer Climate Activities Before 2009

INSURER CLIMATE ACTIVITIES BEFORE 2009	
1	Understanding the climate change problem
2	Promoting loss prevention
3	Aligning terms and conditions with risk-reducing behaviour
4	Crafting innovative insurance products and services
5	Offering carbon risk management and carbon reduction services
6	Financing climate-protection improvements
7	Investment in climate change solutions
8	Building awareness and participating in public policy
9	Leading by example
10	Climate risk disclosure

Note. Reprinted from "A Global Review of Insurance Industry Responses to Climate Change" by E. Mills, 2009, Geneva Papers on Risk & Insurance, 34, p.331. Copyright 2009 by The International Association for the Study of Insurance Economics.

STRUCTURED REVIEW

As implied in the Bibliometrics results, climate insurance is clustered closely with adaption. Kahn (2021) challenged the difficulties in mitigating the effects of climate change, which Kahn believes is a passive reaction and less effective. On the other hand, Kahn (2021) strongly recommended adaptation as a better way of involving human engagement, which is more proactive. Therefore, this literature review focuses on insurers' adaptation practices to build their resilience and longevity. The three categories of the adaptation practice were reviewed and evaluated in the following subsections.

Climate Change Advocate

The authors define that an advocate is not just a passive supporter but an active agent of change who publicly champions and recommends a cause or policy. They are willing to take clear and bold actions to promote positive advancement towards their goals. In the context of climate change, it has become increasingly crucial for industries like insurance that stand at the front line of environmental impact to lead by example as advocates for sustainability (Debus & Himmelrath, 2022). Table 3 summarises the codes of the insurers' climate activities, key practices, and associated peer-reviewed articles for climate change advocates.

Table 3: Climate Change Advocate – Codes Summarised from the Reviewed Literature

INSURER CLIMATE ACTIVITIES	KEY PRACTICES	ARTICLES
Building awareness and participating in public policy	Including climate change as a topic in debates in parliament	Debus & Himmelrath (2022)
	Compelling insurers to share their climate risk information with the government and policymakers	Surminski et al. (2022); Lucas et al. (2021)
	Increasing public awareness about such action	
Promoting loss prevention	Promoting agricultural insurance products in mitigating climate losses	Wang et al. (2022)
	Introducing a crop insurance policy to mitigate losses in case of natural disasters	Wang et al. (2021)
Leading by example	Integrating adaptation measures in business operations	Gatzert et al. (2020)
	Changing processes and decision-making frameworks and adopting responsible management approaches	Sato & Seki (2010)

INSURER CLIMATE ACTIVITIES	KEY PRACTICES	ARTICLES
Investment in climate change solutions	Investing in companies that are aligned with the insurance company's ESG principles	Mittal et al. (2021); Braun et al. (2019)
	Increasing business development increases the company's carbon dioxide (CO ₂) emissions	Isaac & Acheampong (2021)
Climate risk disclosure	Providing comprehensive climate risk knowledge to assist enterprise clients and householders in making the best informative decision	Surminski et al. (2022); Stechemesser et al. (2015); Lucas et al. (2021)
New code: Incorporating ESG agenda	Adapting ESG agendas in support of the UN's SDGs	Stricker et al. (2022)
	Including ESG agenda as part of the insurance company's branding and marketing strategy	Brogi et al. (2022); Kushwah & Mathur (2022)

Note. Table generated by Mendoza. Own work.

The top five codes were kept from Mills' (2009) study, which suggests that engaging in governmental policies (Debus & Himmelrath, 2022; Jiang et al., 2023; Surminski et al., 2022), advertising on loss prevention (Wang et al., 2022; Wang et al., 2021), promoting exemplars (Gatzert et al., 2020; Sato & Seki, 2010), investments in solutions and disclosing climate risks (Braun et al., 2019; Isaac & Acheampong, 2021; Mittal et al., 2021) are still prevalent practice for the insurance industry. A new code, incorporating the ESG agenda (Brogi et al., 2022; Kushwah & Mathur, 2022; Stricker et al., 2022), emerged from the later research. The United Nations (UN) played a critical role in initiating and influencing ESG development (Korcheva, 2022).

Despite a slow transformation, the insurance industry has recently adopted ESG agendas supporting the UN's sustainable development goals (SDGs) (Stricker et al., 2022). This change has been met with hesitation due to concerns about additional expenses associated with supporting sustainability initiatives. However, recent studies such as those conducted by Brogi et al. (2022) and Kushwah & Mathur (2022) have demonstrated that an ESG agenda positively impacts insurance industry. These studies highlight how the insurance companies with clear and well-defined ESG agendas are perceived as more trustworthy by the public than those without such policies. Moreover, using an ESG agenda as part of the insurance company's brand and marketing strategies can attract new customers who value reliability and security for themselves and their beneficiaries (Kushwah & Mathur, 2022).

Mittal et al. (2021) highlighted that many insurance companies incorporate ESG factors into their investment decision-making processes. These insurers choose to invest in firms that align with ESG principles and actively advocate for climate change mitigation efforts. Such a mutually beneficial relationship allows them to advance sustainable practices while ensuring long-term profitability simultaneously. However, Braun et al. (2019) challenged this assertion and suggested no definitive evidence linking an insurer's greenhouse gas emissions contribution or reputation with its investment portfolio's overall performance concerning sustainability metrics. Moreover, Isaac and Acheampong (2021) revealed a concerning correlation between development in the insurance industry and CO₂ emissions. According to their findings, every 10% increase in the insurance industry results in a 2% rise in CO₂ emissions (Isaac & Acheampong, 2021). This statistic is alarming, given that CO₂ is known as one of the primary greenhouse gases contributing to global warming.

Surminski et al. (2022) critique that some insurers hesitate to disclose climate risk data on the barriers to effective adaptation to climate change. A collaboration between parties with transparent sharing of climate risk knowledge needs to be established. Climatic information rewards programmes should be encouraged. Stechemesser et al. (2015) delve into climate risk information and its relationship with financial growth in greater depth. They provide compelling evidence that acquiring and utilising this type of information can have long-term benefits that far outweigh any initial costs organisations incur (Stechemesser et al., 2015).

Conversely, Lucas et al.'s. (2021) recent research highlights a possible need for improvement in realising these benefits. Even if individuals can access climate risk information, they may still need action, such as purchasing insurance coverage. According to the authors' findings, willingness-to-pay (WTP) is a crucial factor driving consumer behaviour when purchasing insurance, highlighting an area where insurers might focus their efforts if they hope to better capitalise on the value of climate risk data. Albeit contrasting, these two articles emphasise the importance of providing climate risk information and understanding how people will react to it to ensure the benefits are realised.

Furthermore, the reviewed articles implied that insurance companies hold a view that policymakers and regulators are powerful influencers in promoting insurance policies for climate change (Debus & Himmelrath, 2022; Jiang et al., 2023; Surminski et al., 2022). As a result, insurance companies lobbying policymakers will remain for the long term. Nevertheless, policymakers and regulators are the supervision authority that monitor insurance companies' adherence to environmental standards, enforce greater transparency and ensure the insurance industry's accountability.

Risk Management Expert

The insurance industry is critical in managing risks, particularly climate change-related ones. It is the largest aggregator of such risks (Stechemesser et al., 2015; Surminski et al., 2022). It possesses a vast wealth of information on mitigating them through its comprehensive data collection from each policy and claim (Zulfiqar et al., 2020). Thus, the industry is uniquely positioned to leverage this knowledge towards developing enterprise risk management strategies that can effectively combat climate-induced perils (Botzen & van den Bergh, 2009). Treating climate change as an enterprise risk management issue could give insurers a holistic approach to identifying, assessing and mitigating risks. Therefore, the three codes of risk management activities remain in insurers' latest practice, and no code was removed from the ones specified in Mills' (2009) study. Engaging in enterprise risk management is a new type of activities emerged from the late studies (Stechemesser et al., 2015; Surminski et al., 2022).

Table 4: Risk Management Expert – Codes Summarised from the Reviewed Literature

INSURER CLIMATE ACTIVITIES	KEY PRACTICES	ARTICLES
Aligning terms and conditions with risk-reducing behaviour	Collecting data from underwritten policies, filed and paid claims for effective risk management	Zulfiqar et al. (2020)
	Including management accounting as a source of information for the insurance company's risk management	Ivanovna et al. (2018)
Financing climate-protection improvements	Developing a loss-sharing disaster financing scheme for flood risks	Jongman et al. (2014)
	Risk Sharing Arrangements for public sector flood risk	Unterberger et al. (2019)
	Developing risk insurance facility for disaster risk reduction	Thirawat et al., (2017)
Offering carbon risk management and carbon reduction services	agricultural insurance incorporating favourable coverage on the adoption of low-carbon technologies	Jiang et al. (2023)
New code: Tailoring risk measurements for enterprise risk management	Providing comprehensive risk knowledge to assist Enterprise clients in making the best informative decision	Surminski et al. (2022)
	using seven categories of adaptation measures associated with three dynamic capability dimensions of climate change adaptation	Stechemesser et al. (2015)

Note. Table generated by Mendoza. Own work.

To truly establish itself as an expert in risk management, however, the insurance industry must proactively align its terms and conditions with climate risk reductions. Zulfiqar et al. (2020) and Ivanovna et al. (2018) investigated the collection of underwritten policies, paid claims and management accounting information for effective risk policy design. Such activity may be transformed from that defined in Mills (2009) study, which is similar to the category. The second essential role, financing climate-protection improvements, evolved to developing risk-sharing arrangements or schemes for mitigating disaster risks at a national or international level. All these risk-sharing arrangements or schemes were proven to have long-term benefits but similarly increasing costs for the insurance clients (Jongman et al., 2014; Thirawat et al., 2017; Unterberger et al., 2019). Jiang et al's. (2023) study is a typical example of carbon reduction services provided to Chinese farmers. In a similar vein, the above four studies alleged the necessity of government support to promote their investigation of insurance services and schemes. An extension of risk management schemes is the insurers' focus to include enterprise clients, due to the significant role of these clients in climate change, with more emphasis on providing extensive risk knowledge and developing adaptation measurements for enterprise clients (Stechemesser et al., 2015; Surminski et al., 2022).

Risk management expertise remains the primary adaptation role for insurance companies. The findings suggest that insurers or their employed researchers endeavour to develop insurance products to cover the growing climate risks and actively engage in lobbying their governments for support. Fortunately, in recent years, various industries have made significant advancements towards finding ways to address this urgent global concern. Among these players is the insurance industry which has taken proactive measures to develop innovative products to help bridge the widening protection gap caused by increasingly unpredictable and extreme weather conditions (Stricker et al., 2022).

Innovative Solutions Provider

Given the enormity of the issue at hand, namely climate change, it has become imperative for a pivotal player to emerge as a practical solutions provider. By creating insurance policies that better assess and address climate-related hazards, the insurance industry was found in playing a crucial role to help individuals and businesses become more resilient to the challenges brought forth by climate change (Stricker et al., 2022). Moreover, as supporters of mitigative and adaptive actions towards climate change, insurance companies can shift their focus from transactional engagements to more consultative approaches (Stricker et al., 2022). Table 5 summarises the main activities and key practices that insurers profiled as innovative solutions providers adopted.

Table 5: Innovative Solutions Provider – Codes Summarised from the Reviewed Literature

INSURER CLIMATE ACTIVITIES	KEY PRACTICES	ARTICLES
Crafting innovative insurance products and services	Developing innovative products	Stricker et al. (2022)
	Reintroducing crop insurance policy to protect farmers	
	Purchasing parametric insurance instead of the traditional indemnity-based insurance	Miquelluti et al. (2022)
New code: Repackaging insurance products and services with flexible premium or subsidy schemes	Incorporating artificial intelligence and machine learning into risk management models	Bakošová (2022)
	Including a subsidy system in the natural disaster coverage insurance model.	
	Giving tax breaks for properties in high-risk regions and lower premium rates for properties in lower-risk regions	Kalfin et al. (2022)
	Repackaging property insurance with risk-based pricing	Standohar-Alfano et al. (2017)

Note. Table generated by Mendoza. Own work.

Crop insurance is a critical tool that can safeguard farmers’ income when their crops are affected by natural disasters. Developed in the 1930s, this protective mechanism has been proven to be highly effective in protecting agricultural incomes, according to an article authored by Miquelluti et al. (2022). Although available for several decades, crop insurance’s market size will grow and reach USD 61.30 billion by 2030. The increasing of the Earth’s temperature could contribute significantly towards the growth of the agricultural insurance industry over time up until 2030. However, recent research by Wang et al. (2021) highlights an issue with the current crop insurance system that may have unforeseen consequences. Some farmers must be more competent to take proactive measures against climate change and other environmental risks and not overly feel secure in their coverage under existing crop insurance policies. Ultimately, while it remains essential for policymakers and stakeholders to continue to provide crop insurance as a critical means of disaster recovery for farmers, the research shows that additional measures may be needed to incentivise proactive climate mitigation measures among farmers.

Miquelluti et al. (2022) provided an alternative solution to address weather-related issues presented with parametric or index-based insurance. The paper further suggests that insurers can offer a non-traditional indemnity policy based on a weather index to protect policyholders against losses caused by natural calamities such as floods and hurricanes. This innovative approach entails paying out a pre-determined amount triggered solely by event magnitude rather than assessing actual losses, which traditional indemnity policies do. The benefit of this product is how claims are settled. Payouts are faster since it does not need a damage inspection Miquelluti et al., 2022).

Similarly, a study by Standohar-Alfano et al. (2017) explored climate change’s impact on property insurance availability and affordability in the USA, focusing on wind-related property insurance in Florida. The paper identified the effects of climate change on property values as a critical concern for the industry. In response to these challenges, the insurance industry has implemented strategies such as risk-based pricing, limiting coverage in high-risk areas, and introducing new coverage options, such as parametric insurance (Standohar-Alfano et al., 2017).

Another alternative insurance solution that can be crucial in adapting to climate change is packaging the disaster insurance product with a subsidy programme granted by the government (Jiang et al., 2023; Kalfin et al., 2022). Considering Indonesia’s unique geographical conditions, Kalfin et al. (2022) conducted an extensive study exploring how natural disaster insurance could be instrumental in supporting the country’s resilience against catastrophic events caused by extreme weather patterns and other environmental factors. The research highlighted the importance of integrating an assistance system into the insurance model the government would grant, considering various pricing mechanisms based on the potential severity of natural disasters in a specific area. Properties located in high-risk zones would receive tax breaks from the government on their insurance premiums, while those in low-risk regions would benefit from reduced subsidies. This approach aims to promote fairness across social classes and incentivises insurers and policyholders amid mounting fears about the impacts of climate change (Kalfin et al., 2022).

Moreover, the paper by Bakošová (2022) suggests that incorporating advanced technologies such as Artificial Intelligence and Machine Learning into existing risk management models can provide more accurate risk assessments by analysing large volumes of data, leading to better pricing, underwriting decisions and more efficient claims settlements.

All the above findings highlight that the insurance industry’s response to climate change has been varied and nuanced, with different strategies implemented in other contexts.

CONCLUSION

Over the years, the insurance industry has significantly changed how it responds to climate change, which has been thoroughly analysed in various articles. What stands out is the crucial role policymakers and regulators play in shaping the future course of this industry. They have an enormous responsibility for working alongside climate change advocates to create policies that ensure insurers and their government adopt measures for climate change adaptation. In addition, collaboration among policymakers and regulators and risk management experts is imperative for effective risk mitigation planning that benefits individuals and businesses. Furthermore, working closely with solutions providers becomes necessary to develop innovative products within budgetary constraints, a critical component when attempting widespread disaster recovery support post-catastrophe events such as hurricanes or earthquakes.

To summarise, while these responses bring positive developments within the insurance industry's ecosystem, it will only realise its full potential through the engagement of policymakers and regulators in promoting climate change adaptation measures and working closely with risk management experts and solutions providers to develop innovative products. This collaborative effort is vital to ensure that the insurance industry is equipped to respond efficiently and effectively to climate change impacts while fostering sustainable development for all.

The research contributes to the literature with the typology of insurers' adaptations to climate change. The focus is constrained to the insurance industry's adaptation practices studied and published in the journal articles reviewed. Such a constraint and the scope of the article selection might limit the trustworthiness of the research findings. However, the limitations were mitigated by identifying the best representable articles from the bibliometrics analysis and careful manual scrutinisation of the articles.

There is a concern about the jurisdiction's influence on the insurance industry's adaptation practices (i.e., different countries have different guidelines, legislation, and political agendas to favour or limit adaptations to better respond to climate change). Since the research findings were scoped to be silent in this regard, future research could further investigate country differences in relation to how the political, legislative, and economic conditions impact their insurance industry's adaptation practice.

Furthermore, this research did not conduct a stakeholder analysis for a more subtle understanding of each different stakeholder's role in this research context. It would be recommended in future to conduct primary research in order to investigate how the insurance industry's adaptations impact or may be impacted by local or central government, brokers/agents, customers, and local communities in addition to insurance companies.

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WHAT A WASTE!

AN EXPLORATORY STUDY OF THE FOOD WASTE MANAGEMENT IN THE MEAL-KIT INDUSTRY IN NEW ZEALAND.

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ABSTRACT

Food waste is not only a financial and environmental issue but also a social problem. Billions of tons of food are thrown away while millions of people go hungry worldwide and it is costing billions of dollars in losses for businesses in the industry and causing harmful effects to the environment. The meal-kit industry is pushing to eliminate food waste through their business strategy of providing pre-portioned and pre-packed meals to their customers and by shortening the food supply chain using the farm-to-table method. This research examined the status of food waste in their production warehouses and reviewed the food waste management practices within the industry using Root cause analysis tools, supported by industry and internet research. Data gathered shows that there is indeed food wastage occurring within these meal-kit production warehouses. The main factors identified which were contributing to food waste include the low quality of products and ingredients being packed, problems with packaging and labelling, errors by packing employees, and poor inventory management. The research recommends several measures and steps to resolve the identified problems, including the repairing and upgrading of the equipment in the meal-kit production warehouse, the introduction of training for employees regarding food rejections and quality control as well as review of the non-compliant suppliers. In addition, rejected food can be donated to employees or charity organisations, in accordance with the Food Act 2014, thereby creating a new sustainable business strategy that uses imperfect or slightly damaged products, that they can market at a lower price range.

Keywords: food waste, waste management, meal-kit industry, food warehouse practices, warehouse management, inventory management

INTRODUCTION

The meal-kit industry provides a food subscription service that delivers prepacked restaurant-level meals with easy-to-follow recipes directly to their customers' doorsteps (Mate, 2021). It is a business model that revolves around giving customers an easy and convenient way to prepare healthy home-cooked meals by putting together fresh and organic ingredients for various recipes, including vegetarian options, and delivering them directly to their customers. The meal-kits are delivered in boxes containing ingredients placed separately in paper bags according to their respective recipes. On the other hand, meats and other products that need to be insulated are placed in a cool pouch with ice packs to keep the temperature low. Lastly, recipe cards are included which contain instructions for food storage, preparation, and cooking. Meal-kits had a boost in their orders and customer subscriptions during the Corona virus disease (COVID-19) pandemic as people were at home and in lockdown, which made it more appealing to order online and avoid the hassle of going out to the supermarket to line up as per the COVID-19 mandatory restrictions. It was also a more popular option since many restaurants were closed due to the COVID-19 restrictions (MarketLine, 2021).

The mission of the meal-kit industry companies is to "change the way people eat" (HelloFresh, 2023) using four main pillars including budget, health, taste, and sustainability. The industry's goal is to give its customers access to high-quality food and various tasty recipes without breaking the bank. It also promotes sustainability and less food waste by supplying ingredients that are all pre-portioned into packets or sachets to ensure that all ingredients and products are consumed (Duffy, 2023). Moreover, meal-kit companies utilise carbon dioxide (CO₂) neutral delivery methods which reduces the amounts of greenhouse gases into the atmosphere (Levin, 2019).

Food waste is defined by the United Nations Environmental Programme (UNEP) (2021) as products that have gone through the food supply chain and are acceptable for consumption but are thrown away or discarded. It is considered a financial,

environmental, and social issue as it results in revenue losses for food businesses as well as destruction of land and water resources and an increase of greenhouse gases released into the atmosphere (Sood, 2022). Furthermore, global hunger is continually on the rise despite having a surplus of food supply with most of it being thrown away (FAO, 2023). The information and data from this research will be valuable for the meal-kit industry to help them improve their sustainability methods and business model to achieve their environmental, social and governance (ESG) goals, but also benefit humanity.

LITERATURE REVIEW

According to the UNEP (2021) Food Waste Index Report for 2021 shows that 1.3 billion tons of food is wasted yearly and yet, the World Health Organization (WHO) (2021) estimates that there are 690 million people who are hungry and undernourished. Food waste is defined as food products that go through the complete supply chain cycle and are of acceptable quality but are not consumed (UNEP, 2021). The effects of food waste go beyond throwing away food that could feed the hungry, it also has a negative effect on the environment as food discarded into landfills emit greenhouse gases which are harmful to the environment and exacerbate climate change (Love Food Hate Waste, 2021). In addition, according to the Food and Agriculture Operations of the United Nations (FAO), other negative effects of food waste include squandering all the resources used in the different stages of the supply chain such as land, freshwater, and petrol for transportation (Levin, 2019).

The fundamental aspect of sustainability within meal-kit companies is to reduce food waste at home by providing pre-measured, pre-packed, and pre-planned meal-kits which ensures that all ingredients and products are used and there would be little to no leftovers (Safdie, 2023). Their business model revolves around reducing food waste within their customers' households (MarketLine, 2021), but it would be interesting to look at what is going on in their backyard, the production warehouses, where the meal-kit boxes are packed and manufactured. As an example, according to the HelloFresh sustainability report, in 2021, they donated over 10,000 fresh edible unsold food products to charity, which accounts for 68% of the total surplus food (HelloFresh Group, 2023). Considering that the meal-kit companies have several packaging facilities worldwide, this means that these facilities are each producing approximately 1% food waste which could pose a risk to the food waste reduction and sustainability efforts of the industry thus it is in the best interest of meal-kit companies to manage and resolve this issue.

Root cause analysis (RCA) tools and management concepts were used to gather baseline data and identify issues or concerns within or which the meal-kit companies is facing. This research used brainstorming with peers to gather all possible ideas and opinions regarding the topic. The information gathered was then organised into different categories using a fishbone diagram to give a clearer picture of the issue at hand (Tableau, 2023). Lastly, a strength, weaknesses, opportunities, and threats analysis (SWOT) was conducted to identify areas that the meal-kit company needs to focus on and to verify if the details gathered using the RCA tools were accurate (Business Research Methodology, 2023). On the other hand, the management concepts such as the 3Cs (company, customers, competition) allowed the researcher an opportunity to conduct an in-depth analysis of the three key factors that are associated with business success (Ōmae, 2007). The use of the 3Cs framework provided valuable information on the companies within the meal-kit industry, their customers and their competition which could be used to ensure the viability and sustainability of the meal-kit industry. Another management framework the researcher used is Henri Fayol's 14 Principles of Management (Carter & Fayol, 1986), which focused on fair remuneration, order, and stability of tenure and how each is relevant to food waste management within the meal-kit industry. The selection of the RCA tools and management concepts for this research as well as how each tool was used in relation to food waste management and is explained further in the results and analysis section.

METHODOLOGY

The data collection methods utilised for this research were observations and internet research both used to gather primary data and secondary data. Observation is a research method that involves collecting data by studying and noting down the behaviours of individuals within their natural setting (Allen, 2017). On the other hand, internet research is a data collection method using information found online from reliable resources such as academic journals, articles, reports, and statistics (Macdonald, 2023). The data gathered was then collated and analysed using quantitative methods such as tables and figures for the information gathered from observations as well as qualitative methods such as narrative analysis for the data from online sources (Dawson, 2009).

The researcher chose the observation method as she was an employee of a meal-kit company and this data collection method gave a first hand experiences of the identified issues and challenges. The researcher was able to observe and study the production processes in the different assembly lines within the meal-kit production facility. The various roles within the meal-kit company also gave the researcher a broader insight into the various circumstances and challenges occurring during the stages of production. The data gathered was limited to observable behaviour and procedures occurring within the meal-kit company's packaging warehouse facility during the work shift of Fridays and Saturdays, 2:15 p.m. to 10:00 p.m. The observation period covered a total of six (6) evening shifts over three (3) weeks.

Online resources were used to gather information on food waste and food waste management within the meal-kit industry in New Zealand as well as global conditions to create a baseline data. The researcher also reviewed research studies and recommendations by scientists and experts using internet research, on sustainability and how to minimise food waste.

Ethical Consideration

The researcher followed strict ethical standards to ensure the safety and privacy of all stakeholders. The research does not include any names or personal details of any participant and the information about the meal-kit industry has been taken

from the company websites and has been referenced. The research included observation of processes and behaviours towards sustainability initiatives of the employees in the meal-kit production line, but no participants were invited to take part in any formal or informal interviews. The documents observed have been highlighted for the data analysis without the company or location details. Furthermore, the research only used publicly available company information, no classified document was used (Dawson, 2009).

Limitations

This research was limited in terms of the following variables, time constraints, limited access to internal information, data collection methods, sample bias, and scope of discussion. Resources in terms of the labour force, funding and data were restricted as this was student-led academic research which can only utilise the information that was publicly available and there was no financial support available. In line with this, time was also limited as there was a schedule that had to be followed for paper submissions and deadlines. Data gathering was also controlled in that the only participants allowed for interviews or surveys were students from the researchers class or those studying at Otago Polytechnic Auckland International Campus (OPAIC) which created sample bias given that the participants were chosen for convenience due to ethical considerations. Although, it should be noted that the researcher was allowed to use their workplace observations and experience to include in the analysis. Lastly, the scope of discussion is limited by the sparse experience of the researcher on the topic of food waste management thus the analysis would not be as in-depth compared to the works of experienced researchers.

RESULTS AND ANALYSIS

The data gathering using the RCA tools, management concepts, observations and internet research are discussed subsequently.

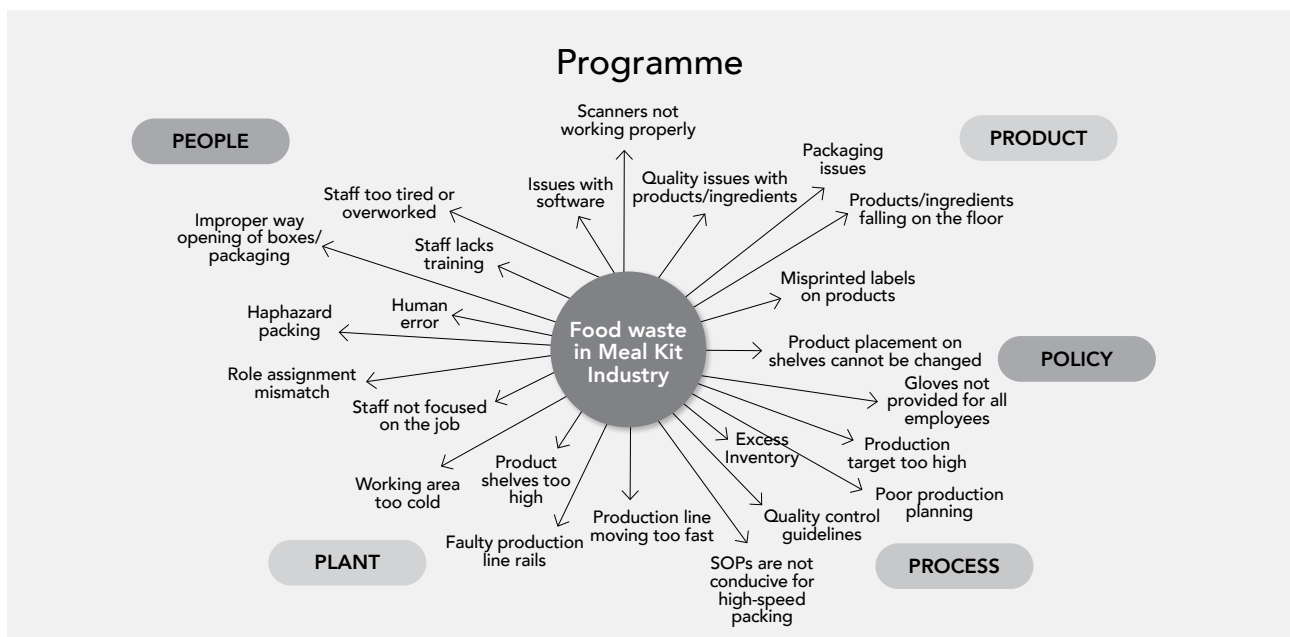
Root Cause Analysis Tools

Brainstorming

Brainstorming is a group problem-solving methodology introduced by Alex Osborn in 1953, and it involves gathering participants and getting them to share their thoughts and ideas related to a particular subject or issue (Besant, 2016; Osborn, 1953). It is critical to encourage the participants to think freely and creatively and make everyone feel that their input will be accepted without judgment and criticism (Gregersen, 2018). An advantage of brainstorming is having different participants with different backgrounds who can offer varying perspectives about a chosen topic thus obtaining diverse points of view regarding the matter at hand.

The brainstorming activity was a tool that helped the researcher gather additional information on the probable causes of food waste within the meal-kit industry as shown in Figure 1 below. The varying points of view and opinions of the participants enabled the gathering of new ideas and perspectives regarding the topic. Given that the researcher was mainly able to observe the production process within the meal-kit packaging facility, the main issues identified were about the employees and the working environment, but the brainstorming activity presented other problems such as those concerning inventory, production planning, hardware, and software trouble.

Figure 1: Brainstorming on the Food Waste in the Meal-Kit Industry



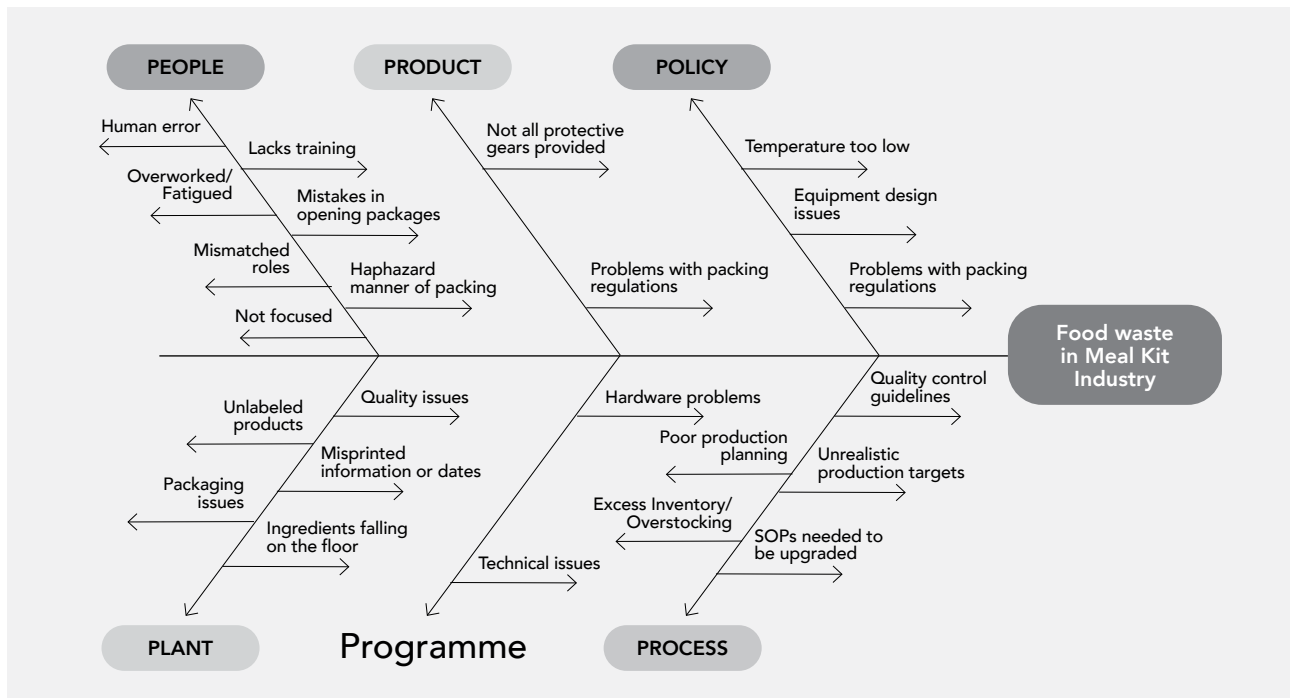
Note: The figure shows all the possible causes for the food waste in the Meal Kit business.

Fishbone Diagram

The Fishbone diagram also known as Ishikawa diagram is a cause-and-effect analysis tool created by Kaoru Ishikawa in the 1960s (Ishikawa, 1976). The diagram is named as such because it resembles a fish bone with the selected topic or problem placed on the rightmost side or the "head of the fish" and the ribs denote the principal classification or categories of the identified root causes. The sub-causes can then branch out from the leading root causes and the spread would depend on the diversity of the identified sources of the problems. The fishbone diagram is useful in identifying the possible causes and sub-causes for a problem. It is also helpful in sorting ideas into categories for a more organized and objective analysis (Ishikawa, 1976).

The fishbone diagram was used to organise the ideas from the brainstorming activity into six categories to make it easier and more convenient to identify the main causes: People, Product, Policy, Programme, Plant, and Process or the 6Ps as shown in Figure 2 below. The data in Figure 2 shows that food waste is associated with three groups which are people, product, and process. The employees working at the meal-kit packaging facilities are mostly in charge of handling the food and putting it in bags or boxes, thus they are an important aspect of the production process. Their overall physical and mental state as well as their training are factors that affect the amount of food waste during production. On the other hand, the quality and condition of the ingredients being packed are other elements that can influence the amount of food wastage. Lastly, processes in place at the meal-kit packaging facility such as production targets and inventory also greatly impacted on the amount of food waste, such as the overstocking of perishable goods. These subjects will be the three main focuses of the discussion.

Figure 2: Fishbone Diagram (6Ps) Used to Analyse Food Waste Issues in the Meal-Kit Industry from the Outcomes of Brainstorming as the guiding points



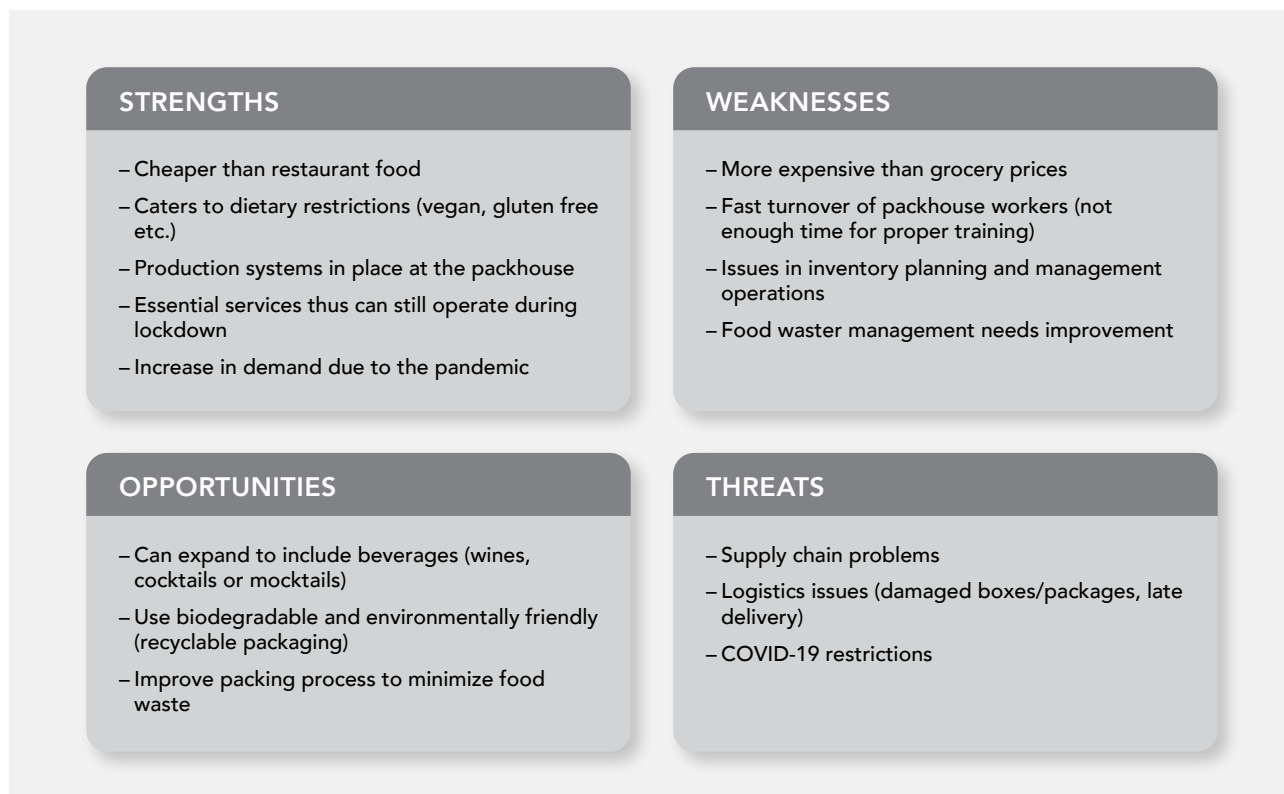
Note: The Figure 2 above shows the mapping of the possible causes on the 6Ps on a Fishbone Diagram. The possible causes from the Brainstorming ideas from Figure 1 have been used.

STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS ANALYSIS

A SWOT analysis is a strategic analysis and planning tool that summarises the strengths, weaknesses, opportunities and threats within a company (Schooley, 2019). The strengths describe internal factors that the company is doing well or their practices which are successful, while the weaknesses are also internal elements that the company is lacking, these are the identified areas for improvement. On the other hand, opportunities are external aspects which could be advantageous for the company and threats are also external components that could be potential risks for growth or success (Schooley, 2019).

The SWOT analysis results produced a baseline assessment for the meal-kit industry as shown in Figure 3 below. It provided a picture of what the meal-kit industry was doing right and what areas needed improvement. In addition, it also lists the elements that could be used to leverage success and those that could disrupt its future growth and viability. This research will focus on the identified weaknesses and opportunities for the meal-kit industry in New Zealand, this includes issues and complications within the meal-kit packaging facilities, which results in food wastage such as problems in inventory and the production processes.

Figure 3: SWOT Analysis for the Meal-Kit Industry



Note: The figure shows the application of the Strength, Weaknesses, Opportunities and Threats for the Meal Kit Industry which has been use to map the strategic position of the meal kit business.

Management Concepts

3Cs (Company, Customers, Competition)

The 3Cs is a strategic management concept focused on three key factors for business sustainability: company, customers, and competition (Ohmae, 1982). It is crucial to incorporate these three elements to ensure a successful business strategy and help a company maintain a competitive advantage. The model was created by Kenichi Ohmae, a Japanese management consultant and organisational theorist to aid in long-term and short-term strategic planning for companies (Ohmae, 1982). The 3Cs framework for the meal-kit industry is discussed below.

Company

The mission of the meal-kit industry is to change the way people eat by providing convenient and healthy options within budget (Duffy, 2023; Mate, 2021). They offer prepacked ingredients and seasonings with recipe cards delivered to customers to make cooking quick and easy (MarketLine, 2021). The meals can be customised depending on the number of people consuming the food as well as their dietary requirements and taste preferences (Mate, 2021).

Customers

The demographics of the target market of the meal-kit industry are customers between the ages of 30 and 50 who are mainly working full-time, young professionals and families where both parents are employed. These are customers with a hectic lifestyle who do not have enough time for grocery shopping and preparing everyday meals. They are also the group who have extra income which can be allotted to meal subscription services (Gitnux, 2023).

Competition

Over the past years, there has been an increasing demand for meal-kit delivery services worldwide. The convenience of having ready-to-cook meals on your doorstep with just the click of a button has been appealing for a segment of the market (Gitnux, 2023). The main competitors in the meal-kit industry in New Zealand include World on Our Plate (WOOP), HelloFresh, MyFoodBag, and FoodBox among some other small players (Junn, 2021). All these meal-kit companies offer similar meal-kit delivery services with varying recipe selections and offerings as well as slight price differences. In addition, MyFoodBag uses packaging that is more environmentally friendly such as paper sachets and wrappers although relative to other meal-kit providers, HelloFresh uses fewer plastic containers and there is room for improvement in this aspect in order

to provide better environmental sustainability. WOOP on the other hand produces the least amount of waste during meal preparation, has packaging materials suitable for kerbside recycling and lets the customer return the packaging with the next order which is recycled after sanitisation (Junn, 2021).

Henri Fayol's 14 Principles of Management

The 14 Principles of Management were developed by Henri Fayol who is recognized as the father of scientific and modern management (Fayol, 1917). Managers use this tool as a guide in the decision-making process, to improve their management practices, and to help improve the motivation of their employees (Rodrigues, 2001). Of the fourteen principles, the research will mainly focus on three principles: remuneration, order, and stability of tenure.

Fair Remuneration

Work compensation, which can be monetary such as salary and pay or non-monetary like compliments or credits, are some of the identified motivators for productivity (Bacud, 2020). In the meal-kit industry, the pay rate per hour of the employees would vary depending on their assigned job and the amount of manual labour involved, although there is not much difference between the pay rates, approximately \$1 per hour. The team leaders would also encourage the employees to motivate them to work faster to reach the quota for the shift. The pay rate within the industry is generally above minimum wage but for some employees, this is not enough to cover the high cost of living in New Zealand.

Order

The concept of order in the workplace can be classified into material order which is concerned with the arrangement of equipment and social order which involves the appropriate roles and resources (Juneja, 2023). The meal-kit company's meal-kit production facility is systematically organised with each production area allotted its own space. Although in the meal-kit company observed, some of the equipment was damaged and needs repairing or upgrading. An example of worn-out equipment is the rail system in the production line, which makes it difficult for the employees to push the boxes along the line as some of the boxes get stuck in broken areas. This in turn disrupts the production process and can cause the employee to lose focus. On the other hand, the social order in some of the meal-kit production warehouses could use some improvement as the roles would change daily depending on who is present during the shift. The line leaders also shuffle employees around if they observe that they are not performing well in a particular assigned task, although this eventually helps speed up the production work it can also cause disruption at the start as employees are pulled in and out of the production line.

Stability of Tenure

Tenure is defined as having a permanent position within an organisation or company, and means employees having job security in their place of employment (Cambridge Dictionary, 2023). In terms of Fayol's management principle, this concept is associated with having higher retention rates for employees, thus less time and money is allocated for recruitment and training (Juneja, 2023). Based on my observations, the majority of the employees in the meal-kit companies are hired on a contractual basis with the majority outsourced from employment agencies offering temporary jobs and there are only a handful of full-time permanent employees who are directly hired. Thus, the rate of employee replacement is quite high at the production plant, which means that new employees are hired on a regular basis and the induction for the job is quite brief and lacking.

OBSERVATIONS

Amount of Food Wastage

Table 1 below shows the kind of food products and the corresponding amount which were disposed of in the enviro-waste bins located in the production area. Food inside these enviro-waste bins is discarded or thrown away during an evening work shift which is a total of 7.5 hours. Food waste includes vegetables, fruits, herbs, canned goods, sauces, spice blends, meat and dairy products. Looking at the number of pieces of food rejected and disposed of, one can conclude that the amount is not big, but it is still significant considering there are two shifts in a day and production is ongoing six days a week and this is only one meal-kit production facility out of the fourteen company currently operates in New Zealand. Adding up all the daily wastage within this meal-kit company increases dramatically the total amount of food waste across this New Zealand meal-kit company. These figures serve as an example of the food being wasted typically while preparing the meal-kits.

Table 1 below also shows the number of pieces/packages rejected of the raw ingredient while completing a quality check and not used in the meal-kit preparation and the explanations of the reasons are as follow:

Legend 1 (Quality): The quality of the ingredient does not meet the specifications or standards in terms of freshness, blemishes, or size as per the purchase specifications.

Legend 2 (Packaging): The size of the ingredient is either too large or too small and cannot be used as per the recipe being prepared for the meal-kit.

Legend 3 (Human Error): Indicates the rejection reason is due to a human error and includes dropping the product to the floor, cross-contamination possibility, dropping on the floor or any such error which does not correspond to Legend 1 and Legend 2 and is the result of carelessness while handling the ingredients.

Legend 4 (Combination of Quality/Packaging or Quality/Human Error): Indicates a combination of the above described Legends

A combination of the above legends were used for documentation and training purpose and have been captured in the below table accordingly.

Table 1: List of Wasted Products and Their Corresponding Amount and Reason for Rejection

S NO	FOOD ITEM	NO OF PIECES	REASON FOR REJECTION (LEGENDS)
1	Basil (15 gms)	35	1,2
2	Oregano (10 gms)	22	1,2
3	Coriander (10 gms)	43	1,2
4	Mesculin (30 gms)	40	1,2
5	Spinach (60 gms)	7	1,2
6	Green Chilli	22	1,3
7	Tomato	5	1,3
8	Cauliflower	156	1
9	Capsicum (Red)	96	1,3
10	Cucumber	6	1
11	Carrot	87	1,3
12	Parsnips	16	1,3
13	Potato	177	1
14	Ginger	5	1,3
15	Garlic	350	1
16	Onion (Red)	80	1
17	Lemon	53	1
18	Spices (Various)	55	2
19	Sauce	50	2
20	Rice	8	2
21	Couscous	11	2
22	Cheese (Feta)	9	3
23	Pork	45	1
24	Chicken	30	1
25	Corn (Can)	14	1
26	Tomato Paste	5	1
27	Coconut Milk	36	1

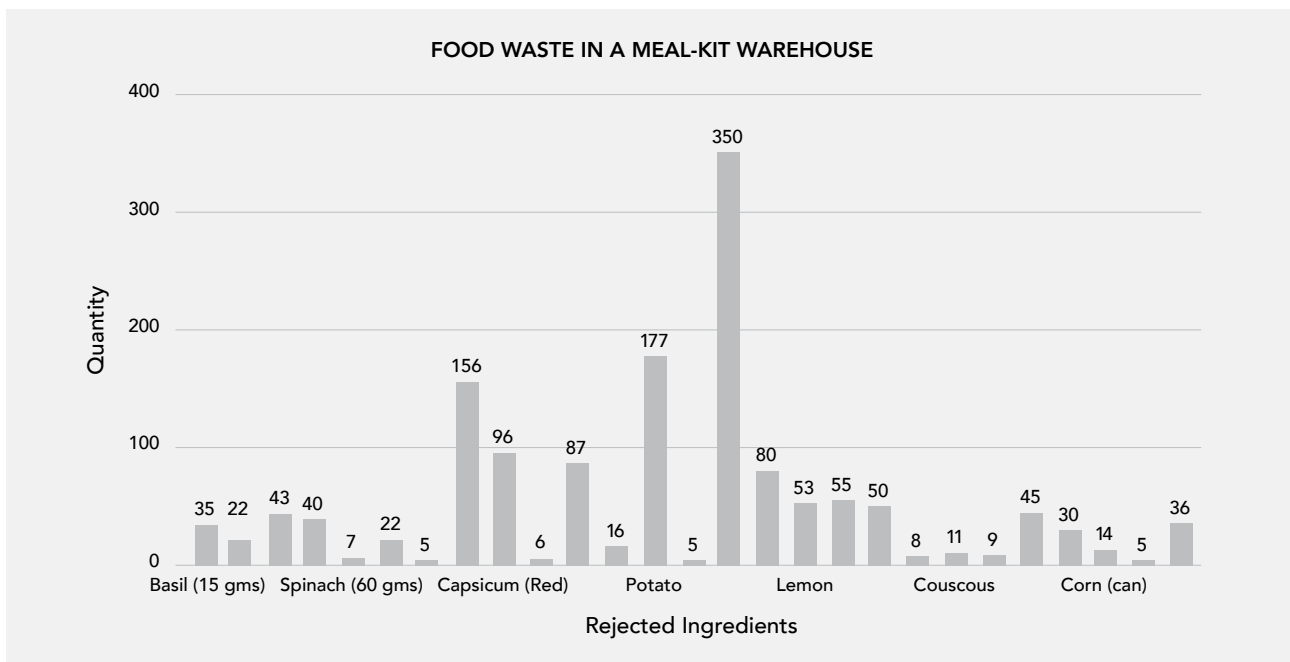
Note. Table generated by Mendoza. Own work.

Reasons for Food Wastage

Table 1 above contains the identified reasons for food wastage which are differentiated by legends assigned to each category. The percentage of each count against the total number of rejected items is also included in the table. The reasons observed for rejecting these ingredients are shown in the last column of Table 1 after the explanations of the legends for reference. The four main factors contributing to food waste include quality, packaging, human error, a combination of either quality or human error or packaging and human error. The last two categories were included to cover all possibilities as there could be instances where the reasons for rejection could not be identified.

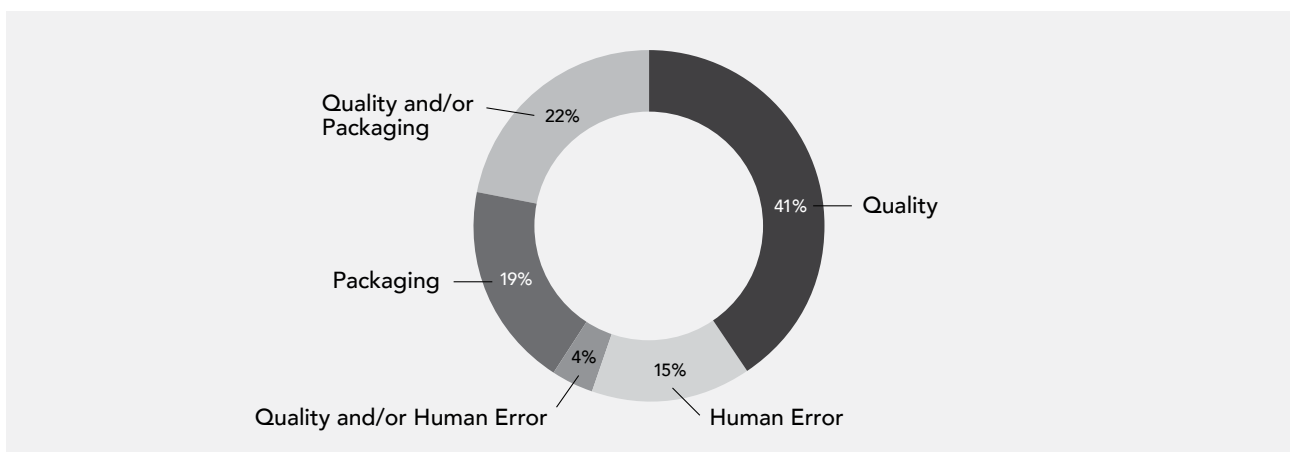
The data on the tables above were converted into Figures 4 and 5 below. Figure 4 shows that the most rejected items are garlic, potatoes, and cauliflowers because of their quality. But it is important to note that the quality of the ingredients might be affected by the seasons. Thus, the items rejected due to quality may vary depending on their availability or the time of the year.

Figure 4: Rejected Products and Corresponding Amount



On the other hand, Figure 5 below shows the main factors affecting food wastage on the production lines at the meal-kit company observed. The largest number of rejections were due to below-par quality of the products and ingredients. The meal-kit company maintains a standard of quality for their meal kits therefore anything that does not pass the quality inspection will be rejected. This is a combination of quality and human error at 21% and packaging and human error at 19%. This means that the products were not included in the meal-kits either because of a combination of substandard quality and the meal-kit production warehouse employees' packing mistakes or issues with packaging and the errors by the packing employees. Lastly, the other reasons identified are focused solely on packaging followed by human error.

Figure 5: Reasons for Food Wastage in a Meal-Kit Warehouse



There are four causes of food waste identified at the meal-kit production warehouse observed. The first is substandard quality of ingredients, for instance, vegetables and fruits that are damaged, rotten, mouldy, wilted, cracked or infected by bugs or cans that are rusty or dented. The second is problems with packaging such as misprinted and incorrectly printed labels, nutritional information and best before or use-by dates. There were also instances where the packages were not sealed properly resulting in spilled ingredients leading to rejections. The third factor identified was human error, that is the meal-kit company employees committing packing mistakes that lead to product rejections and wastage. This also includes ingredients falling on the floor which are thrown straight away into the enviro-waste bins. Human error could also be aggravated by faulty software programmes and broken equipment which makes packing more laborious and challenging for the employees.

Sources of Food Waste

Data was also collected regarding the amount of food donated by meal-kit companies like KiwiHarvest, a charitable organisation that collects perishable goods and distributes them to those in need. Food donations include products and ingredients that have been ordered for the week but have not been used in the meal-kit production facility, in short, these are excess orders. Table 2 below shows a comparison of the amount of food waste from the meal-kit production area, adding up to about 100 crates (bins that are used to carry the ingredients around in the meal-kit production warehouse) per week as compared to the bulk of waste resulting from excess supply, which is a staggering total of 752 crates per week of various ingredients. The majority of food waste comes from excess supply and only a fraction comes from the meal-kit production facility. The issue of over-ordering could be a result of poor inventory management.

Table 2: Sources of Food Waste in a Meal-Kit Warehouse

FOOD WASTE	CRATES PER WEEK	PERCENTAGE
Food waste from production warehouse	97.2	11%
Food waste due to over supply	752	89%
Total	849.2	100%

Note. Table generated by Mendoza. Own work.

Figure 6 below shows the data on Table 2 converted into a pie chart to illustrate the identified sources of food waste.

Figure 6: All Sources of Food Waste



The main reasons for food wastage at the company observed are the poor quality of the ingredients being packed in the production areas and the over-ordering and oversupply of items which accounted for most of the food waste. Although this is put to good use and donated to help those in need, it is still important to address the issue of their inventory management as it is costing them revenue. In addition, the problems regarding the quality of ingredients must also be resolved to be able to reduce food waste and improve food waste management practices at the meal-kit company.

CONCLUSION

There are four leading causes of food waste identified within the meal-kit production facility observed and these include substandard quality of food ingredients, problems with packaging and product labels or information, mistakes by meal-kit

production facility employees and lastly, poor inventory management resulting in over stocking of ingredients or that are left unused, donated to the employees and charity.

The meal-kit industry is on the right track with its sustainability initiatives vis-à-vis the SDGs of the United Nations. However, there is a gap in their food waste management practices that need to be addressed to successfully achieve their sustainability goals. The meal-kit industry should focus on improving its food waste management strategies by addressing the problems with low-quality ingredients from suppliers and finding ways to improve its poor inventory management.

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ENHANCING CHURCH GROWTH USING DESIGN THINKING: A PROPOSAL FOR MOUNTAINSIDE LUTHERAN CHURCH

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ABSTRACT

Mountainside Lutheran Church is one of twelve Lutheran Churches in Auckland under the Lutheran Church of Australia and New Zealand. Between 2017 and 2021, most Lutheran congregations encountered a decrease in regular worshippers. There is an urgent need to develop practical tactics to attract new members while keeping present members and their families within the church. Aho (2021) suggested that Christian Churches embrace Design Thinking as a framework to address problems and stagnation. Design Thinking can help promote a creative atmosphere inside the church and enable members to find new possibilities among themselves. This exploratory study uses the Design Thinking framework and starts by mapping elements related to church growth from different works of literature and local successful churches' experiences. Using this list of elements, a survey was designed to provide an overview of the existing internal resources (including the availability of time, talents, etc.) and willingness for change within Mountainside Lutheran Church. Using this mapping, a list of projects was then proposed to enable Mountainside Lutheran Church to implement with the aim of producing future growth. These findings were also presented to the Parish Council, and Elders group using the Design Thinking framework. Several ministry focus areas were found including:

1. The youth group ministry as the focus to change the church's worship experience.
2. The need to reactivate cell groups and welcoming team to enhance support to families, couples and newcomers.
3. A focus on online ministry to strengthen spiritual support to members and outreach to new generations and different ethnic groups.
4. The development of new creative community services, including childcare and other language classes.
5. The organisation of more fellowship events for friendship among new immigrants.

From here it is suggested that actions should be formulated with the help of the Congregation Life Committee of the church. With the implementation of Design Thinking and the development of continual Design Thinking skills within the church, it is expected that reviews and improvement will help these projects.

INTRODUCTION

Churchgoers are declining despite population growth in wealthy countries (Inglehart, 2021). In New Zealand, traditional church attendance decreased from 43% in 2013 to 37% in 2018 (Figure.nz, 2018; Jones, 2020; McCrindle Research, 2018). The Lutheran Church has only 0.07% of the population as members in New Zealand (Figure.nz, 2018; Lutheran World Federation, 2021). However, according to the Lutheran Church of New Zealand's (2021) 41st Convention Report, the number of Lutherans actively engaging in regular services is significantly lower than the statistic found in the census (Lutheran Church of New Zealand, 2021). The Mountainside Lutheran Church (MSLC) is one of only 12 Lutheran congregations in New Zealand, which combined have 3585 congregation members.

Mountainside Lutheran Church in Auckland serves a diverse congregation, conducting weekly services, baptisms, and Bible study groups (Mountainside Lutheran Church, 2021). Mountainside Lutheran Church has implemented Saturday Bilingual Chinese services for Chinese members, focusing on attracting new attendees while retaining existing ones (Mountainside Lutheran Church, 2021).

As stated in the Book of Reports (Lutheran Church of New Zealand, 2021), almost all Lutheran congregations encountered a decrease in regular worshipers from 2017 to 2021, and only two Parishes among the 12 have more than 100 active members (Lutheran Church of New Zealand, 2021.), MSLC being one of these two parishes. This leads to the research aim, of how to attract new members while keeping present members. The expectation is that this research will assist leaders of MSLC in better understanding the areas that the church should focus on to increase church attendance and where the existing congregation is willing to serve towards this goal through a focus on practical, relevant, and appropriate strategies for the future.

RESEARCH QUESTIONS

The aim was to attract new members to the church utilising the skills and abilities of existing church members and to provide the leaders with practical, relevant, and appropriate strategies for future development.

Therefore, the following research questions were proposed based on the needs of MSLC:

1. What activities and elements are relevant to MSLC to enhance church growth?
2. How can the Design Thinking process be used to plan and develop effective programmes for the church?
3. What are the most effective programmes that can be utilised through the existing resources and talents at MSLC?

LITERATURE REVIEW

A congregation with less than 30% middle-aged adults (over 50 years old) is more likely to grow compared to one with more than 50% (Hadaway, 2011). The number of members between the ages of 18 and 35 also impacts the church's growth, stagnation, or decline (Voas & Watt, 2014). In order to attract young people, the church needs to look at their values, these include credibility, truth, experience, connections, and feelings of necessity in church (Breedt & Niemandt, 2013; Puffer, 2018;). Worship experiences also play a crucial role in attracting and engaging young people (Frisbie, 2016; Poole, 2020).

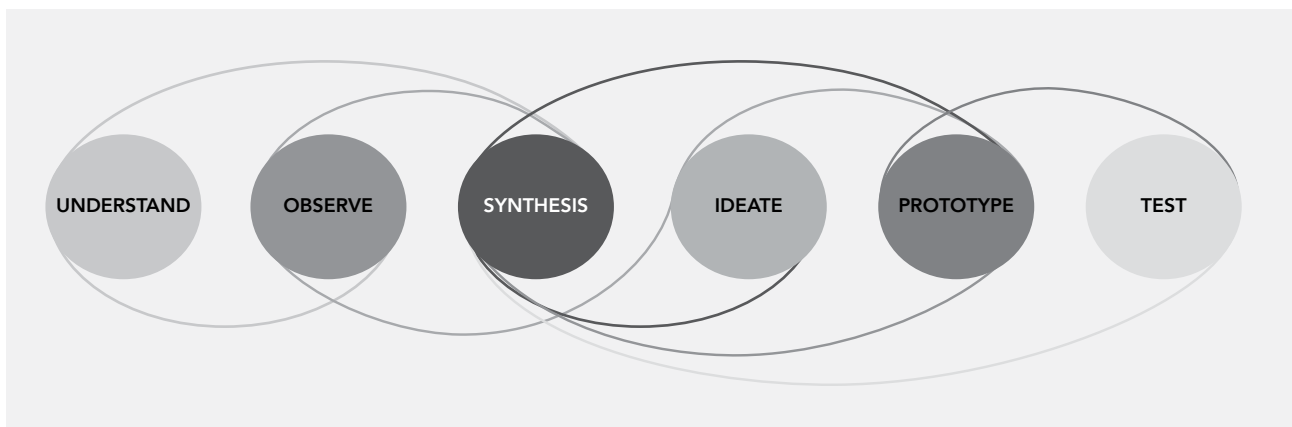
Applying marketing concepts and utilising the Internet can help churches meet the needs of their target market and reach a broader audience (Appah & George, 2017; Ding, 2019; Herring, 2021; Hutchings, 2017; Mork, 2016; Russell, 2016; Smith, 2016). Making a positive first impression on newcomers and implementing systematic admission processes can also contribute to church growth (Frisbie, 2016; McIntosh & Arn, 2013). Enthusiastic and involved church members, along with effective volunteer communication with visitors, are also essential (Ding, 2019; Jackson, 2013).

Members expect support, stability, self-expression, and importance from the church, including care during challenging times (Ding, 2019; Hauerwas, 2019; Warren, 2016). Welcoming attitudes and well-equipped facilities attract newcomers (Ding, 2019; Rainer, 2020; Teasdale & Trefz, 2016), and effective church management and leadership are crucial for ministry effectiveness and growth (Chatira & Mwenje, 2018; Keita, 2019; Puls et al., 2014).

Design Thinking as a Tool to Enhance Church Growth

Design Thinking (DT) was first mentioned by Herbert A. Simon in his book in 1969, and contributed many ideas in the 1970s that are now considered principles of DT (Simon, 1969). It is an agile, non-linear, iterative process used by teams to understand users, challenge assumptions, redefine problems, and create innovative solutions. The process involves five phases: Empathise, Define, Ideate, Prototype, and Test (Leonard, 2021). Design Thinking is particularly effective for addressing ill-defined or unknown problems (Figure 1).

Figure 1: The Design Thinking Process steps by the Hasso-Plattner Institute of Design



Note: From HPI Academy, by Hasso-Plattner Institute, 2018, HPI Academy. Copyright 2018 by HPI Academy.

Jones (2016) echoed Leonard (2021) that traditional churches suffer from the disability of innovation when the world outside the church is rapidly changing. It is therefore helpful for the church to adapt from a human-centred approach to creative problem-solving (Leonard, 2021).

Pearce et al. (2010) found that churches with a high Entrepreneurial Orientation (EO) perform better than their counterparts in attracting and retaining church members. Entrepreneurial Orientation is crucial when management wants to address new opportunities in the market and it refers to the attitudes and behaviours of an organisation, including autonomy, competitive aggressiveness, innovative capacity, proactivity, and willingness to take risks (Sok et al., 2017). According to Lockwood (2010), DT is an approach to problem-solving that puts the focus on the individual and emphasizes observation, teamwork, quick learning, the visualization of ideas, rapid concept prototyping, and concurrent business analysis. Hersleth et al. (2018) further found that EO characteristics were all covered by a different process in DT, as shown in Table 1.

Table 1: Similarities of dimensions of Entrepreneurial Orientation (EO) and Design Thinking (DT)

DIMENSIONS DESCRIBING EO (LUMPKIN AND DESS, 1996)	DIMENSIONS DESCRIBING DT BROWN (2009), CARLGREN ET AL (2016) AND LIEDTKA (2015)
Autonomy	Open minded, user focus, multidisciplinary teams, building confidence in personal creative ability
Innovativeness	Improve innovative performance, creative, design methods
Risk taking	Unknown outcome, experimentation, risk of failure, be optimistic and always believed there is more than one solution
Proactiveness	In-front of, driver for change, act on real customer needs
Competitive Aggressiveness	Go beyond established boundaries, Think outside the box

Note: Reprinted from "Innovation in hard times: Design Thinking for innovating in mature markets," by Hersleth, S. A., Risvik, E., & Gonera, A, 2018, ISPIM Innovation Symposium, p 5. Copyright 2018 by ISPIM.

Aho (2021), therefore, suggested that Christian Churches should embrace DT as the framework to address problems and stagnation. The advantage of DT is that all projects would start with the church members and help promote a creative atmosphere inside the church. As such, DT is uniquely suitable for church innovation development (Aho, 2021), and was used as a foundation for this research.

METHODOLOGY

The research had two stages: a literature review to identify essential elements for church growth and semi-structured interviews with leaders of three growing churches in Auckland. The three churches were chosen as those with increased attendance in the past three years, and interviews were conducted with each church's leaders. Thematic analysis was performed, comparing the findings with the literature review (Maguire et al., 2017). The second stage involved evaluating MSLC resources and members' willingness to commit time to growth activities through a questionnaire provided to 120 active church members.

To understand the church's needs, thoughts, emotions, and motivations, interviews were conducted with pastors and leaders from various committees in MSLC. Review meetings were held with leaders' groups, following which the DT model facilitated iterative loops for evaluation and improvement, resulting in the final proposal presented to the church.

All participants were informed that involvement was voluntary and confidential. Rights were clearly explained in consent forms before the questionnaire or the interviews were completed. Interviews took place in churches, public spaces or online as requested by participants. Participant names are not used, and all leaders' and members' responses were made anonymous.

Approval for the research was obtained from the Research Ethics Committee of Otago Polytechnic Auckland International Campus, ethics number AIC93.

FINDINGS

Interviews with nine external leaders, including pastors, co-workers, and lay leaders from three growing churches in Auckland participated. The responses of nine church leaders from MSLC, including members of the MSLC Parish Council, Elders Group, and Congregation Life Committee were also collected. Their responses were compared with the external church leaders' responses.

Church #1: A New Zealand Church Experience

Church #1 has circa 350 active church members, with around 30% being children. The church has had a steady increase in attendance of 5% per year for the past four years with most growth from the young family demographic.

The church leaders of Church #1 stated that they do not focus much on marketing strategies but rather rely on existing relationships and word-of-mouth to promote events and invite new members. Support for young families, couples, and young adults is a priority, with a large Sunday School programme and youth pastor. Small groups organised by location meet weekly for fellowship, especially targeting recent immigrants. New visitors are personally welcomed and systematically integrated into the church community. Leaders strive to balance strong biblical teaching with reasonable expectations of members. Various services and outreach programmes are offered to establish community connections, including financial courses, life skills, music, dance, and school support. With many ministries, volunteers are crucial. The church has international members from places like the United Kingdom and South Africa and hosts inclusive social events to support them.

Table 2 summarises the interviews themes that help the church to grow in the Auckland setting.

Table 2: Interview Themes for Church #1

THEMES RELATED TO CHURCH GROWTH	
Marketing Strategies, Social Media and other Technological Usage	<ul style="list-style-type: none"> – Not much focus on marketing strategies. – Use Social Media (e.g., Facebook group). – Invite neighbours and family members to join church events.
Support for Young Families, Couples and Young Adults	<ul style="list-style-type: none"> – Focus on family and children ministry. – Strong Childrens' Sunday School. – The teenage group led by a youth pastor. – Small-group ministry.
Personal Greetings and Systematic Admission of Visitors	<ul style="list-style-type: none"> – Systematic welcoming to new visitors.
Church Facilities and Services	<ul style="list-style-type: none"> – Various courses for different communities.
Management and Leadership of Church Leaders	<ul style="list-style-type: none"> – Depends on volunteers.
New Migrant Support	<ul style="list-style-type: none"> – Focus on migrants from the United Kingdom, South Africa, etc.
Strong Biblical Teaching	<ul style="list-style-type: none"> – Emphasis on encouraging members to understand the Bible.

Church #2: An Indian Church Experience

Church #2 has circa 300 active church members, with 90% coming from India. There were also members from Malaysia, Fiji, Africa, and Colombia. The church experienced an increase of 66% in attendance in the past three years.

Leaders stated that less than 30% of the church members are over 50 years old. The pastor of the church also knows everyone's name, listens to ideas, speaks multiple languages, and is a conference speaker. Worship services utilise translators and a skilled worship team. The church has international connections and leverages the pastor's online presence and Social Media to attract newcomers. Many members have information technology (IT) expertise and promote the church online. There is a robust Sunday School and activities for children and youth. Small groups organised by region meet for Bible study and prayer. Newcomers receive personal follow-up and feel welcomed like family. Bible study, prayer meetings, fasting, and study plans encourage biblical engagement. Social events like fishing, barbecues, and regional celebrations build connections. Leaders are identified, trained, and mentored. Most members are migrants, and the church helps to meet practical needs by connecting those with shared languages and providing community.

Table 3 summarises the interview themes that help the church to grow in an Auckland setting.

Table 3: Interview Themes for Church #2

THEMES RELATED TO CHURCH GROWTH	
Church Growth Targeting Young Adults	<ul style="list-style-type: none"> - Most of the members are under 50 years old. - Good worship team. - Good attributes of Church Leaders <ul style="list-style-type: none"> - Willing to listen to members. - Good communication skills.
Marketing Strategies, Social Media and other Technological Usage	<ul style="list-style-type: none"> - Online presence in various Social Media. - Strong IT team.
Support for Young Family, Couples and Young Adults	<ul style="list-style-type: none"> - Strong children and youth ministry. - Various cell groups, prayer groups, and ethnic groups.
Personal Greetings and Systematic Admission of Visitors	<ul style="list-style-type: none"> - Welcoming attitudes to newcomers. - Follow-up team to engage new friends.
Church Facilities and Services	<ul style="list-style-type: none"> - Numerous activities for members to join.
Management and Leadership of Church Leaders	<ul style="list-style-type: none"> - A clear strategy for church growth.
New Migrant Support	<ul style="list-style-type: none"> - Focus on migrants from India, Sri Lanka, Colombia, Africa, and Malaysia.

Church #3: A Chinese Church Experience

Church #3 is a church with a Hong Kong people’s background. The church is divided into Cantonese and English sections. The Cantonese section consists of circa 125 church members, mainly first-generation immigrants from Hong Kong while the Cantonese section has had an increase of ten members per year for the last three years. The English section started five years ago, and it has circa 80 church members, 20 of whom are children.

The English congregation consists mainly of young adults under the age of 30 years old, youth, and younger children. Leaders are caring towards members and non-members. Marketing is limited to a basic website and closed Facebook page, while WhatsApp enables connections and event promotion. A part-time youth worker cares for the youth group. Some leaders pursue further education to better support parents. Cell groups provide care and support, supplemented by informal home gatherings and trips. A welcoming team of friendly, caring members helps new immigrants with practical needs. Sermons focus on the challenges of Christian faith, with the sharing of testimonies. Accountability groups facilitate in-depth sharing. Seminars on topics like finances and parenting support newcomers, along with a partnership with a budgeting organisation. Social events in homes expand the young adults’ network. Leaders are sensitive and willing to take risks. With Hong Kong immigration rising, seminars and festivals attract and connect newcomers while groups provide tangible help.

Table 4 summarises the interview themes that help the church to grow in an Auckland setting.

Table 4: Interview Themes from Church #3

THEMES RELATED TO CHURCH GROWTH	
Church Growth Targeting Young Adults	<ul style="list-style-type: none"> - All of the members in the English section are aged under 50 years old. - Good attributes of Church Leaders - Church leaders care caring about the needs of members/non-members.
Marketing Strategies, Social Media and other Technological Usage	<ul style="list-style-type: none"> - Use Social Media (mainly WhatsApp) to maintain connection with participants. - Not focused on professional marketing.
Support for Young Family, Couples and Young Adults	<ul style="list-style-type: none"> - Half-time youth worker employed for youth group ministry. - Family ministry is also a focus of the church. - Small-group ministry (cell groups).
Personal Greetings and Systematic Admission of Visitors	<ul style="list-style-type: none"> - Welcoming team and following up with newcomers.

THEMES RELATED TO CHURCH GROWTH

Church Facilities and Services	<ul style="list-style-type: none"> – Special seminars are provided for the community. – Create small group events at members' home.
Management and Leadership of Church Leaders	<ul style="list-style-type: none"> – Evangelistic training for leaders.
New Migrant Support	<ul style="list-style-type: none"> – Focus on immigrants from Hong Kong and China.
Strong Bible Teaching	<ul style="list-style-type: none"> – Emphasis on teaching high requirements of the Bible.

Findings from Leaders of Mountainside Lutheran Church

The MSLC is one of the only two Lutheran congregations in New Zealand, with more than 100 active members. Nine of the church leaders were willing to participate in the interviews. Their opinions and expectations were collected and analysed by using thematic analysis.

Table 5: Themes from Interviews with Mountainside Lutheran Church Leadership

Existing problems	<ul style="list-style-type: none"> – Concerned regarding the ageing population of the church. – Second-generation teenagers were not attending. – More church members over 50 years of age with few young adults and young families attending. – Lack of interactions and fellowship activities among members. – Not enough people to take up leading roles and responsibilities within the congregation.
Leadership suggested improvements	<ul style="list-style-type: none"> – Good attributes of Church Leaders open to the ideas of newly joined young church members. – Regular pastoral and elders' visits to help church members who need prayer support when facing difficulties. – Worship experience <ul style="list-style-type: none"> – Traditional liturgy could be simplified to attract the younger generation, with more modern songs introduced. – Marketing Strategies, Social Media, and Other Technological Usage <ul style="list-style-type: none"> – Online ministry is considered an essential direction. – Teaching scripture and related material should be produced online for church members to use in their small groups. – The church experience should be enhanced by providing more exciting events and building relationships with church members. <ul style="list-style-type: none"> – Support for young families and adults – Small-group ministry <ul style="list-style-type: none"> – It is crucial to restart the small group ministry according to its geographical location to enhance fellowship and interaction between church members. – Prayer Support <ul style="list-style-type: none"> – The church should encourage church members to pray for each other by allowing people to express their needs. – Fellowship Activities <ul style="list-style-type: none"> – Seven leaders suggested that more fellowship activities that include all church members should be arranged. It is vital to make sure that church members of all age groups can find friends (new and old) to interact within the church community. – Youth Ministry <ul style="list-style-type: none"> – One member mentioned that a youth pastor is needed to help restart the youth group in the church. – Personal Greetings and Systematic Admission of Visitors <ul style="list-style-type: none"> – Elders of MSLC should be responsible for welcoming people and connecting with newcomers. – Church members with caring characters should also be assigned to the welcoming team to make newcomers feel the church cares for them. – Church Facilities and Services <ul style="list-style-type: none"> – Two members agreed that the church should focus on the local community. – It was also suggested that MSLC partner with other organisations with common goals to serve the local community. – Management and Leadership of Church Leaders <ul style="list-style-type: none"> – Two leaders suggested that MSLC should equip more church members to use their gifts and talents to serve in the local community. The management should approach church members to find out which leaders are willing to help.

The findings from the first stage of the research were correlated to the MSLC church leaders' opinions to see where differences were found. The summary and comparison are shown in Table 6.

Table 6: Summary and Comparison Between Churches

ELEMENTS AND THEMES RELATED TO CHURCH GROWTH	CHURCH#1	CHURCH#2	CHURCH#3	MSLC
Church Growth Targeting Young Adults:				
– Less than 30% of middle-aged adults (50+)		– Most of the members are under 50 year old.	– The whole English section is young adults.	
– Good attributes of Church Leaders		– Yes	– Yes	Agreed
– Worship Experience		– Yes	– Not mentioned	Agreed
Marketing Strategies, Social Media and other Technological Usage	– Not much focus	– Yes	– Not much focus	Agreed
	– Use of social media	– Yes	– Use of social media (mainly WhatsApp).	– Online ministry: invest in high-quality equipment to enhance the church's online presence.
	– Word of mouth	– Yes		– The website of MSLC should be revised.
				Marketing can help to let other people know about MSLC.
				Disagreed
				– The church should first improve our church experience.
Personal Greetings and Systematic Admission of Visitors	– Systematic system.	– Follow-up team.	– Selected welcome team members.	Agreed
	– Follow-up chat.	– Cell group leaders.	– Focus on newcomers' first and second visits.	
	– Small group invitation.		– Cell group invitation.	
Support for Young Family, Couples and Young Adults		– Children and Teenagers Ministry.	– Youth Group Ministry.	Agreed
		– Cell Group, Prayer Group, Ethnic Group Ministry.	– Family Ministry Small-group Ministry.	– Restart small group ministry.
				– Enhance fellowship and interaction.
				– Prayer support
				– Youth ministry mentioned.
Church Facilities and Services	– Alpha evangelism course.	– Two significant regional celebrations.	– Special seminars and talks.	Agreed
	– CAP course.	– Training camps, fishing trips, baby showers, barbecues, etc.	– Partnered with CAP.	– Focus on the local community.
	– Basic life skill programme.		– Creative small social events.	– Partner with other organisations with common goals.
	– Music and dance outreach programme.			

ELEMENTS AND THEMES RELATED TO CHURCH GROWTH	CHURCH#1	CHURCH#2	CHURCH#3	MSLC
Management and Leadership of Church Leaders	<ul style="list-style-type: none"> – Ministries heavily rely upon volunteers. – Offer training programmes. – Discipleship training. – Bible studies for leaders. 	<ul style="list-style-type: none"> – Multiplication is the philosophy used for church growth. – Cell group leaders will also meet up biweekly. 	<ul style="list-style-type: none"> – Encouraged relational evangelism. – Training course for the leaders. – Willing to try out new things. 	Agreed <ul style="list-style-type: none"> – Equip more members to use their gifts and talents. – Approach members to find leaders who are willing to help. – Arrange more interaction between the two sections.
New Immigrant Support	United Kingdom and South Africa.	India, Sri Lanka, Colombia, Africa, and Malaysia. <ul style="list-style-type: none"> – 95% of the members are immigrants. 	Hong Kong, China.	Agreed <ul style="list-style-type: none"> – The Chinese section is now targeting Hong Kong people who speak Cantonese.
Strong Biblical Teaching	Emphasis on encouraging members to understand the Bible.	Not mentioned	Emphasis on teaching high requirements of the Bible.	Not mentioned

Quantitative Questionnaire findings.

Following the mapping of factors for growth the research sought to assess MSLC capabilities using a quantitative questionnaire to look at where these may be used in future church development.

There were 114 emails and personal invitations were sent out, and 31 questionnaires were collected in the English and Chinese sections of the church. Of the 31 questionnaires, 23 were from English-speaking members and eight from Chinese-speaking members.

Of the participants, 64% agreed that the church should engage in more evangelistic efforts to engage new people to attend church. Only 40% of the participants agreed that the church has undertaken sufficient practical community activities to spark growth in the neighbouring community.

On the other hand, 80% of the participants agreed that the church should offer more outreach programmes to the neighbouring community and they were also motivated to participate in growth opportunities when completing a growth project that coincides with their natural interests. Furthermore, 73% of the participants were motivated to participate in outreach activities if the project fits their schedule.

Figure 2: Congregations Areas of Interest to Serve in the Church.

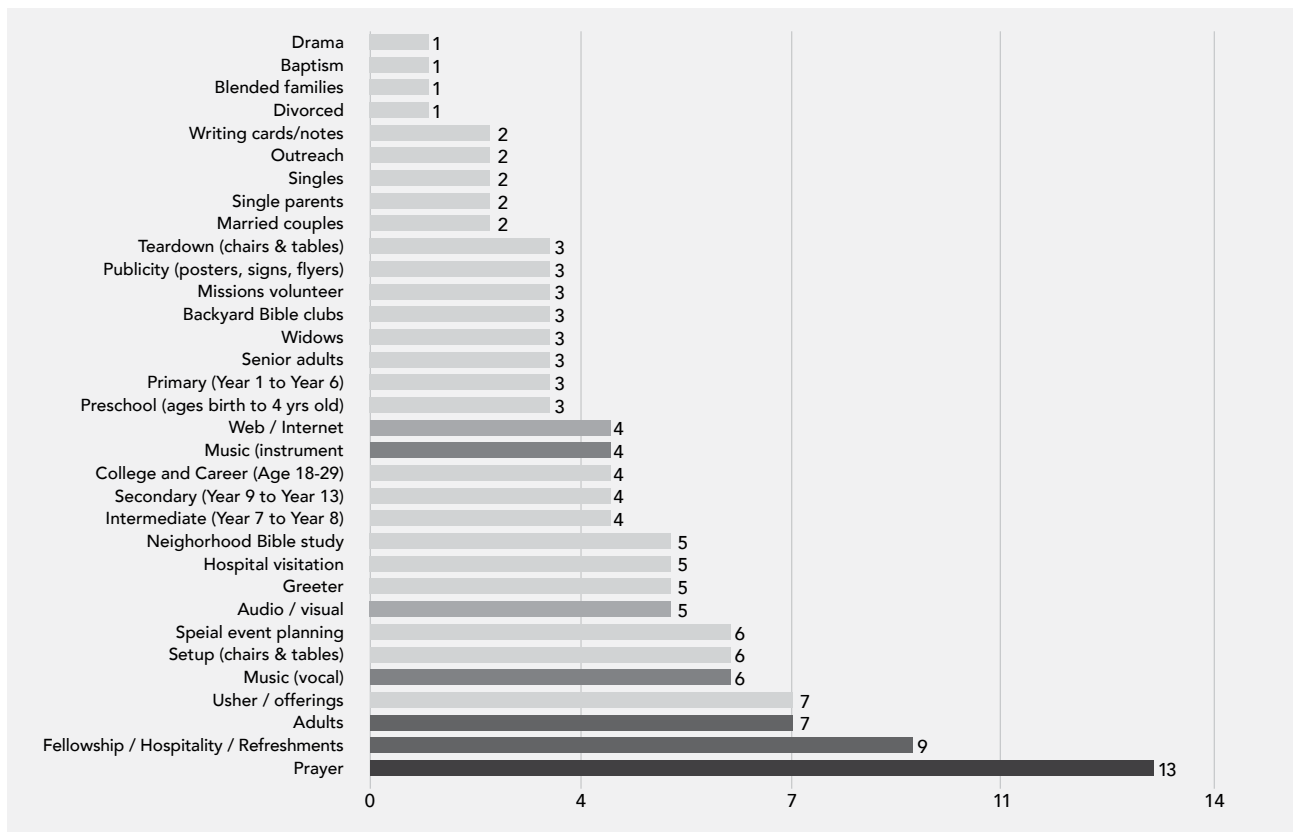
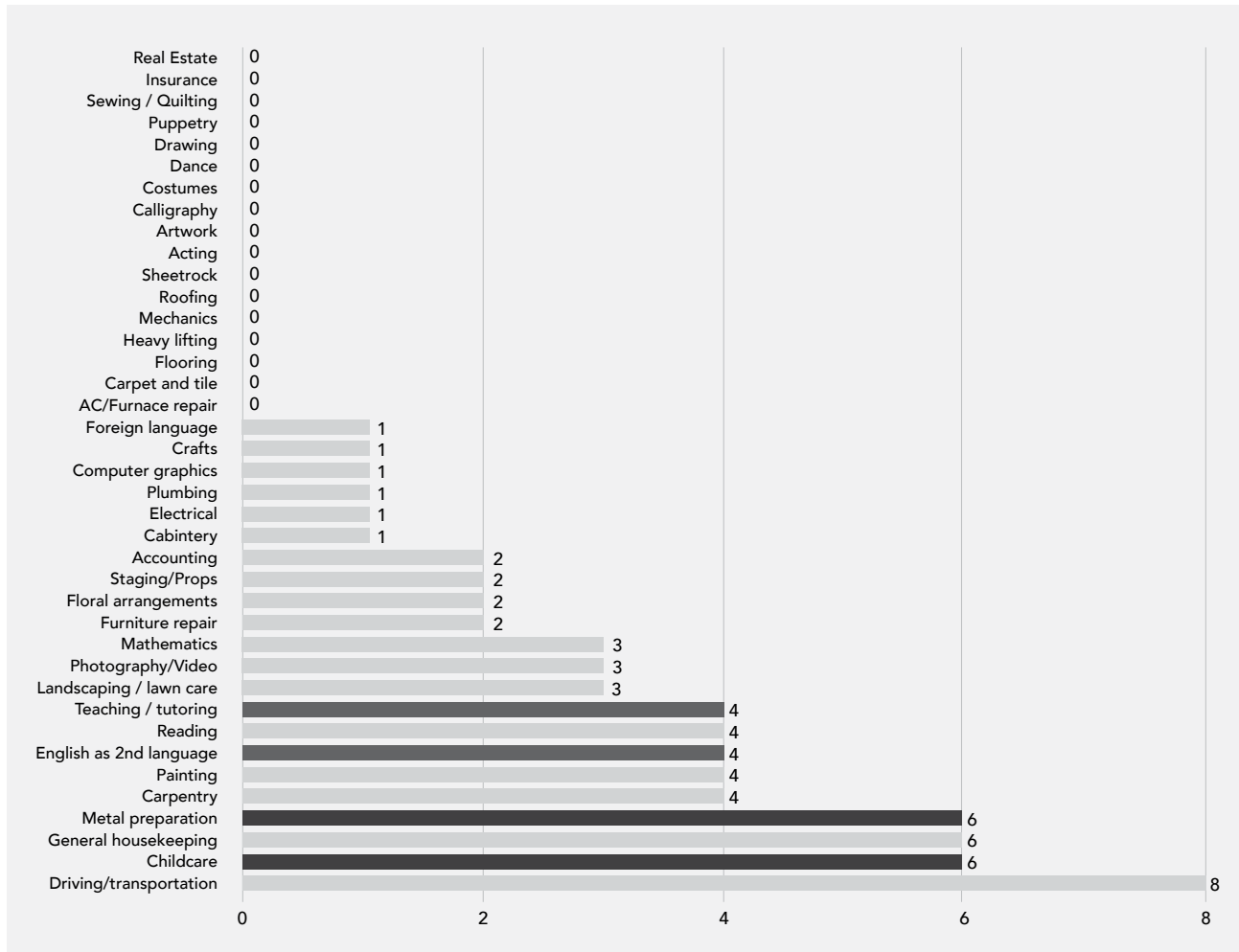


Figure 2 shows the congregation participants' interest in serving in the church in specific areas. Of the participants, 13 showed their interest in being involved in prayers, while nine were interested in fellowship and hospitality-related activities.

Figure 3 shows the congregation participants' skills and talents that could be used in church activities. The responses show that eight participants are willing to offer help in transportation and 12 are interested in childcare and food preparation. Teaching and language were a strength of this group of people with a total of eight participants showing interest. This will help the church match members with related experience to help.

Of the participants, 74% shared that they were willing to partner with the church vision to encourage others to help in activities that can help the church's growth, suggesting that some church members were willing to volunteer in the church community.

Figure 3: Congregation Skills and Talents that can be Used for Church Activities



DISCUSSION AND CONCLUSION

The analysis of the data collected garnered insights regarding the common elements that help church growth in three growing churches in Auckland, that could inform new ministry initiatives for MSLC. In collaborative discussions with church leaders of MSLC, careful consideration was given to the optimal alignment of potential projects with the available human resources, prevalent themes from the literature, and perspectives shared in the leadership interviews. Out of this process, five initial projects emerged:

1. The establishment of youth groups and a worship band.
2. The enhancement of online ministries.
3. Strengthening of small groups and the welcoming team.
4. Offering community classes in English and Cantonese.
5. Childcare and the organisation of fellowship events like baking, hiking, and fishing.

Table 7 lists the suggested projects against the potential congregation numbers and how these items relate to the church growth elements discovered in the literature review and from the church interviews.

Table 7: Suggested Projects for Consideration by the Mountainside Lutheran Church

SUGGESTED PROJECT(S)	SUBJECTS WITH POTENTIAL MANPOWER (NUMBER OF PARTICIPANTS COMPLETING THE QUESTIONNAIRE)	RELATED ELEMENTS AND THEMES TO CHURCH GROWTH
Youth Groups – Worship Band	Music Vocal (6)	1. Less than 30% of adults over 50 years old. 3. Worship experience.
Online Ministry – Marketing, Webpage, Spiritual Resources, YouTube, Facebook.	Web/Internet (4) Audio/Visual (5) PC (5)	4. Marketing strategies, Social Media and other technological usage.
Small Groups Ministry and Welcoming Team.	Listening (14) Encourage (10) Welcome (12) Meal for Sick Members (4)	5. Support to young families, couples, and young adults.
Community Services – English Class, – Cantonese Class for Children, – Childcare Class,	English as 2nd Language + Teaching (8) Childcare + Teaching (10) Childcare + Meal preparation (12)	7. Church facilities and services, 9. New immigrant support,
Fellowship Events – Baking – Hiking – Fishing	Fellowship + Adults (16) Baking (7) Hiking (7) Fishing (4)	5. Support for young families, couples, and young adults. 7. Church facilities and services. 9. New immigrant support.

Continued engagement in ongoing and open conversations regarding these proposals with the wider MSLC congregation will continue with the DT philosophy. The Annual General Meeting will provide an optimal opportunity for additional input and feedback to be solicited from members regarding the extent to which these projects resonate with their aspirations for the church's development. As attempts are made to establish alignment between the data collected and the perspectives held by congregational leaders and members, the congregation life committee of MSLC continue to facilitate discussion among the church. More so than the communication of outcomes, the objective will be to catalyse constructive dialogue that allows all stakeholders to voice their outlook and collectively shape future plans.

Ongoing Projects Using Design Thinking

During the implementation of the suggested projects, it will be important to review the early stages of the DT cycle to understand participants' needs and redefine the project details with MSLC groups and committees (Uebernickel et al., 2020).

In order to develop the five proposed projects, small church teams would be formed, and basic training provided for project leaders to explore the needs of the project users, following the DT model process (Buhl et al, 2019). Aho (2021) emphasised the effectiveness of small teams in implementing DT within a congregation. For example, the youth group leaders can reassess the interests of teenagers and explore ways to involve them in Sunday services. By understanding their needs, the youth group can brainstorm and implement solutions, seeking feedback from the teenagers and iterating as needed (Uebernickel et al., 2020).

Regular testing and feedback loops are crucial for each proposed project church team, allowing them to evaluate effectiveness and discover potential solutions (Dam & Siang, 2021). Incorporating a feedback system from users is essential for evaluating pilot projects (Linton & Klinton, 2019).

The testing stage of the DT model helps to identify and address user problems (Dell'Era, 2020). Church project team leaders should maintain open communication with church members and users to ensure project sustainability (Fewings & Henjewe, 2019). By finding motivated members to lead small church team projects and collaborate with like-minded individuals, the church can initiate activities that contribute to its growth.

CONCLUSION

This research identified key elements for church growth through an extensive literature review questionnaires and interviews with three growing churches in Auckland. The findings provided a framework that could be applied by scholars studying church growth in other contexts beyond the MSLC. By gathering perspectives from the leaders of the three churches exhibiting growth in Auckland, common themes emerged that may be relevant to various denominations and geographic settings. The application of the DT model also demonstrates a process that enables creativity, stakeholder engagement, and human-centred solutions that could benefit other religious organisations seeking revitalisation (Aho, 2021). While the projects suggested were tailored to MSLC's context, the methodology and insights on vital areas like online ministry, community outreach, leadership development, and leveraging members' talents could inform studies by other scholars aiming to understand the factors driving church participation. This research aimed to not only catalyse growth for one congregation but also further scholarly knowledge on principles and approaches for spiritual community vitality that could be adapted by religious leaders and researchers globally.

LIMITATIONS

The participants in MSLC were not as responsive as expected due to church members' difficulties and issues during the COVID-19 pandemic. However, the results could be used to help understand participants' expectations and limitations before any project starts.

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THE NATURE OF INTERNATIONAL SOCIAL WORK IN THE INTEGRATION OF IMMIGRANTS: A SCOPING REVIEW

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ABSTRACT

Even though social work has long been viewed as an international profession in many respects due to the pioneers' intense interest in and involvement in international interaction, the field is still lagging in terms of migration. This review aims to demonstrate the economic, social, and cultural integration of immigrants and how this issue is influencing social work practice globally and also investigates immigrants' integration in Aotearoa New Zealand, and how social work is dealing with this issue. The literature review found that most social workers are employed by social service organizations and state agencies that are caught in a paradox: on the one hand, they strive to improve individual emancipation, but on the other, they adhere to a larger social system that upholds oppression. This review calls on social workers and academics across the world to mitigate tensions in social workers' roles between post-enlightenment and collectivist social work as state agents as well as the growing conflict between Western and Asian views of this profession.

Keywords: international social work, immigrant integration, host society, post-enlightenment, biculturalism

INTRODUCTION

Social work is a practice-oriented occupation that supports community empowerment, social change, development, and cohesion. Social workers are concerned about societal injustices that occur every day, all over the world, both visible and behind closed doors (Hosken, 2018). The phrase 'international social work' was originally introduced at the First International Conference of Social Welfare in 1928, and the topic's academic popularity and attention have increased significantly since a book written by Lyons in 1999 and the publication of two important reference works (Healy & Link; Hueglar & Hall) by reputable publishers in 2012 (Healy & Wairire, 2014). There were approximately 281 million people living outside of their country of birth in 2020, which was equal to 3.6% of the world's population (International Organization of Migration [IOM], 2022) and international migration is one of the most important areas where we can connect global and local issues. Immigrants are people who voluntarily depart their home countries in search of new employment opportunities or to be with family members who have already migrated there (Potocky & Naseh, 2019). Thus, migration has become an important topic in social work because when people move, they frequently experience challenges to integrate into host societies but the growing literature on international social work explicitly connects social work practice to the question of immigrants' integration.

Immigration is a contentious and desirable aspect of Aotearoa New Zealand's economy and society. Since the late 1990s, when Aotearoa New Zealand abolished its racially discriminatory immigration policy and switched to a system that chooses immigrants based on personal merits, the country has seen the highest number of immigrants in its history (Liu et al., 2022). Prior to August 2022, the annual net migration hit a record high of 49,000, despite the severe border controls imposed by Coronavirus Disease (Covid-19) (Statistics New Zealand, 2022). Charania et al. (2020) report that immigrants currently comprise approximately 25% of Aotearoa New Zealand's population. The current immigration approach attempts to attract people who would offer their skills, resources, and energy to fill labour market gaps and boost economic growth (New Zealand Productivity Commission, 2021a). As a result, social work practices in Aotearoa New Zealand cannot ignore their role in integrating immigrants into mainstream societies as the number of immigrants is predicted to rise (Kim, 2021). Therefore, this review aims to demonstrate how social work is playing its role in integrating immigrants and how this issue is influencing social work practice globally.

This review is divided into four sections. The topic and the goal are introduced first, followed by the methodology. Secondly, it examines the literature on the integration of immigrants in the host society and social workers' contributions to immigrants' integration. The literature review also focuses on immigrants' integration as well as social work practice in Aotearoa New Zealand. Throughout, the review addresses tensions in social workers' roles between post-enlightenment and collectivist social work as state agents and provides some additional tactics that can help social workers cope with the upsurge in global migration. Thirdly, it discusses the limitations of the present literature. Finally, the conclusion summarises key ideas and places special emphasis on strategies that social workers may use to deal with immigrants' integration.

METHODOLOGY

Google Scholar, ProQuest, Journal Storage (JSTOR), and the Google search engines were used to access pertinent books and journal articles. Additionally, the facilities of Massey University's library were used to access journals, books, and other publications. The search strategy included the terms social integration of immigrants, social work and immigrants, migration history in New Zealand, immigrants in New Zealand, and social work with immigrants in New Zealand. The selected study papers and materials were read and examined to gain a better understanding of how social work is currently responding to immigrants' integration and disputes in social workers' responsibilities between post-enlightenment and collectivist social work as state agents. To identify common themes and factors that might lead to the effective integration of immigrants and how social work is responding to social workers' responsibilities, thematic analysis was used. As a result, the following key themes were identified during this analysis process: (a) Integration in the Host Society (b) Social Workers' Contributions to Immigrants' Integration (c) Immigrants' integration and social work practice in Aotearoa New Zealand.

LITERATURE REVIEW

Integration of Immigrants in the Host Society

Integration of immigrants is a process that takes time, and it is the ultimate endpoint of migration (Franzke & Ruano de la Fuente, 2021). Some academics contend that it is a desired end state (Favell, 2005; Klarenbeek, 2021), while others contend that there is no such thing as a desired end state (Spencer & Charsley, 2021), suggesting that nothing resembling an "integrated society" actually exists. As integration continues to be extremely context- and nation-specific, there is no agreement on a singular definition. Here, the term "integration" refers to the incorporation of immigrants' social, economic, and cultural aspects into a host society, which should then take steps to promote their adjustment by adopting its norms and customs (Gisselquist, 2021; Grzymala-Kazlowska & Phillimore, 2018; Klarenbeek, 2021; Penninx, 2019; Saharso, 2019). It also can be described as a way of reciprocal adjustment between the host community and the migrants (Naveed & Wang, 2021). To achieve successful integration both the host country and the immigrants need to make an equal contribution (Hamberger, 2009; Naveed & Wang, 2021). However, not all migrants receive a warm welcome from the host communities or are given the opportunity to share the same social, economic, and cultural privileges as local residents and some of them strongly identify as members of their ethnic group and either reject or do not integrate into the host society (Cormoş, 2022).

Immigration into a new country is heavily influenced by economic factors (Castles, 2017). Since they are comparatively recent arrivals to the host community, immigrants are likely to have fewer social connections than local residents, which limits their ability to use their network to find employment (Peters & Vink, 2016). However, discrimination is present in host societies, where pay and employment levels are determined more by ethnicity and visa status than by qualifications, creating barriers to economic integration (Quijano, 2020). Japaridze and Kaplan (2023) claim that the significant wage gap between local and immigrant workers in host countries is primarily the result of immigrants being employed at jobs below their level of skill and education. According to a recent study by the University of Chicago, 22% of migrants worked in private households, mostly women, where they frequently endured sexual assault, 12-hour shifts without breaks, and overtime pay (Quijano, 2020).

The age and place of study of immigrants both affect their ability to integrate economically (Peters & Vink, 2016). When Fortin et al. (2016) investigated how a student's county of origin affected the resident-immigrant wage gap, they discovered that graduates from Asian countries fared the worst and that the gap widened as the immigrant's age rose. Moreover, immigrants encounter difficulties integrating economically because they lack access to resources, education, life experience, language skills, and networks (Japaridze & Kaplan, 2023). Additionally, Peters and Vink (2016) suggest that immigrants are not able to access certain sectors of the labour market, such as positions in the public sector, due to restrictive regulations. Greenspan et al. (2018) revealed that when immigrants are not properly integrated into their host societies, anti-immigrant sentiment develops in the public sphere, and worries about increased competition for jobs and housing lead to defensive behaviour or social unrest among locals.

The multidimensional factors affecting immigrant social integration are the subject of expanding scholarship (Leal & Harder, 2023; Zhao et al., 2018). Migration has brought issues of social integration to the forefront of ongoing discussions about the right to citizenship, equal rights, and a sense of belonging (Viola et al., 2018). In the context of the Global North, social integration has been seen as a constructive process that enables those who have been marginalised or excluded to receive

equal opportunities as well as access to rights (Wieviorka, 2014). Örgütü (2017) stresses that although there are no specific international legal instruments for immigrants' integration along with social cohesiveness, everyone has the right to the protection of their human rights under international law and traditional norms, regardless of their status. Social policies pursue the idea of equality of people and are designed to facilitate social inclusion and well-being (Kotkas & Veitch, 2017). Integration policies prove more successful when they adopt a whole-of-community strategy and when everyone involved, including local, regional, and national authorities as well as immigrants and the society that accepts them, has an in-depth comprehension of their responsibilities (Örgütü, 2017). In contrast, Gsir (2017) recalls that immigrants' familiarity with the host tongue, attitudes towards the host culture, and sense of cultural belonging are all crucial for their social integration into the host society. The importance of learning the host tongue is additionally emphasised by Zou and Deng (2022) as a means of achieving economic success, which then leads to social integration. Nevertheless, it is found that despite efforts made by immigrants to integrate, state policies frequently encourage precarious conditions in a number of different ways. Ataç and Rosenberger (2019) declare that social policies serve as a tool for controlling immigration and impose restrictions on immigrants' access to social services. Although social harmony is the goal of integration, many immigrants, according to McIntyre (2008), adversely experience challenges in integrating into host societies because of political reasons. For instance, Arab and Muslim families experience some of the most severe types of discrimination, which has a detrimental effect on social integration, because of the hostility between the West and Muslims that has developed since 9/11 (Sirin et al., 2021).

The term cultural integration refers to the process of acquiring knowledge of and competence in cultural elements, for example, language or societal norms, that help people function in a given society (Gentin et al., 2019; Korteweg, 2017). Integration of immigrants is seen as an imminent danger to the integrity of the culture of a supposedly homogenous society, which can sometimes result in the adoption of nationalistic endeavours of exclusion, racism, xenophobia, and the denial of every aspect of otherness (Grzymała-Kazłowska, 2015). By highlighting the lack of a critical cultural approach to integration, Schinkel (2018) concludes that homogeneity should be abandoned because it perpetuates cross-cultural inequality. According to Hadj Abdou (2019), who agrees with Schinkel (2018), a critical approach to integration is required rather than relying on the notion of a homogeneous society in which immigrants are seen as a source of disruption. This approach needs to be re-examined considering super-diversity in order to understand the complexity of the demographic and ethno-cultural traits that define contemporary (Grzymała-Kazłowska & Phillimore, 2018). In contrast, some research (Amelina, 2021; Errichiello, 2023) has revealed ethnic diversity as a strength where people of different backgrounds coexist peacefully and racism is not an actual social issue, diversity is valued and helps to promote the host nation as inclusive and multiracial. Similarly, (Ryan, 2018; Strange & Oliveira Martins, 2019; Wessendorf, 2018) research conducted on the super-diversity in various European cities and emphasise that integration does not occur in monolithic communities. Immigrants leave ethnic enclaves as soon as their socioeconomic situation improves and settle in neighbourhoods populated by the local majority (Grzymała-Kazłowska, 2015). This typically entails moving to areas with more amenities and safer streets, where they can learn to function in everyday life (Lin et al., 2020). This is a strategy for successfully integrating immigrants into the community (Berry, 2018).

It is fair to say that the integration of immigrants is a challenging process. Social workers participate frequently in this process and are essential in promoting successful immigrant integration (Viola et al., 2018). The argument about social workers' contributions to immigrants' integration is presented in the section below.

Social Workers' Contributions to Immigrants' Integration

Social workers are in a key position and are actively involved in integrating immigrants due to their professional expertise (Cheetham, 2022; Viola et al., 2018). The International Association of Schools of Social Work [IASSW] and the International Federation of Social Workers [IFSW] (2014) also revealed that by adhering to principles and values like human rights, solidarity, social justice, and diversity, social work aims to achieve positive social growth, being empowered, and the freedom of people. This claim unambiguously supports the rights and freedom of immigrants (Viola et al., 2018). Sakamoto (2007) concurs that the goal of social work with immigrants is now economic, social, or psychological integration into the host society in line with the widely accepted ideologies of multiculturalism.

However, the experiences shared by social workers have brought to light how challenging the integration process is. According to Viola et al. (2018), social workers see immigrants' integration as a process of addressing their basic needs, which is necessary but inadequate to accomplish integration. Nevertheless, the reality is that most social workers are employed by social-service organizations and state agencies that are caught in a paradox: on the one hand, they strive to improve individual emancipation, but on the other, they adhere to a larger social system that upholds oppression (Matthewson, 2021). Particularly, non-profit organisations (NGO) contracted and funded to deliver social services have discovered that they are unable to criticize the effects of governmental policies (Mullaly & Dupré, 2018). To avoid this paradox, social workers must first carefully and meticulously engage in policy practice and social advocacy to advance social change and development rather than as a governing mechanism (Finn, 2020; Hoefler, 2019), in accordance with the profession's values, principles, and goals. Without advocacy and policy practice, these social work values and principles will only exist as documents that students must read and recite to pass exams to become social workers (Beckett et al., 2017).

Since the social work profession is dedicated to disadvantaged and marginalised people (Parker & Crabtree, 2017), social workers should get involved in political and social activism that aims to ensure that everyone has an equal opportunity to have all the services and resources they need that fulfil their basic human needs. When governmental policies are unfair, oppressive, or discriminatory—whether intentionally or unintentionally—social workers can take action to initiate new legislation or amend existing laws by lobbying with bureaucratic and societal systems (Jönsson, 2014). However, participation in policy practice and advocacy with bureaucrats is difficult and complex, and it calls for a variety of knowledge and abilities that social workers might not have (Viola et al., 2018). To address this issue, professional associations and the social work profession must play a significant role (Webb, 2023). Additionally, Julkunen et al. (2023) assert that to promote tolerance and embrace differences, social workers have an ethical obligation to fight oppression by upholding the principles and values of human rights, solidarity, social justice, and diversity.

Henrickson (2022) expresses concern about the conflict between collectivist social work, which is in line with the state's goal of fostering social harmony, and post-enlightenment (liberal humanistic) social work, which encourages personal liberation. Academics were also urged to investigate whether social workers can carry out post-enlightenment social work that is valid and compatible with liberation and empowerment, or if they are just acting as government agents of social control (Henrickson, 2022). Drechsler (2015) also draws attention to the tension between Asian and Western views of social work, where the former places a higher priority on security and social harmony and the latter encourages individual values and freedom. Finally, Henrickson (2022) concludes that while these questions will not be answered right away, if we do not pose them, we will never begin to look for solutions. These problems highlight the need for a critical analysis of the theoretical and ideological underpinnings of social work with immigrants.

Immigrants' Integration and Social Work Practice in Aotearoa New Zealand

Originally based on the indigenous structure of its indigenous Māori people, Aotearoa New Zealand has always been a popular destination for immigrants (Ward & Masgoret, 2008). Less than 200 people settled in New Zealand following James Cook's arrival in 1769, while there was a presence of 100,000 Māori (Phillips, 2023). Early British colonisation was made possible by the 1840 Treaty of Waitangi, and because of severe labour shortages in the nation in the latter part of the nineteenth century, European immigration to Aotearoa New Zealand increased gradually (Mutu, 2019). However, Kukutai and Rata (2017) insist that with the significant inflow of British immigrants after the signing the Treaty of Waitangi in 1840, interactions between the indigenous people and the immigrants were fundamentally altered. A lower percentage of Asian immigrants, Chinese and Indian, also made Aotearoa New Zealand their home at that time, although they were subject to racialised practices and policies (Bandyopadhyay, 2009; Kim et al., 2016). This review does not intend to discuss historical legislation and policies that affected Aotearoa New Zealand's immigrant population and have already been covered by numerous authors; (Ferguson, 2003; Elers, 2018 and Wheeler, 2021). These studies demonstrated how racialised ideology significantly influenced Aotearoa New Zealand's immigration policy between the 1880s and 1920s, when a number of rules and restrictions were put in place to limit immigration from and naturalisation of people from non-European nations (Ferguson, 2003; Elers, 2018 and Wheeler, 2021).

It must also be acknowledged that the extreme shortage of employees and Aotearoa New Zealand's distinct geographic location during the post-World War II period led to a rush of massive Pacific immigration (Bedford et al., 2017). A recession in the 1970s, nevertheless, contributed to the idea that Pacific Islanders were to blame for societal issues and a lack of jobs, and this belief led to the deportation of people who had overstayed their visas (De Bres, 2022). This included an operation called the "Dawn Raids," in which police randomly checked the passports of brown people (De Bres, 2022). The traumatising raids mostly targeted the dwellings of Pacific Islanders families in Auckland, a majority of whom were either residents legitimately or citizens (De Bres, 2022). A more enlightened government officially issued an official apology in 2021 to the communities and people affected by the Dawn Raids (Etherington, 2022). According to the press release, the Dawn Raids period placed a dark cloud over Aotearoa New Zealand's shared history, whole communities were singled out and terrorised, and the raids were unfair (Etherington, 2022).

The Government began to accept non-traditional sources of immigration in 1986, and in 1991 it started to actively seek out skilled and business-oriented immigrants (Wheeler, 2021). This led to a noticeable rise in the number of immigrants from Asian nations, particularly China, India, and the Philippines (Kim et al., 2016). The current emphasis is on luring high-calibre immigrants who will contribute their knowledge, resources, and vitality to boost domestic demand and open job opportunities (De Bres, 2022). Over 10,000 immigrants per year settled in Aotearoa New Zealand between 2015 and 2019 (New Zealand Productivity Commission, 2021b); this data demonstrates that Aotearoa New Zealand draws immigrants from all over the world due to a variety of pull factors. Aotearoa New Zealand is a popular immigration destination due to both economic and non-economic pull factors, including better wages, better opportunities, stability and safety, freedom, a higher standard of living, and family reunions (New Zealand Productivity Commission, 2021b). According to the 2018 census, the population of Aotearoa New Zealand is made up of 70.2% European ethnicity, 16.5% Māori, 15.1% Asian, and 8.1% Pacific, with 1.2% from Middle Eastern, Latin American, and African nations (Statistics New Zealand, 2019). However, if these trends are considered from an international perspective, Aotearoa New Zealand has only had a very limited amount of time to acknowledge and successfully address its growing sociocultural integration (Simon-Kumar, 2020).

Although there was obvious antagonism towards racial and cultural diversity for an important part of Aotearoa New Zealand's history, the current foundation of the country's diversity is the acceptance of the freedom to practise many languages, cultures, and faiths, and access to employment, not only by the local residents but also through numerous initiatives from the Government (Chiou, 2017; Fleras, 2009). Simon-Kumar et al. (2020) drew attention to the fact that the New Zealand Government also actively considers promoting integration a top priority, and a few government programmes were launched with the justification that Aotearoa New Zealand's many cultures will enrich the country. Among these, the well-known Settlement Strategy provided incoming immigrants with support in navigating the nation's work, housing, school, and health systems by providing translator services, English-language lessons, and other forms of assistance (Fleras, 2009; Rupa et al., 2015; Simon-Kumar, 2020). Ethnic minorities can also engage in civic and political activity, including voting and belonging to political parties (Simon-Kumar, 2020), which is unique to Aotearoa New Zealand. This evidence shows that immigrants are accepted in Aotearoa New Zealand and that the nation has created a safe environment for them to do so, which has facilitated their easier integration (Wheeler, 2021). Additionally, because of their desire to learn Aotearoa New Zealand's language, ethics, practices, skills, and economic activities, these immigrants have become more adaptable to the Aotearoa New Zealand environment and have helped to promote integration (Simon-Kumar, 2020). It is noteworthy that more than 160 distinct ethnic groups now call Aotearoa New Zealand home (Statistics New Zealand, 2020), this strongly demonstrates immigrants' integration into the nation.

Since social work is a Western endeavour, it was first practised as a colonial activity in Aotearoa New Zealand, and was greatly influenced by the founding document, the Treaty of Waitangi (Beddoe, 2018). It also reveals that the profession's history reflects the up and down relationship with the government as well as the profession's battle to gain recognition as a profession while also pursuing its goals of promoting societal rights and equality for all (Beddoe, 2018). The Government does maintain a bicultural policy based on the Treaty of Waitangi, which was signed in 1840 by indigenous Māori and the British Crown (Kim, 2021). However, there is no official policy promoting multiculturalism (Nayar, 2013). As a result, in Aotearoa-New Zealand, biculturalism and multiculturalism in social work practice are frequently viewed as competitive frameworks that are oppositional and conflicting with one another (Dam, 2017). Biculturalism is ingrained in many aspects of government policy because of the Treaty of Waitangi's partnership principle, particularly in the areas of the environment, health, education, welfare, and justice, but it's important to remember that this also paves the way for the coexistence of various multi-cultural groups (Nayar, 2013; Pepworth & Nash, 2009). Social work is, in principle, an occupation that fosters social responsibility and cohesion (IASSW & IFSW, 2014). According to this idea, social work in Aotearoa New Zealand emphasises how to enable individuals and groups; and to act to effect change in the social structures that support injustice (Aotearoa New Zealand Association of Social workers [ANZASW], 2019). This viewpoint offers a helpful framework for social workers to think about how the various actors involved in the settlement process interact to address the challenges that immigrants face as they adjust to community life and advance their integration (Kim, 2021). When compared to bicultural social work practice, multicultural practice provides legitimacy for immigrants' position and contribution to Aotearoa New Zealand society, whereas bicultural practice is a fundamental recognition of indigenous people (tangata whenua) and British settlers (Pakeha) (ANZASW, 2019). Dam (2017) highlights that despite the agreement between tangata whenua and Pakeha, the Treaty of Waitangi established manaakitanga-based Aotearoa New Zealand in a special position in comparison to other nations, where every resident, regardless of their national origins, stands for respect and care for one another while also sharing power and protecting the environment. As a result, social work cannot be separated from the diverse ethnic groups that make up Aotearoa New Zealand, and it is crucial for social workers to be familiar with and skilled at working with immigrants in this context (ANZASW, 2019).

LIMITATIONS OF THE LITERATURE

The nature of international social work in the integration of immigrants is subject to limited relevant research (Anis & Turtiainen, 2021; De Paola & Brunello, 2016; Viola et al., 2018). Numerous studies on international migration have identified the driving forces for immigration to new countries, but they have not adequately addressed the nature of international social work integrating immigrants or the ways in which this topic is impacting global social work practice (Cheetham, 2022; Kim, 2021; Potocky & Naseh, 2020). It is necessary to undertake further research to better understand how social workers deal with the challenges posed by post-enlightenment and collectivist social work as state agents.

Although Aotearoa New Zealand is historically an immigrant-based country, there is no solid research on how immigrants are integrating in this country and how social worker is dealing with this process. Therefore, this review calls for Aotearoa New Zealand researchers to research in this area.

CONCLUSION

The review reveals that tensions between immigrants and their hosts are more likely when there are barriers in the way of migrants participating in the social, cultural, and economic affairs of their communities (Cheetham, 2022; Grzymala-Kazłowska & Phillimore, 2018). The review also finds that the social workers' ability to aid immigrants in integrating into society is questioned due to their adherence to a larger social system, despite the principles and values of social work that aim to achieve positive social growth and freedom of people (Viola et al., 2018). Additionally, it explains that there was

obvious antagonism towards race and culture in Aotearoa New Zealand's history, but 160 distinct ethnic groups now call Aotearoa New Zealand home which strongly demonstrates immigrants' integration (Statistics New Zealand, 2020). The review emphasises the need for social workers to become politically and socially active rather than acting as a governing mechanism or state agent by pointing out the necessity of policy practice, social advocacy, and political activism (Matthewson, 2021). Most significantly, a long-lasting solution is needed to address the contentious role of social work between post-enlightenment and collectivist social work, as well as the growing conflict between Western and Asian views (Henrickson, 2022). Achieving effective integration of immigrants is a two-way process that calls for equal privileges and obligations for all parties, as well as mutual adaptation on the parts of the host society and the immigrants (Hamberger, 2009; Naveed & Wang, 2021). It needs also to be acknowledged that if there is an absence of integration into a new culture, society will be chaotic, and immigrants are more likely to experience depression, joblessness, and anti-social behaviours like drug use, violence, and crime (Greenspan, 2018).

Finally, given that social work as a profession is in such varied and developing phases across nations, it may not be possible to have a globally recognized response at this time, but as social workers, it is imperative that we navigate the avenues in search of a mutually agreeable solution.

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