Forced Technology Transfer (FTT) in China: The Experience of New Zealand Firms

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Abstract

Forced Technology Transfer (FTT) has been identified as a significant contemporary issue in international business by scholars and foreign firms doing business in China. The past literature on the topic suggested that the FTT phenomenon is under-researched due to its comparative novelty, and it requires in-depth analysis, specifically in individual country contexts. Therefore, this research aimed to fill the said research gap by studying the nature of the FTT experience of New Zealand (NZ) technology firms doing business in China.

This study is based on the philosophical foundation of relativist ontology, subjective epistemology and interpretivism paradigm. The study followed the qualitative research methodology and semi-structured interviews to collect data. The research was conducted in Auckland, New Zealand and the researcher interviewed four NZ technology firms that have been manufacturing in China for more than two years. The collected data from interviews were analysed using the thematic analysis technique.

The findings of the research suggested that having China as a manufacturer is highly important to the participant NZ firms due to varied reasons such as the high level of technical skills of the Chinese manufacturers, robust-loyal business relationship with Chinese partners, and high reliance on China in terms of manufacturing etc. The findings also suggested that NZ technology firms are not likely to experience FTT in China due to possible reasons such as the unwillingness to disclose such experience, lack of knowledge of FTT practices and policies prevalent in China, lack of leading edginess of participants' technologies, lack of communication with NZ and Chinese Government institutions, and less information received from peer businesses about FTT experience.

The results of this research further indicate that there is a link between the mode of doing business in China and the FTT experience. While it appeared that having a wholly owned subsidiary in China may act as a protective mechanism for NZ technology firms to defend themselves from possible FTT pressure, contract manufacturing seemed to expose the participant firms to possible FTT risks, technology blending and leakage, and even reverse technology transfer situations. The study also found varied external and internal strategies implemented by NZ technology firms to protect their proprietary technologies in a possible FTT environment. The study also found that the above findings could impact the variations of transaction costs of NZ technology firms to varying degrees.

According to the author's knowledge, this could be the first study that investigated the FTT phenomenon in the NZ context. It adds significant new knowledge to international business and

other disciplines, industry leaders, firms seeking to internationalise to China, the wider research community, policymakers, and the public.

Keywords: *Forced Technology Transfer in China, technological knowledge, New Zealand technology firms, intellectual property, proprietary technology*

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Chapter 1
Introduction

1.1 Background

Globalisation facilitated the advancement of information communication technology and transportation creating a closer network of countries around the world. Within globalisation, the interdependence of countries eased the modes of engaging in international business (IB). Firms that engage in IB need to be aware that the different markets that they trade in present different risks and challenges. Forced technology transfer (FTT) is one such challenge that mostly occurs in emerging markets which recently received wider scholarly attention along with the rapid development of the world's second-largest economy, China (Branstetter et al., 2005; USTR, 2018; Prud'homme et al., 2018; Prud'homme & Zedwits, 2019; Qin, 2019; Li & Alon, 2020). FTT is the use of pressure by a government on a foreign firm/company that seeks to enter its market to transfer its vital technology to them. The purpose of the current research is to examine this contemporary phenomenon in the context of New Zealand technology firms doing business in China by answering *"How do New Zealand firms strategically respond to forced technology transfer in the Chinese market?"*.

1.2 Definitions of Forced Technology Transfer (FTT) Phenomenon

Technological knowledge has become a vital intangible asset in the contemporary knowledge-based economy. Distinctive technological knowledge is a critical element of a country's economic advancement, as evidenced by the way the US, the birthplace of the internet, employs its innovative skills (The White House, 2015) to establish technological and hegemonic leadership in the world (Qin, 2019). Developed countries' firms consider their unique technologies as their core intellectual assets which keep them at a competitive edge in the international business environment (IBE). Therefore, firms safeguard their proprietary technology using strict intellectual property rights such as patents, trademarks and industrial designs, and varied other strategies (Prud'hommea et al., 2018).

In the past two decades, a few emerging countries such as Brazil, Russia, India and China (coined BRIC by The Goldman Sachs Group Inc. in 2003) gained rapid economic growth and GDP growth (Gordian, 2015; Osipian, 2015) integrating heavily into the world economy. They are seeking to catch up with developed countries and reach the economic forefront in terms of commercial activities, and economic output during a short period of time (Tiku, 2015). In some cases, these emerging economies have become technological leaders. China is one such rapidly growing large emerging economy that plays a significant role in the international business environment (IBE) in terms of its technological development, large consumer base and

infrastructure (Li & Farrel, 2019). In the first half of 2021, China was the largest recipient of foreign direct investment (FDI) (World Investment Report, 2021) and it is considered one of the main manufacturing hubs in the world which many developed countries depend upon (Hikmet, 2015).

As a part of their development plans, China and other emerging markets (EMs) seek to catch up with the West, and getting frontier technological knowledge from technologically advanced countries such as the US is a vital step in this process (S&P Global China Senior Analyst Group,2018; Simon, 2021). According to scholars, China is an important actor that engages in technology transfer practices and its recent robust growth is primarily dependent on FDI and technology transfer (Zhang &Taylor, 2001). Emerging country governments also support knowledge transfer from foreign firms to local firms by implementing facilitative policies (Prud'homme et al., 2018; Prud'homme & Zedwits, 2019). Accordingly, the pressure emerging market governments impose on foreign firms to share their core technology in exchange for domestic market access is termed "Forced Technology Transfer" (FTT) (Qin, 2019). From a legal perspective, host country governments' compulsions on foreign firms to transfer their valuable technologies, could be a violation of intellectual property rights and international norms (Branstetter, 2006). None of the successful businesses wants to share their core technical knowledge or valuable intellectual assets that keep them at a competitive edge in international markets with their competitors (Burrone, 1999). As a result, foreign firms struggle to confront challenges emanating from FTT policies when doing business in China, and they also fear being locked out of lucrative and high-growth markets.

Many developed countries have implemented policies strengthening intellectual property rights to safeguard their innovations in this growing technology transfer environment (Branstetter, 2006). Further, the US, the European Union, and Japan have jointly condemned FTT as a "practice undermining the proper functioning of international trade and called for new WTO rules to discipline the practice" (Qin, 2019). In fact, FTT is a distortion of free-market processes since it impacts FDI more than trade. Therefore, a necessity has arisen for the WTO to draft new rules addressing these issues (Qin, 2019).

The FTT phenomenon gained wider attention when the US raised allegations against China triggering the US-China Trade war (Kim, 2018; Li & Farrel, 2019). US's position is that China is conducting unfair trade practices in technology transfer and intellectual property under Section 301 of the Trade Act of 1974 (Office of The United States Trade Representative, 2018). According to the US, China is practising FTT through the administrative process and by imposing ownership restrictions to pressure US firms to transfer technology to Chinese firms. Consequent to these allegations raised during President Donald Trump's administration, the US

imposed unilateral actions against China under Section 301 of the Trade Act of 1974 (Office of The United States Trade Representative, 2018). The US imposed 25 per cent tariffs on USD 34 billion worth of Chinese imports in July 2018 (Kim, 2018). China's response to this was a 25 per cent tariff on US imports (Dollar, 2018). Accordingly, China's emergence as a major economic power created numerous challenges to the US as well as to the global economy, and FTT practice is one such major challenge (Prud'homme and Zedtwitz, 2019).

During China's initial growth stage it largely depended on foreign technology since it was not a significant creator of intellectual property. In the absence of core technology that it needs to develop indigenous innovation to compete with the world, absorbing valuable foreign technology from foreign firms became one of China's development strategies (Prud'homme et al., 2018). In 2015, the Chinese Government introduced a 10-year plan to apprise 10 major areas of China's high-tech manufacturing sector (Hickey, 2019). China's "Made in China 2025" strategy is aimed at its national quest for intellectual property to drive the nation to be an inventor of its own products. Therefore, a plausible assumption is that the FTT issue will possibly last in IBE creating debates as long as China or other emerging markets attempt to acquire technological knowledge and leadership, which also highlights the importance of in-depth analysis of the FTT issue.

1.3 Aim of the Study

Companies of all sizes [Small and Medium-sized Enterprises (SMEs) and large firms] that expand their business activities such as manufacturing to emerging markets face unique risks and challenges. As mentioned above, losing their core technological knowledge as a result of technological appropriation by others is one such major challenge that could deprive the firms of opportunities and competitive advantage that they would otherwise have made (Burrone, 1999). For certain technology-based firms, the unique advanced knowledge behind their products is highly valuable and protecting such proprietary knowledge using varied external and internal strategies is a crucial part of their business operations (Prud'homme et al., 2018). Losing proprietary knowledge lessens the uniqueness of their products in the market and counterfeit products producers may become their market competitors.

Further, FTT disrupts the free market process since it impacts internationalisation modes such as FDI and contract manufacturing (Bacchus et al., 2018; Branstetter, 2018). FTT is a critical issue in IBE that companies of all sizes encounter, especially in the process of outsourcing manufacturing to emerging markets. Therefore, it is important to have an understanding of the technology transfer policies in emerging markets such as China. Having such knowledge helps to protect company assets by implementing viable internal and external strategies, and long-

term business relationships. The theft and misappropriation of innovations (intellectual assets) of firms are closely linked to FTT. These issues are specifically common in the emerging markets since they are still improving their IP protection laws and institutional frameworks (Li & Alon, 2020). It is well-known that respect for IP rights lacks in emerging markets (Li & Alon, 2020). Therefore, this study aims to understand the FTT experience of NZ technology firms doing business in China.

Due to the comparative novelty attached to the emergence of China as a large emerging market and resultant FTT practices, there appears to be a serious lack of research studies investigating FTT practices and policies in China. Research studies investigating FTT experience in-depth, and in specific country contexts are even fewer, which highlights a significant gap in research-based knowledge. For example, the study of Prud'hommea et al. (2018) evaluates the ability of FTT policies in China and the study of Prud'homme and Zedwits (2019) investigates managing FTT in emerging markets taking China as a case study. Qin (2019) explores FTT and the US-China trade war and its implications for International Economic Law. Lee (2020) also studies FTT in the purview of China. None of these studies appears to have examined the individual country's experience of FTT. Therefore, the current research aims to address the said research gap by investigating the FTT phenomenon in NZ technology firms' context. NZ is an appropriate country context to investigate the FTT phenomenon since China is its largest trading partner and popular manufacturing destination (New Zealand Foreign Affairs & Trade, 2021). The international business relationship between NZ and China is quite robust and old, which highlights the importance of investigating the nature of the FTT experience of NZ technology firms doing business in China and how they strategically respond to the risks of losing their proprietary knowledge when doing business in China, which is a seriously under-researched topic. Accordingly, the present study aims to fill the said research deficits by investigating, understanding and illustrating the novel FTT phenomenon by addressing the following research question:

> *"How do New Zealand firms strategically respond to forced technology transfer in the Chinese market?"*

The following sub-questions are used to find corroborative answers (information) in support of the main research question.

i. *Why do NZ technology firms select China for manufacturing?*
ii. *What is the nature of the FTT experience of NZ technology firms in China and how do they perceive it?*
iii. *What kind of strategies do NZ technology firms implement to protect their IPs/technology in general and in the context of China?*

iv. *How do the findings of this study impact transaction cost-related factors in a possible FTT environment?*

1.4 Research Contribution

The findings of this research enhance the knowledge of prospective investors in China helping them be strategically prepared when doing business in China. New knowledge will be added to the research community from the analysis of primary data. To the author's knowledge, this research could be the first study conducted on the topic in the context of NZ. Therefore, potential benefits of this research also extend to institutions such as NZ Trade and Enterprise (NZTE), the Ministry of Business and Innovations (MBIE) and the China Chamber of Commerce in NZ which may gain a heightened awareness and be better informed on the opportunities or challenges present in emerging markets, and actively guide to engage in fair technology transfer negotiations. Both the business community and academia will benefit from this research since the FTT phenomenon bears multi-disciplinary value.

1.5 Outline of the Dissertation

This dissertation comprises six Chapters. The first chapter introduces the phenomenon of FTT, its origin and the aim of the study. It also explained the rationale for selecting the topic and the research questions. The second chapter critically analyses the existing literature on the research topic. It includes an analysis of scholarly works and news and magazine articles written from diverse perspectives about FTT. The aim of the literature review is to discuss and summarise the existing knowledge on FTT under different themes while highlighting the research gap. Chapter Three explains the methodology of this research, how this research was conducted, and data were analysed. The third chapter will also explain how and why primary data were collected, and the thematic analysis technique used to analyse the data. The fourth chapter presents the findings of this research. It will explain the codes, themes and sub-themes derived from the interview participants' responses in relation to the research topic. The fifth chapter is a discussion of the research findings and their implications in the purview of the literature review. This chapter is an in-depth discussion of the data, and it answers the main research question and sub-questions. The sixth chapter is the conclusion of the entire research which summarises the key elements, salient findings, recommendations, and limitations of the present research while highlighting the areas for future research.

Chapter 2

Literature Review

2.1 Introduction

The previous chapter introduced the present research including its aim, the importance of investigating the FTT phenomenon and the research gap to be addressed. This chapter explores the existing knowledge of the FTT phenomenon. In other words, this chapter analyses what has already been discovered on the FTT phenomenon in general and in the context of China. It synthesises the existing literary works under different headings. Firstly, this chapter provides an overview of the FTT phenomenon including how it originated and evolved creating challenges for the firms operating in emerging markets. Then, the chapter focuses on how the FTT phenomenon came to light with the emergence of China as a large market, and why it is considered a challenge in emerging markets to emphasise the importance of the research questions. This section also explains the different methods that FTT could occur in China such as FTT policies, JVs, FDI and the recent improvements in the FTT environment in China. As a whole, this section intends to provide a thorough understanding of the FTT phenomenon.

The analysis of literature then focuses on IP theft and IPR violation which have become critical issues in emerging markets and international business. Then the literature review addresses the positive and negative aspects of technology transfer to suggest that, at a time technology transfer was supportive of the economic growth of developing countries. The literature discussion then narrows down to exploring the relationship between New Zealand and China to understand the background where the current research is conducted. Finally, this discussion explains how Transaction Cost Economic theory (TCE) will be used to guide the data gathered in this research.

2.2 An Overview of the FTT Phenomenon

2.2.1 Origin and Evolution of FTT Phenomenon

Scholars such as Guilln, (2001) and Kim (2018) argue that globalisation created greater economic, political and social interdependence of the units of the world facilitating closer connection of nations, inter-state commercial activities and internationalisation of firms. Internationalisation can be interpreted as the process of establishing international transactions or access to other markets by firms due to the limited resources in the home country (Lu & Beamish, 2001) or desired resources available in different geographies (Ricks et al., 1990). Globalisation facilitated the internationalisation process and market entry modes of firms due to technological, transportation and communication advancements. Therefore, the internationalisation processes and market entry modes are

closely related to technology development and transfer (Sedoglavich, 2012); Odlin, & Benson-Rea, 2017).

Within the reasonably open, liberal, transparent economy resulted from globalisation, information, capital and technology flow efficiently between countries and firms enabling faster global business development (Cantwell, 1995; Meyer, 2017; Petricevic & Teece, 2019). Due to the resultant interconnectedness of countries with technological advancement, large firms, as well as Small and Medium-sized Enterprises (SMEs), started offshoring whole or part of their manufacturing process to foreign locations where resources and labour costs are less than the home country (Hikmet & Enderwick, 2015; Odlin & Benson-Rea, 2017). Accordingly, most developed country firms select emerging market economies for these offshore manufacturing activities due to the low-cost labour and mass resources available in such countries (Enderwick, 2008; Hikmet & Enderwick, 2015; Li & Farrel, 2019).

In the recent history of the international business environment (IBE), while technologically advanced countries such as the US, Germany, Japan, Singapore, and the UK reached the economic forefront of the world, some other significant economies such as China, India, Brazil and Mexico now known as large emerging markets gained a rapid economic development integrating to the global economy at a greater scale (OECD, 2021). Emerging markets are the new economic players that acquired dynamic economic and GDP growth (transformation) elevating them from being minor players during the past couple of decades at a continuous pace (Gordian, 2013; Cavusgil, 2021). These emerging markets demonstrate a strong determination to catch up with developed countries by acquiring valuable, unique technologies from technologically advanced countries (Elmi, 2021).

Advancing technology is an important part of the overall economic success of a country since technological innovations keep countries and firms at a competitive edge (Mormina, 2019; Wanaswa, 2021). The varied ways firms or countries acquire technology are through persons, institutions, education, commercial transactions, technological aids, or theft from its originated place (Qin, 2019). The commercial transactions that could enable cross-border technology transfer are licensing, sale, or investments (such as FDI) transactions (Quin, 2019). However, in the recent decade of IBE, a quite contemporary technology acquiring method known as FTT emerged in the context of emerging markets such as China. FTT encompasses situations in which a government requires a foreign firm to share its proprietary information with them in order to conduct business in its country (Qin, 2019). In other words, FTT occurs when technology-based firms are being forced/pressured to transfer their frontier technology to emerging economies (Carbaugh & Wassell, 2019).

FTT practices received global attention with the emergence of China as a large economy. In China, FTT occurs as a result of a cartel arrangement, in which Chinese companies combine with a foreign company (or foreign companies) to capture vital technologies from a foreign company or a group of foreign companies (White House Office of Trade and Manufacturing Policy, 2018). FTT can be perceived depending on the degree of compulsion a government uses via FTT policies and on how critically a firm is affected by it (Qin, 2019). FTT practices received wider scholarly attention when the US publicly challenged China of stealing their technology (USTR, 2018). The US, the owner of most advanced technology brands such as Apple Inc., Alphabet Inc. (Google), Microsoft, and Amazon (Aktas, 2021), largely depends on the resourceful Chinese market for production (Kharpal, 2020) and for most of US' pharmaceuticals, telecommunication equipment and medical compounds that are coming from China (Rapoza, 2020). Hence, developed country firms often transact with emerging markets due to resources available in those markets such as low-cost labour, machinery, and land which they did not have in their home countries (Hikmet & Enderwick, 2015). Therefore, the US and most developed countries are dependent on the large emerging market of China, despite the risk to their proprietary assets in the Chinese market (Gulley et al., 2018; Rapoza, 2020; Lin, 2017).

2.2.2 Challenges Faced by MNCs in Emerging Markets

As mentioned above, different-sized enterprises that source from emerging markets encounter varied risks (Contractor et al., 2011) and challenges such as lack of knowledge of regulatory institutions, protecting intellectual property, and increasing transaction costs (due to lack of knowledge about the host country market i.e. the liability of foreignness) (Peng et al., 2008; Casson, 2013; Buckley et al., 2018; Prud'homme & Zedwits, 2019). As previously mentioned, managing risks posed by FTT policies has become another such major challenge for MNCs (Prud'homme & Zedwits, 2019). Due to FTT policies, MNCs are increasingly facing appropriability risks in emerging markets. Two such closely related policies to FTT are IP laws and IP enforcement laws, even though they are not expressly introduced as FTT policies (Hall, 2014). Some trade performance requirements can also be counted as forced depending on their content (Blomstrom et al., 2000; Kokko & Blomstrom, 1995; UN, 2003). In China, these FTT policies are designed as technology for market access requirements (Prud'homme et al., 2018). Other than that, restrictions on foreign investments and local content requirements are some other specific FTT policies (e.g., Bruun & Bennett, 2002; Hout & Ghemawat, 2010; Feng, 2011; Xia & Zhao, 2012; Grimes & Sun, 2014; Holmes et al., 2015). Sometimes the state attempts to move the bargaining power from foreign entities to the local firms in commercial transactions (Holmes et al., 2015) using FTT policies.

To handle FTT policies, traditional IB theories support “internal strategies” such as the continuation of informal IP, internalisation, and maintenance of technological uniqueness and complexity (Prud'homme & Zedwits, 2019). But it is an often overlooked fact that externally oriented strategies such as obtaining IP protection and usage of other non-market activities are some external strategies that could be more effectively used to respond to FTT policies (Prud'homme & Zedwits, 2019). According to Prud'homme and Zedwits (2019), IB research needs to focus on both externally and internally-oriented strategies in order to manage the complex challenges presented in contemporary emerging markets, specifically comprehensive IP-related institutional challenges. However, how MNCs strategically respond to FTT policies is not adequately researched in IB (Prud'homme & Zedwits, 2019), which is a possible research gap.

MNCs are required to advance their risk management strategies in line with transforming value chains, IP institutions, and circumstances that influence the implementation of FTT policies in emerging markets (Prud'homme and Zedwits, 2019). Firms need to consider the factors such as function, location and governance mode when making strategic choices relating to the global services sourcing and successful implementation of such strategies (Kumar et al., 2009). An important implementation level strategy firms could use is operational partitioning of business processes globally among the services production units (Kumar et al., 2009). By operational partitioning of business processes, firms can mitigate the risk of misappropriation of proprietary information when services are sourced from abroad (Contractor et al., 2011). Gooris and Peters (2016) investigate how the fragmentation of business processes across business units (process fragmentation protection mechanism) can protect proprietary information. Through operational partitioning, firms can protect their information to the regulative environment of the host country and control the activities performed abroad. The development of IT can also be used to reduce information theft in dispersed fragmented units by retaining internal control. Further, Gooris and Peters (2016) validate work on modularity as a method to protect knowledge in a context where IP protection is an issue (Miles et al., 2000).

The emergence of FTT practices can also relate to the current structural reshaping of globalisation; earning profits from innovation, the emergence of new players on a global stage such as Springboard MNEs (Luo & Tung, 2018), new forms of protectionist policies, new types of internationalization motives (Cuervo-Cazurra & Narula, 2015) such as acquiring the more advanced IP than foreign rivals and global technological leadership (Petricevic & Teece, 2019), and new tools of techno-nationalism by national states (Cantwell, Dunning, & Lundan, 2010). These components of a structural reshaping of

globalisation suggest why certain countries are struggling to acquire high technology. It is quite evident that US's technological advancement led to its hegemonic leadership, which is why a large emerging economy such as China attempts to obtain technological advancement. Therefore, IB scholarship and management practice require dynamic changes (Petricevic & Teece, 2019) in order to meet these new changes emanating from the structural reshaping of globalisation or de-globalisation. That is why investigating a contemporary phenomenon like FTT in depth is highly important to articulate new strategies to tackle new challenges in emerging markets, particularly in a specific country context. This is a significant research gap in the literature.

2.3 FTT Practices: The Case of China

It is important to examine why the Chinese Government needs to appropriate technological knowledge from developed countries. Compared to developed country MNCs, most Chinese firms do not possess core technological capabilities which enable them to innovate from their indigenous knowledge (Fu & Gong, 2011; Xiao et al., 2013). China lacks the essential competitiveness of enterprises and its high technology-based industries are weak compared to of those developed countries (Prud'homme et al., 2018). How China and its local firms tackle the challenge of developing indigenous innovation has been a critical problem to solve. China's way out of the problem seems to be absorbing vital foreign technology while developing local firm capabilities (Fu et al., 2011; Fu & Gong, 2011) which is linked to its continuing general policy of technological upgrading.

To catch up with developed economies, the Chinese government adopted a national innovation system to reform the national economic system and new technology-related industrial policies (Freeman, 1987; Gu et al., 1999, Bazavan, 2019). Two key concepts used in this process were "indigenous innovation" and "re-innovation" of foreign technologies (USTR, 2018). The Chinese government designed "technology markets" to operate as distributive bodies for R&D productions to reform its "Science and Technology System" (State Council of the People's Republic of China, 2006; Gu et al., 2008). But, China failed to implement them (technology markets) in their originally designed form since the local firms did not have enough absorbent capacity to absorb transferred foreign technology (Gu et al., 2008). Besides, the Chinese market was quite small to maintain the R&D institutes with adequate earnings. In 1987 another reform policy came into operation promoting the merger of R&D institutes with prevailing enterprises and in 1988 the "Torch Programme" was launched to encourage New Technology Enterprises arising out of prevailing R&D institutes and universities aiming for innovation-driven economic growth (Heilmann et al., 2013). In 1990 the Government implemented another economic reform policy by converting individual R&D institutes into production entities which was an evolutional step that continued through gradual reforms, and trial and error. Other than that, the Chinese

Government used its procurement arm to develop indigenous innovation (Gu et al., 2008; Heilmann et al., 2013).

To absorb the transferred technology, a host country firm (local) should have the ability to understand the value of transferred technology, integrate it and apply it to commercial purposes (Cohen & Levinthal,1990). Therefore, the Government of China benefits its market leaders such as state-owned enterprises through government-mandated JVs with foreign firms to build the required skills and innovative capability (USTR, 2018). China aims to reduce relying on foreign technology and advance itself from a provider of low-cost manufacturing to reach the expected technological development that it needs for global leadership, local dominance, and national security (The State Council of the Republic of China, 2016). China's primary objective is to become the "global innovation power in science and technology." (The State Council of the Republic of China, 2016). To achieve this goal, China has issued numerous industrial policy plans including, sectoral plans, science and technology plans, five-year development plans, and most recently the "Made in China 2025" plan within the last 10 years (Lewis, 2017). Out of them, the most crucial industrial policies are the National Medium and Long-Term Science and Technology Development Plan Outline (MLP) (2006-2020), the State Council Decision on Accelerating and Cultivating the Development of Strategic Emerging Industries (SEI Decision), and the Made in China 2025 plan. China's "Made in China 2025" plan is a 10-year mission designed to transform the country into a manufacturing leader via strategic industries including information technology, rail, aviation, new energy vehicles, agricultural machinery etc. integral to economic growth and competitiveness (US Chamber of Commerce, 2017).

MLP's Section 8(2) promotes "increasing the absorption, digestion, and re-innovation of introduced technology" (The State Council of the Republic of China, 2006). The supporting policy which came into operation afterwards; Opinions on Encouraging Technology Introduction and Innovation and Promoting the Transformation of the Growth Mode in Foreign Trade (IDAR Opinion) stipulate the notion of introducing, digesting, absorbing, and re-innovating foreign intellectual property and technology (Gu et al., 2008; USTR, 2018). Therefore, FTT practices are likely to appear once the local industries develop their technology absorption capabilities to a certain extent and the markets reached a certain level of technological sophistication. China's recent belt and road initiative (BRI) is an example of the technological sophistication it has achieved today and its continuing attempts to expand development plans (Enderwick, 2021).

Allegations against China for practising FTT are mainly coming from the US, and the Executive Office of US Trade Representative (USTR) officially declared that China has required US firms to share their core technologies in exchange for market access to China (USTR,2018). Out of all other prominent economies, the US possessed the "highest concentration of knowledge and

technology-intensive (KTI) industries" as a percentage of all economic activities and it used to lead the world with a 29% global manufacturing share while China held the second place with 27% (USTR, 2018 P.6). However, currently the US and China both share the top position as world's largest producers of total KTI output (sharing 25% each) (American Economic Association, 2022). While the US leads production in KTI services industries, China leads in KTI manufacturing. The US is the world's third-largest exporter of KTI products, after China and Germany (American Economic Association, 2022). According to the US's Trade Representative Executive Office of The President report (2018), the Chinese Government uses tools such as impervious administrative approval procedures, JV requirements, procurements and limitation of foreign equity to influence how US firms operate in China and to pressure holders of technologies and IPs to transfer them to Chinese companies.

Similar to the US businesses, European businesses in China have also claimed to have experienced pressure to transfer their technology to local firms in recent years (2018 -2019), while they attempt to enter the Chinese market (Wernau, 2019). As previously mentioned, generally foreign firms prefer to offshore to China due to the lack of resources in their home countries and the availability of low-cost manufacturing and infrastructure in China. Even though formal assurances have been made by China to stop FTT practices (South China Morning Post, 2019), as per the annual survey conducted by the European Union Chamber of Commerce in China, 20% of the survey's participants (585 participants) mentioned that they were compelled to transfer technology in exchange for market access. This is an increase from 10% in 2017 (Wernau, 2019).

2.3.1 Different Methods of FTT Occur

FTT is a broad concept, which encompasses rules-based means of technology acquisitions such as outbound mergers and acquisitions (M&A), patent portfolio purchases and competition law (Malkin, 2020). It also exemplifies the legal and regulatory system failures of China, FDI rules violations, and industry and government collusion behaviours of Chinese state and private firms (Malkin, 2020). FTT can also be studied from an asset-seeking perspective which includes Chinese firms' outbound technology acquisitions, inbound joint venture-based practices and regulatory and jurisprudential policies employed by Chinese authorities (Malkin, 2020). According to existing literature, the most significant methods that FTT occur are, through the policies implemented by the Chinese Government, FDI, joint ventures (JVs) and licencing. (USTR, 2018; Prud'hommea et al., 2018; Prud'homme & Zedwits, 2019; Qin, 2019) which will be explored separately.

2.3.2 FTT Policies of the Chinese Government

FTT policies are a certain form of government policies meant to increase technology transfer between foreign and domestic firms that simultaneously weaken the

appropriability of foreign firms' innovations (Prud'hommea et al., 2018). The research work of Prud'hommea et al. (2018), provides a comprehensive understanding of the FTT policies of China. Evaluating the potential of FTT policies, they identify three types of Chinese Government's FTT policies; "lose the market" policies, "no choice" policies and "violate the law" policies which are shown in the following table (2.1) (Prud'hommea et al., 2018).

Table 2.1

Typology of FTT policies

Typology of FTT policies.

FTT policy category	Description of state-led bargaining method	Examples in China's SEIs
Lose the market	Foreign firms should transfer technology in line with the policy or lose market access	Technology transfer for market access requirements and often interrelated local content requirements and other foreign investment requirements (e.g., MIIT's technology requirements in NEV JVs, and requirements in the high-speed trains and green technology industries)
No choice	Foreign firms do not have a reasonable choice about whether or not to transfer technology because the state (e.g., court) interprets the letter of the law governing such transfer in a highly dubious way/one that is clearly unreasonable vis-à-vis what is written	Unfair court rulings in IP civil litigation in multiple SEIs
Violate the law	Foreign firms should choose to transfer technology in line with the written policy/law (which itself may be ambiguous or burdensome but nonetheless can at least generally be planned around) in order to be cautious and avoid potentially being subject to administrative or judicial actions enforcing that policy/law	Several provisions of the TIER, and several provisions of measures regulating anti-trust, IP and standards (e.g., burdensome SEP disclosure requirements, unreasonable "FRAND" terms, and a sweeping "essential facilities" doctrine)

Source: Prud'hommea et al., 2018

Lose the market policies include technology transfer in exchange for market access across Strategic Emerging Industries (SEIs) in China such as the requirement to partner with a Chinese firm. Some examples of SEIs are new generation information technology (IT), biotechnology, high-end equipment energy conservation, and environmental protection and manufacturing. The attractiveness of the large Chinese market (Grimes & Sun, 2014; Hout & Ghemawat, 2010) for resources is evident in foreign firms' intentions to enter China either by establishing an R&D presence (Zedtwitz & Gassmann, 2002) or planning a large export-oriented production plant when low-cost labour is needed. Prud'hommea et al. (2018) identify such policies within China's new energy vehicles manufacturing companies which require foreign firms to practice core new energy vehicle technologies with a Chinese JV partner as a precondition to obtaining a manufacturing licence. Similar requirements were identified in green technology industries and high-speed train (Prud'hommea et al., 2018). However, the fact that Tesla was permitted to establish a

wholly-owned subsidiary (WOS) suggests that JV partnering requirements to source manufacturing in China have changed recently (Colodny & Evers, 2019; Yuan, 2021). Tesla managed to gain Chinese authorities' approval to own a WOS to produce its new energy vehicles in China, because of China's aim to attract producers of "new energy vehicles". On the other hand, China is an important destination for Tesla, since China's target for electric vehicles falls in line with Tesla's global strategy (Gardner, 2019; Bursztynsky, 2021; Ma, 2022).

"No choice" policies are present in the form of unjust, partial Court rulings in civil litigations relating to IP in China (Prud'hommea et al., 2018). Even though such unjust court rulings do not come to light or are published often, they exist. For example, Long and Wang's (2015) comprehensive analysis of IP cases in China finds that judicial local protectionism exists in China. Technology Import and Export Regulations are a clear example of "violate the law" policies that were imposed by the China Ministry of Commerce and they are updated constantly (Prud'hommea et al., 2018; Song, 2020). Article 27 of the regulation appears to be weakening the appropriability of foreign firm technologies as it enables Chinese partners to claim ownership of the successive development of the technology made between contracting parties (Cohen, 2019). The following table (2.2) shows the percentages of top IP/technology policies that weaken foreign appropriability.

Table 2.2

Top IP/Tech policies weakening foreign appropriability in China

Top IP/tech policies most significantly weakening foreign appropriability in China.[a]

Policy category	%[b]
• Technology transfer rules of the state	49%
• Lack of robust rules or problematic application of current rules governing abuse of monopoly rights and IP, patent pools and related issues	45%
• Unequal/discriminatory treatment relative to Chinese firms when enforcing IP	38%
• Investment (JV requirements, capital requirements, other restrictions), M &A initiatives, and/or industry consolidation initiatives with a general relation to IP	37%

N = 106.

[a] Out of 21 categories of policies (see Table 2 for a full list).

[b] Percentage of firms surveyed ranking the policies as a "4" or "5", i.e. causing them "strong" or "very strong" appropriability loss/commercial damage.

Source: Prud'hommea et al., 2018

A country exercises the highest form of force to acquire top technology from foreign firms using FTT policies when it has an appropriate environment for it. Some characteristics of such an environment are strong state support for industrial growth, oligopoly competition, high technological uncertainty, policy mode of operation offering basic appropriability and tailored to industrial structure, reform avoidance by the state, stringent policy compliance mechanisms, and other policies closely complementing FTT policies (Prud'hommea et al., 2018). Despite the existence of varied FTT policies, literature does not often name such policies "FTT" per se, nor categorise them as "FTT policies in China". Literature may sometimes term them "trade performance requirements" (Blomstrom et al., 2000; UN, 2003) and their FTT nature can be identified depending on their characteristics (Prud'hommea et al., 2018). One such policy branch closely connected to FTT policies is IP laws and IP enforcement (Hall, 2014).

As discussed above, even though Prud'hommea et al.'s (2018) work is one of the few existing prominent researches that investigates FTT and analyse China's FTT policies, it does not adequately investigate how foreign firms of different countries strategically respond to the Chinese FTT policies when manufacturing in China, which is a significant research gap. Exploring how firms in different countries perceive FTT-related problems in emerging markets, facilitates firms to be strategically prepared to handle the risks pertaining to their intellectual assets such as misappropriation which could deprive the original owners of some future values of such intellectual assets. Hence, the current research aims to address this gap by studying how NZ firms strategically respond to FTT in China.

2.3.3 Market Entry Modes such as FDI, JVs and Licensing

FTT can occur through explicit (intentional) technology transfer methods such as JVs, FDIs, licensing (Maskus, 1998) or contract manufacturing (USTR, 2018). FTT may also take place via unintentional knowledge transfer that occurs due to weak IP protection measures of firms or spill-overs of knowledge (Taylor, 1993). In other words, unintended knowledge leakage from firms as a result of poor IP protection policies creates a suitable environment to operate technology transfer policies (Prud'hommea et al., 2018). This may happen to the firms that entered the Chinese market via JVs or contract manufacturing for reasons such as accessing resources and technical skills that are unavailable in the home country, but not for the companies merely selling their products or exporting to China.

Two components make a great impact on foreign firms' technology transfer abroad: the robustness of the IP system of the foreign country and the market entry mode (Hall, 2014;

Park & Lippoldt, 2014). For example, FDI as a market entry mode is comparatively less risky to transfer technology in weaker appropriability environments rather than JVs and licensing, because JVs and licensing create uncontrollable knowledge flows (Mansfield, 1994). JVs and licensing are considered preferable options for foreign firms to enter other markets only when their IP regimes are strong (Leahy & Naghavi, 2010 as cited in Prud'hommea et al., 2018). Yet, high-tech industries tend to use market entry modes such as WOS and also JVs since they involve a wide range of customisation which requires tighter control over their manufacturing (Erramilli,1990).

However, the above-discussed research works provide inadequate discussion on the specific country experience of FTT and how firms of specific countries perceive technology transfer requirements when China is their top trading partner such as for New Zealand, Canada, the US and India, which creates a significant research gap. The analysed studies provide a general understanding of how firms are required to transfer technology or how to identify an FTT situation. Yet, little has been investigated on how firms could strategically reduce FTT risks when they decide to manufacture their products in China. Hence, the current research addresses the said research gap.

2.3.4 Improvements in the FTT Environment in China

It appears that due to the various criticisms of FTT and Intellectual Property Rights (IPR) violations aimed at China, it deploys efforts to discourage FTT practices by undertaking a series of reforms (Lau et al., 2012; Mercurio, 2012). The Phase-One Trade Agreement with the US is one such effort (Calabrese, 2020). Further, China made initial improvements in IP protection by amending its patent law after joining the WTO (Information Office of the State Council of the People's Republic of China, 2005). China set considerable standards of IP protection which is one of the requirements for countries seeking to join the WTO. Even though entering the WTO has raised China's IP protection level (Shen, 2010) there is still room for improvement such as lessening the differences in IP protection standards that exist across different provinces (Long & Wang, 2015).

China's trading partners and foreign business owners are yet not content with its IP improvements. Brander et al., (2017) suggest that as per the rule-of-law view ''other countries should take action to pressure China to meet its IPR obligations''. In contrast, China considers a market-for-technology policy as a legitimate means to develop its economy which involves just exchange of economic opportunities since foreign firms enter China voluntarily, presumably having calculated losses and benefits (Quin, 2019). Some foreign firms are prepared to expose technologies to a certain extent, but China does not

obtain foreign technology for free, and it provides resources, market, and infrastructure the foreign firms need in return (Quin, 2019).

Li and Alon (2019) critically analyse China's efforts to overcome the issues emanating from the IPR protection in view of the Natural Evolutionary View (NEV). The NEV argues that, despite China's engagement in some serious IP theft activities which have received international criticisms, China will gradually develop a strong IPR protection regime as it develops more of its own technology and intellectual property (Brander et al., 2017; Li & Alon, 2020). Nevertheless, the Chinese Communist Party ruling is above the law influencing court proceedings and judicial appointments, even though its laws are well enshrined (Li & Farrel, 2020; Li & Alon, 2020). Since the proprietary nature of technology comes under the purview of IP protection, receiving a fair hearing in IPR infringement cases before Chinese Courts is crucial to maintain the appropriability of foreign firms' technological innovations (Vishwasrao, 1993). Despite these debates, FTT remains an unanswered issue in the international business environment (Lee, 2020).

2.4 FTT Practices in the Purview of Intellectual Property Theft

A salient issue is the proprietary nature of much of technology (Contractor & Nejad, 1981) and the proprietary nature of technology confirms the IPRs attached to a unique technology. IPR protection and violation issues in world history relate to China more than any other country due to two main reasons (Petricevic & Teece, 2019; Li & Alon, 2020). The first reason is that, China's one party, i.e. Communist Party based, socialist view that all property is owned by the state which differs from IPR protection standards in other democratic countries such as the U.S. The US's democratic governance and market-based economy made a significant contribution to the improvement and evolution of global IPR protection standards (Contractor & Nejad, 1981; Petricevic & Teece, 2019; Li & Alon, 2020), whereas China's state-planned, regulated and non-market economy is focused more on advancing indigenous innovative capabilities, protectionism (Petricevic & Teece, 2019) and nationalism. The second reason is that China accounts for nearly one-fifth of the world's GDP, at USD 23 trillion (CIA, 2019) and China's Communist Party controls about 56% of its GDP through taxes, fees, and state-owned Enterprises (the corresponding figure for the US Government is 32%) (IMF, 2019; National Bureau of Statistics of China, 2016; 2018; Li & Alon, 2020; Li & Farrel, 2020). Therefore, China's IPR violation issue impacts the world more than any other country in terms of IPR protection enhancement as well as a violation (Li & Alon, 2020).

When looking at China's case, one implication for other emerging markets where FTT is probably an issue is the importance of the emerging markets' political system. The predominance of the "rule of law" is a key element to protect IPs in a new market (Li & Alon, 2020). Rule of law

suggests that a country respects law as its highest institution, which is a key characteristic of a democratic political system (Brander et al., 2017). According to (Li & Alon, 2020), another important implication is the degree of globalisation. As seen in the case of China, the more the country is globalised, the greater the impact of domestic and international IPR violations. Finally, the size of the country's economy plays a critical role in IPR protection standards (Li & Alon, 2020). Compared to a larger economy with less globalisation, a small democratic economy may advance its IPR protection faster (Li & Alon, 2020). For example, China is a large undemocratic state with greater globalisation which makes it difficult to improve IPR standards. On the other hand, it could also be argued that greater global involvement would be a positive force for improving IPR standards as the country is more exposed to the policies of others and pressures from international organisations and trade agreements.

Service-based firms are mainly intangible asset-based (such as know-how) and they do not obtain patents often which consequently poses challenges to IPR systems (Miles et al., 2020). IPR systems are built according to the organisational changes of the economy and the technologies that are in use (Miles et al., 2020). IPR advocates counter that strengthening IPR will induce more innovation in the global economy fostering rapid economic growth (Helpman, 1993). However, when it comes to developing countries, strengthening IPR can work against the economic interests because paying rents for multinational patent holders located in the world's most advanced countries such as the US may work against the economic interests of developing countries. Further, paying rent to access existing technologies is cheaper than creating new technologies, which is the main reason for technology theft (Li & Alon, 2020).

However, in general, strengthening IPR will encourage innovations in the global economy which leads the faster economic growth (Lanjouw, 1997; McCalman, 2001). Even though most of the innovations are concentrated in developed countries, enriching IPR will induce technology sharing among countries and thereby benefit all countries. Using U.S. multinational firms' data and patent data, Branstetter et al., (2005) explore whether legal reforms that strengthen IPR increase the transfer of technology to multinational affiliates operating in reforming countries. The study findings suggest that payments for the use/sale of intangible assets made by partners to parent companies, which denotes the value of technology transfer, rose after improving patent regimes (Branstetter et al., 2005).

2.5 Positive and Negative Aspects of Technology Transfer (without the presence of a "forced" element)

In this research, the focus is on "forced" technology transfer. However, there are numerous cases where multinationals based in the US, Japan or Europe have voluntarily chosen to transfer technology to foreign firms (Branstetter, 2018). Hewlett-Packard (HP) made a partnership with

Chinese company Legend Computer (now known as Lenovo) and transferred its technology under four prominent areas, namely, product technology, business model, management practices, and strategic planning processes (Velasquez, 2009). This is an example of "just exchange" of technology (beneficial technology transfer that helps to improve the quality of life of all people) where HP gained market access to China and China earned product, key managerial and marketing technologies (Velasquez, 2009). Even though the multinationals operating in developing countries are often criticised for paying low wages, MNCs from highly industrialised nations can assist a developing country (Velasquez, 2009) by imparting advanced technological knowledge and know-how to enhance the local indigenous knowledge and management skills which are positive aspects of technology transfer.

Technology transfer has been a recognised process for the sustainable development of developing countries [United Nations' Technology and Innovation Report (UNTIR), 2021]. Advancements in frontier technologies, such as artificial intelligence, robotics and biotechnology have already proved the enormous potential for sustainable development (UNTIR, 2021). However, these rapid developments increase inequalities among the nations that have technology versus those that do not (Narula & Straaten, 2021). It is predicted that frontier technologies which currently exemplify a USD350 billion market, could grow to USD3.2 trillion by 2025 which opens a large gamut of opportunities for countries awaiting to welcome such technological developments (UNTIR, 2021). There are instances where technology transfer is imperative to achieve common goals such as tackling climate change (Institute for Global Environmental Strategies, 2020).

2.6 Long-Established Affiliations Between New Zealand and China

It appears that most of the significant literature on FTT and IP violation in the Chinese market has focused on the US experience of FTT in China (USTR, 2018; Prud'hommea et al., 2018; Prud'homme & Zedwits, 2019; Qin, 2019). It is equally important to examine how other technologically advanced countries which have strong geopolitical affiliation with China, such as New Zealand (NZ), face IP theft or FTT-related issues when doing business in the Chinese market.

2.6.1 NZ - China Trade Relations

The NZ-China relationship runs back as far as 1840. NZ is a highly multicultural country that has opened up its gates to many countries as an educational, tourist and business hub. Once the NZ economy had been a highly protected economy and now it is recognised as one of the most open markets (Enderwick & Akoorie, 1996). China is NZ's main trading partner in terms of goods which account for NZ$30 billion (two-way trade), and the second largest in trade in services (MFAT, n.d.). Education and tourism relations between the two countries are much stronger, whereas China is NZ's largest source of foreign students

which accounted for more than 40,000 students in 2017, and the second largest source of tourists that received 450,000 visitors in 2018 (MFAT, n.d.). NZ exports 'knowledge economy' services to China including information technology, food safety, and film and TV worth NZ$3.4 billion in 2018 (MFAT, n.d.).

New Zealand was also the first developed country to sign a Free Trade Agreement (FTA) with China in 2008 (MFAT, n.d.). The FTA facilitates the Chinese people to travel between the two countries on special visa conditions, enabling NZ investors in China to inspect their businesses easily and vice versa. The FTA facilitate economic activities between the countries including the trade of goods and services. As one of the fastest growing economies with a large population, along with a growing middle-class, China provides immense opportunities to NZ such as low-cost labour (Li et al., 2008; MFAT, n.d.). According to NZTE production in China brings NZ closer to Asian and European markets, manufacturers, and Chinese advanced research, science, and technologies (NZTE, 2014).

An Innovation Technology Transfer Centre was established in 2010 between Wellington and Changsha as a partnership between NZ and Chinese researchers to develop innovative technologies (Victoria University, 2022). However, there have been suggestions that NZ scientists are confused about a geopolitical relationship with China due to the worldwide concerns that China is acquiring sensitive technology from universities around the world (Dyer, 2020; Kakuchi & Sharma, 2021; Mckenzie, 2022; Park, 2022). Such suggestions necessitate conducting empirical research to investigate whether NZ firms experience a risk of losing their vital technologies when doing business in China, specifically in instances such as offshore manufacturing. The China-NZ affiliations are also confirmed by the signing of the memorandum between the two countries in 2017 to work together in specified areas of trade and investment, in China's Belt Road Initiative (New Zealand China Council, 2018).

2.6.2 The Importance of Technology Industry to New Zealand Economy

The NZ technology sector is a major contributor to its economy, GDP and exports (NZtech, 2022). NZ's top 200 tech exporters' revenue grew 11.5% from 2020 to 2021 and each has 4% growth in tech sector productivity to create USD 2.7b additional GDP. New Zealand's tech sector invested USD 24m in R&D in 2020 and that investment quadrupled over the past 10 years (NZtech, 2022). Several innovative NZ technology manufacturing companies (High and medium-high tech) are operating internationally with significant market share (Hikmet, 2015). The NZ technology sector offers varied investment opportunities to address global issues with market-winner solutions (MBIE Investor guide, 2019). According to the TIN top 200, (2020), NZ tech businesses attract notable investment from

around the globe and expanding footprints in global markets in the fields of agritech, fintech, healthcare and digital media (TIN, 2020).

NZ pioneered innovative technology ventures such as Glaxo Smith Kline, Hamilton Jet, and Gallagher Group have facilitated the world's population intellectually for a long period (MBIE Investor guide, 2019). NZ provides a strong start-up supportive ecosystem for new tech companies (MBIE Investor guide, 2019). NZTE and Callaghan Innovation support the rising NZ's tech sector innovative businesses by partnering with them to develop new products, services and processes (MBIE Investor guide, 2019). In recent history, a significant number of NZ technology companies have been acquired by global companies.

According to Sir Paul Callaghan, *"New Zealand has the fundamentals in place... We are ranked among the highest countries in the world for property rights, market freedom, free trade, lack of corruption and legal and political rights. And our taxation rate – personal and business – is one of the lowest in the OECD"* (MBIE Investor guide, 2017). According to Vic Crone, CEO of Callaghan innovation *"Every dollar invested in the tech sector creates $3 worth of growth in the New Zealand economy*, and according to Deepak Natarajan, Former Director - Intel Capital, Singapore, "*NZ's regulatory environment, IP protection regime and quality research universities are a big plus for tech investors*" (MBIE Investor guide, 2017). These quotes confirm the facilitative environment in NZ for tech investments and the importance and significance of NZ's innovative tech businesses which could inspire researchers to investigate whether NZ technologies are protected when outsourcing manufacturing to other countries.

NZ is being recognised as a technological hub and many of its technology companies have come to the top-ranking lists; NBR Rich List, TIN100 List and Deloitte Asia Pacific Technology Fast 500 indexes. However, while NZ's largest 200 technology companies mark record profits, there has been fear about the increasing number of tech companies being sold offshore (Keall, 2018; TIN 2018) which suggests possible technology transfer. NZ companies such as Fonterra, Waikato Milking Systems and Lanza Tech have major holdings in China (Rennie, 2019; Fox, 2020). Investment in China is important to secure a long-term market for NZ products, assist in penetrating China's enormous developing consumer market (MFAT, 2015) and simultaneously lay the foundation for good partnership relationships to increase outsourced manufacturing. Total NZ investment stock in China is USD541 million. Lifting the level of NZ investment in China is a priority of MFAT, learning from the successes of companies such as Fonterra, Rakon, Nuplex, Sanford and Richina, all of which have invested in their own or through joint venture operations in China (MFAT, 2015).

Nevertheless, there have been incidents of NZ-owned IP theft by China. For example, in 2010 a kiwifruit grower smuggled the profitable secret of NZ's number one kiwifruit brand Zespri's golden kiwifruit (Sun Gold) to China (MacCluer, 2021). Even though NZ has fought to protect its IP (MacCluer, 2021), currently USD 1 billion worth of Sun Gold kiwi fruits are being grown in China without permission (RNZ, 2021). When exploring a contemporary topic such as FTT in relation to the Chinese market, which has mostly been a US-centred debate in the academic literature (USTR, 2018; Prud'hommea et al., 2018; Prud'homme and Zedwits, 2019; Qin, 2019, Li & Alon, 2020), the strong trade relations between NZ and China lead to the question whether NZ firms also experience the debatable FTT issue in the Chinese market. Yet, there is less empirical research works investigating whether NZ firms experience FTT in the Chinese market. Therefore, exploring a contemporary topic such as FTT in the context of NZ firms is timely and crucial.

2.7 Theoretical Perspective

Technology evolves fast and international trade and investment are built on the constantly evolving institutional structures which have been unpredictable in recent years (Gao et al., 2017; Petricevic & Teece, 2019). Institutional theory (Meyer & Rowan, 1977) provides that the organisation and behaviour of firms are greatly influenced by the institutional setting/environment in which they function (Meyer & Rowan, 1977; Meyer, 2001). China's institutional system is highly influenced by one dominant party. In such economies, investors fear the inadequate protection of intellectual property (Oxley, 1999) which increases transaction costs. Western firms that enter transition economies encounter high transaction costs since they do not have adequate information about the local partners in the host country (Meyer & Peng, 2016). They might incur high costs in negotiations with their agents being inexperienced of the environment, unfamiliar with regulatory frameworks, and corruption (Meyer & Peng, 2016). According to the transaction cost economic theory (TCE) (Coase, 1937; Williamson, 1979; Williamson, 1981), a goal of an organisation is to minimise the costs of exchanging the resources in the environment and the costs of managing these resources inside the organisation. This research will utilise the TCE founded and developed by Coase and Williamson (1981) to analyse and guide the data gathered in this research.

According to Williamson (1981), bounded rationality (limited capacity to store and analyse information) is a critical factor and a behavioural assumption that impacts transaction cost. When making transaction decisions, the company decision-makers' rationality is bounded due to the limited information they have. This element can be linked to manufacturers outsourcing to China; in this research NZ firms manufacturing in China via contracts and WOS. Inadequate information about risks and challenges that could exist in China such as FTT may limit the rationality of NZ

firms. The “bounded rationality” element will be used in this research to find whether participant NZ firms experience a lack of knowledge of FTT that could possibly affect their business decisions.

Further, factors such as the ability to evaluate and process information and the limited time available for such evaluation impact understanding of the business situation (Flache & Dijkstra, 2015; Cuypers et al., 2021). If the business parties were not bounded by rationality, they could predict every possible future contingency without incurring any costs and parties can draft almost perfect contracts enfolding potential future outcomes (Wigand, 2003; Cuypers et al., 2021) that will consequently reduce the costs of contract drafting, updating and monitoring. Practically, complete contracting is not possible for firms when they enter to do business in an environment where FTT practices or policies could possibly exist. Because the decision-makers cannot foresee every probable situation FTT risks could occur. Therefore, the knowledge of FTT is bounded by rationality. The data of this research will enable the researcher to analyse, even if the company management were able to foresee the risk of FTT, whether the advantages prevalent in the Chinese market such as cost-effectiveness and resources could trade-off (outweigh) such risks.

Another vital factor that impacts transaction cost is opportunism (Williamson, 1981; Noorderhaven, 1996) where individuals try to fulfil their own interests undermining the company’s interests. Opportunism can be perilous to economic transactions when economic factors are bounded by rationality. People are inherently opportunistic and evaluate advantages as opposed to disadvantages (Cuypers et al., 2021). The Chinese Government’s technology transfer requirement in exchange for market access can be perceived as an act of opportunism in the absence of the advanced technology they need. However, in a practical business transaction, whether people will honour every promise is not guaranteed, which is why social institutions exist to take action against the breach of agreements (Cuypers et al., 2021). Having to pass-off vital proprietary information under pressure could lose the competitive advantage available to a particular firm and threaten its existence.

The decision to perform a transaction is based on the factors such as asset specificity, frequency of the transaction, parties' interests in the transaction and obscurity or unclearness in explaining the transaction (Williamson, 1981), and how unique the component company require is. According to TCE, there are four different types of costs in transactions.

i. *Search costs:* TCE could be used in the current research context (doing businesses/ manufacturing in China), to see whether search costs will be low since the “partner” is often predetermined. Therefore, the usual search and communications costs involved in evaluating the risks and advantages of the offshore sourcing partner to locate activities

should be reduced. Chinese partner with whom the manufacturing contract or the JV agreement will be signed is predetermined by participant NZ firms. Therefore, the search costs that are usually involved in finding products, partners, sellers or buyers to do manufacturing (Williamson, 1981) can be low in the current research context.

ii. *Contracting costs* – The data of the current research will enable the researcher to analyse whether the contracting costs of transactions involved in the process of manufacturing in China will increase or decrease when the parties are seeking quite different assets within the FTT phenomenon. If China is seeking to acquire proprietary technology of foreign firms for giving access to their market, and if the foreign firms seek access to China to gain business opportunities without losing their proprietary technology, the costs of drafting and performing the contract harmonising these two different expectations could be high.

iii. *Monitoring costs*: The monitoring costs are usually incurred to ensure that the terms of contract have been met (compliance). This element will be related to the data of this research to examine whether possible FTT experience in China lead to breach of contract terms, IP theft or IPR violations that could result in taking legal actions, adding to legal costs.

iv. *Adaptation costs* – In a situation where foreign firms (in this research, selected NZ firms) are being pressured to hand over technology to gain market access, they may need to invest in maintaining the technological lead over the local partner and market competitors which could result in high costs. The application costs to have intellectual property protection, strategic planning to adapt to the new environment and having to update contract terms to defend firms from FTT risks could be some costly steps of the adaptation process.

Guiding the data of this research using the TCE will enable the researcher to examine the variations of transaction costs (increased or decreased) of participant NZ firms in an attempt to protect their proprietary asset/technology when manufacturing in China. TCE supports exploring the opportunistic behaviour of China, as a supplier of resources (labour, land or machinery) and recipient of foreign technology in exchange. Accordingly, the data of this research enable building a discussion around the relationship among the key elements of TCE theory, FTT practices in China and the experience of NZ firms which have not been satisfactorily addressed in previous research.

2.8 The Research Gap

In this chapter existing literature was explored to understand the scope of the existing knowledge relating to the FTT phenomenon. Existing research work on this topic is limited due to the

comparative newness of the concept. The few pieces of literature that are available on FTT are starting point works. Therefore, there are numerous gaps to be filled by future research. Among the multiple gaps that exist within this research topic, different country firms' experience of FTT in the Chinese market and how they respond to the FTT requirements is a critical gap that needs to be filled by contemporary research. Because China is a top trading partner of most developed countries' firms and those firms should be implementing vivid strategies to combat FTT practices while maintaining a good business relationship with China, which is worth investigating. As mentioned above, NZ is one such country maintaining a long-established, effective and continuing trade relationship with China through multiple channels (NZTE, 2022; MFT, 2022). NZ's tech industry is thriving, contributing vastly to the NZ economy and many NZ firms engage in outward investments in China via manufacturing contracts, FDIs or JVs. Therefore, there could be a possibility for NZ firms doing business in China to encounter FTT risks. Yet, there is less (none) research works investigating such a possibility, which is a significant gap in IB research in general and in the context of NZ. The above-discussed existing literature has not answered the below-mentioned research question/s. Therefore, the current research aims to find answers to the following main research question and its sub-questions:

"How do New Zealand firms strategically respond to forced technology transfer in the Chinese market?"

The following sub-questions are used to find corroborative answers (information) in support of the main research question.

i. *Why do NZ technology firms select China for manufacturing?*
ii. *What is the nature of the FTT experience of NZ technology firms in China, and how do they perceive it?*
iii. *What kind of strategies do NZ technology firms implement to protect their IPs/technology in general and in the context of China?*
iv. *How do the findings of this study impact transaction cost-related factors in a possible FTT environment?*

2.9 Chapter conclusion

This chapter explored the existing literature drawn around the research topic: FTT Practices in China. The literature showed that the existing knowledge on FTT runs through several branches as mentioned in the introductory paragraphs, but such knowledge is rather generic and lacks depth. The main finding of this chapter is that even though there are few significant research works highlighting the magnitude of the FTT problem in the IB environment, written mainly from the US perspective, fewer research works have examined the FTT experience from the other developed countries perspective. Therefore, this research studies the NZ technology firms'

experience of FTT in the Chinese market. The next chapter will explain the “methodology” this research was conducted.

Chapter 3
Research Methodology

3.1 Introduction

The previous chapter discussed the existing knowledge on the research topic and emphasised the research gap that exists within the current knowledge domain. This chapter explains the method and methodology used by the researcher to fill the said research gap by answering the main research question (RQ) *"How do New Zealand firms strategically respond to forced technology transfer in the Chinese market?"* and its sub-questions. The chapter explains the philosophical foundation on which this research is based, the qualitative research methodology followed in this research and the data collection method i.e., semi-structured telephone interviews. It further explains how the participant companies were selected for the research, their background information, and the data collection process. The chapter concludes by explaining the data analysis method used in this research i.e., thematic analysis and the measures taken to preserve the ethical standards of the research.

3.2 Philosophical foundation

Well-designed research work is based on a philosophical foundation and assumptions created in a researcher's mind (Myers, 2013). Research philosophy supports the researcher to understand the type of research design that will be most supportive to achieving the research aim (Gray, 2014). Ontology and epistemology are two interconnected concepts, used to explain the philosophical assumption of research.

Ontology is a researcher's fundamental beliefs about the nature of reality or the study of the nature of existence (being) or "what it is" (Crotty, 1998; Gray, 2014). Ontology is built up around the core debates that reality exists independently of human cognizance and experience (realist ontology), or it subsists within human cognizance and can be understood only through experience (relativist ontology) (Levers, 2013). In other words, whether reality is built in our mind through our thoughts or is it something constructed independently in the outside world. The researcher bases her research design on relativist ontology to explain the FTT phenomenon because FTT practices and policies are practically interpreted and understood through human experience. From a relativist perspective, the reality is not distinguishable from the subjective experience of it (Guba & Lincoln, 2005; Denzin & Lincoln, 2005). The current research is also based on the subjective experience and interpretations of participants since the researcher believes that there is nothing that exists outside our thoughts (Levers, 2013). The relativist ontology perspective of "reality is human experience and human experience is reality" (Levers, 2013, p.2) is, therefore, more compatible with the phenomenon being investigated.

In this research, the researcher believes in the possibility of existing multiple realities about the FTT phenomenon and the fact that reality about FTT practices may vary depending on the country, company, and experience (Levers, 2013). The existing literature investigating FTT is mainly woven around the US experience of FTT practices in China. But the NZ experience of FTT may differ from the US experience. Each NZ firm's response about FTT experience in the Chinese market may differ from one another depending on their market power, size, and resources, even under similar circumstances. Further, NZ's long-established robust foreign relations with China (NZTE, n.d.) may also impact the reality of NZ firms' FTT experience. As such, experience can be interpreted in multiple ways generating multiple realities (Levers, 2013). Therefore, a relativist ontological perspective helped the researcher to uncover the subjective experience of reality about FTT and assumptions of multiple truths. Therefore, the "relativist ontology" placed an appropriate philosophical foundation in this research to answer the research question/s.

Epistemology is "a way of understanding and explaining how I know what I know" (Crotty, 1998, p. 3). Epistemology lays the philosophical foundation for understanding the legitimacy and adequacy of knowledge (Gray, 2014) and it asks, "how we come to know what we know?" (Denzin & Lincoln, 2005, p. 183). According to the two opposing epistemological perspectives, either knowledge (truth and meaning) exists within an object independent from human subjectivity (objectivism) or it derives from human experience, interpretation, and reflection (subjectivism). In this research, the knowledge of FTT is meant to gather through human experience. After all, it is humans who subjectively interpret their experiences including the researcher (Neuman, 2014). Thus, the knowledge about experiencing FTT by the NZ firms in China has been filtered and interpreted from the participants' points of view supported by the researcher's academic knowledge, contextual factors, and experiences. Hence, the researcher used subjective epistemology to explain how she acquired the knowledge of the FTT phenomenon.

According to objective epistemology, knowledge can be discovered by eliminating the human influence on the phenomenon being studied (Levers, 2013). However, this is not the position of this research since complete elimination of human influence is not possible when studying a contemporary novel issue such as FTT. NZ firms' FTT experience from the perspectives of the firms' decision-makers such as the founders, CEOs or Managers will influence the FTT experience to a considerable degree. Hence, gaining knowledge of FTT experience in emerging markets does not seem possible without reflections and interpretations (Levers, 2013) of those who practically experienced it. Yet, objectivism suggests that all background elements should be eliminated to study a phenomenon since it exists independent of the human mind (Levers, 2013) which cannot be applied to the current research context. Opposingly, subjectivism (the stance of this research) claim that knowledge is "always filtered through the lenses of language, gender,

social class, race, and ethnicity" (Denzin & Lincoln, 2005, p. 21) which is an appropriate philosophical lens to interpret the knowledge of NZ firms pertaining to FTT in the Chinese market.

3.3 Research paradigm

The paradigm denotes "a system of ideas, or world view, used by a community of researchers to generate knowledge" (Levers, 2013, p.3). The selection and application of paradigms vary from one researcher to another depending on his choice and the nature of the phenomenon being studied (Kankam, 2019, p.85). In this research, the RQs are designed to study a particular group's unique experience; NZ technology firms manufacturing in China. The researcher aims to understand the nature of NZ technology firms' experience of a novel phenomenon that has become an issue in IB by interviewing representatives of such firms. Hence, in order to interpret participants' responses (data) and give meaning to their unique experiences, the researcher needs to take a subjective interpretive stance. Therefore, this research follows the "interpretivism" paradigm to find answers to the RQs.

As the term denotes, the interpretivism paradigm is used to understand, interpret, and give meanings to people's actions or group experiences (Fossey et al., 2002, p.718). In line with interpretivism, the researcher attempts to discuss the FTT problem from the researcher's perspective and apply the already discovered knowledge in that process. Interpretivism does not encourage observing a phenomenon impartially or sitting away from its context. Instead, it supports interpreting people or organizations' experiences through inductive reasoning. In this research, the researcher does not aim to discover a single generalizable truth about the FTT issue. Instead, the researcher seeks to understand how NZ technology firms perceive this issue by getting actively engaged in the context and adding her own interpretations which are encouraged by the key characteristics of the interpretivist paradigm and subjective epistemology. The RQs are articulated according to the interpretive perspective that reality is dependent on each individual's experience, beliefs and understanding.

3.4 Research methodology

This research aims to examine the nature of the FTT experience of NZ technology firms doing business in China. To achieve this aim, the researcher follows the qualitative research (QR) methodology. Generally, QR methodology is used to understand the human experience (Bearman, 2019) and it can be vividly described as "the systematic study of social phenomena, expressed in ways that qualify, describe, illuminate, explain, explore the object of study" (Bearman, 2019, P.2). QR encourages "understanding the meanings, interpretations and subjective experiences of individuals" (Liamputtong, 2009, p. 11) which perfectly matches with the aim of this researcher; investigating the NZ technology firms' FTT experience. The main question of this research is

exploratory in nature and it aims to discover new knowledge on FTT practices in China by understanding and interpreting the subjective experience of NZ technology firms in the Chinese market that are unquantifiable. Hence, the QR methodology is more appropriate for this research since it seeks to analyse unquantifiable data i.e. the FTT experience of NZ firms.

In the current research, the researcher interviewed selected NZ firms (through representatives) to study their experience of FTT in the Chinese market. From the researcher's perspective, the best way to fill this research gap highlighted in the previous chapter i.e. lack of in-depth analysis into the FTT phenomenon especially, in an individual country context, is by interpreting the experiences of firms of a selected country in the light of already discovered knowledge. Hence, the researcher utilised the qualitative techniques such as experience, judgement and intuition described in QR methodology for the study (Wright & Geroy, 1991). Gray (2014) provides that the decision of methodology depends on the determinants such as researchers' beliefs of truth, whether the truth is available in the environment to be discovered, or whether the researcher studies diverse perspectives of people in the natural environment. In this research, the researcher aims to uncover varied truths (relativist ontology) by interpreting and giving meaning to NZ firms' experience (subjective epistemology) which can better be done using QR methodology.

3.5 Data collection method

Out of several qualitative data collection methods such as surveys, case studies and focus groups, the researcher selected semi-structured telephone interviews to collect data for this research. Interviews are one of the most common and effective qualitative data collection techniques that helps researchers to earn a deeper understanding of the human experience (Bearman, 2019). The researcher selected semi-structured interviews as opposed to structured and unstructured interviews (Myers, 2013) since they help the researcher to bring out the participants' experience on the issue in investigation effectively. Interviews can be conducted face-to-face, through online platforms or over the telephone. While the traditional method of conducting interviews has been face-to-face, with the rapid advancement of technology in recent years, researchers have been shifting to alternate interview methods to reduce the cost of interviews while increasing the reach of the targeted amount of data (Block & Erskine, 2012). The current pandemic situation has been a serious obstacle to the researchers conducting face-to-face interviews encouraging opting for alternative methods such as online and telephone interviews.

In recent history, the use of the telephone interview method in QR has increased due to the rapid development in communication technology (Block & Erskine, 2012) and due to its significant benefits, such as cost-effectiveness and time efficiency (Cannell, 1985; Dinham, 1994; Sarantakos, 1998). However, face-to-face interviews provide some unique benefits such as the ability to observe the interviewee's body language and expressions which could become

advantageous in interpreting the meaning of the responses. Maccoby and Maccoby (1954) defined the interview as "a face-to-face verbal exchange, in which one person, the interviewer, attempts to elicit information or expressions of opinion or belief from another person or persons".

However, two significant advantages directed the researcher to conduct telephone interviews for this research. One advantage is the ability to adhere to social distancing measures, due to the fast spread of the Covid-19 virus, including the novel Omicron variant during the research period. The second advantage is the ability to reach the targeted number of interviews within a limited period. Due to the unique nature of the research topic, the researcher had to select members of the higher management of firms such as founders, owners, CEOs or managers for the interviews and the telephone interview method provided the benefit of overcoming the difficulty of obtaining appointments from the respective participants' tight schedules and limited availability. On the other hand, the participants preferred to be interviewed over the telephone due to its efficacy and comfort. Other than that, choosing the telephone interview method offered the researcher additional benefits of cost-effectiveness and efficient time management. To overcome the disadvantage of lacking observation, the researcher used techniques such as discussing the research topic in advance with participants, maintaining an interactive, friendly atmosphere throughout the interview and carefully observing the tone of voice they used when expressing certain ideas.

The interviews were conducted on the personal mobile phones of the selected participants at a convenient date and time chosen by them. Participants of this research are higher management members of firms involved in decision making such as a CEO, founder, or manager. A carefully prepared semi-structured interview guide was used to gather data from the participants as shown in Appendix A. A semi-structured interview guide should be effective to earn a thick, rich description of the phenomenon in the investigation (Bearman, 2019) and such effective interview questions enable the interviewer to obtain information beyond the trivial experience of participants which will consequently generate new interpretations of the phenomenon being studied (Schultze & Avital, 2011, p. 3).

3.6 Participant company selection and the data collection process

Based on the aim of this research, which is investigating the FTT experience of NZ technology firms, three main criteria were used to select research participants. Firstly, they should be New Zealand technology-based firms that produce any form of technology/technology-based product as proprietary asset/s (intellectual property) (e. g. agricultural technology, farming technology, medical technology). Secondly, they should be manufacturing such technology-based product/products in China. Thirdly, their business relationship with China should have lasted for more than two years since the company requires considerable time to experience FTT problems

within its operations and implement strategies to tackle them. These criteria were decided upon consulting the experienced researchers/lecturers in the IB scholarship of AUT.

Accordingly, four New Zealand technology companies were selected purposely through networking, referral, other relevant organisations, and publicly available websites. They were invited to participate in the research via a formal email invitation which is provided in Appendix B. They were provided with two detailed information sheets (one for the company and the other for the interview participant) to thoroughly educate about the research beforehand which are provided in Appendix C and D. The researcher interviewed either a CEO, founder or a manager from each firm, all of whom are members of the higher management, considering their high involvement in the decision-making process when doing business in the Chinese market. Secondary data sources such as company websites, annual reports, quality news and magazine articles and journal articles were used with the same weight to gather data, support the findings, and confirm the information shared by participants.

The researcher followed a semi-structured indicative interview guide (provided in Appendix A) which includes about 12 questions. Yet, the questions were not limited to the guide, and they were open-ended aiming to gather in-depth answers. Additional questions were also asked to obtain rich information. The questions were mainly about NZ firms' experience with FTT in China. The duration of each interview was about 25-30 minutes. Interviews were recorded with an audio recording device with the consent of the participant. The following table provides the background information of participant firms.

Table 3.1

Background information of participant firms

Participant Firm (pseudonym)	**Company Representative (pseudonym)**	**Type of technology company using**	**Number of years of business in China**	**Position of the Interviewee**
A	PA	Medical	3	CEO & Founder
B	PB	Rendering and Processing	12	Manager-China
C	PC	Automated entertainment products	17	Co-CEO & Co-Founder
D	PD	Infrastructure	Around 20	National Quality & Compliance Manager

3.7 Data analysis

The researcher used the Thematic Analysis (TA) to analyse the data collected through interviews to identify and interpret their shared meanings and experiences (Braun & Clarke, 2012) which is, in this case, the FTT experience of NZ firms. This method involves coding and analysing qualitative data systematically, which can then be linked to broader theoretical or conceptual issues (Braun & Clark, 2012). TA is an appropriate entry mode to qualitative research (Braun & Clark, 2012) and the data can be analysed manually or using software such as NVivo, MAXQDA etc. Yet, the researcher preferred to do the data analysis manually to earn a thorough understanding of participant responses. Besides, TA is an interesting data analysis technique that enabled the researcher to interpret data distinctly to generate a number of significant findings.

Following the TA, the researcher identified significant themes and sub-themes that enabled her to answer the RQs. Braun and Clarke (2006) distinguish two levels of themes namely, semantic and latent. In semantic themes, the researcher is looking to interpret the explicit meaning of data and does not look beyond the trivial meaning of the interviewees' responses. Contrarily, in the latent themes, the level which was used in this research, the researcher looked beyond words, and underlying ideas, by making assumptions, conceptualisations and ideologies. An effective TA interprets data in a meaningful way rather than summarizing it. However, when performing TA on interview data, the researchers should not use interview questions as the themes (Clarke & Braun, 2013)

Braun & Clarke (2006), laid down six steps to follow when analysing the data using TA namely, familiarising with data, generating initial codes, searching for themes, reviewing the themes, defining and naming the themes and producing the report. These six steps have been followed in this research to generate findings and they will be explained with examples in the next section.

3.7.1 Formulation of the codes, subthemes and themes

This section explains the method followed by the researcher when formulating codes, subthemes and themes. Firstly, the interviews were transcribed using the services of a professional transcriber who signed a confidentiality agreement. Participant companies were given the pseudonyms A, B, C and D. Interview participants were assigned the pseudonyms PA, PB, PC and PD to preserve their confidentiality and privacy. Then, following the first step of Braun & Clarke's (2006) six steps thematic analysis, the researcher got herself familiar with the entire set of data by repeatedly reading all interview transcripts and making short notes on significant information in different colours. Secondly, some codes were assigned to the data (phrases in interview responses) which indicate important information. An example is shown below.

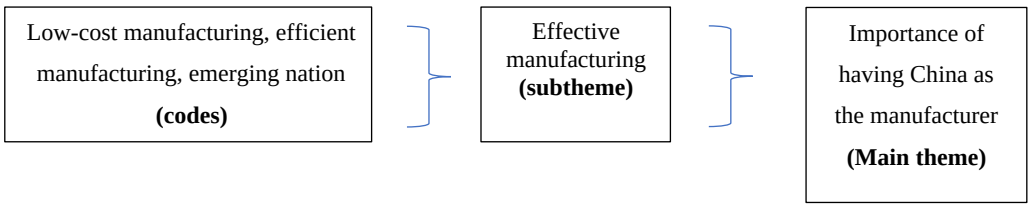
> *"It's* (manufacturing) *very effective, very cost-effective and very fast in terms of producing product for us, producing components."* **(efficient and low-cost manufacturing)**

A code is a short description of an important fact said in the interview (not an interpretation) (Braun & Clarke, 2006). When such important or interesting parts are observed in the transcripts, the researcher gave appropriate codes to such responses. In step three, the given codes were sorted into subthemes and/or themes. Themes are broader in nature than codes and consist of the interpretation of codes and data (Braun & Clarke, 2006). The end result of this phase is different categories of similar codes organised under broader themes that suggest something specific and relevant to the RQ. An example is shown below.

Obtaining IP rights protection from law, own manufacturing plant/more internal control, maintaining good partner relationships **(a category of similar codes).**

External Strategies **(theme)**

In situations where there are too many codes that come under one theme or they are unable to directly connect to the main theme or better fit within a slightly different theme relating to the main themes, the particular cluster of codes was given a sub-theme. An example is shown below.



In the fourth step, the themes were reviewed and evaluated to see whether the interview extracts support, contradict or overlap the themes. Where contradictions are found within one theme, they were split into separate themes, or the existing codes/extracts were moved back and forth where they match better. This process was repeated until a consistent and logical collection of themes was created across all the interviews. A table showing how interview extracts (and the respective codes) were organised under subthemes and main themes is attached to this work titled "Appendix H".

In the fifth step, identified themes were named descriptively to suggest why such themes are important and interesting in the purview of the main research question and its sub-questions. When these themes were carefully evaluated, a storyline was identified connecting each theme to

the primary RQ and its sub-questions. In the final review of the themes, it was important to identify the 'essence' of each theme (Braun & Clarke, 2006, p.92) in order to address the main research question in depth.

The sixth step of thematic analysis is producing the report (in this case, the research dissertation) based on the findings relating to the research topic, facilitating the reader to ascertain the quality and transparency of the research. The codes, subthemes and themes formulated as such using the repeated and similar responses of the four research participants have been presented in "Table 4.1" in the following chapter.

3.8 Ethical consideration

This research used interviews to collect data and during that process, the researcher had to interact with people (research participants). Therefore, the researcher adhered to the ethical guidelines/standards laid down by the AUT Ethics Committee and the Treaty of Waitangi throughout the research to preserve their privacy and confidentiality. This research was approved by the AUT Ethics Committee on 9th May 2022 as shown in Appendix E. The interviewees were provided with information sheets, which contain detailed information about the research process and the ethical standards (Appendices C and D). Participation in this research was completely voluntary. The researcher provided a "Permission for Access Form" and a "Consent Form" (Appendices F and G) to the selected firms and the respective interview participants to obtain their consent and confirm voluntary participation. The research participants were assured that the information provided by them will only be used for research purposes. The research participants' privacy, identity and confidentiality are protected by using pseudonymised names instead of real names. The selected professional interview transcriber was requested to sign a confidentiality agreement for the same confidentiality reasons. The researcher has taken measures to hide the firms' identities in the research findings. The original data of this research are securely stored in a password-protected device at AUT, and they will be destroyed after six years.

3.9 Chapter conclusion

This chapter explained the philosophical foundation and the methodology used for this research. It also explained the data collection method i.e., semi-structured interviews, thematic analysis, and the measures taken to preserve ethical standards throughout the research. The next chapter will present the findings generated from the data collected in this research.

Chapter 4

Findings of the Research

4.1 Introduction

This chapter presents the findings produced from the interview responses of the four research participants using thematic analysis. The repeating ideas of participant responses produced six main themes, seven subthemes and sixty codes which are summarized in "Table 4.1". Each of these themes and subthemes will be introduced and explained in this chapter with the corresponding interview extracts of participants. These themes will provide an overarching summary of the participant NZ firms' wide range of experience, perspectives, and perceptions of manufacturing in China, FTT and strategic implementations to protect firms' technology-based products.

Table 4.1

Summary table of the codes, subthemes and themes

Codes	Sub-themes	Themes
Low cost manufacturing, efficient manufacturing, emerging nation	Effective manufacturing	Importance of having China as the manufacturer
Appreciation of Chinese investment, long business relationship, uninterrupted business relationship, contented relationship, appreciation, loyal employees, trusted and an uninterrupted business relationship, diverse business relations (manufacturing, R&D, investment)	Robust commercial relationship	
Efforts to get accustomed to Chinese business culture, comfortable within relationship, openness to expand business relationship, strengthening the relationship, high reliance on Chinese market, importance of China in overall business, high integration	Intention to continue with China	
Uniqueness of the product/technology, significance of the technology, usefulness to NZ technology sector, highly valuable products to firm/unique designs/intellectual property/proprietary knowledge, measure to protect IP	The importance of the technology-based product to the firm and NZ	The primary need of protecting firms' technology
Sharing manufacturing files, sharing specification of what company wants, copying products, IP theft, passing updated new knowledge to manufacturers, technology blending, copying and distributing products	Possible technology transfer situations	
Clear rejection of experiencing FTT, disagreeing to experience FTT	Denial of experiencing FTT in China	FTT Experience when doing business in China
Unawareness of FTT practices/policies, FTT is not within identifiable knowledge, no adequate knowledge, less consultation of NZ Government units, no involvement with Chinese Government, FTT is not a popular topic among peers, peer experience sharing, not heard of FTT from peers	Knowledge of FTT practices in China	
Obtaining IP rights protection from law, owning manufacturing plant/more internal control, maintaining good partner relationships		External Strategies
Assembling the final product inhouse, sharing only the required part/amount of knowledge, non-disclosure policy, keeping core technological knowledge inhouse, authority to effect changes, verification and final approval, staying aware of trade shows, e-commerce platforms, customs and border patrol, brand protection		Internal strategy

Reduced communication cost, reduced travel and monitoring cost, reduced transaction cost, increased communication cost, less adaptation cost, less contracting cost, monitoring cost		Transaction cost-related factors

The following table (4.2) shows participants' positions in the respective firms and the way they operate in China. It supports understanding the findings on participants' levels of involvement when dealing with China and their FTT experience. It also helps to understand the findings on the relationship between participants' possible FTT experience and modes of operating in China.

Table 4.2

A summary of participants' positions and firms' operating modes

Participants	Participants' positions in the firm	The way firms operate in China
PA	Founder and CEO	Contract manufacturing
PB	Manager - China	Own manufacturing plant (WOS)
PC	Founder and CEO	Own manufacturing plant (WOS)
PD	National Quality & Compliance Manager	Contract manufacturing

The following table (4.3) presents a summary of the different aspects of participants' experience with regard to manufacturing/doing business in China. To understand the nature of the commercial relationship between the selected NZ firms and China and the degree of participant firms' reliance on China, a scale of 1-5 was applied to participants' responses. Levels 1 and 2 were interpreted as weak, levels 4 and 5 were interpreted as strong, and level 3 was interpreted as an average.

Table 4.3

Different aspects of participants' experience with regard to manufacturing in China

Nature of commercial relationship	Degree of reliance on China	Whether the participant firms intend to continue manufacturing in China or not	Degree to which their technology is matured or standardised	Whether the sub-contractor produces for other firms or technology is internalised in a WOS	Nature of FTT Experience
Strong	Average	Yes	Novel technology	Producing for others	No
Strong	Strong	Yes	Unique Technology to the firm and NZ, but the invention is fairly old now	Technology is internalised and therefore exclusive	Not aware
Strong	Strong	Yes	Less novel, but the automation component of the product is novel	Technology is internalised and therefore exclusive	No
Strong	Strong	Yes	Most products are less novel and	Producing for others	Not aware

			generic, few product designs are unique		

The proceeding sections of this chapter explain each of the six themes and seven subthemes with supporting interview extracts, where necessary. The codes given to the information of participants' responses are mentioned within brackets, in bolded font, at the end of each interview extract, and the pseudonym of the participant who provided that response/information/idea is mentioned within square brackets. Ex: [PA], [PB], [PC], [PD].

4. 2 Importance of having China as the manufacturer

The first theme generated from the participants' responses is the "importance of having China as the manufacturer" to NZ firms. As pointed out in the literature review, NZ firms select China as their business/manufacturing destination due to several reasons. During the interviews, all the interview participants were keen to talk about varied reasons as to why they selected China to manufacture their technology-based products and why they will continue to do so. This theme is composed of three subthemes; effective manufacturing, robust business relationship, and intention to continue the business relationship.

4.2.1 Effective manufacturing

Effective manufacturing is one of the main reasons why firms select China to outsource manufacturing. As discussed in the literature review, China provides low-cost labour, resources and infrastructure that facilitate efficient manufacturing. Participants PA, PD and PC held that manufacturing in China is efficient, cost-effective and fast. According to their perceptions, China's recognition as an emerging nation [PC], consistency and the volume of products being made [PD] are some positive reasons to select China for manufacturing.

> *"It's* (manufacturing) *very effective, very cost-effective and very fast in terms of producing product for us, producing components"* [PA] **(efficient and low-cost manufacturing)**

4.2.2 Robust commercial relationship

Another reason firms prefer to have China as their manufacturing partner is the robust commercial relationship between themselves and the Chinese employees. The terms the interview participants used to describe the commercial relationship between them (NZ firms) such as "helpful, open, grateful, loyal, hard-working and appreciative" implied the strong trust-based business relationship NZ firms maintain with Chinese manufacturers. Some participant companies have been manufacturing in China for long periods such as 12 years or 17 years [PC and PD] through varied channels; manufacturing, R&D and

investment [PA, PB, PC and PD] which suggests long uninterrupted business relationships. The robust commercial relationship between business partners could reduce the fear of losing proprietary knowledge or technology, or the ability to identify the existing FTT risks. On the other hand, Chinese partners may not see NZ firms as a threat to their businesses or competitors.

While mentioning that their company has several Chinese investors, participant PA expressed its gratitude/appreciation toward Chinese funds. Some participants seem to be content with the helpful, open relationship with China and confirmed that there have been no disruptions in their relationship with China other than market-led disruptions, i.e. shipping disruptions or government restrictions around Covid-19. According to him, they are wider disruptions rather than anything specific to China [PD]**.** These appreciations and compliments imply the distress of NZ firms about losing a valuable business partner and the consequent disadvantages that could result from such loss.

> *"Low-cost manufacturing and just an emerging nation that's very driven to growth and to development. So you have the deployment of very active and engaged employees* **(appreciation)***, so they are very dedicated to the results of not only their personal growth but also the business growth, so an incredibly loyal and hard-working workforce"* [PC] **(loyal employees, trusted and an uninterrupted business relationship)**

4.2.3 Intention to continue business relationships

The NZ firms prefer to continue manufacturing and improve their business relations with China due to the contented trusted relationship. As participant PA mentioned, some of their actions such as translating documents into the local language (Mandarin) and holding conversations with suppliers in Mandarin [PA] demonstrate NZ firms' efforts to get accustomed to Chinese business culture in order to improve the commercial relationship. These efforts also demonstrate NZ firms' learning and investment in the relationship which suggests the likely demand to share technology. Within a likely FTT environment, foreign firms may try to educate themselves better about the local partners to enhance the ability to detect possible threats.

Going forward, participant PA expressed their strong intention to continue with new Chinese partners and that they have already started working with new Chinese groups. They expressed their ability to remain flexible and open up to new supplier relationships which indicates satisfactoriness, comfortableness and willingness to expand business relationships. However, according to the facts, it is unlikely for the NZ firms to decide to

continue business with China if they are under pressure to transfer their proprietary technological knowledge to Chinese partners and if they are uncomfortable within the business relationship.

> *"I think also we're starting to sell more product; we get our packaging from China* **(strengthening the relationship, more reliance on the Chinese market)** *as well, so we're probably buying a greater number of units per order or per batch than we previously did* **(contentment about the existing relationship)***, which also reduces the transaction costs"* [PA].

Some firms rely on Chinese manufacturers for the manufacturing of their main or most products/equipment [PB and PC]. Such a high level of reliance on China can necessitate NZ firms to continue manufacturing in China since the change of manufacturer (under assumed FTT threat) could cause additional costs and resources. Hence, the degree of reliance is also a factor that compels NZ firms to have China as a manufacturing partner. About 80-90% of some firms' products are manufactured in China and they admitted that China's role in their overall business is "very large" [PC], which indicates the importance of China in their overall business. This high degree of reliance suggests that there could be more channels, a bigger network and government-involved means to sustain in China, which could involve a possible trade-off arrangement (informal) in exchange for the benefits of production in China. Such possible trade-off arrangements may facilitate technology transfer situations.

> *".....we are so integrated into China, because our business has got very large offices there and very big teams there, and we do most of the design development and production here; we are heavily vertically integrated into China"* [PC] **(high integration)**

4.3 The primary need for protecting firms' technology

The responses of interview participants informed the need of protecting firms' technologies or technology-based products that are being manufactured in China based on two factors. One reason is the critical importance of the product to the firm as an intellectual property (proprietary asset) that creates competitive advantages for the firm. The other reason is the possible technology transfer situations in certain stages of manufacturing.

4.3.1 The importance of the technology-based product to the firm and NZ

The responses given by the interviewed firms confirmed that their technology-based products that are being manufactured in China are substantially valuable, not only to the

respective firms but also to the NZ technology sector. In some instances, the product which is being manufactured in China is the main equipment that performs the core function of the business such as a piece of machinery [PB]. For example, the technology company B is using is rendering and environmental processing, and the main machinery used for pumping and milling is manufactured in China which indicates the uniqueness of the product and significance of the technology behind that product. Their China factory is exclusively manufacturing their main equipment [PB]. Since the product is innovative, patented and performs a unique function [PB], it is highly valuable to the firm, the NZ technology sector and the NZ economy. However, these findings also suggest that when firms manufacture through a WOS, the technology is internalised and the possibility of technology leakage or transfer is lessened. A similar scenario was explained by participant PD as follows.

> *"We manufacture and distribute infrastructure, primarily in (name of the product) products, as well as in supporting products such as streetwear accessories, covers, water mains, PVC and others through our Sales Centre network. Firm D has been operating in New Zealand for "X" amount of years; it was founded in "Y" year with a main focus on what was called (name of the product) product; so that's the manufacturing process that was used to manufacture "name of the product."* [PD] **(usefulness to NZ technology sector)**

According to participant PD, out of 140 products of his firm, about 15 are unique designs and they are licensed and certified under firm D's standard mark which indicates the high importance/value of those products to the firm [PD] and the IP value. However, firm D is manufacturing under contract and one of his responses suggested the possibility of blending technology which enables to draw a link between contract manufacturing and the high possibility of technology transfer.

Participant PB mentioned that their recently developed product has got a patent which implies its uniqueness and innovativeness. Generally, the criteria for obtaining patent is uniqueness and novel features of a product that necessitate a high level of protection for the rights attached to it. Further, diverse strategies implemented by firms to protect these unique technology-based products (this finding will be discussed in detail in a proceeding section), such as obtaining IP protection [PA], [PB] registering designs [PD] confirm the value of proprietary knowledge to a firm, the necessity to protect them and the possibility to encounter pressure to transfer such technology to China i.e. FTT.

4.3.2 Possible technology transfer situations

The previous subtheme highlighted the importance of the technology-based product to participant firms and NZ. When such important technologically unique products are being manufactured in China, technology transfer or leakages are possible for the reason that China is lacking indigenous knowledge to develop advanced technologies. According to participant PA, their company usually shares manufacturing files with the Chinese manufacturer that contains specifications on manufacturing the component they need. Firm A would specify their China manufacturing partner the type of material they want the particular product to be moulded in, and the verification procedures that require to be performed before sending them to NZ [PA]**.** Such manufacturing and specification file sharing suggests at a certain kind of technology transfer demand to manufacture the product.

> *"Well, in order to have components manufactured we have had to share the manufacturing files with the sub-contract manufacturer so that they can produce the tooling to make the components, so the (name of the product) tooling, and then make the individual units. So yes, so I guess we also share the materials that we require the components to be manufactured with."* [PA] **(sharing manufacturing files)**

However, participant PC opined that they are being very careful with confidentiality, their manufacturing facilities, and maintain strong terms and conditions. Because in their opinion a lot of manufacturers will potentially copy their products and distribute them through side channels. As discussed in the literature review, IP theft which involves stealing proprietary knowledge or property is closely related to FTT. There are possibilities that employees might steal the proprietary information of a firm and pass it to a third party. One such IP theft situation was mentioned by participant PB where a previous employee stole a unique manufacturing drawing from his company and fled to China, and later on, became a competitor of company B. Hence, participant PC emphasised the need of being cautious while learning and developing processes and systems to evolve with the ever-changing landscapes. Their perception of China is that China is a great example of a country that tries to become more aware and improve IP as it is growing and developing, which indicates their awareness of China's IP theft acts and taking precautions to avoid such situations.

Technology-based companies update their products often and they have to pass the updated information to manufacturers [PD]. In that way, the newest technological updates are often

being passed on to the manufacturing plants in China, which also indicates a passing of new technological information.

> *"What we will do is, if we have a new or a change to one of our designs we will ask the Chinese foundry to make the change or test the change."* [PD] **(passing updated new knowledge to manufacturers).**

According to the information given by participants, there are only two modes the participants manufacture in China; contract manufacturing and through a wholly owned subsidiary (WOS). These two modes seem to impact the degree of risk and type of technology loss in China firms might face. It is apparent that owning a WOS gives more internal control to the parent NZ company reducing the possible technology transfer demands, whereas contract manufacturing increases the possibility of blending and leaking a firm's technology which will be further discussed in the strategy section. Hence, owning a WOS seems to be giving NZ firms more ability to handle possible FTT situations.

When the same Chinese manufacturer produces for several companies (in addition to the NZ firm), the possibility of blending one another's technology [PD] could be high. However, a significant fact that came out of the interviews is the possibility of combining Chinese partners' input/technological knowledge to NZ products [PD] which is quite opposite to the phenomenon being investigated. This means the Chinese manufacturer's input/knowledge could also be blended in a product that is being sent to NZ [PD], and as discussed above, the manufacturing mode matters at this point. Firm D's mode of doing business in China is contract manufacturing and it indicates a high possibility of blending Chinese workers' knowledge with the NZ firms'productions and vice versa in contract manufacturing.

> *"It's quite possible that they'll use features in our products, or other products that they manufacture, and in the same way that the features themselves would have been from other ones that they've already been manufacturing* **(technology blending)**. *So they would have used their knowledge and their R&D to develop the unique features and put them together in a unique item that we sell as a labelled product."* [PD] .

As such, the above discussed two subthemes; the importance of the unique technology owned by a firm for the continuation of its businesses, and the existence of possible technology transfer situations within outsourced manufacturing demonstrate the serious need to protect NZ firms' technology within a possible technology transfer environment.

4.4 FTT experience when doing business in China

The next theme drawn out from the participant responses is the FTT experience when doing business in China. This theme has three subthemes; denial of experiencing FTT in China, lack of knowledge of FTT practices in China, and lack of obtaining information from government institutions and peers when doing business in China. The participants' responses to the questions on FTT experience in China were rather straightforward and short. Some responses showed a strong disagreement about experiencing FTT in China, while some indicated a lack of knowledge of FTT practices and policies in China. Getting advice from government entities and peer businesses before engaging in business in China was also linked to NZ firms' possible FTT experience.

4.4.1 Denial of experiencing FTT in China

Half the participants vehemently rejected experiencing pressure or force to transfer their proprietary technology-based product knowledge to Chinese partners. At the outset, it was apparent that firms had not been subjected to FTT policies during their business processes in China. The firms reiterated that the Chinese Government entities did not require them to pass their propriety information or knowledge to them. While participant PA declared that they have never had pressure applied from a technology transfer perspective, which shows a clear rejection of experiencing FTT, participant PC, mentioned that they are pretty sensitive about the topic of FTT which also shows the divergence of experience in FTT.

> *"No, to the very best of my knowledge we have never experienced that, which I guess is what you would refer to as a forced technology transfer, is that right?"* [PA] ***(clear* rejection of *experiencing FTT)***

Denial of experiencing FTT could be due to the lack of knowledge of FTT practices in China (next subtheme) and the resulting failure to identify them. Or another plausible inference is the technologies used by the participant firms are not particularly novel or worthy of appropriation. However, the latter assumption has less weight, since all the participants in this research seem to own some sort of unique, valuable technology protected by varied means. Yet even though their technologies are valuable to them (participant NZ firms), they may be of less value to China and Chinese firms. As mentioned in a previous finding, the participant firms' trust and loyalty-based relationships with Chinese partners could be another possible reason for them to deny experiencing pressure to transfer technology. Yet, all the participants demonstrated numerous efforts to protect their proprietary technologies using varied strategies (which will be presented in a

proceeding section) which anticipates foreseeing fear/risk of losing their proprietary knowledge including FTT risks.

4.4.2 Lack of knowledge of FTT practices in China

As discussed above, there could be a possibility that denial of experiencing force/pressure to transfer technology may also occur when the firms are unaware of FTT occurring or respondents know very little about the firm's technology in general. Yet, the latter assumption bears less weight since the researcher interviewed CEOs, founders or respective managers (as shown in Table 4.2) who should have a great degree of involvement in the manufacturing process in China. Hence, they were presumed to have sufficient knowledge. Lack of knowledge might prevent participants from identifying FTT policies, and trade performance requirements (as discussed in the literature review, FTT policies could also be disguised as trade performance requirements) when they enter China. Although participants admitted having to comply with Chinese Government requirements when doing business in China, they did not have adequate knowledge about the specifics of such requirements (PB, PC, PD). According to participant PC "whatever country a firm is manufacturing in they have to work and comply with governmental regulations in that space".

> *"I wouldn't know the specifics of that, I'm sorry."* [PC] **(unawareness of FTT practices/policies)**

> *"Ahhh, I have no idea for that question."* [PB] **(unawareness of FTT practices/policies)**

In response to whether the Chinese Government required sharing technological information about company products, participant PD's response was "I am not aware of that occurring", which shows that FTT is not within his identifiable knowledge. Further, in response to whether he is aware of the government policies which require his company to disclose technological information or trade secrets when entering the Chinese market, participant PD replied, "I am not aware, no" which also indicates the company does not possess adequate knowledge on FTT requirements or policies**.**

It was also found that some of the participants did not consult NZ Government units such as NZTE before going to the Chinese market, or afterwards [PD and PC], which suggests non-experience of FTT-related issues. If NZ firms had faced such issues, either the NZTE or any other NZ government entity should be aware of such incidents, or the firms would have informed government units about their FTT policy experience. Participant firms' lack

of direct involvement (as mentioned by them) with the Chinese Government could be another possible reason for their non-experience in FTT. Participant PC mentioned that they had just gone into doing business with China by themselves and they had no need for support at that point as they were more hands-on [PC]**.**

> *"We do not generally utilise or request government support or help when it comes to the… we deal with them directly ourselves."* [PC] ***(No involvement with the Chinese Government).***

Firms venturing into a new market usually consult peer firms to acquire some knowledge about the new market that they are entering to do business. Therefore, participants were asked whether they had heard about the FTT experience from their peers and the responses were negative [PD]. However, participants talked with peers about other issues within regulatory strategy such as reimbursement, complexity, geographical locations, potential partners to work with, things to be careful about etc. [PD]. According to participant PA, the peer companies also constantly discuss experiences about different markets and the nuances of each of those markets. The latter response leads to the thinking; why a contemporary phenomenon like FTT that received wider attention in the context of China was not brought up for discussion when peer businesses discuss nuances of each market.

> *"considerations such as regulatory strategy, such as reimbursement, complexity, geographical locations, things to be careful of, potential partners to work with, all those sorts of things."* [PA] **(peer experience sharing)**

4.5 External strategies

According to the findings, firms deploy multiple external strategies to protect their core technological knowledge from passing-off to manufacturers and competitors. The findings of the previous section indicated that participant companies do not seem to experience FTT-related issues in the Chinese market. Regardless of that, varied external strategies are being implemented by firms to protect their IPs and prevent possible technology transfers.

Obtaining intellectual property protection through law (locally and internationally) is the most significant and common external strategy NZ companies implement to protect their technology-based products and prevent possible technology transfer. Obtaining a patent is the key legal protection available for innovative products that involve a unique technology [PA, PB]. Trademark and industrial design registration [PC, PD] are some other legal measures that prevent products and technology from being illegally acquired. It is apparent from the responses of the participants that there is a high dependency on IP protection granted by law.

> *"firstly, we have registered intellectual property rights, so patents and other trademarks, and now design registrations that have been and are continuing to be registered internationally, including in countries that we manufacture in, for example, China."* [PA] **(obtaining IP rights protection from the law)**

Some firms have a range of products that have got patents with inventive features [firms C and D]. Participant PC mentioned that one of their products has got exclusive patent protection in many countries, including China. They have core forms of IP and proprietary technology across most of their products manufacturing in China [PC]**.** Another participant firm has recently developed an equipment that serves the core function of the business which is protected by patent. [Firm B]**.**

> *"like I alluded to before we will make sure that we get intellectual property, so, particularly in China, Copyright, and then we will go to the Trade Show and make sure…","……Yeah patents as well as copyright and trademark."* [PC] **(obtaining IP rights protection from the law)**

Having a firm's own manufacturing plant (WOS) in China to manufacture exclusively is another significant strategy that firms adopt to counter possible technology blending in situations where manufacturers produce for multiple customers. Having a firm's own manufacturing plant could prevent passing of knowledge to other products, and it facilitates more internal control to protect a firm's technology in China. For example, firm C has plants in China that exclusively work for them [PC]. Having more internal control in respect of production in China enables NZ firms to mitigate the possibility of being forced to transfer technology.

> *"We have our own company, Actually, the China factory is a manufacturing .., say equipment for our business in the world, so mainly in … and the X area, and then they produce some ..wares for other regions as well. So the main role is manufacturing of equipment."* [PB**] (own manufacturing plant/more internal control)**

Doing business with China effectively for a long period leads to strong "customer relations" [PC]. According to participant PC, maintaining good commercial relations is their "biggest protection mechanism" (strategy) to protect the firm's proprietary technology and counter possible technology leakage since the loyal employees will work in good faith and Chinese Government officials could respect such strong foreign relations. Even though PC refers to their relationship

as “customer relations”, it is in fact about a “partner relationship” since there is only a partnership between the Chinese manufacturers and NZ firms.

4.6 Internal strategies

As the findings suggest, firms’ technological knowledge or technological knowledge-based products can be protected through certain internal strategies. One such strategy is assembling the final product in-house [PA]. When firms outsource manufacturing to China, some firms get only the components manufactured and the final product is assembled in-house [PA]. As such, the aggregate knowledge firms are to share with manufacturers regarding the product is reduced.

> *“Secondly, we typically only get sub-components manufactured offshore and we then do all of the final assembly in-house where we bring all of the sub-components together in a final assembly stage to complete the product build.”* [PA] **(assembling the final product inhouse)**

Another way of protecting a firm’s knowledge when outsourcing manufacturing is sharing only the required amount of details or drawings to manufacture the product [PA]. Sharing limited details secures the knowledge in-house and it is an internal decision to decide how and what information to share with the manufacturer.

> *“Yeah, I think the other thing is just in terms of the way of working, we only supply information that is needed on a need-to-know basis. We do not supply any information over and beyond what is the minimal information required to produce the component.”* [PA] ***(sharing only the required part/amount of knowledge)***

According to participant PB, they protect their detailed drawings inhouse without sending them to outside organisations or clients. As a policy, they are allowed to share only the general arrangement or pictorial drawing with China manufacturers [PB] which confirms that non-sharing of detailed drawings or sharing only the required part/amount of knowledge is an effective strategy to maintain core knowledge within the firm.

There is a possibility of leaking proprietary information such as trade secrets to outsiders through company employees who have access to such information. Maintaining internal non-disclosure policies prevent employees from externally sharing commercially sensitive company information. It is an internal strategy that could protect firms’ proprietary information.

> *“Yeah, actually we have our internal policy. Our employee or member cannot give any detailed drawings to our client or our end user; we just only give some pictorial*

drawing or general arrangement drawing. That's our policy, then I think the IT team can monitor these things." [PB] **(non-disclosure policy)**

Keeping core technological knowledge in-house confidentially is another internal strategy NZ firms adopt. According to [PC] they have automation base products and most of that automation is kept confidential within their facilities. The technology behind products evolves often and firms have to instruct their manufacturers to incorporate changes to products accordingly. Hence, the authority to initiate changes, verify and give final approval to the product, lies with the NZ firm. This process gives more authority to the company over their product being manufactured in China which is a good method to protect the firms' technology.

"What we will do is, if we have a new or a change to one of our designs we will ask the Chinese foundry to make the change or test the change. So they'll confirm if it will still meet the specifications that we needed to make, so they'll verify it by design and then they'll test it inhouse, and then if it passes their testing it'll be sent to New Zealand where we will run our own testing on it to verify that the design meets the specification that we need for the New Zealand market. Typically, where the nature of the design changes we will give them an outcome; we wanted to achieve this, and then they will work out how to update the design to meet that need." [PD] **(authority to effect changes, verification and final approval)**

According to participant PC, staying alert on platforms where copied products and technology of firms can be found, marketed and transferred is another effective strategy. Trade shows, e-commerce platforms and customs and border patrols are some places where companies can hunt down firms' illegal copies, and duplicated or appropriated products.

"we will make sure that we get intellectual property, so particularly in China, Copyright, (IP protection) and then we will go to the Trade Show and make sure… Especially in the trade shows in Hong Kong, for example, we will make sure that we walk the trade show and if we see any products that have been copied with our items we will get them removed at the trade show." [PC] **(Staying alert on trade shows, e-commerce platforms, customs and border patrol)**

As a strategy, participant firm C uses tracking mechanisms on e-commerce platforms to find copies of their products and then actions are taken to shut down the respective accounts on e-commerce platforms like Amazon or Taobao which they refer to as 'online take-down'. Since the manufacturers who made these counterfeited products are the ones that usually export them to e-commerce platforms and shutting down their e-commerce platform accounts deprives their

revenue stream. PC also stated that they take measures to stop copies of products at customs and border patrol**.**

Brand protection is another popular mechanism that could protect a firm's technological products [PD]. The brand includes trademarks, logos and designs that differentiate the product from others and grant IP rights to the owners.

> *"Well, like I said, it's mainly around the brand protection, so the designs that are unique to us are more the way that it's put together as a whole set, so there would be a lot of component elements."* [PD**] (brand protection)**

4.7 Transaction cost-related factors involved when manufacturing in China

Participants noted several factors relating to transaction cost elements such as communication costs, monitoring costs, and adaptation costs that were discussed in the literature review chapter. These factors are related to outsourcing manufacturing to China. One such factor is online engagement when doing business with China to reduce communication costs. According to PA, they often use online engagement, especially in the post-pandemic era, to communicate with their Chinese partners. Zoom meetings are also used to perform audits and reduce travel, communication and monitoring costs**.**

As mentioned earlier, the authority to effect changes to the products being manufactured in China and quality verification procedures of participant NZ firms could increase the communication and monitoring cost since such procedures require constant communication and monitoring. However, according to participant PA, performing such procedures before shipping products to NZ reduces the transaction cost.

> *".....to reduce the transaction costs I think yeah, the main ones are… we've implemented more stringent quality procedures as well to ensure that the product is being thoroughly verified from a technical perspective before it's shipped to us."* [PA] **(reduces the transaction cost)**

In the absence of FTT risks (as per the findings), firms tend to make plans to expand and continue their business relations with China [PA, PC] encouraged by a robust trust-based relationship (as per the findings). According to participant PA, as their firm is expanding, more of their packaging will be manufactured in China and a greater number of units per order or per batch will be ordered than they previously did, which will reduce the transaction costs while increasing the communication cost. Firm A is also evaluating the shipping and airfreight costs since currently their products are airfreighted from China**.** The resulting growth in sales and high product volumes

manufactured in China may increase transactions since the growth of businesses between the partners involve stringent monitoring costs and contracting costs, especially in an attempt to secure firms' technology.

In an environment where firms perceive less threat from FTT, they tend to continue with more standard types of manufacturing contracts. Even though going forward with such standard contracts [PC] and agreed terms and conditions could reduce new contracting costs, lack of updated terms and conditions could expose the firm to possible FTT risks and IP thefts.

> *"We just have standardised contracts now though so we have an in-house legal team. We have standardised manufacturing contracts so it's not a big cost. Like I say, it's just a day-to-day business expense, it's pretty standard."* [PC] **(less adaptation cost, contracting cost, monitoring cost)**

The data suggested that manufacturing in China is crucial to most firms since their products being manufactured in China play vital roles in respective business operations [PA, PC, PD]. Therefore, all firms expressed their intentions to improve business relations with China due to overall satisfying experiences. Even though a foreseeable large-scale integration with China is likely to increase transaction costs as well as possible technology transfer and leakage risks, the benefits that participant firms experience in China seem to outweigh such increasing costs and risks and firms perceive such costs as general operational costs [PC].

> *"…. those costs are just general operating costs for us. So we don't have these big upfront costs of integrating a line into China manufacturing, but they're just business costs for us such as tooling or investment and deposits in manufacturing, or…. I mean, they're just business costs at the end of the day that you incur anywhere; it's not specific to China."* [PC] **(less search, monitoring and adaptation costs)**

4.8 Chapter Conclusion

This chapter presented the findings made from the information shared by the participant firms relating to their experience in doing business in China. Six main themes were identified from the participant responses: the importance of having China as the manufacturer, the primary need of protecting firms' technology, FTT experience when doing business in China, external strategies, internal strategies and transaction cost-related factors. Since the identified themes and subthemes were presented and expounded in this chapter, the next chapter will provide an analytical discussion of these findings in the light of the reviewed literature and answer the research questions.

Chapter 5

Discussion of the Findings

5.1 Introduction

The previous chapter presented the findings of this research. It introduced six main themes with seven subthemes formulated out of the interview participants' responses. This chapter critically discusses the said findings and relates them to the existing knowledge of the FTT phenomenon while guiding them toward the research aim.

The first section of this chapter recapitulates the research aim and the research question/s. The second section discusses the implications of having China as a manufacturer for NZ technology firms. Thirdly, the chapter discusses the implications of NZ firms' lack of FTT experience in China and how it impacts their intentions to continue business in China. The fourth section emphasises the primary need of protecting NZ firms' proprietary technology within a likely FTT occurring environment. The fifth section analyses how NZ technology firms could use their external and internal strategies to protect their proprietary technologies in possible FTT occurring environments. Lastly, the chapter focuses on discussing how the findings of this research impact the variations of transaction costs within a possible FTT environment.

5.2 Recapitulation of the Research Aim

The wider purpose of this research has been to investigate the contemporary phenomenon of FTT that has become a significant issue in IBE, particularly for firms doing business in the large emerging market, China, for reasons such as - FTT practices create volatility in free trade, affects FDIs and JVs, reduces appropriability of innovations etc. (USTR, 2018; Petricevic & Teece, 2019; Prud'hommea et al., 2018; Prud'homme & Zedwits, 2019; Qin, 2019; Branstetter, 2019). The literature survey showed that the existing studies have not adequately dealt with this issue to examine the individual country's experience of FTT or how different country firms perceive this problem. Hence, this research aimed to investigate the nature of the FTT experience in the NZ technology firms' context and how they strategically respond to possible FTT-related issues when doing business in China. The findings of this research presented in the previous chapter are used to address the following main question and sub-questions of this research;

> *"How do New Zealand firms strategically respond to forced technology transfer in the Chinese market?"*

i. *Why do NZ technology firms select China for manufacturing?*
ii. *What is the nature of the FTT experience of NZ technology firms in China and how do they perceive it?*

iii. *What kind of strategies do NZ technology firms implement to protect their IPs/technology in general and in the context of China?*
iv. *How do the findings of this study impact transaction cost-related factors in a possible FTT environment?*

5.3 Implications of Having China as a Manufacturer to NZ Technology Firms

One of the main findings of this research is that China is an important destination for NZ firms to outsource their manufacturing activities for varied reasons. As discussed in the literature review, most developed countries select China as their manufacturing destination due to its cost-effectiveness and resourcefulness (Enderwick, 2008; Hikmet & Enderwick, 2015), and the participants' responses confirmed the same reasons such as low-cost manufacturing, effective and efficient manufacturing, and robust relationship with Chinese manufacturers. Hence, it appears that the large benefits and satisfaction NZ firms experience in China outweigh the possible risks and challenges, including a highly critiqued practice such as FTT.

The findings also suggested that not only do NZ technology firms largely rely on China in terms of manufacturing their main equipment, vital components and consumer goods but also such large-scale dependency (reliance) may cause NZ tech firms to continue doing business in China for an indefinite period in the future, despite the possible risks and challenges Chinese market/government may pose in terms of technology appropriation or technology leakage. Some participant NZ firms are largely integrated into China, as much as about 80-90% in terms of manufacturing. With that kind of high reliance in terms of product manufacturing in China, NZ firms are almost bound to continue with Chinese manufacturers. This argument is supported by the interview participants' constant expression of their satisfaction with Chinese manufacturers' performance, appreciation of loyal service and efforts to expand partner relationships in order to continue doing business in China.

The participants seem to be quite comfortable within the existing partner relationship with China since some participant companies had built up 12-year [PB] and 17-year [PC] old uninterrupted manufacturing relationships. According to the findings, trust, loyalty and efficacy of Chinese manufacturers are some reasons for such strong commercial relationships. However, these findings, such as the robust relationship, NZ firms' intentions to continue with China, and the high reliance on China are linked with another finding of this research i.e. denial/lack of experiencing FTT in China that will be discussed further in a proceeding section. Within the contented partnership relationship, the NZ technology firms seem to be trying to get accustomed to Chinese business culture, as evident by some of their acts such as translating documents into Mandarin [PA]. Such learning and investment efforts within the relationship could possibly be interpreted as a way of anticipating possible demands for technology sharing, or it can be the

reality of doing business in a foreign country. Yet, this argument can be countered by saying NZ firms will not decide to continue doing business with China if they are forced to transfer technological knowledge to Chinese partners or if they are uncomfortable with the business relationship.

Accordingly, this section answers the first sub-question: *"why do NZ technology firms select China for manufacturing"* by discussing how important China is for NZ firms as a manufacturer for the reasons such as the benefits of manufacturing in China, fewer threats from FTT practices, high reliance/integrations, and robust, loyal partnership relationship with China.

5.4 Implications of the NZ firms' Nature of FTT Experience in China

The findings suggested that NZ firms are not likely to experience a force to transfer their technologies to China in order to gain market access. The participants' responses suggested a strong denial of experiencing pressure to transfer their technologies to China. The findings also explicated an inadequacy of knowledge of participant NZ firms about FTT practices prevailing in China. As pointed out in the literature review, FTT is a fairly new issue in IBE. Although lack of knowledge of participant NZ firms about such a fairly contemporary phenomenon is admissible to an extent, it must be noted that all the participants were CEOs, founders or managers in the relevant field those who are presumed to have sufficient knowledge of their respective firms' involvement in China. Hence, it is important to discuss possible reasons why NZ firms doing business in China did not experience FTT.

One reason why NZ firms do not encounter technology transfer pressure from China could be the lack of commercial novelty or advancement of their technologies which make them worthy of being acquired. Currently, China has achieved a high level of technological sophistication and it is focusing on competitive leading-edge technologies such as artificial intelligence and 5G (Lam, 2019). Therefore, the technologies NZ firms are using may not be the frontier technologies that China is looking for. On the other hand, NZ technologies may not be compatible with China's future development strategies. In Tesla's case, the Chinese government granted permission for Tesla to set up a WOS since Tesla's global strategy for energy vehicles was compatible with China's mission of full transition to electric vehicles by 2022 (Bursztynsky, 2021; Ma, 2022).

It appears that the ways participant NZ firms engage in businesses with China work as a protection mechanism to counter the possible FTT risks. From the responses of participants PB and PC, it appeared that conducting business through a WOS gives firms more internal control to protect their proprietary technology and handle core knowledge within their own WOS reducing the exposure to probable FTT practices. On the other hand, contract manufacturing (firms A and D cases), could increase the possibility of having to comply with technology transfer demands and

technology blending or leakage. In contract manufacturing, products are being manufactured for multiple companies within the same manufacturing plant that uses diverse technologies and it increases the possibility to blend technology. According to participant PD, the Chinese manufacturers can use features of their products for others while manufacturing for several customers, which is a practical example of how technology could blend or transfer under contract manufacturing. Participant PD also revealed the possibility of Chinese partners' input/technological knowledge being blended into NZ products, which is quite opposite to the phenomenon in investigation and more relates to reverse technology transfer. It was apparent that Chinese manufacturers use their knowledge and R&D to develop the unique features of NZ firms' products when they are requested to design them based on the specifications given by the NZ firms, which exemplifies reverse technology transfer.

Even though the participants denied experiencing FTT practices/policies due to the possible reasons discussed above, their responses indicated some situations where FTT could possibly occur. Proprietary knowledge can transfer through various other means (Qin, 2019) and it does not necessarily have to be a forceful acquisition. Findings explicated that pressure to transfer technology is possible within legally validated business relationships such as contract manufacturing, and other unavoidable means such as document sharing for manufacturing purposes. Firms need to share some sort of documented knowledge to get their products designed/manufactured. Firms do this by sharing manufacturing files with manufacturers. Besides, the technology-based products manufactured in China may require constant upgrades and quality checks, and NZ firms have to share evolving new knowledge with manufacturers to upgrade the products. This whole process may involve a certain degree of pressure to transfer new technological information. This process (sharing of updated knowledge) can also be analysed from the supplier/buyer perspective. The NZ firms (buyers) will want to transfer knowledge to their Chinese manufacturers (suppliers) to upgrade their capabilities because it is the NZ firms who ultimately benefit from this process, particularly if the latter is the sole manufacturer (supplier).

As pointed out in the literature review, the NZ-China relationship is historical and NZ has undoubtedly benefitted from a variety of investments received from China through investors, students and tourists (MFAT, 2022; NZTE, 2014). NZ is the first developed country to enter into an FTA with China and it has also declared support for China's largest project ever i.e. the Belt and Road initiative (New Zealand China Council, 2018) which exemplifies the continuous co-dependency between the two countries. Within a trust-based relationship of that nature, the possible force from the Chinese Government on NZ firms to transfer their technologies could disrupt the long-established geopolitical relationship between the two countries. Hence, it is prudent to arrive at the proposition that loyal partnership relations NZ firms have built over the

years with China could prevent NZ firms either from being subject to technology appropriation or disclosing such experience since it could disrupt the good partnership relationships.

Sharing of FTT-related experiences in China could be highly commercially sensitive. After all, preserving a loyal partnership relationship and strategic preparedness is more advantageous than disclosing an unforeseen risk i.e. FTT. Besides, the participants' firms were only focusing on China for production and better resources due to the high labour shortage in NZ. Their intentions are not to seek market access or to compete with Chinese firms. Under these circumstances, there is no reasonable ground for China to ask for a technology trade-off. Hence, the participant NZ firms are likely to be in a unique minority position of non-experiencing FTT in China and it can also be interpreted as NZ firms' cleverness to avoid risks in other markets such as FTT.

The overarching summary of this section is NZ technology firms lack FTT experience in China, but as per the findings, there are probable situations FTT could occur or have already occurred within the manufacturing relationship. Several possible reasons could cause a denial of experiencing such FTT practices/policies; inadequate knowledge of participant firms about FTT practices and policies in China, the type of technology the participant firms are using is not novel/frontier/leading-edge enough to be acquired by China, China does not perceive NZ firms as a threat/competitor, the robust partnership relationship with China within which NZ firms do not foresee an FTT pressure, and the NZ firms' unwillingness to disclose such experiences due to the long-lasting relationship with Chinese partners. As such, this section answers the second sub-question and the main research question of this research: "*what is the nature of the FTT experience of NZ technology firms in China and how do they perceive it?*"

5.5 The Primary Need for Protecting Firms' Technology

The participants of this research, all of whom are producing technology-based products, contribute to the NZ economy at an appreciable level. Most of their products are unique and innovative products protected by patents, trademarks and trade designs. The findings confirmed the importance of these unique technology-based products to the respective firms and the NZ economy. For example, Firm A is contributing to NZ by producing medical equipment used to treat an illness. Firm B is engaged in rendering and environmental processing technology, while firm C is developing entertainment products. Firm C is contributing to the NZ economy through infrastructure-related manufacturing. When such important technologically unique products are being manufactured in China, there could be possible technology apprehensions or leakages for the reason that China lacks indigenous knowledge to develop advanced technologies.

Going back to the literature review, China's technology acquisition mission from developing countries involves instances where IPs were stolen from NZ and carried away to China

(proprietary technological knowledge is also an IP that is usually protected by a patent). Therefore, the findings on the significance of participants' unique technology-based products suggest the need of protecting them through effective strategies. By analysing the findings, although it is possible to conclude that participant NZ firms were not subjected to technology appropriation policies implemented by China, several situations were identified where FTT could possibly occur (this was discussed before) even in the absence of direct application of FTT policies on NZ firms. Therefore, it is of utmost importance to protect NZ technology through successful implementation of strategies when such products are being made in a country that is critiqued to acquire unique technologies.

5.6 Implications of External and Internal Strategic Measures Implemented by NZ Technology Firms on Possible FTT Situations

The previous section of this chapter discussed the uniqueness of firms' proprietary assets and the primary need of protecting firms' technology within a technology transfer environment. This section discusses some crucial findings of this research; the strategies implemented by participant firms to protect such unique technology or technology-based products. Even though none of the participants expressly mentioned the experiences relating to FTT when manufacturing in China, their external and internal strategies that were discussed in the findings chapter suggest unforeseen risks of FTT and preparation to face them. Hence, the plausible reason for implementing these strategies could be to avoid possible FTT risk in the Chinese market. A summary of such strategies implemented by NZ firms to protect their technologies when outsourcing manufacturing to China is provided in "Table 5.1". As pointed out by interview participants, these measures are used to protect their technologies/technology-based products when manufacturing in China.

Table 5.1

Strategies implemented by NZ firms to protect their technologies when outsourcing manufacturing to China

External Strategies	Internal strategies
Obtaining IPR protection from law	Assembling the final product inhouse
Owning a manufacturing plant (WOS)	Sharing only the required part/amount of knowledge
Maintaining good partner relationships	Non-disclosure policy
	Keeping core technological knowledge inhouse
	Retaining the authority to effect changes, verify and grant final approval to the product
	Staying alert on trade shows, e-commerce platforms, customs and border patrol
	Staying alert on e-commerce platforms
	Brand protection

According to some scholars, how MNCs strategically respond to FTT policies is not adequately researched in IB (Prud'homme & Zedwits, 2019). This research discovered some internal and external strategies implemented by NZ firms to protect their technology-based products in the Chinese market. Even though the participant firms did not expressly admit experiencing FTT, they seem to take varied measures to avoid such a risk. The literature review pointed out that, traditional IB theories support "internal strategies" such as the continuation of informal IP, internalisation, and maintenance of technological uniqueness and complexity to address FTT policies. The IB scholarship also provides that externally oriented strategies such as obtaining IP protection and usage of other non-market activities are often overlooked, which can be more effectively used to respond to FTT policies (Prud'homme & Zedwits, 2019). According to literature IB research needs to focus evenly on externally and internally oriented strategies to manage challenges in emerging markets, (Prud'homme & Zedwits, 2019).

Obtaining IP rights is the most common strategy (external) participant firms use to protect their proprietary knowledge. Obtaining legal protection for their ownership rights is the most plausible and recognised way of protecting an innovative product (WIPO, n.d). However, adherence to IP rights in the Chinese market is quite controversial. As discussed in the previous section, owning a manufacturing plant grants more internal control to NZ firms, thereby facilitating opportunities to protect firms' product knowledge from possible FTT. Maintaining good partner relationships (as discussed above) can be another robust external strategy to emotionally discourage actors from imposing pressure on transferring technology.

One of the internal strategies followed by participant firms is maintaining internal policies to protect secrecy. Firm B maintains the internal non-disclosure policy that none of their employees or members can give any detailed drawing to their clients or end user. They only share their pictorial drawing or general arrangement drawings. Further, the particular firm use its IT unit to monitor the passing of such important drawings. This strategy supports Gooris and Peeters' operational partitioning strategy to maintain secrecy (Gooris & Peeters, 2016). It also suggests how IT development can be used to mitigate FTT risks. Literature also suggests that an important implementation level strategy firms could use is operational partitioning of business processes globally among the services production units (Kumar et al., 2009), which mitigates the risk of misappropriation of proprietary information when services are sourced from abroad (Contractor et al., 2011).

The internal strategy of assembling the final product in-house is another way to keep the core technological knowledge of a product in-house. This strategy is viable under contract manufacturing and when firms get only the components manufactured in China. It is a way of

keeping core technological knowledge in-house. Further, the authority to effect changes, verify and give final approval to the product, is also retained by some participant firms which gives them more internal control while reducing the possibility to be subjected to FTT rules.

As pointed out in surveyed literature, China's adherence to IP rights is quite controversial. It receives criticisms worldwide in respect of large-scale illegal copying of products owned by international brands and IP violations (Li & Alon, 2020). A strategy that could be used to address this kind of situation is staying alert on trade shows, e-commerce platforms and customs and border patrol. Copying products could be seen as a different act from FTT. However, forcedly transferred technology could have been used in these copied products. Especially in situations where NZ firms failed to identify the forced technology acquiring requirements, due to their lack of knowledge about FTT practices (this finding was discussed in the previous chapter), firms can still identify their products/technology in the market. Hence, brand protection is another strategy that owners of technology-based products could use to challenge FTT requirements since it discourages the acts of demanding technology behind a well-established brand.

The participant companies appeared to be satisfied with their prevailing strategic measures to protect proprietary knowledge. Yet, there seems to be room for the improvement of those strategies, especially being technology-based firms in an era of high technological advancement. According to Prud'homme and Zedwits, (2019) firms (refer to MNCs here) are required to advance their risk management strategies in line with transforming value chains, IP institutions, and circumstances that influence the implementation of FTT policies in emerging markets. The findings suggested that NZ firms seem to be largely relying on IP rights protection. Only two firms mentioned acquiring international patents which is crucial when manufacturing in China. According to a participant, standard contracts are being used with a minimal cost which contradicts the need for adaptation to a new environment; in this case China. Continuing with existing contractual terms and conditions may expose the firm to new forms of FTT policies and risks. In an environment, firms believe they have less threat of FTT, the tendency to use standard manufacturing contracts is admissible (which also reduces the cost of keeping the legal terms updated). Yet, the issue is whether China is really a safer environment for IP.

Overall, the strategic measures implemented by participant NZ technology firms seem rather generic. Considering the high technological advancement gained by some NZ technology firms in recent years, more effort to implement novel strategies to protect their core technologies is expected from NZ firms. However, as previously mentioned, one possible reason for less comprehensive strategies could result from inadequate knowledge of FTT practices. Another reason could be the progression that NZ technology and business sectors are still trying to achieve (Kavanagh, 2019). In a situation where participant NZ firms plan to expand business relations

with China, NZ requires advanced strategic measures to protect its knowledge. Even if NZ firms internationalise to any other emerging market, risks of similar nature will be unavoidable. Confirming this future need, PA mentioned that they are continually searching for opportunities and ways to improve and become bigger in terms of funds and resources. As they become more sophisticated in terms of operating procedures, they will pay attention to possible FTT types of issues. This suggests that the firms have some sort of expected risk in future as they further internationalise.

As such, this section responds to the third sub-question of this research: *"what kind of strategies do NZ technology firms implement to protect their IPs/technology in general and in the context of China?"* and the main research question: "*How do New Zealand firms strategically respond to forced technology transfer in the Chinese market?*"

5.7 Impacts of Findings on Transaction Cost-related Factors in a Possible FTT Environment

According to the TCE theory, a goal of an organisation is to minimise the costs of exchanging the resources in the environment and the costs of managing these resources inside the organisation (Williamson 1979; 1981). Western firms that enter emerging economies tend to experience increases in transaction costs without adequate information about their local partners (Meyer & Peng, 2016). They must incur high costs for negotiations with agents due to inexperience in the environment, unfamiliarity with regulatory frameworks, and corruption. In the case of manufacturing in China, the search costs can be less since the "partner" is often predetermined. In all four interviews, participants had a clear idea about using China for their manufacturing. Some participant firms such as C and D did not consult NZ Government units to seek further information (search) when they decided to go to China. Hence, the search cost is less when the partner is predetermined.

According to TCE theory, transaction costs are generally impacted by opportunism (Williamson, 1981). The theory section of the literature review chapter discussed China's opportunistic behaviour in terms of forced technology acquiring practices from developed countries. China receives investment and revenue from NZ technology firms manufacturing in China either by way of WOS or contracts. In these scenarios, there can be opportunities for Chinese manufacturers to enhance manufacturing expertise and technological knowledge (as a trade-off to produce NZ products), which may also include the possibility to incur pressure to transfer technology.

Some other important TCE factors are contracting, adaptation and monitoring costs. It was presumed in the TCE theory discussion in the literature review that contracting costs of transactions could be comprehensive or probably high within the FTT environment since the

parties are seeking quite different assets within the FTT phenomenon; market and technology. However, one participant mentioned that their legal cost (contracting cost) is minor since they mostly use standard manufacturing agreements. Contracting, adaptation and monitoring costs could be low when China does not consider NZ firms as competitors since NZ firms are not seeking market access. When China counts NZ firms as unimportant entrants, they are unlikely to be subject to FTT. Although within a likely FTT occurring environment adaptation costs could have been high since the firms have to keep updating contract terms requiring more transparency, in this case, contract updating costs appear to be low since NZ firms are less likely to encounter FTT risks in China. However, some NZ firms attempt to get accustomed to Chinese business culture by translating documents into the local language etc. [PA] which could incur additional adaptation costs for the company in the form of learning and investment costs.

According to Williamson (1981), bounded rationality (limited capacity to store and analyse information) is a critical factor and a behavioural assumption that impacts transaction cost. When making transaction decisions the company owners'/directors' rationality is bounded due to the limited information they have. PC mentioned that they did not consult government units to get information when entering China. None of the participants had received information about FTT practices or possibilities for FTT from peers. These factors could have limited the ability of firms' decision makers (such as CEOs, Managers) to process information. Factors such as the ability to evaluate and process information, and the limited time available for evaluation impact understanding of the business situation (Flache & Dijkstra, 2015, Cuypers et al., 2021).

In a situation where foreign firms (in this research, selected NZ firms) had to hand over their technological knowledge in exchange for market access, they may need to invest in maintaining the technological lead over the local partner and market competitors, which could once again lead to high costs. For example, participant PB mentioned a situation where a former employee who stole his company's proprietary drawing became a competitor in China. As such, since there is always a possibility of losing proprietary technology, firms need to be prepared with alternative strategies to maintain the market lead.

The monitoring costs are incurred to ensure that the terms of the contract have been met (compliance). Monitoring costs can be high in the purview of the FTT phenomenon because a possible breach of the contract terms, IP theft or IPR violation could result in taking legal actions which add to additional costs. Participant PB mentioned an IP theft the company faced, and participant PC also mentioned the possibility of duplicating their products in China. Such incidents necessitate the initiation of legal actions and strengthening of IT supervision, adding to high costs.

Accordingly, in the light of the interview participants' experience in the Chinese market, this section observed the nature of the transaction costs (increments or decrements) when attempting to protect their proprietary asset/technology in an environment that exists possible force to transfer technology. Hence, this section answers the fourth sub-question of this research: *"how do findings of this study impact transaction cost-related factors in a possible FTT environment?"*.

5.8 Chapter Conclusion

This chapter discussed the findings of this research presented in the previous chapter. The collected data was guided toward the research aim and research questions. During that process, some useful insights gained from the literature review were incorporated to back up the discussion on findings. The next chapter will contain the conclusion and future recommendations of this research.

Chapter 6
Conclusion and Recommendations

6.1 Introduction

The previous chapter discussed the findings of this research in-depth and the implications of the findings. This chapter summarises the study in three main sections. The first section provides a summary of the entire research and its contribution. The second section provides recommendations in the purview of the research findings and surveyed literature. The third section presents the limitations of this research and suggestions for future research.

6.2 Summary of the research

FTT has been a significant topic of IB in recent years. While technologically advanced countries such as the US, Germany and UK dominate the economic forefront of the world demonstrating the cruciality of technological advancement for economic development, some new emerging markets have almost caught up with these developed countries at a rapid economic success rate in recent years. China is one such major emerging market bestowed with a vast amount of resources including low-cost labour, infrastructure and land which many developed countries cannot resist doing international business with. Therefore, most developed countries seek market access and resources in China. China, strongly led by one-party-dominated, state-centred leadership, is strategically moving forward to gain the world's hegemonic leadership. To achieve its mission, China deploys certain practices to acquire the most advanced technologies from developed countries and FTT has been recognised as one such major practice.

FTT practices are defined and critiqued as a way the Chinese government acquire unique technologies from foreign technology firms entering to do business in China through FDIs, JVs, licensing or contract manufacturing by pressuring them to share their proprietary technological knowledge in exchange for market access. The Chinese government incentivised policies play a major role in the FTT process. However, it was identified by reviewing existing scholarly literature that this issue is under-researched in IBE and only a few studies have examined the individual country's experience of FTT. Therefore, the current study aimed to investigate the FTT phenomenon in one country setting which is NZ. The researcher selected NZ to explore this phenomenon due to its close relationship with China in terms of export, investment, tourism and education. The researcher aimed at investigating the nature of NZ technology firms' FTT experience when doing business in China. To achieve this aim, the researcher selected four NZ technology-based firms; two of them are outsourcing manufacturing to China through contracts and the other two are manufacturing in China through WOSs. The researcher followed the qualitative research methodology for this research and data were collected through telephone interviews conducted with participants. The gathered data were analysed using thematic analysis

and it generated six main themes and seven sub-themes that were used to answer the research questions.

The research found that having China as a manufacturer is highly important to the participant NZ firms due to the effective manufacturing skills of Chinese partners, robust-loyal business relationship with Chinese partners, high reliance on China, and intentions to continue manufacturing in China in future. This research also found that NZ technology firms are not likely to experience FTT practices in China and it could be due to the unwillingness to disclose such experience due to their long-term intentions to conduct business in China and the commercial sensitivity of such information. Lack of knowledge of FTT practices and policies prevalent in China, less communication with NZ and Chinese government institutions, and less information received from peer businesses about FTT experience are some other possible reasons found for less FTT experience of NZ technology firms. It was also found that the type of technologies used by participant NZ firms may not be leading-edge technologies that China is looking for or NZ firms are clever enough to evade FTT pressure in China by maintaining good relationships.

This research also found that there is a connection between the mode of doing business in China with possible FTT risks. While it appeared that having a WOS in China may act as a protective mechanism for NZ firms to defend themselves from possible FTT pressure, contract manufacturing seemed to be exposing the firms to possible FTT risks, technology blending and leakage and even reverse technology transfer situations. The research also found the primary need of protecting NZ firms' proprietary technology within a likely FTT occurring environment since the proprietary technologies used by the participant firms are highly important to them as well as to the NZ economy. The research study found varied external and internal strategies implemented by NZ firms to protect those proprietary technologies in a possible FTT occurring environment. This work also found that the above findings could impact the variations of transaction costs of participant NZ firms within a possible FTT environment at varying degrees.

6.2.1 Contribution of this research

Forced technology transfer is a major concern raised by investors and trading partners when doing business in China. Therefore, the researcher believes that the participant firms enhanced their knowledge about a contemporary international business issues by taking part in this research. Their enhanced knowledge will enable them to make improved business decisions and most importantly to be strategically prepared to respond to future risks of losing their proprietary technological knowledge in emerging markets including China.

This research adds new knowledge to the IB research discipline and other disciplines and new primary data. According to the researcher's knowledge, only a few prior pieces of research exist on this research topic and this could possibly be the first research that investigated the FTT in the context of NZ firms. Potential benefits of this research also extend to institutions such as NZTE, NZMFAT, MBIE and China Chamber of Commerce NZ who may gain a heightened awareness about opportunities or challenges in emerging markets. The research will contribute to the wider community by making them aware of the importance of protecting a firm's proprietary technological knowledge when doing international business.

6.3 Recommendations

1. This research explored strategies implemented by NZ technology firms to protect their unique proprietary knowledge in general as well as in China from possible FTT practices. However, it appears that there is room for improvement in those strategies. For example, participant NZ firms appeared to be relying largely on IP protection from the law. Yet, firms should be concerned about registering their IPs internationally, particularly in China since the participant NZ firms indicated their intentions to continue doing business in China. Hence, NZ firms require advanced strategic measures to protect their core technological knowledge. For example, they can use their IT expertise to establish monitoring systems to monitor technology leakage or theft. Further, NZ firms could implement management strategies such as operational partitioning to preserve the secrecy of their knowledge (Gooris & Peeters, 2016) and legal measures such as constant updates of contractual terms and conditions.

2. It was discussed in the literature review that FTT may occur via "unintentional knowledge transfer" which means unintended leakage of knowledge from the firm (Taylor, 1993). This may happen to the firms that have already entered the Chinese market via JVs or contract manufacturing. Unintentional knowledge transfer is a possible way in which state technology transfer policies might attempt to operate (Prud'homme et al., 2018). Hence, it is recommended for the firms doing business in China to be knowledgeable of "unintentional knowledge transfer" situations.

3. Two components may impact foreign firms' technology transfer abroad; the robustness of the IP system of the foreign country and the market entry mode of the foreign firm (Hall, 2014; Park & Lippoldt, 2014). China's IP laws and protection regime is still improving. Therefore, while NZ firms manufacturing in China may raise their IP protection standards, they should also be concerned when manufacturing through sub-contracts since it may lead to technology leakage. As pointed out in the discussion,

owning WOS could be a better strategy to do business in China since it gives more internal control to NZ firms.

4. It was discussed in the previous chapter that NZ firms' denial of FTT experience in China may be due to the lack of ability to identify FTT policies and practices. This could impact their intentions to continue business in China. Being knowledgeable about risks and challenges present in emerging markets, including FTT enable the NZ firms to be strategically prepared. Therefore, it is recommended for the NZ technology firms to enhance their knowledge of threats and risks in the emerging market including issues such as FTT in China. This can be done by establishing an effective consultation mechanism with NZ government institutions such as NZTE, NZMFAT and MBIE. According to the findings, none of the participants had received information about possible FTT issues in the Chinese market from peer businesses. Therefore, it is prudent for the companies who have encountered FTT experience to make them vocal or documented. A lack of information limits the ability of decision makers to process information as discussed under the bounded rationality of TCE theory (Williamson, 1981).

5. It appears that China's trading partners and foreign business owners are not content with its IP improvements. According to some critics, China did not have to force NZ to acknowledge China's political influence and soft power activities since the NZ government willingly accepted it (Brady, 2017). But, as per the rule-of-law view, ''countries should take action to pressure China to meet its IPR obligation'' (Brander et al., 2017) and it is recommended for NZ to be part of that encouragement process due to the great partnership relationship they have been maintaining with China and NZ firms' intentions to expand businesses with them in the long run.

6. There are instances that technology transfer is imperative to achieve common sustainable development goals such as tackling climate change (United Nations Climate Change, 2022) and improving the quality of life of people. Businesses may learn key managerial and marketing technologies within a just technology transfer arrangement (Velasquez, 2009). The findings also provided that there are technology blending and reverse technology transfer possibilities within the NZ and Chinese manufacturing relationship. It was also presumed that NZ firms' technology may not be leading-edge enough to be forcibly acquired which suggests the need to improve NZ technologies. Hence, instead of imposing pressure, "just exchange" of technology between NZ and China, respecting the IP rights of both parties, could enrich the partnership relationship and contribute to the technological advancement of both countries.

6.4 Limitations of the current study and suggestions for future research

There are several under-researched areas within the FTT phenomenon that open multiple avenues for future research.

1. It is open for future researchers to investigate the nature of FTT practices and policies present in other large emerging markets such as India, Brazil, South Africa, and Russia. China is not the only emerging nation where NZ firms outsource manufacturing. Hence, future researchers could investigate whether NZ firms experience FTT practices/policies in other emerging markets too. Investigating risks prevalent in the emerging market benefits the IB scholarship and industry leaders. Future research could also analyze the benefits of outsourcing manufacturing to China as opposed to FTT and IP theft issues. Researching the global perspective of the FTT phenomenon on a wider scale and more empirical research on FTT practices are highly encouraged.

2. This research studied the FTT experience only in NZ technology firms' context. It is always beneficial for the research community to widely investigate the FTT experience of other countries that have invested in China via FDI, JVs, contract manufacturing or licensing. Even though participant NZ firms had apparently unique technologies, none of them appeared to have experienced FTT. One possible reason for that could be the lack of uniqueness in their technologies to be appropriated by China. Therefore, it will be important to find what type of technologies China is mostly after. Research could examine whether there is a relationship between strategic emerging industries set out in the Made in China 2025 plan and the types of technologies China is seeking to acquire. This situation can be widely investigated from the perspective of China.

3. It was found that the mode of doing business in China has a close relationship with FTT risks. It appeared that contract manufacturing exposes firms to more FTT risks. The literature suggested that market entry modes such as JVs, licensing or contract manufacturing have a clear impact on the level of exposure to FTT (Prud'hommea et al., 2018). Therefore, future research could investigate in depth the relationship between FTT and market entry modes (modes of doing business in China).

4. It is always crucial for firms to study more about the best strategies that could effectively counter FTT practices while maintaining robust business relationships in China.

This research studied the FTT phenomenon in the context of NZ technology firms. Due to the time constraints and comprehensive inclusion criteria, only a limited number of companies were

found and expressed readiness to participate in the research. The data represents only NZ technology firms' experience of FTT when manufacturing in China. Therefore, the findings are country-specific and industry-specific. As mentioned above, future research could investigate other countries' perspectives and global perspectives of the FTT phenomenon in-depth. The research presents only the NZ technology firms' experience who manufacture products or components in China and not the other companies. This research has interviewed only one participant from each firm and future research could learn a wide spectrum of ideas about the FTT issue by interviewing several participants from each company.

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Appendix A: Interview Guide

Indicative questions to the participants

1. Background information of the participating company
    - Please explain the nature of your business
    - How many years have you been conducting business/international business since the incorporation?
    - How long has the company been doing business with China?
    - Briefly explain what kind of business transaction/activities you conduct with China (production/manufacturing, R&D, etc.) and how it happens (via joint venture/ partnership/ contract manufacturing/ WOS etc.)
    - What kind of a role does China play in your overall business operations as a business partner?
2. What kind of unique technology /technologies has the company been using and owning?
3. Has the company obtained intellectual property rights protection for any of the technology /technologies company has been using?
4. Have you ever had to share information about your core technological knowledge with Chinese business partners/government as part of your business agreements? Please share your experience
5. If yes, how did you respond to such a requirement to share knowledge?
6. What strategic measures has your company implemented to avoid transferring your core technological knowledge to Chinese business partners?
    - What did you/your company do to protect its intellectual property in China?
7. Have such measures disrupted the business relationship with them/Chinese officials?
8. Did you consult others before going to China? (e.g. other businesses from your network, government agencies such as NZTE)
9. Going backward, having the knowledge that you have now, what things that you might do or not do to protect your technology when dealing with the Chinese market?

10. Are you going to protect your company's technology/proprietary information in the same way or differently? and why?
11. When your company implements different strategies to protect their technology when manufacturing in China, do those measures add more costs to the company?
    For example:
    - Search costs to obtain information about manufacturers (communication)
    - Contracting costs draft contracts,
    - monitoring costs about compliance to contract terms,
    - adaptation costs (update terms and conditions, intellectual property protection related costs)

Appendix B: Invitation Email sent to potential participants

Dear Sir/Madam,

Research Invitation

My name is Madhushika Thilini Thambugala. I am currently undertaking a research for my Master of Business dissertation in International Business at Auckland University of Technology titled "Forced Technology Transfer in China: The Experience of New Zealand Firms". I am conducting interviews as part of a research study to increase understanding of how "Forced Technology Transfer" is perceived and experienced by New Zealand technology-based firms that conduct businesses with China. As a firm owner/CEO/Director/Manager or a decision-maker, if you are in a position to share with me your valuable first-hand experience relating to the above topic representing your company, I will be immensely thankful. If more appropriate, please pass this invitation onto a person in your company who has knowledge of the company's technology, strategies, and business activities with China.

I am inviting you to participate in my study as your participation will be valuable to the research and findings, which could lead to a greater public understanding of the effective ways to maintain international competitiveness within New Zealand's technology-based manufacturing industry and protect intellectual property. I am sending herewith an "information sheet" which contains detailed information about the research. It will help you to make a decision about your participation in the research.

The interview will take approximately 30-40 minutes. If you are willing to participate, please suggest a day and time that suits you and I will do my best to be available. If you have any questions, please do not hesitate to ask. My contact mobile number is 0221080042. I would welcome the opportunity to discuss this with you if you seek further clarification. In addition, I would be happy to provide any further information you may require in order to make a decision. If you have any questions about this research project you may also contact my primary supervisor Dr Taghreed Hikmet (email taghreed.hikmet@aut.ac.nz) at any stage.

Thank you for your time to read this email.

Sincerely,

Madhushika Thilini Thambugala

AUT Student ID 20109077

Appendix C: Information sheet provided to the participant firm

Participant Information Sheet
(For the Owner/CEO/Officer authorised to grant permission to access company information)

Date Information Sheet Produced:

20th May 2022

Project Title

Forced Technology Transfer (FTT) in China: The Experience of New Zealand Firms

An Invitation

My name is Madhushika Thambugala. I am a student at Auckland University of Technology (AUT) reading for the Master of Business Degree. This research is conducted as partial fulfilment of my degree and I am inviting your esteemed business organizations to take part in my research. I am exploring the New Zealand technology firms' experience pertaining to "Forced Technology Transfer (FTT)" in the Chinese market which is a contemporary issue in international business. For this purpose, I am inviting some technology-based New Zealand firms that conduct businesses in China to take part in my research. I request your company to pass this invitation to an appropriate representative nominated by your company to take part in my interview. This interview will be conducted approximately for 35-40 minutes via an online meeting platform such as Zoom or Skype or if preferred, face-to-face at your company office or at AUT premises at a time and date convenient to the interview participant nominate by your company. I highly appreciate your participation in this research study.

What is the purpose of this research?

Forced technology transfer (FTT) is an issue raised by investors and trading partners when doing business with China. FTT occurs when the Chinese government requires a foreign firm to share its proprietary information (company-owned valuable information) in exchange for access to the Chinese market. This research aims to explore the experience of New Zealand (NZ) firms in terms of FTT in the Chinese market and how they strategically respond to this issue. The findings of this research will be published in my dissertation and academic publications such as journals and presentations. Your company will not be identified in the research findings. Your company name or your representative's will not be disclosed in the final work and pseudonyms will be used to conceal your identity.

How was I identified and why am I being invited to participate in this research?

Your company was identified as a potential participant in this research because it is a New Zealand owned technology-based company that uses technology as a proprietary asset and

your company has been doing business with China for a minimum of two years. I found your company information on the internet/Social Media platform. I did a background research based on the publicly available information of your company. Two inclusion criteria were considered to invite your company for this research. One is your company is based on an apparently unique technology. The second criteria is that your company has been doing business in China for more than two years presumably by way of Joint venture or other sourcing arrangement with China. I believe your company is more than an exporter of completed products or services and therefore may be sharing technology with Chinese partners. Studying your company's experience pertaining to FTT when conducting business with china and how you strategically respond to it is highly beneficial for this research since it will contribute to the key findings.

How do I agree to participate in this research?

I will provide two "Information Sheets" (for your company and for your company representative) explaining about this research. I will provide a "Permission to Access form" to your company to obtain permission to approach your staff and obtain and use company information relevant to the research. You company (owner/CEO/Any Officer authorised to grant permission to access company information) can sign and email that to me at xjj3592@autuni.ac.nz I will also provide a "Consent Form" for your company representative (interview participant) and she/he can agree to take part in this research by sending a signed copy of the Consent Form to me at xjj3592@autuni.ac.nz These will be emailed to you separately. Notes will be taken during the interviews and the interview will also be audio-taped and transcribed. Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

This research conducts semi-structured interviews to collect data from participating companies. Your company representative (the interviewee) will be interviewed for 35-40 minutes via an online meeting platform such as Zoom or Skype or if preferred, face-to-face at your company office or at AUT premises at a time and date convenient to you. I, the primary researcher (Madhushika Thambugala) will ask the questions from the interviewee on the research topic. The interview guide which contains the interview questions will be emailed to the interviewee 7 days prior to the date fixed for the interview to prepare answers. However, some additional questions will be raised based on the interviewee's answers when necessary and to seek clarification. The interviewee can answer or refuse to answer these questions. The interviewee can also amend her/his answers. The interview will be audio-recorded and transcribed. A transcript of the interview will be sent for the interviewee's approval and the interviewee will be requested to approve it at her/his earliest. At that stage, he/she can amend, delete or modify her/his answers.

I will be asking general questions about the nature of your business and relationship with china, China's role in your business as a partner, nature of the unique technology the

company is using (not in depth) and whether it is protected through intellectual property rights, whether you had to share your core technological knowledge with Chinese business partners/government as part of your joint venture/sourcing agreements, how did you respond such requirements, what does your company do to protect its intellectual property in China, whether your company consult others before going to China, whether you are going to protect your company's technology from dissemination in China and if yes, how. You, as the interview participant should be with knowledge of the company's operations in China, about the company's technology, technology transfer experience encountered in China and strategies implemented in response.

What are the discomforts and risks?

There are no foreseeable discomforts or risks involved in this research or interview process. I, (the interviewer) will maintain the best professional etiquette to minimise possible discomforts that could arise during the interview. The interview questions will relate only to the research topic and will not lead to personal discomforts or embarrassment. The interviews are designed to gather information about your professional knowledge.

I will not require disclosure of commercially sensitive company information such as trade secrets, business strategies or any data regarding financial or operational performance that the company is not willing to share and consider as confidential. I will only be collecting information relating to the FTT experience of your company, whether it has been an issue and how your company respond it. I will be using pseudonyms for your company in the research dissertation and other publications and avoid disclosing information as best as possible that could reveal identify of your company. I will be signing a Confidentiality Agreement with the interview transcriber to protect the confidentiality of participants. Only the research supervisors and I will have access to original data (information) and after the research they will securely be kept with the primary supervisor at her office at AUT in a password locked device which will be destroyed after six years period. You are at the liberty to not to answer any question and withdraw from research up to the end of data collection. However, once the findings have been produced, removal of your data may not be possible.

How will these discomforts and risks be alleviated?

Your participation in this research is voluntary and you are able to withdraw from the study at any time. If you withdraw from the study then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible. Your identity will be confidential and your privacy will be preserved. Your compnay representative is not required to answer all the questions if he/she does not want to. I will do my best to maintain an interesting interview as far as possible.

I assure you a high level of confidentiality. I will be signing a Confidentiality Agreement with the interview transcriber to protect the confidentiality of research data. Interview recording device will be in my possession until the end of the research. Only the transcriber, the research supervisors and I will have access to original data (information) and after the research they will securely be stored with the primary supervisor at her office at AUT in a password locked device which will be destroyed after six years period.

What are the benefits?

FTT is a major concern raised by investors and trading partners when doing business with China. Therefore, you will be able to enhance your knowledge of a current business phenomenon and thereby make improved business decisions. This research will help New Zealand companies to be strategically advanced to manage the current forced technology transfer environment and protect their valuable intellectual properties. Further, this research is designed to generate new knowledge beneficial to the New Zealand business community that conducts business and invest in the large developing market, China. Therefore, knowledge to be discovered through this research will mutually benefit you and me. Most importantly, the successful completion of this research will enable me to earn the Master of Business degree from AUT.

How will my privacy be protected?

Please note that all the information you provide is used for research purposes only. A "Permission for Access Form" will be given to your company and permission will be sought to obtain information relevant to this research. Your privacy will be protected using pseudonymised names (changed to a fictive name) instead your real company name or your representative's real name. A certain code will be assigned to every participating company (E.g. Ab, Cd, Ef etc.) and to the company representative (E.g. X from company Ab, Y from company Cd) to preserve identity and confidentiality. Nobody else will know these codes apart from myself, the research supervisors, and the selected professional interview transcriber who signed a confidentiality agreement. Accordingly, your company will not be identified in the research findings. However, you could choose to be identifiable in the publications. The original information provided by you will be shared by me only with supervisors involved in this research.

What are the costs of participating in this research?

There are no costs of participation involved in this research. I deeply appreciate your representative allocating 35 to 40 minutes of your valuable time for this research.

What opportunity do I have to consider this invitation?

You will receive an email inviting you to participate in this research along with this information sheet. 14 days period will be given to make a final decision regarding your participation. Once you confirm your participation, you will be requested to sign a "Permission to Access form" and your company representative will be requested to sign a "Consent Form". An interview will be scheduled at a time, and date convenient to your company representative. The interview will be through an online meeting platform such as Zoom or Skype or if you prefer, face-to-face at your company office or at AUT.

Will I receive feedback on the results of this research?

Yes. In the consent form if your representative selects the option "I wish to receive a summary of the research findings", I will be more than happy to email you a summary of the findings of my research.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Taghreed Hikmet, via email on *taghreed.hikmet@aut.ac.nz,* or by calling on 0921 9999 ext:5313

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *ethics@aut.ac.nz* , (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and copies of the Permission to Access form and Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Madhushika Thambugala, xjj3592@autuni.ac.nz, (+64)221080042

Project Supervisor Contact Details:

Dr Taghreed Hikmet, taghreed.hikmet@aut.ac.nz, work phone number. 0921 9999 ext:5313

Approved by the Auckland University of Technology Ethics Committee on *9th May 2022*, AUTEC Reference number *22/76*.

Appendix D: Information sheet provided to the interview participant

Participant Information Sheet
(For the Company Representative/Interviewee nominated by the Company)

Date Information Sheet Produced:

20th May 2022

Project Title

Forced Technology Transfer (FTT) in China: The Experience of New Zealand Firms

An Invitation

My name is Madhushika Thambugala. I am a student at Auckland University of Technology (AUT) reading for the Master of Business Degree. This research is conducted as partial fulfilment of my degree and I am inviting your esteemed business organizations to take part in my research. I am exploring the New Zealand technology firms' experience pertaining to "Forced Technology Transfer (FTT)" in the Chinese market which is a contemporary issue in international business. For this purpose, I am inviting some technology-based New Zealand firms that conduct businesses in China to take part in my research. I requested your company (owner/CEO/Person authorised to grant access to information) to pass my invitation to an appropriate representative to take part in my interview. This interview will be conducted approximately for 35-40 minutes via an online meeting platform such as Zoom or Skype or if preferred, face-to-face at your company office or at AUT premises at a time and date convenient to you. I highly appreciate your participation in this research study.

What is the purpose of this research?

Forced technology transfer (FTT) is an issue raised by investors and trading partners when doing business with China. FTT occurs when the Chinese government requires a foreign firm to share its proprietary information (company-owned valuable information) in exchange for access to the Chinese market. This research aims to explore the experience of New Zealand (NZ) firms in terms of FTT in the Chinese market and how they strategically respond to this issue. The findings of this research will be published in my dissertation and academic publications such as journals and presentations. Your company name or your name as the company representative will not be disclosed in the final work and pseudonyms will be used to conceal your identity.

How was I identified and why am I being invited to participate in this research?

The company you represent was identified as a potential participant in this research because it is a New Zealand owned technology-based company that uses technology as a proprietary

asset and your company has been doing business with China for a minimum of two years. I found your company information on the internet/ Social Media platform. Then I did a background research based on the publicly available information of your company. Two inclusion criteria were considered to invite your company for this research. One is your company is based on an apparently unique technology. The second criteria is that your company has been doing business in China for more than two years presumably by way of Joint venture or other sourcing arrangement with China. I believe your company is more than an exporter of completed products or services and therefore may be sharing technology with Chinese partners. Studying your company's experience pertaining to FTT when conducting business with china and how you strategically respond to it is highly beneficial for this research since it will contribute to the key findings.

How do I agree to participate in this research?

I will provide two "Information Sheets" (one for your company and one for you) explaining about this research. I will provide a "Permission to Access form" to your company to obtain permission to approach staff and obtain and use company information relevant to the research. You company (owner/CEO/Any Officer authorised to grant permission to access company information) can sign and email that to me at xjj3592@aut.ac.nz. I will also provide a "Consent Form" for you (company representative/interview participant) and you can agree to take part in this research by sending a signed copy of the Consent Form to me at xjj3592@aut.ac.nz. Notes will be taken during the interviews and the interview will also be audio-taped and transcribed. Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

This research conducts semi-structured interviews to collect data from participating companies. You (in the capacity of a company representative) will be interviewed for 35-40 minutes via an online meeting platform such as Zoom or Skype or if preferred, face-to-face at your company office or at AUT premises at a time and date convenient to you. I, the primary researcher (Madhushika Thambugala) will ask the questions from you on the research topic. The interview guide which contains the interview questions will be emailed to you 7 days prior to the date fixed for the interview for you to prepare your answers. However, some additional questions will be raised based on your answers when necessary and to seek clarification. You can answer or refuse to answer these questions. You can also amend your answers. The interview will be audio-recorded and transcribed. A transcript of the interview will be sent for your approval and you will be requested to approve it at your earliest. At that stage, you can amend, delete or modify your answers.

I will be asking general questions about the nature of your business and relationship with china, China's role in your business as a partner, nature of the unique technology the company is using (not in depth) and whether it is protected through intellectual property rights, whether you had to share your core technological knowledge with Chinese business

partners/government as part of your joint venture/sourcing agreements, how did you respond such requirements, what does your company do to protect its intellectual property in China, whether your company consult others before going to China, whether you are going to protect your company's technology from dissemination in China and if yes, how. You, as the interview participant should be with knowledge of the company's operations in China, about the company's technology, technology transfer experience encountered in China and strategies implemented in response.

What are the discomforts and risks?

There are no foreseeable discomforts or risks involved in this research or interview process. I, (the interviewer) will maintain the best professional etiquette to minimise possible discomforts that could arise during the interview. The interview questions will relate only to the research topic and will not lead to personal discomforts or embarrassment. The interviews are designed to gather information about your professional knowledge.

I will not require disclosure of commercially sensitive company information such as trade secrets, business strategies or any data regarding financial or operational performance that the company is not willing to share and consider as confidential. I will only be collecting information relating to the FTT experience of your company, whether it has been an issue and how your company respond it. I will be using pseudonyms for your company in the research dissertation and other publications and avoid disclosing information as best as possible that could reveal identify of your company. I will be signing a Confidentiality Agreement with the interview transcriber to protect the confidentiality of participants. Only the research supervisors and I will have access to original data (information) and after the research they will securely be kept with the primary supervisor at her office at AUT in a password locked device which will be destroyed after six years period. You are at the liberty to not to answer any question and withdraw from research up to the end of data collection. However, once the findings have been produced, removal of your data may not be possible.

How will these discomforts and risks be alleviated?

Your participation in this research is voluntary and you are able to withdraw from the study at any time. If you withdraw from the study then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible. Your identity will be confidential and your privacy will be preserved. You are not required to answer all the questions if you do not want to. I will do my best to maintain an interesting interview as far as possible.

I assure you a high level of confidentiality. I will be signing a Confidentiality Agreement with the interview transcriber to protect the confidentiality of research data. Interview recording device will be in my possession until the end of the research. Only the transcriber, the research supervisors and I will have access to original data (information) and after the research they will securely be stored with the primary supervisor at her office at AUT in a password locked device which will be destroyed after six years period.

What are the benefits?

FTT is a major concern raised by investors and trading partners when doing business with China. Therefore, you will be able to enhance your knowledge of a current business phenomenon and thereby make improved business decisions. This research will help New Zealand companies to be strategically advanced to manage the current forced technology transfer environment and protect their valuable intellectual properties. Further, this research is designed to generate new knowledge beneficial to the New Zealand business community that conducts business and invest in the large developing market, China. Therefore, knowledge to be discovered through this research will mutually benefit you and me. Most importantly, the successful completion of this research will enable me to earn the Master of Business degree from AUT.

How will my privacy be protected?

Please note that all the information you provide is used for research purposes only. Your employer will know that you are participating in this research because the company appointed you as their representative. A "Permission for Access Form" will be given to your company and permission will be sought from the head of your company to undertake research within the company or with the company's employees and to obtain information relevant to this research. Your privacy will be protected using pseudonymised names (changed to a fictive name) instead your real company name or your real name. A certain code will be assigned to every participating company (E.g. Ab, Cd, Ef etc.) and to the company representative (E.g. X from company Ab, Y from company Cd) to preserve identity and confidentiality. Nobody else will know these codes apart from myself, the research supervisors, and the selected professional interview transcriber who signed a confidentiality agreement. Accordingly, you or your company will not be identified in the research findings. However, you could choose to be identifiable in the publications. If you have any questions during the interview, please feel free to ask anytime. The information provided by you will be shared by me only with supervisors involved in this research.

What are the costs of participating in this research?

There are no costs of participation involved in this research. I deeply appreciate your allocating 35 to 40 minutes of your valuable time for this research.

What opportunity do I have to consider this invitation?

Your company will receive an email inviting to participate in this research along with an information sheet. 14 days period will be given to your company to make a final decision regarding participation in this research. Once your company confirm its participation in this research and nominate you as their representative to take part in the interview with me, you are given this information sheet that contains information about this research, and you are requested to sign a "consent form" that is already being emailed along with this information. Then, an interview will be scheduled at a date and time convenient to you. The interview will be through an online meeting platform such as Zoom or Skype or if you prefer, face-to-face at your company office or at AUT.

Will I receive feedback on the results of this research?

Yes. In the consent form if you select the option "I wish to receive a summary of the research findings", I will be more than happy to email you a summary of the findings of my research.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Taghreed Hikmet, via email on *taghreed.hikmet@aut.ac.nz,* or by calling on 0921 9999 ext:5313

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *ethics@aut.ac.nz* , (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

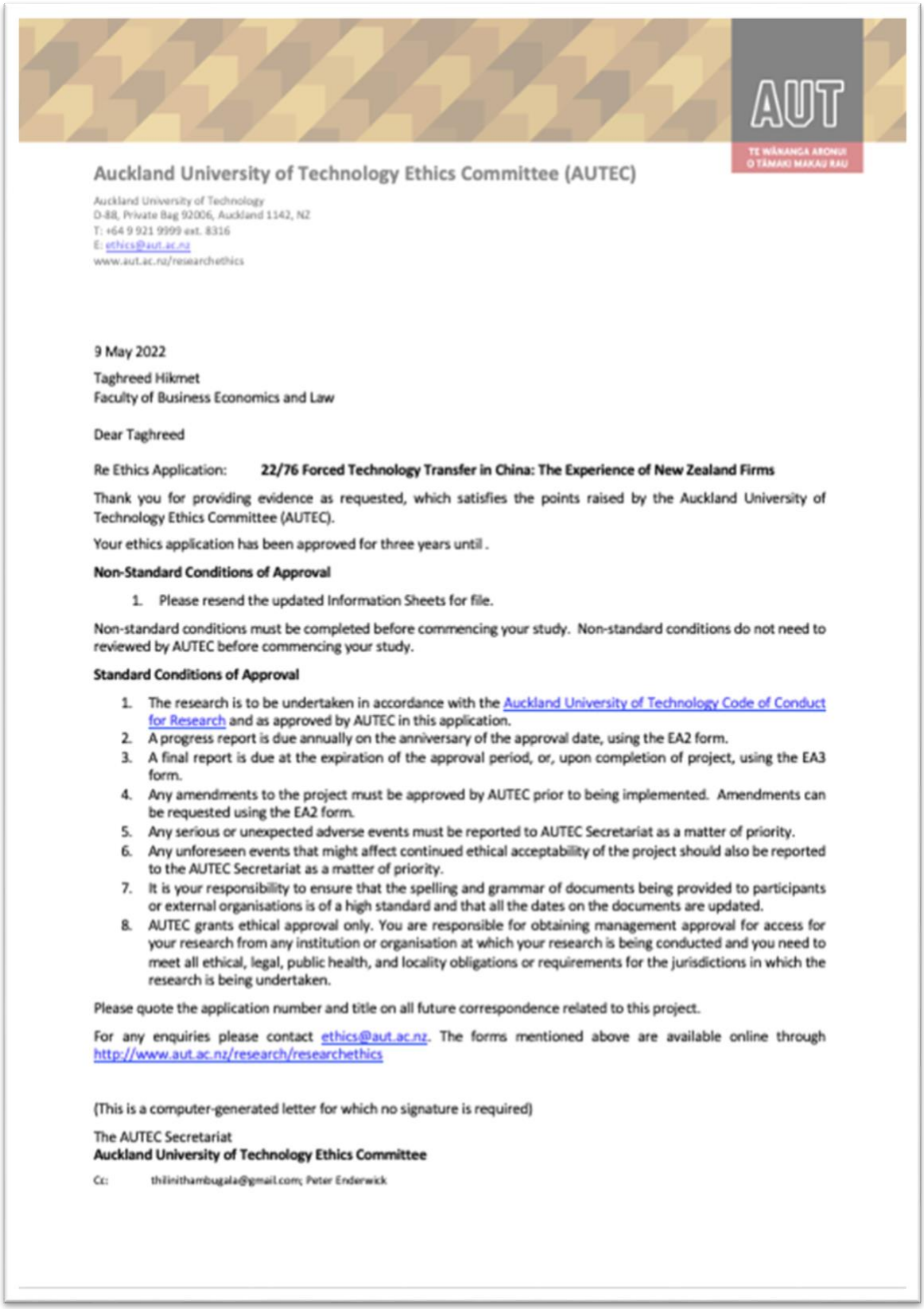
Madhushika Thambugala, xjj3592@aut.ac.nz, (+64)221080042

Project Supervisor Contact Details:

Dr Taghreed Hikmet, taghreed.hikmet@aut.ac.nz, work phone number. 0921 9999 ext:5313

Approved by the Auckland University of Technology Ethics Committee on *9th May 2022*, AUTEC Reference number *22/76*.

Appendix E: AUT Ethics Committee approval letter



Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

9 May 2022

Taghreed Hikmet
Faculty of Business Economics and Law

Dear Taghreed

Re Ethics Application: **22/76 Forced Technology Transfer in China: The Experience of New Zealand Firms**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until .

Non-Standard Conditions of Approval

1. Please resend the updated Information Sheets for file.

Non-standard conditions must be completed before commencing your study. Non-standard conditions do not need to reviewed by AUTEC before commencing your study.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: thilinithambugala@gmail.com; Peter Enderwick

Appendix F: Permission for Access Form

Permission for researchers to access organisation staff

Project title: Forced Technology Transfer (FTT) in China: The Experience of New Zealand Firms

Project Supervisor: Dr Taghreed Hikmet and Prof. Peter Enderwick

Researcher: Madhushika Thambugala

- I have read and understood the information provided about this research project in the Information Sheet dated 20th May 2022
- I give permission for the researcher to undertake research within **.....**
-
- I give permission for the researcher to access the staff / employees of **.....**

CEO's/Director's signature: .....

CEO's/Director's name: .....

CEO's/Director's Contact Details (if appropriate):
.....
.....
.....
.....

Date: …… May 2022

Approved by the Auckland University of Technology Ethics Committee on ***9th May 2022***
AUTEC Reference number 22/76

Note: The head of the organisation should retain a copy of this form.

Appendix G: Consent Form

Consent Form

For use when interviews are involved.

Project title: *Forced Technology Transfer (FTT) in China: The Experience of New Zealand Firms*
Project Supervisors: *Dr Taghreed Hikmet and Prof. Peter Enderwick*
Researcher: Madhushika Thambugala

- ○ I have read and understood the information provided about this research project in the Information Sheet dated 20th May 2022
- ○ I have had an opportunity to ask questions and to have them answered.
- ○ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ○ I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without being disadvantaged in any way.
- ○ I understand that if I withdraw from the study then I will be offered the choice between having any data that is identifiable as belonging to me removed or allowing it to continue to be used. However, once the findings have been produced, removal of my data may not be possible.
- ○ I agree to take part in this research.
- ○ I wish to receive a summary of the research findings (please tick one):
  Yes○ No○

Participant's signature: .....……
Participant's name:
.....……
Participant's Contact Details (if appropriate):
……..
……..
……..
……..
Date:

Approved by the Auckland University of Technology Ethics Committee on 9th May 2022 AUTEC Reference number 22/76

Appendix H

Organisation of interview extracts (and the respective codes) under the main themes and subthemes

Interview extracts and given codes	Sub-themes	Themes
"It's (manufacturing) *very effective, very cost-effective and very fast in terms of producing product for us, producing components"* [PA] (efficient and low cost manufacturing) *"I suspect it'll be around consistency and just volume of product being made"* [PD] (efficient and low cost manufacturing) *"Low cost manufacturing and just an emerging nation that's very driven to growth and to development"* [PC] (low cost manufacturing and emerging nation)	Effective manufacturing	Importance of having China as the manufacturer
"Low cost manufacturing and just an emerging nation that's very driven to growth and to development. So you have the deployment of very active and engaged employees (appreciation)*, so they are very dedicated to the results of not only their personal growth but also the business growth, so an incredibly loyal and hard-working workforce" [PC]* (Loyal employees, trusted and an un-interrupted business relationship) *"it's always been a pretty helpful, open…* (contented relationship, appreciation)*, The only disruptions have been market-led, i.e. shipping disruptions or government restrictions around Covid, but that's all been wider disruptions rather than anything specifically with us to China" [PD]* *"we're pretty happy with the processes and the change in the way that we developed the elements" [PD] (contented relationship, appreciation)*	Robust commercial relationship	
"We continue to work with new partners in China as well, so we recently started working with another group there, so we remain flexible and we're open to new supplier relationships" [PA] (comfortable within relationship/ openness to expand business relationship) *"I think also we're starting to sell more product; we get our packaging from China* (strengthening the relationship, more reliance on Chinese market) *as well so we're probably buying a greater number of units per order or per batch than we previously did* (content about the existing relationship)*, which also reduces the transaction costs"* [PA]. *"Yeah, we manufacture all of our (mention the product) ranges and lines in China, and we also manufacture some of our (mention the product) consumer goods, such as (mention the product), and we're also looking at additional integrations on our consumer goods or fast-moving consumer goods to be manufactured from China" (high reliance, intention to expand the relationship) [PC]* *".....we are so integrated into China, because our business has got very large offices there and very big teams there, and we do most of the design development and production here, we are heavily vertically integrated into China" [PC] (high integration)*	Intention to continue with China	

"We manufacture and distribute infrastructure, primarily in (name of the product) products, as well as in supporting products such as streetwear accessories, covers, water mains, PVC and others through our Sales Centre network. Firm D has been operating in New Zealand for "X" amount of years; it was founded in "Y" year with a main focus on what was called (name of the product) product; so that's the manufacturing process that was used to manufacture "name of the product" [PD] (usefulness to NZ technology sector) *"Of those 140 amount of products about 15 of them are D's unique designs, so they're designs that are licensed and certified under a D's standard mark licence" [PD]* (highly valuable products to firm/unique designs /intellectual property/proprietary knowledge)	The importance of the technology based product to the firm and NZ	The primary need of protecting firms' technology
"Well, in order to have components manufactured we have had to share the manufacturing files with the sub-contract manufacturer so that they can produce the tooling to make the components, so the (name of the product) tooling, and then make the individual units. So yes, so I guess we also share the materials that we require the components to be manufactured with" [PA] (sharing manufacturing files) *"We would specify what type of (material name) we want the product to be (product name) moulded in and then also any sort of verification procedures that are required to inspect the parts and approve them at the end of manufacture prior to sending them to us, so that we only get the good quality product"* [PA] (share specification on what company wants) *"Yes, of course, of course. And that just comes down to being very careful with confidentiality and your manufacturing facilities, and having strong terms and conditions there because a lot of manufacturers will also potentially copy your products, right, and they will put them through side channels for distribution" [PC]* (Copying products) *"It's quite possible that they'll use features in our products, or other products that they manufacture, and in the same way that the features themselves would have been from other ones that they've already been manufacturing* (technology blending). *So they would have used their knowledge and their R&D to develop the unique features and put them together in a unique item that we sell as a labelled product"* [PD] .	Possible technology transfer situations	
"No, to the very best of my knowledge we have never experienced that, which I guess is what you would refer to as a forced technology transfer, is that right? [PA] *(clear* rejection of *experiencing FTT)* *"Yeah, no we have never had pressure applied from that perspective"* [PA] (clear rejection of experiencing FTT) "No"…. "No. No, we're pretty sensitive about that" [PC] (disagreeing to experience FTT)	Degree of FTT experience	FTT Experience when doing businesses in China
"I wouldn't know the specifics of that, I'm sorry" [PC] (unawareness of FTT practices/policies) *"Ahhh, I have no idea for that question" [PB]* (unawareness of FTT practices/policies) *"We do not generally utilise or request government support or help when it comes to the… we deal with them directly ourselves" [PC] (No involvement with Chinese government).* *"we're continually talking to our peer companies and discussing the different markets and the nuances of each of those markets" [PA] (peer experience sharing)*	Knowledge of FTT practices in China	
"firstly, we have registered intellectual property rights, so patents and other trademarks, and now design registrations that have been and are continuing to be		External Strategies

registered internationally, including in countries that we manufacture in, for example, China. [PA] (obtaining IP rights protection from law) *"We have our own company, Actually, the China factory is a manufacturing, say equipment for our business in the world, so mainly in … and the APEC area, and then they produce some ..wares for other regions as well. So the main role is manufacturing of equipment" [PB*] (own manufacturing plant/more internal control)		
"Secondly, we typically only get sub-components manufactured offshore and we then do all of the final assembly in-house where we bring all of the sub-components together in a final assembly stage to complete the product build" [PA] (assembling the final product inhouse) *"Yeah, I think the other thing is just in terms of the way of working, we only supply information that is needed on a need to know basis. We do not supply any information over and beyond what is the minimal information required to produce the component" [PA] (sharing only the required part/amount of knowledge)* *"Yeah, actually we have our internal policy. Our employee or member cannot give any detailed drawing to our client or our end user; we just only give some pictorial drawing or general arrangement drawing. That's our policy, then I think the IT team can monitor these things"* (non-disclosure policy) *[PB].*		Internal strategy
".....to reduce the transaction costs I think yeah, the main ones are… we've implemented more stringent quality procedures as well to ensure that the product is being thoroughly verified from a technical perspective before it's shipped to us" [PA] (reduces the transaction cost) *"We just have standardised contracts now though so we have an inhouse legal team. We have standardised manufacturing contracts so it's not a big cost. Like I say, it's just a day-to-day business expense, it's pretty standard " [PC]* (less adaptation cost, contracting cost, monitoring cost)		Transaction cost related factors

Note: Not all the codes given for important information nor interviews extracts are included in this table. This table is used as an example to explain generation of codes, themes, and sub-themes from participant's responses.