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How does the perception of intellectual property rights protection in China influence the foreign direct investment decisions of UK multi-national enterprises?

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How does the perception of intellectual property rights protection in China influence the foreign direct investment decisions of UK multi-national enterprises?

By

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BBus (Strategic Management)

PhD

June 2020

How does the perception of intellectual property rights protection in China influence the foreign direct investment decisions of UK multi-national enterprises?

A thesis submitted in partial fulfilment of Coventry University's requirements for the Degree of Doctor of Philosophy

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Certificate of Ethical Approval

Applicant Paul

Project

How does the perception of Intellectual Property Rights protection in China influence the Foreign Direct Investment decisions of UK Multi-National

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Low Risk

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“Wisdom is not a product of schooling but of the lifelong attempt to acquire it.”

— **Albert Einstein**

Abstract

This PhD thesis considers the much researched, but little understood relationship between intellectual property rights (IPRs) and foreign direct investment (FDI). It employs a mixed methodology research design to answer the main research question, namely: '**How does the perception of intellectual property rights protection in China influence the foreign direct investment decisions of UK multi-national enterprises'.** It examines aggregate data drawn from the FAME database, explores business decisions through an extensive survey of 205 senior executives of UK MNEs and draws specific understanding of the phenomenon through a series of nine follow-up interviews with executives.

The paradox of China, with a poor reputation for IPRs, receiving large amounts of global FDI acts as a backdrop to this research. This research uses John Dunning's (1977) OLI framework to build its conceptual framework. The methodology employed allows for the disaggregation of companies and of FDI following the lead of Edwin Mansfield (1994) but, additionally, extends the taxonomy to services companies and to companies that both deliver services and manufacture products.

This research has demonstrated that China's IPR system (including laws, regulatory system and enforcement) does impact the FDI decisions of UK MNEs. Evidence produced demonstrates that the perception of weak IPRs in China leads many companies to invest in lower quality FDI, invest with older technology or to choose not to invest in China. Additionally, the evidence produced shows that the mode of investment companies choose is impacted with wholly-foreign-owned entities preferred to joint ventures as a result of weaker IPRs. In addition, this research provides empirical evidence of internal company strategies to enable FDI in R&D facilities in countries with weaker IPRs, safely.

The main contributions to knowledge of this thesis lie in the deeper understanding, through robust evidence, of the nature and behaviour of UK MNEs when operating in a country with weak IPRs. The thesis highlights the requirement to disaggregate companies and type of FDI when considering the FDI/IPR nexus and that a failure to do so may be the reason for previously mixed findings and a resulting unclear understanding of the IPR-FDI relationship in the existing literature. The key implications for policymakers flowing from this thesis are that better IPRs will improve the quantum and quality of FDI investments.

Acknowledgements

I would like to express my sincere thanks to everybody who has supported me during my PhD studies.

My colleagues have encouraged me to undertake this study, and I am grateful to Coventry University for being open to the idea, allowing me time to study and funding the research. Academic colleagues have provided useful tips and much encouragement along the way. Undertaking a PhD is a special activity and talking to those who have achieved this feat was always illuminating and inspiring. The feedback I received from the annual Performance Review Panels helped guide my activity and build confidence in my work.

My supervisors have been outstanding, offering me guidance and support, but also space when I needed it. I always felt energised after our meetings, even if the encounters themselves were sometimes challenging. Dr Lindsey Appleyard gave me particular support on the survey and interviews and the analysis of qualitative data. Professor Glauco De Vita, my principal supervisor, deserves much praise for me getting to this point. He believed in me long before I believed in myself. I asked for honest feedback from day one, I got it throughout, and I am most grateful for this. I did not have time for insinuation or intimation, I needed robust guidance, and I got it. This has led me to produce a substantial thesis that makes an original contribution to knowledge of which I am very proud. Professor De Vita's passion for scholarly activity proved infectious, and his drive for quality was inspiring. He pushed me throughout, and I would not have got the outcome I have without him.

I should also thank the many businesses that took part in this research, including those that supported the piloting of my research instrument, those that completed my survey and took part in the interviews. These business people generate economic value for this country; they are creative, inspiring and brave. Their openness to discussing their business strategies with me has defined the results of this research.

And finally, my loved ones. My children, Charlotte and Alexander, have supported me through everything I have done, and this PhD was no exception. Alexander even spent a portion of his holiday, helping me check references, probably the job that requires a software solution more than any other in academic life. Thank you. My partner Hannah has been alongside me every step of the way supporting me with tea, space to study and encouragement. She has been patient of the stacks of paper strewn around the house and the evenings alone as I tapped away at my computer. Thank you. I love you very much.

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List of Abbreviations

BEA	Bureau of Economic Analysis
BRIC	Brazil, Russia, India, China
CADQAS	Computer-assisted qualitative data analysis software
CEO	Chief Executive Officer
CJV	Contractual joint venture
CPI	Corruption Perceptions Index
DC	Developed Countries
EBRD	European Bank for Reconstruction
EIU	Economist Intelligence Unit
EJV	Equity joint venture
EU	European Union
FAME	Financial Analysis Made Easy
FDI	Foreign direct investment
FPRs	Foreign Patent Rights
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GPI	Ginarte and Park Index
IIPA	International Intellectual Property Alliance
IP	Intellectual Property
IPIC	Treaty on Intellectual Property in Respect of Integrated Circuits
IPRs	Intellectual property rights
ISAs	Ideal Survey Attributes
JV	Joint venture
LDC	Less Developed Countries
MNE	Multi-national enterprise
NIC	Newly Industrialising Countries
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
RRI	Rapp and Rozek Index
SEZ	Special Economic Zones
SIC	Standard Industrial Classification
SIPO	State Intellectual Property office
SYS-GMM	System-generalised method of moments
TCE	Transaction cost economics
TRIPS	Trade-Related Aspects of Intellectual Property Rights
U.K.	United Kingdom
U.S.	United States
UNCTAD	United Nations Conference on Trade and Development
UPOV	International Union for the Protection of New Varieties of Plants
USCC	United States Chamber of Commerce
USD	US Dollars
USTR	United States Trade Representative
WEF	World Economic Forum
WFOE	Wholly-foreign owned enterprise
WIPO	World Intellectual Property Office
WMRC	World Markets Research Centre
WTO	World Trade Organisation

Chapter One: Introduction

1.1 Chapter Overview

This chapter provides an overview of this thesis. Section 1.2 sets the context of this research and highlights the problem statement to be addressed. Section 1.3 discusses the academic background of this study and the gaps in theory and empirical evidence that will be addressed in this thesis. Section 1.4 details the main research question to be considered and the seven sub-questions identified to answer the main research question. Section 1.5 sets out the boundaries of this research. Section 1.6 synthesises the contribution to knowledge, theory and methodological treatment. Finally, section 1.7 gives a brief outline of the structure of this thesis.

1.2 Context and Problem Statement

Foreign Direct Investment (FDI), along with exporting and licensing (including franchising) makes up the trinity of international business. This thesis considers FDI and the behaviour of (UK) companies undertaking these activities. FDI is defined as having taken place when a company establishes, through either greenfield investment, acquisition or a partnership, an overseas subsidiary with at least a 10% ownership and exerting a lasting interest and some management control over the subsidiary (OECD, 2008). It is FDI that makes companies multinational enterprises (MNEs), which are particularly important actors in international business as the drivers for global trade and investment (UNCTAD, 2013).[1] Countries, regions and cities compete with each other to attract FDI as it drives financial investment, job creation and, most importantly, brings new technology and know-how to a territory which supports ‘spillover’ benefits in the receiving country’s economy (Spencer, 2008).

Companies that take part in FDI do so for several reasons including accessing new markets, lower production costs, accessing resources or a global supply chain, or perhaps to navigate barriers to trade such as distance or import tariffs and quotas. There are many determinants of FDI including market size and growth, cultural closeness, financial incentives, access to funding or people and technology and, the subject of this thesis, intellectual property rights (IPRs) (De Vita, 2001; De Vita and Lawler, 2004; Blonigen, 2005).

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[1] See http://unctad.org/en/PublicationsLibrary/wir2013overview_en.pdf for full report.

The link between FDI and IPRs is a widely researched but little understood topic, and the relationship between the two remains ambiguous in the theoretical literature. The empirical literature is equally inconclusive, though a weak pattern of results can be found that suggests better (stronger) IPRs support more FDI, but such evidence is not definitive (Noon *et al*., 2019). However, if the transfer of knowledge assets through FDI remains of beneficial economic benefit to countries; and the knowledge assets of a company some of the most valuable assets they hold; then the link between FDI and laws and procedures that protect these knowledge assets must be an essential variable to understand. Failure to do so represents a significant problem in the international business environment, for MNEs and countries wishing to attract FDI alike, as evidenced by an innumerable number of cases and disputes across the business landscape. For example, the three-year legal dispute between Jaguar Land Rover (JLR) and Jiangling Motors Corporation over the design of the LandWind X7 (that was almost identical in design to the Range Rover Evoque), and the profound importance of IPRs to JLR and their determination to defend their designs.[2] Additionally, some of the most important negotiations that take place between countries often relate to the recognition and protection of IPRs. The recent trade dispute between the USA and China that has resulted in billions of dollars' worth of tariffs imposed on one another's goods shows that IPRs can be the trigger for significant geopolitical conflict.

As defined by Khemani and Shapiro (1993, p.49) in their OECD "Glossary of Industrial Organisation Economics and Competition Law"[3], IPRs refer to "*the general term for the assignment of property rights through patents, copyrights and trademarks. These property rights allow the holder to exercise a monopoly on the use of the item for a specified period*."

The global system of IPRs is undergoing a significant change. Many developing nations, as well as economies in transition, have strengthened their IPR legislation over the past decade and many international IPR trading arrangements now address questions of regulatory convergence, pushing for stronger non-discriminatory minimum standards of IPRs. Although this trend aligns

[2] The Beijing Chaoyang District People's Court determined unfair competition in this case and ordered that Jiangling Motors Corporation (and their joint venture partner) immediately cease their unfair competition including manufacturing, displaying and offering for sale the LandWind and awarded damages of RMB 1.5 million (approximately £165,225) as compensation to JLR. See https://gowlingwlg.com/en/insights-resources/articles/2019/jaguar-land-rover-v-landwind-unfair-competition/ last seen 18 February 2002.
[3] https://stats.oecd.org/glossary/detail.asp?ID=3236 Last seen May 2020

with processes of globalisation through the reduction of barriers to FDI, whether and how countries' strength of IPR protection influences FDI is still unclear.

The agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) within the World Trade Organisation (WTO) has had the effect of levelling up IPR regimes across the globe (Adams, 2010) and is argued as being a driver for the growth in international trade and investment. However, the complaints and disputes relating to IPR infringements remain an active area for legal and international disputes with 42 cases citing TRIPS in WTO disputes between 1996 and 2019.[4]

The rules pertaining to IPRs sit within many international agreements and treaties, and the accession to these treaties is public knowledge. This would seemingly provide an objective measure of IPR strength. However, enforcement of the laws and the imposition of penalties to offenders that deter infringement is equally vital in measuring the strength of a county's IPR system. In addition to these issues, the views of others, perhaps communicated through the media or directly between business people, influence the perception of a country's IPRs. This research has, therefore, chosen a mixed methodology that blends secondary empirical data (collected from the FAME database) with primary data drawn directly from MNEs through a questionnaire survey. This data is enriched with interviews with executives about their perceptions of IPRs and the influence they have on their FDI decisions. The methodological choices are detailed and justified in Chapter Four.

This thesis considers the strength of IPRs and their impacts on FDI decisions (by UK MNEs) in China, for several reasons. First, China is a large, growing economy that receives prodigious amounts of international trade and FDI from across the globe (Yu and Zheng, 2000; Long, Yang and Zhang, 2015). Secondly, China joined the WTO in 2001 following a history driven by cultural and political ideologies that did not respect IP in the same way as in the West (Yu and Zheng 2000). By joining the WTO, China was required to implement a developed country's IPR laws at the insistence of the major developed countries (Harris, 2008). China complied with this request and now has IPR laws 'on the books' that are broadly in line with developed countries (Park, 2008b). However, China has remained an IP pariah in the eyes of many countries, including the USA (USTR, 2009). China's poor reputation as a country rife with imitation has, however, not

[4] https://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm last seen 17 February 2020.

stopped China racing to the top of the FDI league tables. This apparent dichotomy between the stained perception of China's IPRs and the significant attraction of FDI provides an interesting backdrop in which to study this important subject.

1.3 Academic Background and Knowledge Gaps

Despite the longstanding discussion at both a theoretical and empirical level, the relationship between IPRs and FDI decisions remains ambiguous (Noon *et al*., 2019). Theoretical postulations considering the interplay between IPRs and FDI are often contradictory. Positive outcomes (in terms of better IPRs increasing FDI) are postulated through stronger IPRs, strengthening of the ownership and location advantages (Dunning, 1997; Smith, 2001; Braga and Fink, 1998). Negative relationships include enabling monopolistic rents to be taken for longer, pushing up the cost of imitation closer to the cost of innovation eventually stimulating innovation, therefore, reducing the monopolistic advantages of foreign companies (Mansfield *et al.,* 1981). Others suggest that more robust IPR regimes may encourage companies to engage with firms through licensing rather than FDI thus reducing the quantum of FDI (Braga and Fink, 1998; Maskus *et al*., 2005; Ferrantino, 1993).

A significant body of empirical work does offer at least weakly skewed evidence in support of the proposition that more substantial IPR regimes support growth in FDI. See Appendix 1 for a list of selected empirical studies and their findings, discussed in more detail in Chapter Three. Evidence on the strength of this effect is, nevertheless, inconclusive and seemingly dependent on many factors including sector, technology intensity, and host-country characteristics to name but a few (Noon *et al*., 2019). With a few notable exceptions, the majority of the empirical (applied) research uses aggregated data and, therefore, argued in this thesis, misses the nuances of companies and the investment decisions they are making. Much of the previous work is also based on manufacturing companies only and thus fails to capture the behaviour of, for example, service sector businesses that nowadays constitute a large part of the globalised economy. These gaps in the empirical frameworks used in previous work leave several questions about the link between FDI and IPRs unanswered or only partially addressed.

Of the few qualitative or mixed methods studies undertaken to date, Edwin Mansfield's 1994 pioneering work is of particular relevance as it does consider specific decisions and specific companies. Mansfield, through a survey of 94 manufacturing companies, was able to identify behaviour in certain types of companies and when making different types (quality) of investments in response to differing IPR regimes. Mansfield (1994) did show a relationship between better IPRs supporting better quality FDI in high R&D-intensive manufacturing companies. However, how service companies or companies that both manufacture and deliver services act or are influenced by IPRs when making different types of FDI decisions, is, so far, unknown and importantly addressed in this thesis.

Much of the literature that considers IPRs does not consider the weight and importance of other drivers for FDI. While some of the research (e.g., Buckley and Casson, 2009) have highlighted the heterogeneity of companies impacting on the FDI decisions they make, few studies consider these impacts through the use of a mixed methodology that seeks to understand the aggregate effects as well as the individual choices of particular companies.

With the notable exception of Mansfield (1994, 1995), the literature considers all FDI as one homogenous activity. This research will seek to understand if this is a valid assumption and if FDI of different forms is impacted in different ways by the strength of IPRs.

This research, therefore, seeks to fill some glaring theoretical and empirical gaps in the existing literature by using a mixed-methods approach to understand the behaviour of a large cross-section of UK MNEs when investing overseas. It attempts to bring clarity to the theoretical pond and elucidate the empirical contradictions. It seeks to understand better the diversity and the complexity of companies, and the FDI decisions they make and how IPRs impact these decisions.

1.4 The Aim, Main Research Questions and Research Objectives

This thesis aims to understand better the link between IPRs and FDI analysing the decisions of executives in MNEs. It explores how the strength of IPRs impact FDI decisions in different companies to shed light on the ambiguities in both the theoretical and empirical literature and to bring a greater understanding of the role of IPRs in FDI decisions for both policymakers and businesses.

The main research question addressed in this thesis is: **‘How does the perception of intellectual property rights protection in China influence the foreign direct investment decisions of UK multi-national enterprises?’**

Answering this question will aid a better understanding of how Chinese IPRs impact the investment decisions of UK MNEs. The findings of this research will inform theory on the links between FDI and IPRs, which has proved to be ambiguous within the literature. China is considered as a case study of a large, growing, developing country that receives prodigious amounts of FDI despite having a reputation for poor IPRs. This research contributes to the breadth and depth of knowledge on this much-studied but little understood subject.

To answer the main research question, seven research sub-questions, as set out below, will guide the analysis that follows:

I. What is the nature of UK MNEs (including 'ownership' advantages, imitability, sector, FDI experience, R&D intensity and size)?
II. What behaviours do UK MNEs display when engaging in FDI?
III. What is the importance of IPRs to UK MNEs?
IV. What are the impacts of IPRs on the FDI decisions of UK MNEs?
V. How do UK MNEs perceive China's IPR system?
VI. What is the FDI behaviour of UK MNEs in China?
VII. How do China's IPRs impact the FDI decisions of UK MNEs?

1.5 Boundaries of this Study

This research considers the behaviour of MNEs when undertaking complex FDI decisions. It considers these decisions through an analysis of secondary data that is expanded upon through primary data collected through an extensive survey and follow up interviews. These three data collections will generate significant quantitative and qualitative data. However, it is not within the scope of this research to carry out a detailed econometric analysis similar to much of the academic literature (e.g., Awokose and Yin 2010b; Watkins and Taylor, 2010; and Ushijima, 2013). It will, however, engage statistical research techniques suitable for the analysis of qualitative and quantitative data to conclude answers to the research questions.

This research deliberately excluded review articles focusing on FDI determinants in general, albeit some of these studies included some form of institutional or legal framework proxy as an independent variable. Instead, it concentrates on studies which specifically took as their explicit unit of analysis the role of IPRs on FDI determination. This means the exclusion of, for example, the many studies by Globerman and Shapiro on the role of governance infrastructure on FDI (see, e.g., Globerman and Shapiro 2002; and Globerman and Shapiro, 2003) as these studies did not isolate the measurement of IPRs.

A more difficult decision had to be made concerning the inclusion or exclusion from this research of contributions from contiguous research domains as in this literature boundaries can become somewhat fuzzy. In this respect, this research excluded theoretical and empirical studies focusing primarily on the IPR-trade nexus (e.g., Fink and Braga, 2005), the role of IPRs in maximising economic growth or global welfare (e.g., Gould and Gruben, 1996), on whether strengthening IPRs induce more technology transfer between countries (e.g., Yang and Maskus, 2009), unless it was deemed that the analysis of such studies helped shed some light on the research question and sub-questions, which specifically concentrated on the IPR-FDI link.

While this research will consider variables such as research intensity and ease of copying that will be generated from the survey of executives, it does not propose to explain the links between these variable and other variables. In addition, this research is limited to the impacts of IPRs on the decisions of MNEs when undertaking FDI. It does not seek to explore the impacts of these decisions (for example on profitability, spillover benefits and other areas of international trade) in detail except for the impact these might have in driving policy implications.

1.6 Expected Contribution

This thesis will contribute additional knowledge within the field of international business relating to the link between IPRs and FDI. It will provide a comprehensive picture of the nature of UK MNEs and their behaviour when undertaking FDI considering their IP and the IPR protection available in countries hosting the investment. It will offer insights as to why the relationship between these variables has remained ambiguous within the theoretical and empirical literature. It will shed light on the business decisions of UK MNEs as a group but also broken down by several variables to better understand whether different companies in different sectors of various sizes, R&D intensity or FDI experience act in different ways. These analyses are absent in the existing literature. The analysis will also inform as to whether different types of FDI are dependent on the strength of IPRs. Critically, it will reveal how UK companies perceive China's IPRs and the impacts this perception has on their investment decisions, thereby illuminating the theoretical and empirical understanding of MNE behaviour. Comparatively, it will also rigorously establish whether the findings of Mansfield (1994) are generalisable across all company types. By using a novel research methodology that disaggregates several core variables, this research will also make a significant contribution to methodological practice. Overall, the findings and associated contributions to knowledge, theory and methodology will allow a much greater understanding of considerable benefit to the international business research agenda, policymakers and business.

1.7 Structure of the Thesis

Chapter One provides a brief overview of this thesis. It sets the context of this research and the problem statement to be addressed, highlighting the academic background of this study and the gaps in theory and empirical evidence that will be investigated in this thesis. This then leads to the main research question to be considered, and the seven sub-questions identified to answer the main research question. This chapter also sets out the expected contribution to knowledge, theory and methodological treatment. Finally, the chapter ends with a brief outline of the structure of this thesis.

Chapter Two will examine the background literature on both the FDI process and IPRs. The chapter also seeks to understand the specific IPR protection position in China.

Chapter Three critically evaluates the specific business and economics literature that has examined the link between IPRs and FDI at both a theoretical and empirical level. It focuses on those studies that are the most influential in this field. It covers literature from a wide range of sources including published studies in peer-reviewed journals of management, international business, economics and law as well as book chapters, reports, working papers and other sources of knowledge.

Chapter Four presents the overall research strategy and then examines, in-depth, the approach to obtaining the data required to answer the research questions identified in chapters two and three stemming from the critical review of relevant literature. It sets out the reasoning behind the choices made vis-à-vis available alternatives and the methodologies for data collection and analysis. It describes the process employed to ensure a sound research design, considering the time and cost constraints as well as ethical considerations.

Chapter Five analyses the data collected from the FAME database and the survey of UK MNEs to answer the research questions set out in the conceptual framework and the broader question, 'how does the perception of intellectual property rights in China influence the FDI decisions of

UK MNEs?'. These data are analysed through the lens of the Eclectic Paradigm (Dunning, 1997), leading us to look at investment decisions through the three company advantages of Ownership, Location and Internalisation.

Chapter Six discusses the findings from the analysis of primary data drawn from a survey of 205 executives of UK MNEs, also with reference to the analysis of secondary data that was drawn from 8,049 records on the FAME database, which was presented in Chapter Five. To supplement this analysis, data collected from 9 interviews with senior executives of UK MNEs is used, to illuminate behaviour to answer the main research questions and sub-questions.

Chapter Seven discusses the key findings of this research, the policy implications flowing from these findings, and the contribution of this research to knowledge, theory and methodology over what was known before. This chapter also offers an acknowledgement of the limitations to this research and directions for future research. The chapter concludes with the researcher's reflections on undertaking a PhD.

Chapter Two: A Critical Literature Review of FDI, IPRs and China's IPR Environment

2.1 Chapter Overview

The purpose of this chapter is to examine the background literature on both the foreign direct investment (FDI) process and intellectual property rights (IPRs). The chapter also seeks to understand the specific IPR protection position in China. The chapter is structured into a number of sections as follows. Section 2.2 considers the definition of FDI and Multi-National Enterprises (MNEs) and their motivations for investing overseas. It also provides a critical review of the main models aimed at explaining FDI along with a brief review of the historical trends of global FDI flows and their expected impact. Section 2.3 considers the key facets of IPRs, reviewing historical developments as well as issues related to the measurement of international IPRs. Section 2.4 provides a thorough evaluation of China's IPR environment, which forms the context of this PhD study. In Section 2.5, a chapter summary concludes.

2.2 Foreign Direct Investment (FDI)

2.2.1 Definition and Types of FDI

Since the industrial revolution at the end of the 18th century, there has been a rapid increase in the amount of inter-country trade, the expansion of companies across borders and the transfer of business activity to multiple international destinations. At the same time, technology and knowledge have been shared and developed in multiple destinations. Globalisation is the process through which national and regional markets become more tightly integrated through the reduction of government and natural barriers to trade, and increased investment and technology flow (Fink and Maskus, 2005). At its broadest, FDI is one core activity in the process of globalisation along with import, export, foreign indirect investment (FII or foreign portfolio investment), franchising and licensing, the movement of labour and international remittances. MNEs[5] are the biggest driver of international trade being responsible for 80% of global world trade as they manage complex, fragmented, geographically dispersed production processes and flows in trade and investment (UNCTAD, 2013)[6]. MNEs are one of several types of organisations

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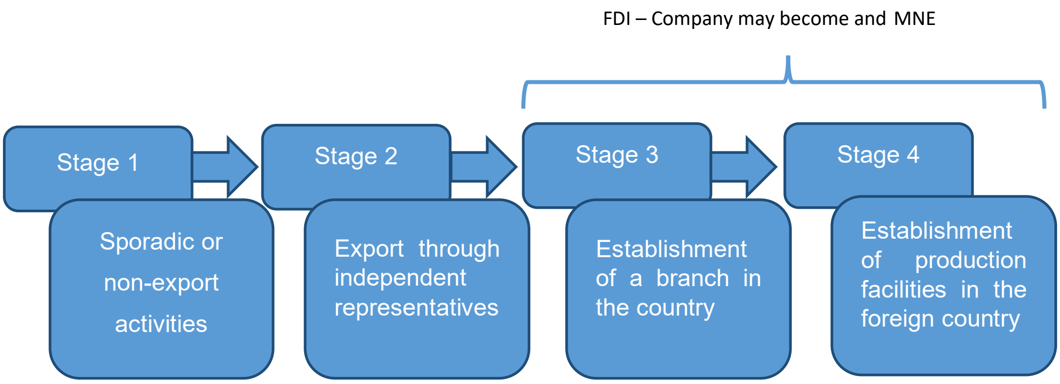
[5] Throughout this thesis the term 'MNE' is used to denote a business (whether headquartered in advanced or developing economies) that operates on a global scale. This definition applies irrespective of size and hence includes small and medium sized enterprises (SMEs) that operate in multiple countries and that hold at least a 10% equity share in an overseas subsidiary.

[6] See http://unctad.org/en/PublicationsLibrary/wir2013overview_en.pdf for full report.

that are engaged in international business and, by definition, are inextricably linked to FDI (De Vita, 2001). They are similar to companies that export or import across international boundaries and to companies that carry out multiple economic activities domestically. In the seminal work conducted by the Swedish researchers Johanson, Vahlne and Wiedersheim-Paul (Johanson and Vahlne, 1977; Johanson and Wiedersheim-Paul, 1975) they describe the sequence that leads to a company becoming an MNE. This starts with a company serving its home market, followed by them penetrating overseas markets through exporting. This then leads to companies establishing sales (and marketing) outlets in foreign countries followed by the setting up of offshore production. This sequence is commonly known as the Uppsala Model (Johanson and Wiedersheim-Paul, 1975), see Figure 1.

Figure 1

The Uppsala Internationalisation Model



Source: Castro (2009 p.42)

While the Uppsala Model suggests a sequential progression through exporting to FDI, there are many examples of companies that are so-called 'Born-Global'. In particular, in the high-technology sectors where markets become international from the first concept, thus suggesting that the steps in the Uppsala Model can be moved through very quickly or by-passed altogether.

To be classified as an MNE, the company must <u>own</u> assets overseas where the value is added to the enterprise through production, knowledge or sales (Hymer, 1968). Irrespective of how an MNE is structured and configured, whether it is a decentralised or multi-domestic corporation, a global corporation that acquires cost advantages through centralised production, an international company that leverages on the parent's corporation's technology or R&D, or a transnational corporation that combines elements of the above configurations (see Bartlett and

Ghoshal, 1991), the definition of what is an MNE is, has essentially remained as originally elaborated by Hymer (1968).

FDI occurs when an enterprise establishes, acquires or increases production in a foreign country (Hamilton and Webster, 2015). FDI is likely to displace exports where the cost of trade (perhaps through tariffs, etc.) and/or transport costs are high, where the costs of setting up a production facility are low, where productivity is relatively high compared to the cost of labour, where the market size is large, and R&D and marketing in the product is also high (Maskus, 2000). The MNE becomes a direct investor in a country that is foreign to its place of incorporation (either through greenfield investment or by acquisition). Through this investment, the MNE establishes a long-term interest in an enterprise in a different country. The existence of a long-term relationship between the investor and the foreign enterprise and the significant degree of influence on the management of such enterprise is typically measured by a minimum level of stock ownership (or "voting power"). The OECD sets this minimum level of stock ownership at 10%[7]. *Inward FDI* refers to the flows of FDI into a country while *Outward FDI* the flow of FDI out of a country. The stock of FDI refers to the total accumulated value of foreign-owned assets at a given time (usually a year). In contrast, FDI flows refer to the amount of FDI undertaken over a period of time.

Official definitions employed by international or supranational organisations, albeit slightly different in their emphasis or threshold levels of ownership (however defined), essentially confirm the salient features of FDI as highlighted above. The OECD (2008) defines FDI as:

> "*A category of investment that reflects the objective of establishing a lasting interest by a resident enterprise in one economy, in an enterprise that is resident in an economy other than that of the direct investor*".

FDI, as defined, can take many forms (as elaborated on further, later in this chapter). It is worth noting that these definitions give sufficient flexibility for countries to count FDI projects such as the setting-up of a manufacturing facility (that includes R&D), sales and marketing (for the local market and exports) or the production of intermediate goods. Thus, it is important to

[7] See the OECD Benchmark Definition of Foreign Direct Investment (fourth edition, 2008) at: https://www.oecd.org/daf/inv/investmentstatisticsandanalysis/40193734.pdf

understand the nature and the scope of FDI projects to understand the value to the company and the host economy. One of the benefits of FDI is the technology spillover effects that include the transfer of technology or knowledge into the domestic supply chain (Kneller and Pisu, 2007). An example of this is seen in the impact that Japanese motor manufactures had on the transfer of process improvement into the automotive supply chain following their significant investments in the UK. As put clearly by BIS in 2011[8] (p. XV)

> *"The potential benefits of inward investment depend crucially on the characteristics of the project. High-quality projects, capable of contributing positively to productivity, UK R&D, and skilled jobs, are likely to be mainly technology exploiting, greenfield investment."*

The literature on FDI sets out four main motives for this activity, namely: (i) resource seeking; (ii) market seeking; (iii) efficiency-seeking; and (iv) strategic-asset seeking (Buckley *et al*., 2007; Dunning, 1988; Makino *et al*., 2002) see summary in Table 1. These categories are not necessarily mutually exclusive as enterprises may follow a number of these strategies at the same time.

Resource seeking FDI takes place when companies in manufacturing or primary production invest in overseas enterprises to gain access or secure supply of physical resources of some nature (for instance minerals or agricultural production). Alternatively, some companies may intend to exploit a source of labour that might be plentiful, cheap, skilled or unskilled (UNCTAD, 2004). Other firms undertake resource seeking FDI to acquire technological capacity, knowledge or expertise.

Market Seeking FDI occurs where an enterprise invests in a market to supply goods and services to that country or neighbouring countries or to protect a market developed through exporting. This activity can be driven by factors such as population growth and growing gross domestic product (GDP) per head, in the receiving country/region. Negative drivers include the distance from the market, tariffs or duties that make exporting unattractive, or other trade-limiting

8 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/32106/11-805-international-trade-investment-rationale-for-support.pdf Last seen April 2020

activities (Aliber, 1970). A further reason for market-seeking FDI would be to adapt products or services to local tastes or needs including developing a product or service in the local market with the cultural and social references that pertain to that market to support product demand and loyalty. Alternatively, an MNE might exploit a new location to reduce the costs of sales to adjacent economies reducing time and distance or taking advantage of inter-country/regional trade agreements that may not be available from the enterprises' home market. An example of this would be companies setting up in one European country to gain access to the European Single Market to allow them to sell goods and services to other members of the Single Market. Market-seeking FDI might also be undertaken to hedge activity of other MNEs within their sector, to ensure they have operations in similar jurisdictions to their main competitors (Dunning, 1991).

Efficiency Seeking FDI is often motivated by the need to reduce costs and risks by specialisation of parts of production (Eckel, 2003). This type of FDI may follow on from resource seeking and market seeking activity where it has built to such an extent as to warrant a rationalisation of production. This type of investment might focus around exploiting, particularly low costs of production in a country or where there are opportunities to take advantage of economies of scale.

The fourth group of MNEs are those corporations involved in *strategic asset seeking* FDI. These companies may be motivated by securing cost, knowledge or marketing advantages over their competitors (Meyer, 2015). They aim to benefit from the common ownership of diversified capabilities. This sort of activity is particularly seen in the major MNEs with diversified product ranges which look to acquire developing knowledge, technology, skills or products to enhance their portfolios but also to maintain their advantage against other MNEs.

Table 1

Comparison of Main Motivations for FDI

FDI motives	Description
Resource-seeking	to gain access or secure supply of physical resources of some nature (for instance minerals or agricultural production) or a supply of labour
Market-seeking	to supply goods and services to that country or neighbouring countries or to protect a market developed through exporting.
Efficiency-seeking	to reduce costs and risks by specialisation of parts of the production
Strategic asset seeking	to secure cost, knowledge or marketing advantages over their main competitors

Source: Author's research.

Other motivations for FDI in addition to those discussed above include the need to escape restrictive home economies that might moderate overseas trade, tariff-jumping FDI[9], or punitive tax regimes. MNEs may also invest overseas to support investments in other parts of the organisation, for instance, in distribution or marketing activity. MNEs may also partake in passive investments (financial) in different companies in foreign countries to hedge their business activities or to demonstrate support in a partner (Markusen, 1997).

The aggregate, economy-wide impacts of FDI include assets that generate products for local consumption or export, leading to growth and employment in the host economy. FDI also creates backwards and forward linkages and spillovers that strengthen the capabilities of domestic firms (Aghion *et al.,* 1998; Borensztein *et al.,* 1998; Lall, 2000; Liu, 2008; Safarian, 1999). These assets can contribute to local capacity-building, industrial and structural change, consumer welfare, higher labour and environmental standards, improved living standards and poverty alleviation (AIM, 2015; Acemoglu and Johnson, 2005). However, FDI can also have adverse effects. MNEs can engage in restrictive business practices, avoid taxes, create unfair competition and crowd-out local firms (thereby limiting the development of indigenous industries in the host economy). This activity can dominate industries central to growth and development and even jeopardise national security (Aitken and Harrison, 1999; Hale and Long, 2012).

[9] The tariff-jumping FDI argument runs as follows. Due to trade barriers, MNEs are confronted with a choice, the choice between exporting to the local market protected by such tariffs and moving the production facilities to the local market thereby "jumping" over domestic tariffs.

Against this backdrop, the role of policy is to maximise the benefits of FDI and minimise the negative impacts. It follows that national policies regarding FDI are of fundamental importance to ensure countries benefit as much as possible from the level and type of FDI that they attract (Te Velde, 2006; AIM, 2015). This is especially true given that the world FDI market is becoming increasingly competitive. Competition takes place in a framework in which national investment laws are becoming quite similar, and many countries have enhanced their regulatory frameworks with international agreements. IPRs are one area where countries can compete for FDI.

2.2.2 A Brief Review of Models of FDI and Historical Global Trends of FDI Flows

Early empirical studies on the determinants of FDI involving questionnaires asked about the reasons for investing in a country. Key contributors included Robinson (1961), Behrman (1962), Basi (1966), Kolde (1968), Wilkins (1970) and Forsyth and Docherty (1972). These studies considered several drivers, including market factors, trade barriers, cost factors and the investment climate. The consensus from this research showed that key determinants of FDI were drivers related to market factors such as market size, market growth, and maintaining market share (Agarwal, 1980). Cost and the availability of labour were also important determinant factors (Faeth, 2009).

Early theoretical models of FDI include work based on the Heckscher-Ohlin[10] model of neo-classical trade theory where FDI was part of the trade in international capital. This model essentially suggests that where there is an imbalance in the factors of production in one country, then production would move to create an equilibrium between the countries. So, for instance, if labour were cheaper in one country, an MNE would move work to the cheaper country until the cost of labour was equalised. This model, however, assumes a constant return to scaling production, zero transport costs and perfect competition. It follows that while attractive as a theoretical model for its simplicity, it does not reflect real-world conditions (Jasay, 1960; MacDougall, 1960).

[10] The Heckscher–Ohlin (H–O) model is a general equilibrium model of international trade, developed by Heckscher and Ohlin at the Stockholm School of Economics. It builds on the theory of comparative advantage by predicting patterns of commerce and production based on the factor endowments of a trading region. The model predicts that countries will export products that use their abundant and cheap factors of production and import products that use the countries' scarce factors.

Markusen (1984) described the 'Horizontal' model of FDI, where firms set up multiple plants in multiple markets to exploit firm-specific assets and to avoid transport costs and trade barriers. The 'Vertical' model, as described by Helpman (1984), describes the geographic separation of production and headquarter (HQ) activities to exploit factor cost differentials. Markusen (1998) developed these models into the 'Knowledge Capital Model', a single equilibrium where horizontal investment dominates when countries have similar relative skill levels and vertical when skill levels are different. He also suggested that high costs of trade stimulate horizontal FDI. Giroud and Mirza (2015) suggest that the motivation for integrating global value chains as a model is becoming more prominent. As MNEs have internationalised, countries liberalised, and the rules of global competition have changed – so have the motivations for entering foreign markets. As MNEs have fragmented and modularised their strategies, they have evolved towards global supply chains (Dunning and Lundan, 2009).[11]

It is also understood that as countries develop, the nature of FDI changes. Least developed economies are unlikely to attract large amounts of FDI (except for extractive industries) because they lack: a large enough economy, skilled workforce, adequate infrastructure and effective governance. However, as these economies develop skills and open up, they become targets for vertical FDI as MNEs seek to exploit low labour costs. As they develop further into a more advanced economy, and as labour rates equalise across countries, then one would expect to see an increase in the amount of horizontal FDI entering the market (Dunning, 1991).

As the global economy has developed, the dominant drivers and models of FDI proliferation have changed over time. In the immediate aftermath of World War Two, FDI was characterised by mainly market seeking, horizontal investment activity as distance and communication costs plus institutional barriers dominated. Overseas enterprises of MNEs were afforded significant autonomy from the parent company to run the business in the new jurisdiction (Giroud and Mirza, 2015).

[11] 'Global' supply chains refer to the internationalisation of the network between a company and its suppliers to produce and distribute a specific product throughout all the steps required to get the product or service to the customer. These steps include all internal functions, logistics, distribution, sourcing, customer service, sales, manufacturing and accounting.

The mid-60s and accelerating in the 1970s, saw a rise in assembly and production plants in overseas markets as companies sought efficiency-seeking FDI from lower labour costs and carried out more vertical FDI (UNCTAD, 2013).

The oil shock of 1973 drove companies to seek sources of cheaper energy leading to larger, specialised enterprises, but where the parent HQ retained functional control of knowledge and management decision making. The period from around the mid-1980s saw a response to the development of widely dispersed production into a more integrated international production formula. This would be the early development of the global supply chain (Dunning and Lundan, 2009). Production and assembly of goods, under the control of regional HQ operations, often saw MNE activity concentrated in fixed 'markets' with geographic designations. This period also saw an increase in the amount of asset seeking FDI as MNEs attempted to acquire existing assets to gain technology, resources or access (Makino et al., 2002). The final period, from the late 1990s to today, has seen a consolidation of offshoring activity and a rising share of activities being carried out by MNEs (UNCTAD, 2011; 2013). The power within an industry is dispersed across many symbiotic MNEs (Mudambi and Venzin, 2010; Milberg and Winkler, 2013). This new model of global supply chains can be generated when MNEs either instruct or incentivise their domestic suppliers to accompany them overseas (Giroud, 2008). In addition, domestic suppliers seek to benefit from their business links with MNEs to establish abroad (Ivarsson and Alvstam, 2013). Table 2 presents a broad timeline of the development of types of FDI. It should be noted that this timeline is only a guide to the development of types of FDI, and indeed all forms of FDI will have occurred in the period under review and will continue to do so.

Table 2

The Development of FDI and its Main Characteristics

	Immediate Post WWII	**Mid 1960's**	**Mid 1980's**	**Late 1990's**
Type of FDI	Market Seeking	Efficiency Seeking	Strategic Asset Seeking	Strategic asset consolidation and rise of global supply chains
The autonomy of overseas affiliate	High	Limited to specialisation	Low – but regionalised autonomy created	Low and company control dispersed to other MNE's
Horizontal/Vertical	Horizontal	Vertical	Mixed	Mixed

Source: Author's research.

As there are different drivers and models for FDI, there are, similarly, various determinants of MNE activity. They must seek to explain not only the location of the overseas activities but also the ownership and organisation of these activities. There are many different theories relating to the drivers of FDI that range across the economic and political landscape. At one end, there is a belief that FDI is an inevitable product of capitalism where MNEs attempt to exert monopolistic power over countries and companies (Hymer, 1972). At the other end, some consider FDI as being a natural product of business drivers continually striving to raise efficiency and value in the organisation (Buckley and Casson, 1976). Hymer (1976) criticised the neo-classical model as he believed that companies were looking to exert monopolistic advantage when investing in FDI (disputing a model that requires perfect competition). Companies would seek to exploit their knowledge advantages in a country that would allow them to compete with the indigenous companies, thus promoting the expansion of horizontal FDI. The aggressive (swallowing up of competition) and defensive (pre-empting competition) behaviours of MNEs were described by Knickerbocker (1973). He concluded that it is the interdependence and uncertainty which characterise the nature of oligopoly behaviour that explains the clustering of FDI in such industries (De Vita, 2001). In their book 'The Future of the Multinational Enterprise', Peter Buckley and Mark Casson (1976) described activities of MNEs outside their national boundaries. They described MNE activities extending the value-added activity of firms into the new territory. They identified several market imperfections that drive this behaviour, such as time-lags and transaction costs (De Vita and Lawler, 2004). In his seminal work, Ronald Coase (1937) questioned why the market could not contract all transactions within an organisation. He concluded that the transaction costs of the market meant that it was more efficient for transactions to take place within a firm. Therefore, the transaction costs between companies in different jurisdictions could be reduced by incorporating the transaction through extending the company across a border through FDI (rather than through market transactions such as outsourcing or offshoring).

From a macroeconomic perspective, FDI can be considered through location-specific variables 'why do countries engage in or attract FDI?' A vast literature exists within economics at both the theoretical and empirical level on the country determinants of FDI. *Location determinants*, especially *economic determinants* such as market size and growth, quality of infrastructure, availability of skilled labour, costs of production factors, availability of natural resources, exchange rates, political stability, science and technology resources, continue to remain very important in the study of the direction and intensity of global FDI flows (see, for example, the reviews by De Vita, 2001; De Vita and Lawler, 2004; Blonigen, 2005). On the other hand, much less attention has been paid to the role of an *enabling regulatory framework* in attracting FDI, particularly insofar as IP protection is concerned, as this too can influence foreign investment decisions. Other studies have focused on the question of 'why companies of different nationalities have different propensities to FDI?' (see, for example, Kojima, 1982, 1990). James Markusen (1998, 2002) takes a different point of view when considering the actions of MNEs arguing that the macroeconomic tools of trade theory need to incorporate firm-specific characteristics such as the size, degree of diversification, economies of scale and scope, and cross border market failure.

A different perspective comes from theorists like Buckley and Casson *et al*. (1998; 2002) who argue in favour of the 'internalisation school of thought'. Building on earlier work carried out by Coase (1937; 1960) on the theory of transaction cost economics (TCE), the (Coasian) nature of the firm and rational action modelling, this school of thought focuses on the problem of explaining the existence of the MNE based on MNEs seeking to internalise a market for cross-border intermediate products.[12] Buckley and Casson (2009) also determined that the decision to internationalise was dependent on industry-specific factors such as product type, market structure and economies of scale. They also concluded that MNEs active in R&D intensive industries were likely to have a higher degree of internationalisation. Other dependencies included region-specific factors such as distance, transport costs and cultural differences. Nation-specific factors were also considered important such as political and financial characteristics.

Other theories are concerned with why companies from one country can penetrate a foreign country and perform better than companies indigenous to that country (Hymer, 1968). It is argued that; an MNE must have some level of monopolistic advantage over indigenous companies (Caves, 1982; Dunning and Bansal, 1997). Hennart (1982; 1991) described internationalisation advantages as being due to 'Know-how' or reputation, which would lead an MNE to consider horizontal FDI. Advantages due to lack of competence in other markets were more likely to result in vertical FDI (backwards or forwards). In contrast, Teece (1981; 1985) saw

[12] But see Buckley and Casson (2009) for a discussion of how the agenda soon broadened to encompass the analysis of multiple international entry forms and various aspects of international business.

vertical FDI as a response to market failures and horizontal FDI as a response to market power and market failures. Casson (1987) argues that market imperfections that distort prices provide an incentive to internationalise production.

A further explanation of FDI activity could be linked to an MNE's desire to diversify risk. Rugman (1975; 1977) argued that companies undertake FDI to diversify risk to protect their profits. Hughes *et al.* (1975) presented evidence supporting this theory. Companies who invest in production in unconnected countries can avoid economic shocks to their business (Caves, 1996). It is worth emphasising at this point that, given the diversity in FDI, it is not possible to identify a single theory which explains all forms of FDI activity. A food producer investing in agricultural production in South America will inevitably have different drivers to a major accounting firm setting up operations in China. It follows that individual aspects of all these theories may be relevant in either case, but none are likely to explain the activity entirely.

While the above theories concentrate on company-specific advantages and drivers of FDI, scholars such as Scaperlanda and Mauer (1969) considered the drivers of aggregate variables such as market size and market growth. They found that MNEs were driven to invest in countries with large economies. However, Goldberg (1972) found that market growth, rather than market size, was a significant driver to invest. Lunn (1980) determined that market size and growth, plus trade barriers all impact on an MNE's propensity to carry out FDI.

Policy variables could drive other determinants, particularly of the location of FDI. In particular, these may be impacted by the behaviour of the receiving (host) country rather than the MNE concerned. These drivers demonstrate that the decision to invest is either an agreement between the MNE and the recipient government or a contest between countries, regions and cities to attract FDI. These might include a difference in tax rates, subsidies, financing arrangements, labour market conditions, export conditions and the ability to use expatriate labour and repatriate profits. These drivers can be broadly segmented as incentives, profit-based and market-based (De Vita, 2001). Bond and Samuelson (1986) described the benefits of attracting FDI using investment incentives such as tax holidays. Black and Hoyt (1989) described the most effective incentive regime as being the best combination of wages, costs and tax holidays when they compared the FDI attraction across two cities. Haaland and Wooton (2001) concentrate on the attractiveness of labour market flexibility. The ability for a company to 'easy come – easy go' was the most attractive proposition, and the value of incentives such as grants, and subsidies was short-lived. These arrangements between MNEs and governments have played out in recent news reports relating to the retaining of investment from companies like Nissan in the UK where the UK government has given assurances of market protection to maintain the investment of the Japanese car manufacturer (Mason, 2016).

In an ambitious attempt to integrate these main theories into one overarching paradigm led John Dunning (1976) to develop the 'Eclectic Paradigm of International Production'. Known also as the 'OLI' model, this framework breaks the drivers of FDI down into three specific pillars, namely: 'O' – ownership-specific advantages; 'L' location-specific factors; and 'I' internalisation advantages. Ownership advantages, or firm-specific advantages, help to explain the existence of MNEs. Companies are viewed as a collection of assets including, management skills, technology, trademarks, designs and patents, reputation, practices and products and innovative capacity, and that MNEs possess higher-than-average levels of the assets (Maskus, 1998a). These assets can then be managed internally through different subsidiaries and business groups, thus taking the form of internal public goods. These assets can also be applied to production in various locations without significantly reducing their effectiveness. Dunning (1988) categorised these advantages into two groupings. Firstly, *assets* which are advantages owned by the organisation and secondly*, transactions* which are benefits arising from the management of these assets located in different countries. Even with these strong knowledge-based assets that are ripe for exploiting in overseas markets, companies still need to make decisions on many factors, including location, facilities, entry mode, production techniques, and whether to partner or go it alone (Maskus, 1998b).

Location-specific factors, or country-specific advantages, relate to the distribution of natural or created resources such as market size, infrastructure, transportation, availability and quality of labour, and the receiving governments' environment (Seyoum, 2006).

Internalisation advantages relate to the exploitation of trading advantages or avoidance of disadvantages such as incentives to invest or trade barriers, respectively. These influence how a company decides to operate in a foreign country, trading off the savings in transactions, hold up or monitoring costs of a wholly-owned subsidiary, against the advantages of other entry modes such as exports or licensing. This third element of Dunning's taxonomy seeks to explain why some activities are carried out within firms and others through arms-length transactions (Coase, 1937).

Of course, no model or theory is free from criticism. The OLI paradigm is no exception. The literature has highlighted its failure to account for the role of managerial discretion, inability to reflect the dynamic evolution of MNEs, lack of specification of measures to operationalise its main constructs, and limitation of taking insufficient account of the interaction between the policy environment and firm.

In response to the many criticisms directed towards the Eclectic Paradigm of International Production, Dunning (1988) restated the paradigm's central tenets and outlined possible extensions. In this article, he also reaffirms that the OLI model remains a robust framework for explaining not only the economic rationale of economic production but many organisational and impact issues to MNE activity as well. Over four decades after its inception, the OLI framework as developed and extended by Dunning (1976, 1977, 1979a, 1979b, 1988, 1995) can rightfully be seen as an enduring and effective tool for understanding many factors leading to the successful international expansion of MNEs. However effective, this is indeed 'a tool' and should not be thought of as an exhaustive and universal, 'all-encompassing' theory of FDI. [13]

Most of the models and theories set out above concentrate on manufacturing industries and FDI. There are limited studies into the FDI determinants for the services sector as defined by Eurostat (2009, p.2) as:

> "Service products are entities over which ownership rights cannot be established. They cannot be traded separately from their production".

With the increase of FDI activity over the last few years, so has the prevalence of FDI from business services companies. Europe, in particular, has seen a sharp increase in the internationalisation of services in the last two decades (Castellani *et al*., 2016) see Table 3.

[13] As observed by Eden (2003), and Eden and Dai (2010), Dunning originally saw OLI as a 'theory', an 'eclectic theory' capable of drawing together different strands of economic models of international production. In his early work he consistently referred to the 'eclectic theory of international production'. It wasn't until the late 1980s that he began to use the term 'eclectic paradigm'.

Table 3

EU-27 FDI Stocks by Economic Activity

EU-27 FDI stocks by economic activity, 2007
(EUR 1 000 million)

	Outward	Inward
Total	3,108.2	2,346.1
Agriculture, hunting and fishing	1.2	1.1
Mining and quarrying	162.9	48.9
Manufacturing	642.8	336.1
Food products	72.0	51.2
Textiles and wood activities	34.1	42.0
Petroleum, chemical, rubber, plastic products	260.3	133.4
Metal and mechanical products	107.8	40.5
Machinery, computers, RTV, communication	21.1	14.1
Vehicles and other transport equipment	71.9	23.1
Electricity, gas and water	53.6	16.2
Construction	14.4	9.2
Services	2,176.8	1,885.8
Trade and repairs	124.3	143.2
Hotels and restaurants	11.5	8.9
Transport and communications	141.5	45.3
Financial Intermediation	1,387.8	1,162.1
Real estate and business services	481.5	503.6
Other services	30.1	22.7
Other sectors	56.6	48.8

Source: Eurostat (bop_fdi_pos)[14]

[14] See: http://appsso.eurostat.ec.europa.eu/nui/show.do?query=BOOKMARK_DS-061460_QID_4F26EE44_UID_-3F171EB0&layout=POST,L,X,0;TIME,C,X,1;ACTIV,L,Y,0;CURRENCY,L,Z,0;PARTNER,L,Z,1;GEO,L,Z,2;INDICATORS,C,Z,3;&zSelection=DS-061460INDICATORS,OBS_FLAG;DS-061460PARTNER,EXT_EU27;DS-061460GEO,EU27;DS-061460CURRENCY,MIO_EUR;&rankName1=PARTNER_1_2_-1_2&rankName2=CURRENCY_1_2_-1_2&rankName3=INDICATORS_1_2_-1_2&rankName4=GEO_1_2_1_1&rankName5=POST_1_2_0_0&rankName6=TIME_1_2_1_0&rankName7=ACTIV_1_2_0_1&rStp=&cStp=&rDCh=&cDCh=&rDM=true&cDM=true&footnes=false&empty=false&wai=false&time_mode=NONE&lang=EN

Jeong (2014) carried out a segmental analysis looking at each of the determinants of FDI that had been identified in previous studies by Kolstad and Villanger (2008) who used industry-level FDI data from 57 countries 1989–2000 to examine the host country determinants of FDI flows in services. He looked at the FDI inflows for service industries in 34 countries and considered 13 variables as determiners of the inward investment. Jeong concluded that the key determinants from his study of FDI for the business services sector were bribery and corruption, IPRs, transparency, distribution infrastructure, ease of doing business, productivity in services and industrial productivity. There was less strong but still some correlation with the cost of living, office rents and GDP. Jeong did not find a meaningful correlation with exchange rates, but he did note that his study covered a period where exchange rates were not particularly volatile. His findings suggest that many of the drivers for service industry FDI are similar to those in manufacturing ones. The importance of a stable political and regulatory system does seem to dominate Jeong's findings and can perhaps be borne out by the concentration of service industries in financial centres such as London, New York and Frankfurt.

Jeong found that institutional quality and democracy are more important for FDI in services than general investment risk or political stability. He also found a strong correlation between FDI in manufacturing (non-services) and FDI in services that would support manufacturing, such as finance and transport. Jeong (2014) also took into account work by Ramasamy and Yeung (2010) who studied FDI flows across manufacturing services and business services and concluded that the drivers identified by Kolstad and Villanger (2008) were relevant but also that the development level of infrastructure was less important in the services sector.

Tomlin (2008) considered Japanese inward investment into the US services industry and found a strong positive correlation with exchange rate volatility and FDI.

In summary, several different types of FDI are instigated by many different drivers depending on the company, market and country determinants. FDI can take different forms in different sectors, markets and at various times in the development of an enterprise.

Dunning's eclectic paradigm offers a framework for understanding the pattern of behaviour of MNEs but is not an exhaustive, all-encompassing theory. To understand individual FDI decisions, it will be necessary to understand the particular company's motivations, drivers to internationalise, and the environment that pertains to the country, region and industry receiving the investment.

2.2.3 FDI into China

China has experienced a significant increase in inward FDI in the past two decades since it re-joined the world trading system in the late 1970s (Yu and Zheng, 2000; Long, Yang and Zhang, 2015). Asia receives most of the FDI into the developing world, and China accounts for almost half of Asia's share of global FDI, see

Table 4. China's FDI inflow grew from virtually nothing in 1979 to $45.5 billion in 1998; and less than a decade later in 2006, its FDI inflow increased to $69.5 billion even bucking the reduction in inflows seen across the globe following the 2000-2001 global recession. FDI flow into China accounts for more FDI than that of the entire African continent ($35.5 billion) and is just a bit behind all of Latin America ($83.8 billion) (see UNCTAD, 2007). Since 1993, China has become the largest recipient of FDI among developing countries, and, except for the United States, the most popular destination of choice for MNEs (Long, Yang and Zhang, 2015). Between 2000 and 2010, China received 20% of global FDI flows, and in 2011, 124 billion USD of FDI went to China (Yang *et al*., 2013).

Table 4

Overview of recent trends in the global flow of FDI

Region Country	**1990-1998 Annual average**	**1999-2007 Annual average**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
					FDI Inflows (billions of US Dollars)					
World	322.3	1 022.5	1 497.8	1 181.4	1 388.8	1 566.8	1 510.9	1 427.2	1 277.0	1 762.2
Developed economies	215.0	710.7	801.9	654.4	699.9	817.4	787.4	680.3	522.0	962.5
Developing economies	103.6	283.4	578.5	465.3	625.3	670.1	658.8	662.4	698.5	764.7
Europe	127.5	468.0	349.2	439.2	431.7	478.1	483.2	323.4	306.0	503.6
European Union	121.7	445.5	318.6	390.5	384.9	425.8	446.5	319.5	292.0	439.5

Region Country	1990-1998 Annual average	1999-2007 Annual average	2008	2009	2010	2011	2012	2013	2014	2015
FDI Inflows (billions of US Dollars)										
United Kingdom	26.3	93.8	92.2	89.7	58.2	42.2	55.4	47.6	52.4	39.5
United States	67.5	175.3	306.4	143.6	198.0	229.9	188.4	211.5	106.6	379.9
Asia	65.1	184.6	379.9	324.3	412.4	426.7	409.6	431.4	467.9	540.7
China	27.8	58.2	108.3	95.0	114.7	124.0	121.1	123.9	128.5	135.6

Source: UNCTAD, Annex table 01. FDI inflows, by region and economy, 1990-2015 [15]

Opening China to world trade by Deng Xiaping in 1979 with the initiation of the 'Open Door' policy was a radical political departure for China which had hitherto been largely closed to the world economy (except some joint ventures with the Soviet Union). Xiaping realised that China's industrial base lacked investment and technology and therefore, could not compete globally without radical change. The primary objective of opening up the economy was to attract foreign capital, advanced technology, management skills, and to catch up with more developed economies. The 'Open Door' policy started with a limited law on joint ventures and was quickly followed in 1980 by the establishment of four Special Economic Zones (SEZ), in Shenzhen, Zhuhai, Shantou and Xiamen. These zones featured several incentives to invest including a 15% corporation tax, cheap land and services, low labour costs, greater freedom on the management of labour, zero or low customs duties, simplified entry, exit and other formalities, and increased access to the Chinese market (Ling and Lawler, 2001). In 1984 a further 14 coastal cities were set up as 'Open Cities' with similar investment incentives as the SEZs (Zhou, Delios and Yang, 2002). In 1985 the Yangtze River Delta, Pearl River Delta and the Minnan region were made development zones, while Hainan was added as a fifth SEZ in 1988 (Thorpe, 2004). Initially, investment in China came from Hong Kong and Macau. In 1986 laws were introduced to enable the setting-up of wholly-foreign owned enterprises (WFOEs) and cooperatives (Zhang, 2002). In 1988 a law protecting against expropriations and allowing better and fairer access to the Chinese market was introduced. Developments since this time have broadly clarified arrangements and supported further FDI into China (Story, 2003).

[15] See: http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx

Wang and Swain (1995) examined the host country determinants of FDI in China. They found that FDI in the manufacturing sector is driven by China's GDP, GDP growth, wages, and trade barriers. They found several characteristics of FDI in China. First, investments concentrate on secondary industries like manufacturing, utilities, and property development. Between 1979 and 1998, the number of foreign enterprises in secondary industries made up 75% with capital taking up 62% of the total.[16] Second, foreign capital flowed mainly from Asian countries, with over 80% of the total foreign capital coming from Hong Kong, Taiwan, Japan, Korea and other Southeast Asian countries. Third, FDI is unevenly distributed across provinces within China, with most focussed on the coastal regions of Eastern China see Figure 2.

[16] Economic Times, December 2, 1999

Figure 2

Distribution of Chinese FDI 2005

Source: Authors own work derived from Industry Week (2017)

Sun, Tong, and Yu (2002) also considered the determinants of FDI across China (noting a variation by province). They conclude that initially FDI was drawn in through export-oriented industries from Hong Kong and Taiwan that were lured by cheap production costs. Later China drew in investments from the Western world from MNEs that were eager to tap into the huge domestic market. Their study provides evidence that the importance of FDI determinants changes over time. Low wages drove FDI before 1991 but had a negative relationship after then.

Similarly, provincial GDP bore no significant relationship with GDP before 1991 but became highly positive after 1991. This reflects the fact that the nature of FDI before and after 1991 is quite different. The importance of high labour quality and effective infrastructure are also important in the location decisions of MNEs investing in China. For China as a whole, its ability to maintain strong political stability and its new and sustained openness to international business has been a significant attractor of FDI. Long, Yang and Zhang (2015) argue that the increase in China's FDI has led to a rise in institutional effectiveness thus creating a virtuous circle of increasing FDI and increasing stability, openness and effective regulation. Cheng and Kwan (2000) also highlight the attractiveness to FDI of agglomeration effects, particularly of services as companies invest. Gelb (2000) highlights some of the negative drivers to FDI in China, which include:

- The limits, through legislation, to the nature and scope of certain foreign operation permitted in China;
- The implementation (or lack) of China's WTO commitments;
- Problems in securing intellectual property rights in China;
- Attracting and keeping good quality employees;
- Maintaining good relations with the Chinese authorities.

Sun (1999) considered the concept of socio-cultural distance in the context of FDI modes of entry. Socio-cultural distance is the difference between social and business cultures between the investing country and the receiving country for FDI. The greater this difference is, the more information the investing company will require before and during the set-up and operation of the investment. Companies will need to build knowledge of the local prevailing business culture to function efficiently. This disadvantage may be mitigated by investing through a joint venture (Hymer, 1976; Root, 1994). Sun (1999) also considers that the operating distance in a foreign culture is likely to create business uncertainty and increase the risk for the international company. Again, joint ventures (JVs) may help to address some of these issues. A positive relationship between socio-cultural differences and the propensity to create joint ventures has been demonstrated in several studies (Goodnow and Hansz, 1972; Gatignon and Anderson, 1988; Shan, 1991; Hu and Chen, 1993). The socio-cultural difference will also be related to the geographic adjacency of the investor and receiving economies as there are likely to be greater social ties with a closer country. In China's case, investors from Hong Kong and Taiwan will share similar cultural backgrounds reducing the socio-cultural difference of investors. Asian countries such as Japan, Singapore, Malaysia and South Korea will also have close cultural ties with China due to their geographic proximity, cultural links and preponderance of Chinese immigrants. By contrast, Western economies, like the UK, US and Western Europe, will have significant socio-cultural distances to traverse. One would expect to see investors from countries with low socio-cultural distances to engage in more investments as WFOEs transitioning to a preference for more JVs from those countries in the western group (Sun, 1999). The three possible entry modes into China are:

- Equity Joint Venture (EJV) where a foreign and Chinese partner share equity and management of a shared enterprise;
- Contractual Joint Venture (CJV) where a foreign and Chinese investor collaborate through a contractual arrangement; and
- Wholly Foreign-Owned Enterprise (WFOE) where the foreign investor is the sole owner of the invested enterprise.

Evidence from Sun (1999) would seem to demonstrate that countries with lower socio-cultural distances do indeed engage in a higher proportion of WFOE investment and those with greater socio-cultural differences in JVs. See Table 5.

Table 5

Entry Modes of FDI (pledged) into China by Major Investing Economies Between 1987 and 1992.

Percentage Type of investment in China between 1987 and 1992			
Country/Region	**EJV**	**CJV**	**WFOE**
Hong Kong	47%	28%	25%
Taiwan	48%	10%	42%
Singapore	59%	14%	27%
Japan	52%	9%	39%
US	68%	8%	24%
Western Europe	84%	5%	10%

Source: Extract taken from Sun (1999, p.648).

Sun's analysis is important since it prompts the question of whether UK investors mirror these entry mode differences into China. Sun only looks at one determinant, socio-cultural differences and no other determinants or the interplay between them. Nor is there any sectoral analysis of the impacts of socio-cultural differences.

There is little doubt that China's ability to attract and openness to FDI has increased starkly since the country opened up to the West in 1979. Strong incentives, an enormous market, and high growth rates, plus accelerating agglomeration effects have surely been significant drivers of this growth in FDI. Understanding if China has achieved its potential to attract FDI, and to gain the most advantage from it, is a moot point.

2.3 Intellectual Property Rights (IPRs)

2.3.1 IPRs: Definition, Theory and Types

IPRs are often contextualised theoretically by referring to Kenneth Arrow's seminal work of 1962, where he states that:

> *"In an ideal socialist economy, the reward for invention would be completely separated from any charge to the users of the invention. In a free enterprise economy, inventive activity is supported by using the invention property rights; precisely to the extent that it is successful, there is an underutilization of the information."* (Arrow, 1962, p.617).

What Arrow is saying is that in an ideal world, the inventive activity would be considered a public good, made available to everyone so that the benefits are exploited to the maximum. However, if this were the case, in a free market society, there would be little incentive for innovation. He, therefore, postulates that a government-mediated solution is required that rewards inventors to maintain the motivation to innovate (Braga and Fink, 1998). This incentive is provided by the IPR system that enables the inventor to charge monopoly rents on the exploitation of an idea for a length of time. While IPRs stimulate invention, they also have the impact of reducing the exploitation of the invention, thus making this a less efficient outcome for society (Arrow, 1962).

The WTO[17] defines IPRs as *"the rights given to persons over the creations of their minds"*. IPRs usually give the creator an exclusive right over the use of his or her creation for a specific period. Ghidini (2006, p.24) states that:

> "*the innovation already developed in such a way that the reward granted to the current inventor stimulates both the inventor to continue and third parties to develop subsequent innovation which might compete with the preceding one, thus also spurring on the first innovator, in a virtuous pro-innovation and pro-competition dynamic process.*"

The property right owner can, therefore, receive enhanced rents for its product due to its monopoly position. This incentivises companies to maintain innovation. The additional monopolistic rents are required to be above or equal to the cost of innovation to be effective in this way (Léger, 2006).

The UK government further defines intellectual property as something unique that one physically creates. An idea alone is not intellectual property. For example, an idea for a book does not count, but the words written do[18]. The copyright, design and patents Act 1988 define IPRs as firstly property rights – but secondly, as property rights in something intangible. Finally, they protect innovations and creations and reward innovative and creative activity. Christie (2006) further refines the definition of IPRs as something intangible derived from the intellectual activity in the industrial, scientific, literary and artistic field.

IPRs are often broken down into two main areas: (i) Copyright rights and related to copyright; and (ii) industrial property rights. Copyrights are the rights of authors of literary and artistic works (such as books and other writings, musical compositions, paintings, sculpture, computer programs and films). Industrial property rights themselves can usefully be divided into two main areas. Firstly, the protection of distinctive signs, trademarks and geographical indications. Secondly, are the types of protection aimed at stimulating innovation, design and the creation of technology, this category includes inventions (protected by patents), industrial designs and trade secrets (Maskus, 1998b).

[17] For the full WTO definition see: https://www.wto.org/english/tratop_e/TRIPS_e/intel1_e.htm
[18] See: https://www.gov.uk/intellectual-property-an-overview

Although IPRs are territorial, definitional uniformity is important as nations seek to arrange mutually satisfactory agreements on how resident titleholders can secure IP protection in international markets. The negotiations of the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) promotes greater harmonisation of IPR protection. The taxonomy developed by the Innovation Policy Platform [19] based on WTO (1994) articles on TRIPS**,** reported in Table 6 below, provides a useful summary of the nature and types of IPRs, as recognised internationally.

[19] See: www.innovationpolicyplatform.org

Table 6

Summary: IP and Innovation

Patents	Utility models	Trademarks	Copyright	Geographical indications	Industrial design rights	Plant variety protection	Trade secrets
Description							
Patents grant their owner a set of rights of exclusivity over an invention (a product or process that is new, involves an inventive step and is susceptible to industrial application), as defined by the "claims" (i.e. a clear and concise definition of what the patent legally protects).	Utility models provide a second-tier patent system, offering a cheap, no-examination protection regime for technical inventions (Suthersanen, 2006). Differently from patents, *inventive step* is not a requirement for receiving protection, while *novelty* is a requirement; that is, inventions need to be at a level above the "state of the art".	Trademarks provide exclusive rights of a sign, design or expression.	Copyright gives exclusive rights to authors for their artistic creations. In most countries it provides legal protection for software.	GI is a name or sign used on some products that correspond to a specific geographical location or origin.	Industrial design rights protect the visual design of objects including shape, configuration or composition of pattern or colour, or combination of pattern and colour	Plant variety protection (PVP) grants rights over new plants that are novel and distinct from available varieties, display homogeneity, and have stable traits in that the plant remains true to type after repeated cycles of propagation[i]	Trade secrets protect knowledge that is not known to the public, which confers economic benefits to its owners and is subject to reasonable efforts to maintain its secrecy. It is a weaker right in that, if it is independently duplicated by others, they can use the information for their own economic benefit.
Type of IP							
Application required	Application required	Application required	No application required, that is, granted "sui generis"	Application required	Application required and in some cases granted "sui generis"	Application required	No application required, that is, granted "sui generis".
Fields/sectors							
For technological inventions	For technological inventions	Trademarks cover manufacturing industries and services including, consumer and agricultural products (such as wine and fruits)	Copyright covers creative industries including software sector (although protection is weak) & entertainment.	GIs are mostly applied to food products such as cheese, wine, and champagne; it also applies in some countries to handicrafts.[ii]	These rights cover sectors where non-technological design innovations are valuable, such as consumer products, architectural and engineering services, computer and telecommunications, fashion and crafts (UK IPO, 2013)	PVP covers plant breeder industries.	Trade secrets broadly cover manufacturing and services sectors. They can also protect innovations that are not well covered by other types of IP (such as different types of specific business models).
Relation to innovation and relevance for development							
Patents provide IP to inventions with **industrial applicability,** as opposed to inventions designed solely around theoretical concepts and ideas. *They, therefore, cover potential future innovations.* However, technically speaking patents are not equivalent to innovation, because patents provide IP for **inventions** and these may be implemented or not, resulting in innovations. Not all patented inventions reach the	Utility models follow patents in this respect. The only major differences are the lower degree of novelty and boundaries with the "state of the art". The latter has impacts on the extent to which innovation is supported. It can be useful in contexts of development (see Box 1.1).	Trademarks do not directly protect inventions, but can offer contributions to innovation if brand recognition, for example, creates incentives to upgrade the quality of services. Moreover, service firms in emerging countries often represent an important share of economic activities, even though some often have low levels of productivity and	Copyright can play an important role to the extent that it rewards novel creations. In relation to the development of ICTs, in particular, it provides more opportunities for the diffusion of creations and arguably greater business opportunities. It is likely of importance also for development contexts, albeit with potential enforcement challenges constituting a major hindrance.	To the extent that it provides brand recognition, GIs can encourage innovation to strengthen or develop product quality. They can provide larger rewards by strengthening community involvement via IP potentially supporting traditional sectors (see section 1.5).	Industrial design rights provide IP to design that is above "state of the art". They are particularly useful for non-technological innovations in consumer products. They are possibly quite relevant for emerging economies with an advantage in traditional activities (e.g. furniture and clothing).	PVP is relevant for ensuring quality and investments in its specific field. Its relevance is linked to the importance of such sectors in development contexts.	Trade secrets are relevant to the extent that they effectively protect innovative business practices for wider groups of innovators (Lemley, 2008). They are often quicker and cheaper, as no registration is required, and thus can be useful for development contexts, although this is conditional on enforcement.

Source: Innovation Policy Platform, available at https://www.innovationpolicyplatform.org/content/types-ipr (last seen December 2017)

2.3.2 Historical Developments on IPR Protection

IPRs have been in existence since the end of the middle-ages and seen in Roman pottery where the maker would place a mark or imprint designating his or her ownership of the design or structure (Torremans, 2013). IPRs were also used to demonstrate patronage through privileges granted by royal prerogative allowing the inventor or maker to capitalise on their inventions and protect against piracy (Terrell and Thorley, 2000). In the UK in 1624, the Statute of Monopolies allowed the true and first inventor a patent monopoly for 14 years, and this also included those importing technology from overseas. In the 18th century, the industrial revolution provided a new impetus to the development of IPRs and saw the development of patent specifications, followed by improved procedures for patents including a commissioner of patents and the ability to lodge provisional applications that gave protection until a full patent was granted.

The Patent, Design and Trademark Act of 1883 addressed the inadequacies of litigation procedure and created the Patent Office and a requirement to search previous patents. At the end of the 19th century, as globalisation blossomed through wider trading links, there was a need for more international cooperation to protect ideas and innovations. The 1883 Paris Convention for the Protection of Industrial Property became the fundamental instrument of global patent protection. For the first time, foreign inventors were treated in the same way as domestic ones. This 1883 Paris Convention Act also included a definition of trademarks which was further strengthened through amendments in 1919, 1938 and 1984 to include service marks (Beier, 1980).

Copyright had been historically related to written work, which initially had been handwritten and so challenging and time-consuming to copy. However, with the introduction by Gutenburg in 1439 of moveable type and Caxton in 1476 of the printing press, the ability to make duplicate copies of documents increased exponentially (Deazley, 2004). The requirement to enable copying to take advantage of this new technology, but the need to protect the original author and the publisher against copying led to the Stationers Company receiving a royal charter in 1556. This created monopolies for company members to exploit intellectual property (IP). The first statute of copyright was the Statute of Anne in 1709 that granted 'sole right and liberty of printing books to authors and assignees' for 14 years that could be extended by a further 14 years if the author remained alive.

In 1833 performing rights were acknowledged and included in statutes and 1842 musical scores were added. In 1886 the Berne Convention for the Protection of Literary and Artistic Works gave cross-border recognition of the need for copyright protection. In 1908 this was strengthened to protect at the point of creation rather than at registration.

As technology progresses and innovations emerge, there is a requirement for new rules supporting different media formats. Therefore, conventions and acts have had to be revised to include cinematography, films and broadcasts. The Records of the Intellectual Property Conference of Stockholm 1967 and the Paris Convention 1971 updated the Berne Convention to include new media formats.

Given that intangible assets can travel easily, IP requires international cooperation to provide broad protection as well as economic incentive to innovate and create (Ullrich, 1989). However, there are disparities between countries in their ability to innovate, and the monopolistic power given to owners of IP can be detrimental to broader development (Mansfield *et al*., 1981). Asid and Saiman (2004) highlight the benefits of IPRs to developed nations that own most of the world's IP. However, developing countries can benefit if there is an effective technology transfer, and there are incentives to share and disseminate the benefits of R&D. However, Lai (1998), Glass and Saggi (2002) and Helpman (1992) challenge the idea that higher IPR protection in developing countries always improves the levels of innovation on the basis that companies can receive higher rents for longer with stronger IPRs thus reducing the need to innovate further.

The General Agreement on Tariffs and Trade (GATT) 1947 saw 23 countries negotiate a series of agreements on tariffs and trade and became the genesis of the World Trade Organisation (WTO) that today sets uniform baseline provisions of standards for the protection of IPRs. The Uruguay Round of negotiations that ended in 1974 established the World Intellectual Property Office[20] (WIPO) through the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). This mostly reproduced the most important aspects of the four international agreements that related to IP, namely:

[20] See: http://www.wipo.int/portal/en/

- The Paris Convention (1967)[21] for the protection of industrial property;
- The Berne Convention (1971)[22] for the protection of copyright;
- The Rome Convention (1961)[23] for the protection of performers, producers of phonograms and broadcasting organisations;
- The IPIC (integrated circuits) treaty (1989)[24] protects the layout designs (topographies) of integrated circuits. (Note: This treaty has yet to come into force according to the WIPO website referenced)

The TRIPS Agreement extended the principal provisions of these key treaties to the multinational context. Developing countries were granted periods to transition with least developed countries given a more extended period. The TRIPS agreement also requires WTO members to adopt fair and equitable procedures to ensure the adequate protection of IP rights within their sovereignty. The WTO provides a dispute resolution mechanism between member states (Hoekman and Mavroidis, 2007). Maskus (1998a) considered that if IPRs are being used as an attractor for FDI then perhaps the development of TRIPS, that effectively sets a minimum standard for IPRs, will reduce this advantage. He also notes that IPRs are just one of many policy tools available to countries to attract FDI.

2.3.3 Measurement of International IPRs

There are two commonly used measures of national IPR protection in the academic literature. Both are based on a measure of patent law strength, which is used as a proxy for all IPRs. The index of Rapp and Rozek (1990) (RRI) is based on each country's patent laws in 1984 compared to the minimum standards set by the United States Chamber of Commerce (USCC). The USCC standards include procedures for the examination of patents, the length of time a patent is protected for, the requirement for compulsory licensing of patents, coverage of inventions, how patent rights can be transferred, and effective enforcement regulation against infringement. The RRI index is set on a six-point scale with higher numbers indicating stronger IPRs see Table 7. This scale uses patents as a proxy for all IPRs but does not contain a measure for actual

[21] For a guide to this convention see:
http://www.wipo.int/edocs/pubdocs/en/intproperty/611/wipo_pub_611.pdf
[22] See: http://www.wipo.int/treaties/en/text.jsp?file_id=283698
[23] See: http://www.wipo.int/treaties/en/ip/rome/summary_rome.html
[24] See: http://www.wipo.int/treaties/en/ip/washington/

enforcement of those patent laws, only the existence of enforcement regulations. It is also limited as being a snapshot in time and as patent laws are continually changing has quickly become out of date. It is also less than clear in Rapp and Rozek's work what the key differences are that would give a particular score, for instance, what would need to be different to move from a score of 2 "*seriously flawed laws*" to a score of 3 "*flaws in laws, some enforcement*".

Table 7

Rapp and Rozek's (1990) Patent Protection Scale

Score	Description
0	No IP protection laws
1	Inadequate protection laws; no law prohibiting piracy
2	Seriously flawed laws
3	Flaws in laws, some enforcement laws
4	Generally good laws
5	Protection and enforcement laws consistent with minimum standards proposed by the UC Chamber of Commerce

Source: Rapp and Rozek (1990), Appendix 4.

The second commonly used index of IPR developed by Ginarte and Park (1997) is, again, based solely on patent rights. It covers 110 countries for 1960–1990 (broken down into five years intervals). The index is the sum of five separate scores for coverage (patentable inventions); membership of international treaties; duration of protection; enforcement mechanisms; and restrictions (for example, compulsory licensing if a patented invention is not sufficiently exploited). This index provides an indicator of the strength of patent protection through the laws in place, not the quality of the patent system. Each area of protection is given value ranging from 0 to 1. The unweighted sum of the five values constitutes the overall value of the index with higher values of the index indicating stronger levels of protection, see Table 8.

Park updated this index in Park (2008b), retrospectively, to include more countries (such as China and the East European countries). This update also showed changes in relative scores over time, showing the generally positive development in world IPRs. China entered the index for the first time and scored a very creditable 4.08 in 2005 which was a notable improvement from the ratings given by Park of 1960-1990 of 1.33, 1995 of 2.12 and 2000 of 3.09. The 2005 rating was a higher score than countries such as Turkey, New Zealand and Cyprus. However, again, this index is based on laws in place in specific countries rather than the reality of implementing patent laws. The dichotomy between legislation on the books and enforcement with regard to China in particular will be discussed later in this chapter.

Table 8

Summary of the Categories and Scoring Formula for Ginarte and Park Index

(1) Coverage	**Yes**	**No**
Patentability of pharmaceuticals	1	0
Patentability of chemicals	1	0
Patentability of food	1	0
Patentability of plant and animal varieties	1	0
Patentability of surgical products	1	0
Patentability of microorganisms	1	0
Patentability of utility models	1	0
(2) Membership in international treaties	**Yes**	**No**
Paris convention and revisions	1	0
Patent cooperation treaty	1	0
Protection of new varieties (UPOV)	1	0
(3) Loss of protection measures against losses	**Yes**	**No**
Working requirements	1	0
Compulsory licensing	1	0
Revocation of patents	1	0
(4) Enforcement	**Yes**	**No**
Preliminary injunctions	1	0
Contributory infringement	1	0
Burden-of-proof reversal	1	0
(5) Duration:	**Values**	
Application based standard		
x > 20 years	1	
0<x< 20	x/20	
Grant-based standard:		
x' > 17 years	1	
0 <x' < 17	X'/17	

Notes: Where x = duration of protection (in years) under an application-based standard and x' = duration of protection under a grant-based standard. The value of each category, other than duration, is j/k, where j is number of l's received (or number of conditions satisfied) and k the number of conditions to be satisfied. For example, in the U.S. in 1990, category (1)=0.85, (2)= 1.00, (3)= 1.00, (4)= 0.67, and (5)= 1.00 (where the U.S. is under a grant-based standard). Thus the PR index value = 0.85 + 1.00 + 1.00 + 0.67 + 1.00 = 4.52.

Source: Ginarte and Park, 1997: 300 (Appendix A).

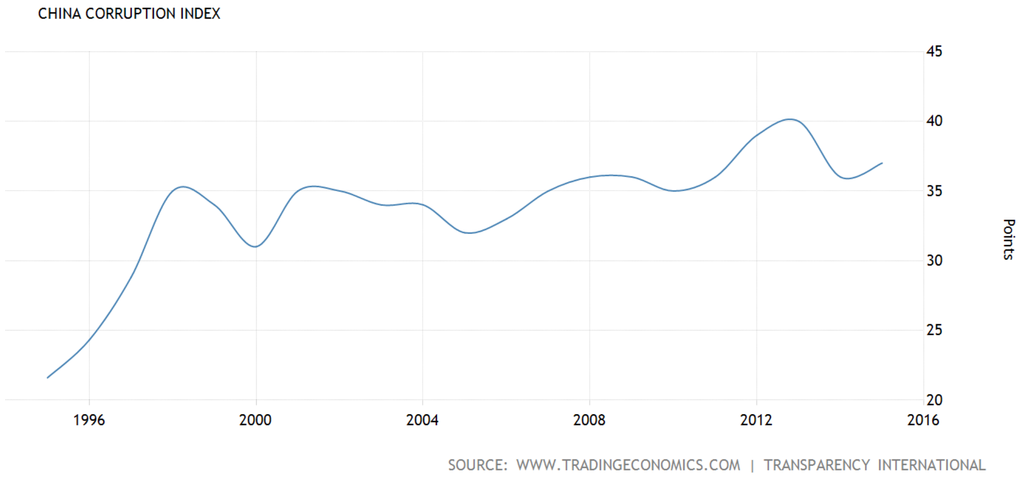
The Corruption Perceptions Index (CPI) is produced by Transparency International[25], and is a composite index, using data compiled over two years. It surveys business people and the assessments of various country analysis from independent institutions. The objective of the CPI is to report on the perceptions of corruption within a country. The index accepts that it is difficult to find hard data on corruption but uses these perceptions data as a proxy for the actual level of corruption in a country. It draws data from contributors such as the Economist Intelligence Unit (EIU), World Economic Forum (WEF) and the World Markets Research Centre

[25] See: http://www.transparency.org/

(WMRC). The CPI averages ratings are taken over three years to limit sharp single year movements in perceptions. Comparisons can be made over time against a country's score. The CPI also ranks countries by levels of corruption Lambsdorff (2007). The 2015 CPI[26] index ranks Denmark as the least corrupt country in the survey and Somalia and North Korea as the joint-most corrupt countries. China currently sits ranked at number 83 well behind Turkey (66), New Zealand (4) and Cyprus (32). China's corruption index score has improved significantly in the last ten years, as seen in Figure 3.

Figure 3

China Corruption Perception Index 1995-2015



Source: http://www.tradingeconomics.com/china/corruption-index (last seen December 2016)

The International Intellectual Property Alliance (IIPA)[27] is a group of trade associations formed in 1984, which represent U.S. copyright-based industries to improve international protection and enforcement of copyrights. The IIPA and its member associations, working with U.S. government, foreign governments, and local representatives, analyse copyright laws and enforcement regimes across the globe.

The IIPA submits an annual report to the U.S. Trade Representative (USTR) and other U.S. Government agencies in the U.S. Government's annual "Special 301" review on whether:

[26] See: http://www.transparency.org/cpi2015#results-table
[27] http://www.iipawebsite.com/

"*acts, policies or practices of any foreign country deny adequate and effective protection of intellectual property rights or deny fair and equitable market access for U.S. persons relying on intellectual property protection*".

The IIPA also produce country reports for the U.S. Government highlighting problems and developments in copyright protection in various countries. China has featured heavily in these, and special reports and the IIPA have recommended, in its latest report[28], China maintains its place on the Priority Watch List – the highest level of concern.

Measuring a country's IPRs is complex as it covers not only several different pieces of legislation relating to various types of intellectual property, they change over time, and understanding enforcement and measuring breaches of IPRs can be difficult. The Ginarte and Park (1997) index has become the favoured tool by many academics and benefits from covering over 100 countries, is regularly updated and has a useful time-series. However, it has flaws, not least that it only looks at the country's legal framework for protecting patents and not the reality of breaches and enforcement across the gambit of IPRs. However, it has proved itself to be a useful and sustained tool in applied research. Several academics also supplement the Ginarte and Park index with data on perceptions such as that available from the CPI or the IIPA, or they carry out their own surveys of MNEs like Mansfield (1994).

To fill the 'enforcement' gap in the relevant models for measuring IPR strength, Papageorgiadis, *et al.* 2014, created a new composite index of patent systems that includes enforcement-related activities for 48 countries for the period 1998-2011. Using transaction cost theory[29], Papageorgiadis *et al.* 2014, use data on servicing costs, property rights protection costs and monitoring costs proxies to calculate a new composite index. They used data sources from the Global Competitiveness Report of the World Economic Forum, the World Competitiveness Yearbook produced by the International Institute of Management Development, the International Country Risk Guide published by the Political Risk Services Group, the Corruption

[28] http://www.iipawebsite.com/rbc/2016/2016SPEC301CHINA.PDF

[29] Transaction cost theory suggests that companies try to minimise the costs of doing business with the environment outside of the business, and also minimise the cost of doing business within the business. Companies are therefore weighing up the costs of engaging with the external and internal business environments. (Coase, 1937; Williamson, 1981)

Perceptions Index published by Transparency International, data on piracy rates reported by the Business Software Alliance and the USTR Special 301 report.

Papageorgiadis *et al.* (2014) went on to publish a table of international patent systems strength index scores on a scale of 0-10 with a score of 10 being the maximum. The average index scores for the years 1998-2011 is reproduced below in Table 9.

Table 9

International Patent Systems Strength Index Scores, Average Values (1998-2011)

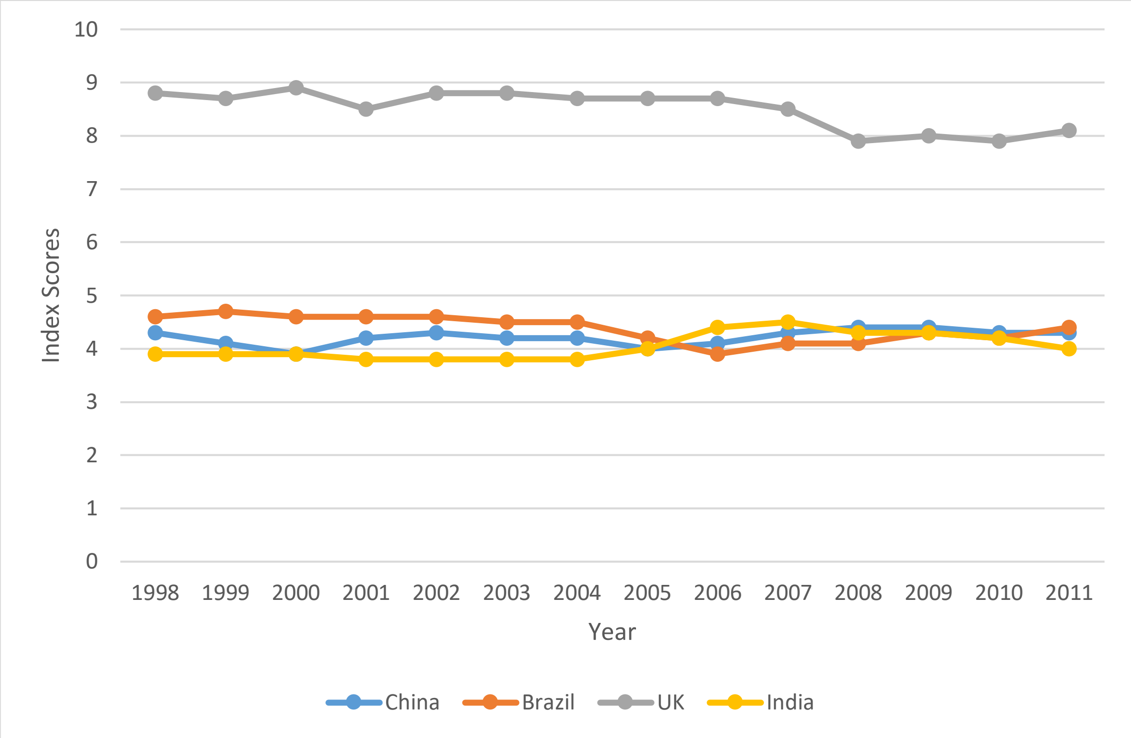
Country	Score	Country	Score
Argentina	3.6	Jordan	5.6
Australia	8.8	Korea (South)	5.3
Austria	8.3	Malaysia	5.5
Belgium	7.2	Mexico	4.1
Canada	8.9	New Zealand	9.4
Chile	7.3	Norway	8.8
China	4.2	Philippines	3.5
Columbia	4.1	Poland	4.8
Czech Republic	5.1	Portugal	6.6
Denmark	9.5	Romania	4.0
Finland	9.5	Russia	3.1
France	7.2	Singapore	9.2
Germany	8.2	Slovakia	4.8
Hong Kong	8.2	Spain	6.9
Hungary	5.6	Sweden	9.3
Iceland	9.1	Switzerland	9.0
India	4.0	Taiwan (ROC)	6.1
Indonesia	3.1	Thailand	4.2
Ireland	7.9	Turkey	4.4
Israel	7.0	Ukraine	3.1
Italy	5.3	United Kingdom	8.5
Japan	7.4	Venezuela	2.9

Source: Papageorgiadis, *et al*., (2014) p.592

Figure 4 shows the change-over-time of a selection of countries index scores for patent system strength.

Figure 4

Selected National Patent System Strength Index Scores (annually for the time period 1998-2011)



Source: Taken from data in Papageorgiadis *et al*., 2014, p.593.

2.4 China's IPR Environment

Modern IPR laws were not introduced in China until after it re-entered the world trading system in the late 1970s (Yu and Zheng, 2000). Since that time, pressure from trading partners like the U.S. (Allison and Lin, 1999) and a desire to join the WTO has driven China to revamp its IPRs several times (Yu and Zheng, 2000; Yu, 2006). Shortly after China reopened its market to foreign trade, China and the U.S. signed the Agreement on Trade Relations which, amongst other things, called for reciprocal protection of copyrights, patents and trademarks (Yu, 2008). In the late 1980s and early 1990s, much lobbying by U.S. companies produced threats of economic sanctions, trade-wars, non-renewal of most-favoured-nation status and potential opposition to WTO membership (Yu, 2000). These threats led to two further MOU's being agreed in 1989 and 1992 reiterating China's commitment to strengthening its IPRs. Today China has joined the main IPR conventions including the Berne, Paris and Geneva Conventions, plus the Patent Co-Operation Treaty and UPOV (the International Union for the protection of new varieties of plants). See

Table 10 for a list of the key milestones in China’s IPR development.

Table 10

Milestones in China's IPR Development

Time	Milestone
1980	The Patent Office of China (CPO) was established.
	China accredited to WIPO
1982	The Trademark Law enacted.
1984	The Patent Law was adopted.
1985	China joined the Paris Convention for the Protection of Industrial Property.
1989	China joined the Madrid Agreement on International Registration of Trademarks.
1990	The Copyright Law was promulgated.
1992	The Patent Law was amended to extend the scope of protection.
	China entered the Berne Convention for the Protection of Literary and Artistic Works, and the Universal Copyright Convention.
1993	The Trademark Law was revised.
1998	The State Intellectual Property Office (SIPO) was established, which superseded the CPO.
2000	The Patent Law was amended for the second time.
2001	The Copyright Law was amended.
	The Trademark Law was again revised and took effect.
	China was accepted into the WTO and signed TRIPS.
2008	The Patent Law was amended for a third time coming into force in 2009
2010	The Copyright Law was amended and took effect
2013	The Trademark Law was revised, took effect 2014
2014	Draft Copyright Law amendments issued for consultation

Source: Adapted from information provided by Cao (2014, p.42) and Thomas (2017, Chapter 7).

However, despite signing up to the major conventions and acceding to the WTO, concerns remain about China’s enforcement of these treaties.[28] The International Intellectual Property Alliance – Special Report 301 estimated that copyright piracy in China resulted in $2.2 billion of U.S. trade losses in 2006 alone.

As one of the most rapidly developing countries, China has arrived quickly onto the international IP[30] stage. The response to this by Western nations has been one of apprehension and unease

[30] Jeff Sommer (Looking Beyond Europe, N.Y. TIMES, Dec. 11, 2011, at BU6) explains that China is expected to surpass the United States as the World's largest economy by the year 2027 because it

(Jacobson, 2008). International trade concerns and China's interest in developing a strong IP market have pressured continuous reform of China's IP laws to meet the World Trade Organisation's (WTO) strict requirements[31]. However, nations such as the U.S. and UK argue that China's IPRs fall well short of WTO requirements and that China does not effectively enforce these regulations (Wu, 2011). Various WTO member nations believe China's undeveloped system of IPRs unfairly infringes upon global market opportunities (USITC, 2011)[32].

The United States Trade Representative (USTR) has identified China as having one of the least developed and least effective IP regimes in the world (USTR, 2009). Piracy in China is estimated to have cost IP owners $2.4 billion worldwide in 2006 (IIPA, 2008)[33]. Furthermore, China's copyright infringement caused an estimated $1.5 billion global loss (Maguire, 2012). Over four thousand patent infringement cases were filed in China in 2008. At the time, penalties for counterfeiting were so small they were viewed by the counterfeiters as business costs, creating only a negligible deterrence. Thus, the ineffective enforcement of international IPRs in China has frustrated international companies (Harris, 2008).

Historically, China was not particularly receptive to the idea that IP was a form of individual property rights that should be legally protected (Chen, 1997). The Confucian and Taoist historical background of China created an environment that did not support the development of intellectual property rights. The development of robust IPRs was further frustrated when communism gained control of the country.

Over two thousand years, China encouraged its citizens to share inventions, discoveries, and creative works as these were considered a public good rather than a personal benefit to the inventor/creator (Chen, 1997). The sole reward for successful intellectual achievements was public recognition and endowments from the King or Emperor. As explained by Chen (1997, p.9):

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enjoys "largely sound government debt and deficit positions, robust trading networks and huge numbers of people all moving steadily up the economic ladder".

[31] For a summary of the main TRIPS requirements see: https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm7_e.htm

[32] See http://www.usitc.gov/publications/332/pub4199.pdf

[33] See www.iipa.com/pdf/2008SPEC301LOSSLEVEL.pdf

> “*learning was not an individual pursuit; it was a community goal*”. “*Tao or ‘The Way’ from which the traditional culture grew, is an idea of social totality, as opposed to the individualism that is promoted in Western culture. Neo-Confucianism also stresses the common good over individual desires”* (Lam, 1995, pp 867-868).

It is worth noting that while this philosophy of learning and knowledge as a public good is not accepted in most Western capitalist cultures, it does closely resemble the ‘ideal’ society envisaged by Arrow (1962).

This way of life was reflected in almost every aspect of Chinese society. Traditionally, copying was a legitimate method of learning in China. Students of sculpture, painting, and calligraphy honoured their master by copying his style and work carefully. The more people who admired a master's work, the more it was copied and spread, increasing the master's success and popularity. The national acceptance of copying combined with a tradition of isolationism and distrust of outsiders further discouraged any development of internationally recognised IPRs (Maguire, 2012).

Despite having a religious and cultural background that discouraged IPRs, China began to recognise such rights around the turn of the 20th century. In 1898, China implemented its first patent act, the Reward Regulations for Promoting Technology Development. In 1903, China signed its first bilateral patent treaty with the United States. This Treaty accomplished two primary goals: (1) "the extension of the United States international copyright laws to China," and (2) "the promise from China to establish a patent office in which the inventions of citizens of the United States may be protected." In 1910, the Chinese emperor enacted the first written national statute on copyrights. In this manner, IPRs slowly gained momentum in China (Allison and Lin, 1999).

Progress in China's IP regime came to a halt with the onset of communism. Between 1945 and 1949, the Communist Party fought and beat the Nationalist Party for control of the political system. Even decades before 1949, communists-controlled areas around the country, influenced politics and culture to create "Soviet-like" microcosms (McCabe, 2009). Hence, when the Communist Party gained control in 1949, a strong sense of the communist ideology had already spread throughout the nation. Communist policies promoted sharing property and discouraged individual ownership (Allison and Lin, 1999). The socialist economic system that protected against the establishment of new private property interests meant that China afforded authors and inventors very little protection (Alford, 1995; Mertha, 2005).

Under the communist regime, China adopted a two-track approach toward patents, imitating the approach taken by the Soviet Union. The "first track" discouraged individual property ownership in an invention by awarding only a "certificate of invention" (McCabe, 2009). The certificate was meaningless as it attributed ownership and rights to the government, including the right to disseminate and collect royalties from the invention. The "second track" of Chinese patent law issued a true patent to the inventor, including the right to receive royalties. Qualifying for this type of patent was not only difficult, but the government had the right to confiscate the invention at any time if the product concerned "national security," or "affected the welfare of the great majority of people." As a result, by 1963, property rights in patents were essentially abolished (Ganea, Pattloch and Heath, 2005).

In the decades following the establishment of a communist regime in China, further cultural movements halted the IP system almost entirely. During the period from 1966-1976, Chairman Mao instigated the Cultural Revolution to prevent the formation of the bureaucratic communism that had developed in the Soviet Union (Slavicek, 2010). This movement led to the imprisonment of writers, scientists, doctors, and many other intellectuals to eradicate individualism. For the next decade, China lacked an IP system entirely due to the renunciation of all previously established patent laws. In 1969, Chairman Mao declared an official end to the Cultural Revolution, but the movement continued to be active until the death of military leader Lin Biao in 1971 (Watkins, 2012).

A period of aggressive cultural and political reform began when Deng Xiaoping came to power in 1978 (Gabriel, 2008). He recognised that foreign investment was essential to China's future and that the implementation of an IP regime was necessary to attract international business. Consequently, in 1979, China began drafting patent laws, and in 1980, China joined the World Intellectual Property Organisation (WIPO). In 1984, China enacted its first patent law in decades, listing the methods for a patent application, the patent examination process, and the protection strength of effective patents. However, the 1984 patent law lacked essential features. For example, the law excluded patents for inventions that involved food, pharmaceuticals, and beverages. Although the law was later amended in 1992 to cover pharmaceutical patents, it still offered little protection. The second and third amendments were adopted in 2001 and 2008 to expand the intellectual property regime (Wu, 2011).

To gain recognition in the global trade arena, China joined the WTO in 2001. Upon China's acceptance into the WTO, member states insisted that China assume more obligations than other member states due to its under-developed IP system. Member states also argued that China's should not receive developing country status as these countries are afforded more benefits and flexibility than developed countries in the WTO (Harris, 2008). China was ultimately classified as a developed country for the purposes of IP laws, as it was the third-largest trading nation and received more FDI than any other country (except for the US). Thus, China agreed to implement patent provisions that met the requirements of Trade-Related Aspects of Intellectual Property Rights (TRIPS). Instead of the five-year grace period that was afforded to developing countries, the WTO required China to immediately implement IP laws that would meet the minimum requirements of TRIPS. China has complied with the provisions of TRIPS by enacting laws that meet the minimum requirements. Still, other nations within the WTO have criticised China for ineffectively enforcing these new laws (Smith, 2005).

Although China's recently introduced patent reform initially sparked high hopes, experience has shown that the country has fallen far behind in enforcement mechanisms. China relies on administrative or adjudicative mechanisms to enforce IP laws in both the criminal and civil context. However, these mechanisms are often ineffective against infringement (Bronshtein, 2008). Patent holders may file a request for an administrative investigation into infringement at a local State Intellectual Property Office (SIPO). If the local SIPO office agrees there has been an infringement, the patent administrative authority may order the infringer to terminate his or her actions immediately. The infringer has fifteen days to file an appeal in court. Starting when the patentee becomes aware of an infringement, a patent holder has two years to file a patent infringement suit before the statute of limitations bars such action. If the patentee files a suit within this two-year period and the infringement is deemed to be criminal, a criminal investigation of the infringer will also ensue[34].

Although SIPO has broad powers to enforce equitable remedies, the office more often merely issues monetary penalties that are insufficient to discourage infringers from repeat violations. SIPO has the authority to make the infringer discontinue manufacturing, to order the destruction of infringing products, and to confiscate machinery used to make infringing products. However, infringers often receive only a monetary penalty, which is not distributed to patentees but kept by the government (Bronshtein, 2008).

The SIPO office itself lacks the financial means, and therefore the motivation, to improve enforcement methods and train staff. Because the counterfeiting business may be a significant portion of the local economy, local governments may be hesitant to provide more financing to SIPO offices. Consequently, staff can be insufficiently trained to enforce cease-and-desist orders, and little incentive is provided by the local community to do so. Infringement cases are often not sent to criminal authorities because doing so would disrupt the local economy (Evans, 2003).

As a result of these difficulties and because of the overwhelming complexity of patent infringement cases, adjudicative relief is more often sought by patentees.[35] Chinese courts have not yet developed effective methods for determining infringement and cannot use case law to guide cases. Plaintiffs must gather and present "*their own evidence to meet*" the burden of proof. Chinese courts only permit evidence "*in its original form*" and only sometimes allow evidence from certain previous court proceedings. If evidence originates from outside of China, it "*must be notarised in the originating country*" and "*authenticated by the Chinese embassy or consulate*" (Bai, Wang and Cheng, 2007, p.459).

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[34] See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/306146/ipchina-factsheet.pdf, page 2.

[35] China's judicial system consists of four levels. First, the Basic People's Court handles the first instance of cases at a local level. Second, the Intermediate People's Court handles relevant important local cases in the first instance and hears appeals from the Basic People's Court. Third, the Higher People's Court is the highest local court in China, and its jurisdiction corresponds with the province or large city in which it is located. The Supreme People's Court is the highest court in the mainland area of China, excluding Hong Kong and Macau (Bai, Wang and Cheng, 2007).

Monetary penalties that courts impose for patent infringement are considered an insufficient deterrent. Before the third amendment to Chinese patent law, the maximum for civil penalties was set at 500,000 Yuan, or about $62,500[36]. However, the number of patent infringement cases has continuously risen in China, and the maximum fine today is three times the infringer's income, which includes calculations of the infringer's profit and the patentee's losses. Despite this heightened ceiling, actual fines imposed average less than $800. Thus, what seems to be an effective penalty regulation is not a significant deterrent (Wu, 2011).

In the criminal context, China's IP system is also lacking. Chinese law suggests criminal prosecution only if the circumstances are 'serious'[37]; such ambiguous statutory language allows for broad interpretation and does not generally result in an infringement (USTR, 2006)[38]. Local governments, to protect local economies, often pressure judges to utilise this broad discretion to ignore patent infringement cases before them. When a criminal prosecution is successful, the system allows for a three-year maximum sentence if "*the circumstances are serious*" and a seven-year maximum sentence if the infringement is of *"a more serious nature."* Furthermore, local legislatures may enact their own IP laws, resulting in inconsistent IPRs across China (Zhou, 2001).

Considering China's political and cultural background in the past century, its IP regime has developed rapidly. However, China's IP system is one of the youngest in the world. China has taken several solid steps toward rebuilding its IP laws. The strength of IPRs in China has increased rapidly since 1995, as measured by the Ginarte and Park Index (GPI). Between 1960 and 1990 the average GPI for China was 1.33. In 1995 the GPI raised to 2.12, 2000 to 3.09 and 2005 to 4.08 (Park, 2008a). However, China's corruption perception rating has only increased from 1995 at 2.16 to 2000 at 3.1, 2005 at 3.2 to 2015 at 3.17; leaving it, at 83rd in the global ranking table[39].

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[36] See: http://www.china-iprhelpdesk.eu/sites/all/docs/publications/EN_Enforcement_Mar-2016.pdf page 5.

[37] Law of the Peoples Republic of China (promulgated by the Standing Committee. National People's Congress,). 2nd Amendment. 25 August 2000, effective date 1 July 2001. Art 58.

[38] See: https://ustr.gov/archive/assets/Document_Library/Reports_Publications/2006/2006_Special_301_Review/asset_upload_file473_9336.pdf

[39] See Transparency International for detailed tables http://www.transparency.org/cpi2015

In addition to the development of IPRs in China, it has also sought to develop innovation policies aimed at stimulating R&D within China and the process of technology transfer from foreign companies. There are six specific policies designed to achieve these outcomes (USITC, 2011):

I. Intellectual property produced in China can be added to a government list enabling it to have preferential treatment in government procurement programmes supporting the innovation;
II. Chinese standards support the adaptation of foreign technology for local market uses;
III. China has invoked strong anti-monopolistic laws;
IV. There are significant tax incentives for R&D that is carried out in China and owned by a Chinese company;
V. There are specific requirements to transfer technology to sectors such as aerospace and automotive. Foreign companies are required to transfer particular pieces of technology to a Chinese company, usually the JV partner;
VI. There are local content requirements linked to FDI which support the backward linkages of technology.

These policies support technology transfer in China, and, interestingly, patents filed in China by Chinese companies now outstrip those of foreign companies 2-1 when as recently as 2004 they were far more closely balanced (Dhar and Joseph, 2012). However, these innovation policies potentially force international companies to share IP in China, as evidenced by the statement made by the Office of the U.S. Trade Representative (2012, p.27):

> *"Many knowledge-based industries remain concerned that the Chinese Government is using policies intended to promote 'indigenous innovation' to disadvantage foreign enterprises through measures and actions that effectively coerce the transfer of IPR from foreign rights holders to domestic entities."*

2.5 Chapter Summary

This chapter presented a critical review of the relevant literature relating to the existence of FDI and activities of MNEs. After providing a thorough discussion of the definitional features of these constructs, it considered the broad concepts of FDI both from a company and host country angle. It demonstrated that there are multiple and potentially co-existing motivations for FDI, and several models are available to explain the types of FDI that occur. Many theories of international production have been put forward over the years, explaining various phenomena of FDI. Some seek to explain why a firm will favour FDI as a means of entering a foreign market when other alternatives (e.g., exporting) are open to it. Others seek to explain why firms choose specific locations, depending on motives or country determinants. Dunning's (1997) eclectic paradigm attempts to combine various theoretical models and perspectives into a single and comprehensive explanation of FDI, seeking to rationalise the why (ownership advantages), how (internalisation advantages), and where (location advantages) of FDI. This framework will provide a critical theoretical platform for the analysis to be undertaken later in this PhD study.

The international IPR system has developed over many centuries to support growth in innovation, and to support trading but is not necessarily balanced to maximize the exploitation of knowledge. Measurement of IPRs quality and strength is complex and must include several measures, including enforcement and change over time. Models created by academics provide a useful baseline for benchmarking IPR systems but remain deficient in many areas.

A review of the literature has revealed that while China has signed up to the major international agreements relating to IPRs, there is a widely held perception that IP is not respected in China. This perception may or may not be valid, but it may nevertheless impact the decision making of UK companies, investing in China. However, despite this reality or perception, FDI has grown significantly in China since it opened up to the world economy.

Chapter Three: How Do IPRs Affect FDI? A Critical Synthesis of Theoretical and Empirical Work

3.1 Chapter Overview

This chapter critically evaluates the specific business and economics literature that has examined the link between IPRs and FDI at both a theoretical and empirical level. Its focus is on studies that are the most influential in this field. It covers literature from a wide range of sources including published studies in peer-reviewed journals of management, international business, economics and law as well as book chapters, reports, working papers and other sources of knowledge. Section 3.2 provides a critical review of previous theoretical studies on the relationship between FDI and IPRs. Sections 3.3 and 3.4 focus on the applied literature that has investigated the influence of IPRs on FDI, reviewing both econometric work and in Section 3.4, an appraisal of the survey-based qualitative studies. Section 3.5 offers a critical synthesis of the conflicting theoretical postulations, previous evidence and gaps leading to the development of a conceptual framework that will guide this qualitative empirical study of UK companies that have invested or have the potential to be investors in China. Section 3.6 provides a concluding summary.

3.2 A Review of the Theoretical Channels Postulating a Link between IPRs and FDI

No theory offers a comprehensive framework of analysis for examining the relationship between FDI and IPR protection, and/or how inward FDI may be deterred by environments which provide (or may be perceived to offer) low IPR protection. However, across the general theoretical literature pertaining to FDI and international production - many propositions and some complex (partial, or dynamic general equilibrium) models have been developed that can shed light on the contrasting views of how IPR protection may influence the FDI decision of foreign investors.

Despite the limited theoretical work in this area, it can be stated that there is little agreement on the impacts of strengthened IPRs on the prevalence of FDI. The OLI model (Dunning, 1976, 1977, 1979a and 1979b) suggests that if an MNE is approaching FDI to secure access to lower wages or to improve their proximity to markets, then stronger IPR regimes would support MNEs taking advantage of these benefits, by reducing the risk of piracy and enforcing the monopolistic benefits, effectively bolstering the ownership advantages of the MNE (Dunning, 1976). In this case, weaker IPRs would work against the proposal to invest through FDI as it would be more difficult to protect and maintain protection against imitation across the whole production and selling cycle. This is eloquently summarised by Smith (2001, p.414), '*strong FPR (IPR) protection enhances the ownership advantage of the source firm in the foreign market by providing legal recourse against violations of its assets'*. This protection increases the cost of imitation, thereby reducing the incentive to imitate and increasing the firm's control of and returns from its IP related assets. This postulates a positive relationship between stronger IPRs and more FDI.

A model developed by Glass and Saggi (2002) with endogenous innovation, imitation and FDI found that lower IPRs may deter a company from exporting or producing in a foreign country for fear of pirates diminishing profitability. Ferrantino (1993) found that IPRs are less critical to exporters as although products can be reverse engineered, the design and production processes remain overseas. However, stronger IPRs allow a company to sell above marginal cost (to recoup the innovation costs) through a monopolistic position. They may also be incentivised to reduce supply to drive up prices. In this argument, the case for increasing IPRs to stimulate trade and investment is ambiguous.

Markusen (2001) modelled the relationship between MNEs and agents acting as subsidiary companies either through licensing or direct investment in a simple two product cycle model. Given the additional costs of exporting, FDI produces higher rents. In the model, the MNE introduces a new product every two time-periods (the product cycle). A product is economically obsolete at the end of the product cycle. However, the agent can defect at the end of the first time period to set up a competing subsidiary company based on the knowledge learnt in the first time period. The MNE can also dismiss the agent. The IPRs are effectively a cost to defection. Markusen (2001) concludes that too high a level of IPRs gives the MNE too much monopolistic power to the detriment of the agent. Too little IPR protection and the MNE will not invest and choose to export products despite the higher costs of exporting. This is an inefficient outcome for both parties, so Markusen (2001, p.190) concludes that:

> "*the optimal policy for a developing country is to set the level of contract enforcement just high enough to induce entry*".

While enlightening, Markusen's (2001) model is simple and does not consider the plethora of complementary drivers for investment that would need to be taken into consideration, and also does not address the possibility of different types of FDI as described by Mansfield (1994).

Using a North-South quality ladder model developed by Glass and Wu (2007), Tanaka and Iwaisako (2104) examined how IPRs impact on innovation and FDI. The Glass and Wu (2007) model was based on the quality ladder model originally developed by Grossman and Helpman (1990). Tanaka and Iwaisako (2014) built on the previous models by introducing two types of subsidies, one for FDI and the other for R&D. In the North, there are companies defined as 'leaders' who can develop technology and new products; all other companies are 'followers'. Leaders can develop new products and then produce and sell them in the south. Stronger IPRs will enable them to earn monopolistic rents in the South earlier (weaker IPRs might mean they export or do not sell in the South) and benefit from lower labour costs in the South earlier. This view is also backed up by Mansfield (1994), who suggested that companies may look to invest with older technology should there be a concern about IPRs. Tanaka and Iwaisako's (2014) model is simplified to include exogenous and cost-less imitation of technology, and it does indicate that strengthening IPRs in the South will promote innovation and further FDI. They also conclude that strengthening IPRs will increase welfare in the South as more production is moved south more quickly; also driving up wages in the South. This finding contrasts with Glass and Wu (2007) but is the same as in Lai (1998), who employed a variety-expansion-type North-South model. This result is significant because it shows that innovation, whether treated as a 'quality improvement' or 'variety expansion' type, does not play a key role in determining the effects of IPRs on FDI and that such distinction does not, in itself, help reconcile the conflicting predictions arising from these different models.

Glass and Saggi (2002) used the product cycle model (originally developed by Vernon, 1966) to consider the impact of IPRs on imitation, innovation and FDI. They demonstrated that stronger IPRs should benefit the source company, through reducing the prevalence of imitation, giving the MNE a monopoly in the receiving country (see You and Katayama, 2005, reviewed in later paragraphs). Therefore, this may reduce the prevalence of exports and increase the amount of FDI and licensing as the MNE can be sure of the protection of their ideas. However, if stronger IPRs increase imitation costs, this could drive up the labour costs in the receiving country as more resources are required. This reduction in available resources could lead to higher production costs in the host country, and more production might, therefore, be maintained in the host country. Interestingly, as more production resource is retained in the host country, this could crowd out innovation capacity that is diverted to production away from research and development activity (Glass and Saggi, 2002). However, Branstetter and Saggi (2011) found that while strengthening IPRs decreases imitation (through making it less efficient) in the receiving country; it will also increase FDI flows into that country. This FDI flow and the resulting increase in real wages, more than offsets the reduction in imitation activity, producing a net gain in welfare in the receiving country.

Branstetter, Fisman, Foley, and Saggi (2007) is one of the few studies testing the effects of increased Southern IPR protection on Southern industrial development in a product-cycle model of international trade and FDI directly. They extend Helpman's (1992) model allowing the level of FDI in the South to respond endogenously to changes in the strength of Southern IPR protection (with Northern MNEs shifting production to their Southern affiliates) and by treating the imitative effort by Southern firms as a costly and endogenously determined activity. They test the model's prediction that FDI accelerates Southern industrial development by analysing responses of U.S. MNEs to IPR reforms in the 1980s and 1990s. Several measures of the scale of U.S. MNEs' activity serve as dependent variables to capture indirect evidence of production shifting (see Appendix 1). Their results indicate that MNEs expand the scale of FDI after IPR reform and that stronger IPRs in the South accelerate the rate at which MNEs' production is transferred there.

In Glass and Wu's (2007) quality-improvement-type R&D model (similar to Glass and Saggi, 2002), Northern firms innovate to improve the quality of existing products. They may later shift production to the South through FDI. Southern firms may then imitate. Glass and Wu (2007) assume costless imitation, as did Lai (1998), and examine how increasing the probability of imitation affects innovation and FDI. They show that imitation can increase FDI and innovation for quality improvements, whereas the opposite occurs when innovators develop new varieties. This study helps reconcile the discrepant findings between Lai (1998) who, using a model of variety-expanding-type innovation, concludes that stronger IPRs promote both innovation and FDI, and Glass and Saggi (2002), showing that results are seemingly dependent on whether innovation is treated as one of the 'variety expanding' or 'quality improving' type. However, Branstetter and Saggi (2011) found that in a North-South product-cycle model in which innovation, imitation and FDI are all endogenously determined, while strengthening of IPRs in the South decreases imitation (by making it less efficient), it increases the flow of FDI.

However, Mansfield *et al.* (1981) argue that FDI decreases with a strengthening of IPR protection. Specifically, they suggest that IPR protection increases the costs of imitation, bringing such costs closer to the cost of innovation. IPRs give MNEs security from imitation in absolute terms, but no more security than that offered to innovators not involved in FDI. Therefore, Mansfield *et al.* (1981) argue that as the cost of imitation increases, this will stimulate innovation hence reducing the monopolistic market held by FDI holding intellectual property. Effectively the high cost of imitation crowds out FDI. Moreover, it could also be argued that a foreign location (interpreted in Dunning's terms) with stronger IPRs may further deter foreign investors by inducing firms to license rather than engage in FDI (see, for example, Braga and Fink, 1998; Ferrantino, 1993; Maskus *et al.,* 2005). This is also consistent with Yang and Maskus (2001), who find that licensing is more likely to take place in countries with strong IPR protection.

Fink and Braga (2005) sought to quantify the impact of IPRs on international trade flows and FDI. They did this by integrating a variable for the strength of IPRs into a 'trade gravity model'[40], one of the first studies to do so, alongside other variables including supply and demand and other forces either resisting or assisting trade flows such as distance from market, population, GDP and cultural distance. They demonstrated that the biggest drivers of trade are GDP and population. Increased IPRs negatively impacted on high-technology trade. This is possible because the higher the technical level of a product or service, the harder it may be to copy. The level of technology, in this case, gives the product its protection and monopoly status. As IPRs increase reducing piracy of competitors, the MNE can reduce supply to drive up prices. They concluded that the effect of IPRs on international trade is theoretically ambiguous.

Aiming to provide a reason for the negative relationship between stronger IPRs in a developing country and FDI, Mathew and Mukherjee (2014) developed a model in which a Northern firm can sell its product to the South either through export or FDI, and the Southern firm decides whether or not to innovate. Their premise is that for FDI to a developing or a newly industrialised

[40] The trade gravity model was first used by Jan Tinberger (1962). The model postulates that bilateral trade flows are mainly a function of economic sizes of the two trading countries (measured by GDP) and the geographic distance between the two countries. The model has since been applied to other bilateral flow data such as migration, remittances and FDI.

country, the host-country firm's innovative activity plays a critical role. They show that stronger IPRs in the Southern country increase the incentive for FDI if imitation occurs only under FDI. However, if imitation occurs under both export and FDI, the effect of stronger Southern IPRs on the Northern firm's incentive for FDI is ambiguous. If either the cost of Southern innovation is low, or the Southern firm's cost of innovation is moderate, a stronger Southern IPR regime may reduce the Northern firm's incentive for FDI. However, their model is based on several restrictive, simplifying assumptions, as only the case of a duopoly where demand for the product is only in the Southern market is considered, and imitation is costless (as in Helpman, 1992, and Lai, 1998).

Additionally, the relevant literature suggests that the impact of IPRs on FDI is also dependent on the development stage of the country receiving the FDI. In the poorest countries where the capacity and capability to imitate is low, there is a lower requirement for strong IPRs. The MNE should be able to exploit the benefits of location and labour costs without much concern of imitation. In developing countries where the ability for the domestic industry to imitate is higher, then the requirement for strong IPRs is an essential factor. Indeed, weak IPRs in developing countries may damage not only FDI but also the willingness of MNEs to trade, particularly their most recent and innovative products and services for fear of imitation (Ginarte and Park, 1997).

To explain why China and other emerging economies could have had such phenomenal growth in inward FDI despite weak IPRs, Yang's (2013) model incorporates complexity into a Dixit-Stiglitz framework based on a world with three regions: a developed North, a developing South, and a third developing country. The model assumes that imitation costs are positively related to complexity and that such costs are higher when imitating a product designed only for the foreign market. All consumers prefer to consume diversified and complex products, but in the developed North, firms can produce and sell to all regions while in the South and the third country can only produce and sell in their home market. Yang's model generates several conclusions. First, strengthening of host IPR protection promotes the MNE's FDI in the host country. Second, given that local imitators will charge a higher price when IPR protection is strengthened, stronger IPRs increase the MNE's profit. Third, stronger IPRs make the MNE invest in higher complexity sectors because this increases the penalty income for the MNE and also maintains the common price index (the price of a product from multiple producers, including imitators who produce and sell at a lower price). Weaker IPRs are likely to shift FDI from manufacturing (including complex products) to export-supporting investments like sales, marketing and distribution. Finally, cost-oriented FDI is less sensitive to host IPR protection than market-oriented FDI. While Yang's (2013) model provides an explanation of why emerging host countries with low IPR protection attract a large amount of FDI manufacturing products solely for exporting, it relies on stringent and implausible assumptions, including zero transportation costs. While Yang's model does suggest that the quality of FDI might be where the impact is felt in China, it fails to offer any qualitative evidence from companies that this is indeed the case. Hence the theoretical model would benefit from being 'verified' against the real world.

Of course, IPRs are just one amongst many variables considered in FDI decisions. Market size, trade barriers, access to low-cost resources or production factors, low tax rates, exchange rates, among others, may well override concerns about IPR protection. Hence, it has also been hypothesised that IPR protection may be a relatively insignificant factor for attracting FDI due to more critical location advantages influencing foreign investors' location decision (e.g., Yu, 2007). As put boldly by Maskus (1998a, p.128),

> *"it must be emphasized that strong IPRs alone do not sufficiently generate strong incentives for firms to invest in a country."*

To muddy the waters further, it is hypothesised that the strength of the IPR-FDI relationship may depend on the type of FDI and the industry carrying out the investment (Mansfield, 1994; 1995; Javorcik, 2004). Without strong protection, firms may be deterred to invest in stages of production that have high IP-related content such as R&D and technology-intensive manufacturing processes (Braga and Fink, 1998). This justifies Maskus (2000, p.15) when he writes, "*the need is acute for sectoral breakdowns of investment*" to increase our understanding of the role of IPRs. Maskus (2000) observes that FDI in lower technology goods and services, such as textiles and apparel, electronic assembly, and distribution, depends much less on the strength of IPR protection than on input costs and market opportunities. FDI in products or technology that entail a high cost of imitation may also reduce the importance of IPR regimes in FDI location decisions. On the other hand, FDI in easily 'copiable' products and technologies, such as pharmaceuticals, chemicals and software, is more sensitive to the strength of IPR regimes.

Three main, general conclusions can be drawn from the synthesis of the primary IPR-FDI hypotheses discussed above:

(i) Economic models studying the effects of strengthened IPRs in the developing world (the South) on FDI by Northern MNEs are divided as to whether developing countries would attract more FDI. In the absence of a full-blown theory on the relationship between FDI and IPRs, the OLI paradigm remains a useful albeit not exhaustive framework to examine the channels of how firms' FDI may be induced or deterred by the strength of IPR regimes of host environments. Still, it does not, in itself, lead to determinate predictions.

(ii) Given the many different theoretical channels postulated and conflicting effects hypothesised, positive as well as negative, the aggregate net effect of the strength or weakness of IPR protection on FDI by MNEs remains ambiguous. Yet, there are various reasons to expect that the impact of IPR protection on FDI is blurred unless industry characteristics, FDI type and host country conditions are considered.

(iii) The strength of the impact of IPRs on FDI, and hence their importance in influencing MNEs' investment location decisions relative to other factors or country determinants influencing FDI location choice, may depend on the stage of development of the country likely to host the investment, the type of FDI undertaken and the technological intensity of the industry receiving the investment. Moreover, the benefits of the FDI choice are relative to the comparative advantages of other foreign entry modes such as exporting and licencing. Changes in IPRs may motivate a firm to switch between these different modes of serving international markets.

3.3 A Review of the Empirical Evidence on the Impact of IPR Protection on FDI

One of the earliest econometric studies focusing on the effect of IPRs on FDI is that by Ferrantino (1993), who investigates the impact of membership in IPR treaties in the context of U.S. exports, foreign affiliate sales, and flows of royalties and license fees. Ferrantino (1993) concludes that U.S. MNEs export more to subsidiaries in countries that do not adhere to such treaties, but their impact on arms-length exports and FDI is minimal. A similar result of 'no relationship' between measures of IPR protection and U.S. MNEs' FDI was found in Maskus and Eby-Konan (1994).

Maskus (2000) dismisses the early studies cited above, arguing that their models employed "crude measures" of IPRs and were plagued by misspecification. He concludes that their results should be discounted, while also dismissing Maskus (1998a), as it is based solely on stylised facts and does not report an econometric analysis as such.

It is important to note that empirical analyses that are failing to detect a significantly positive relationship between IPR protection and FDI, or even unveiling a negative one, are not confined to early and rather rudimentary studies. Aiming to challenge the proposition that strong patent protection is one of the important characteristics of an attractive investment climate, Kondo (1995) analyses the U.S. outward FDI to 33 European, Asian and Latin American countries between the mid-1970s and 1990. He finds that the U.S. outward FDI is not significantly affected by the patent regimes of destination countries.

Kumar (1996) analyses the determinants of the location of R&D investments by U.S. MNEs in over 40 countries on the basis of the Benchmark Survey data on U.S. Direct Investment Abroad in 1977, 1982 and 1989. Kumar's (1996) results suggest that the relative strength of the patent regime affects the direction rather than the magnitude of R&D investments. The overall strength of a country's IPR regime favourably affects the probability of attracting R&D investments only in the full and industrialised countries samples. For developing countries, IPR protection does not appear to influence MNEs' R&D investments.

This proposition is supported by Adams (2010) who uses panel data for a cross-section of 75 developing countries over 1985-2003, to test the impact of IPR protection and whether the TRIPS agreement had any effect on FDI flows. In addition to standard FDI explanatory variables, he includes the square of IPR (IPRSQ) to capture any nonlinearities, and an interaction term (IPR*TRIPS) to investigate whether there is a differential IPR effect before and after the TRIPS agreement. He finds that IPR is significant and positively correlated with FDI, but when both IPR and IPRSQ are included in the regression, both coefficients become statistically insignificant, suggesting the absence of a nonlinear relationship or diminishing returns of IPRs on FDI for developing countries. Adams (2010) also finds that the average IPR for both 1985 and 1990 is considerably lower than that recorded in 1995 and 2000, after TRIPS agreement. When interpreted in conjunction with the significantly positive IPR*TRIPS interaction term, Adams suggests that the effect of IPRs on FDI in the post-TRIPS era was far and above the pre-TRIPS period. Adams (2010) concludes that if developing countries establish strong IPR regimes supported by measures aimed at improving the investment climate, "*they are likely to benefit from an increased flow of the right type of FDI essential for stimulating economic growth*" (p.206).

Nevertheless, several shortcomings should be highlighted with Adams' (2010) analysis. First, the study focuses exclusively on the effect of IPRs on the total volume of FDI, thus neglecting its composition. It follows that any conclusions on "the right type of FDI" are unsubstantiated. Second, by first-differencing the data, Adams effectively removes its long-run properties, making the analysis one that at best reflects the short-run. Third, the inclusion of the squared IPR variable does not test for the many forms of potential nonlinearity that may characterise the IPR-FDI relationship. Finally, Adams does not disaggregate the data by country and, as observed by Lesser (2002), determinate results of the effect of IPRs on FDI may only be possible on a country-by-country basis.

Seyoum (1996) also found that the relationship between patents and FDI was non-significant for a sample of 27 developed, newly industrialised and less developed countries. However, within Seyoum's regressions, there was a relationship of significance between IPRs and FDI for developed countries. Seyoum (1996) tests the distinct effects of patents, trademarks, trade secrets and copyrights on FDI inflows to 27 developed (DCs), newly industrialising (NICs) and less developed countries (LDCs) from 1975 to 1990. His study finds no significant relationship between patents and FDI for LDCs. For DCs, there is a significantly negative relationship between patent protection and inward FDI. Trademarks are significantly positive for LDCs and DCs, but the coefficient is significantly negative for NICs. Trade secrets are significant for all country groups but with a negative coefficient for LDCs and DCs. The copyright variable is significantly positive for all country groups.

Seyoum (2006) considered the impact of IPRs on FDI across a sample of 63 countries that included developed and developing countries. Seyoum (2006) wanted to understand the relative importance of IPRs against other market seeking factors. Seyoum's (2006) results confirmed that IPRs were a significant factor in the decisions around FDI (partially contradicting Seyoum, 1996) for all types of market and over both periods. He also found positive and significant relationships between market size, unemployment rates and market openness; and the expected negative and significant correlation between corruption and FDI. There was little evidence that devaluation, infrastructure or GDP growth rates were significant to FDI. However, Seyoum (2006) was unable to obtain more granular data to understand if there was a difference in the importance of IPRs by sector or technology intensity. The use of the Ginarte and Park (1997) index is a further limiting factor as it does not measure the actuality of companies' experience with IPRs.

Park and Lippoldt (2003) investigate the relationship of an index of the strength of patent rights with FDI and trade using national data as well as data disaggregated by industry for the period 1990-2000. The index considers membership of relevant international treaties, IPR restrictions, means of enforcement, duration and sectoral coverage of patent rights. They find that patent rights are associated positively with FDI and moderately with trade, but the strength of these effects varies by level of development and by industry. The variation in FDI as a result of strengthened patent rights is largest for least developed nations (where IPR regimes are weakest), and second largest for developing nations (where IPR regimes are next weakest). This suggests that patent rights have a positive but diminishing association with increased FDI as the strength of those rights increases. In industries such as metals, machinery, and transportation, FDI is insignificantly affected by IPRs. IPRs appear to matter to FDI in computer services, finance, and chemicals (including pharmaceuticals), industries based on technologies that are, they argue, relatively easy to imitate.

Park and Lippoldt (2008) assess the relationship between measures of local innovation and IPR indexes using a data set covering a broad international panel of developing countries for 1990-2005. To complement the statistical analysis, they employ regression analysis and case studies of the BRIC[41] countries. The indexes of IPRs show that between 1995 (when the TRIPS agreement came into force) and 2005, developing and least developed countries, as a group, experienced a greater percentage increase in IPR strength than did the developed world. During the same period, compared to developed countries, developing and least developed countries experienced a large growth in inward FDI flows, merchandise and service imports, patent applications by foreigners, as well as increases in their R&D to GDP ratios and patenting by local residents. The empirical analysis broadly confirms the extent to which these patterns can be attributed to IP reforms in the developing world, *ceteris paribus*. The main results show that:

[41] Brazil, Russia, India and China.

(i) The index for patent rights tends to be positively associated with inward FDI.

(ii) This relationship holds for all groups of countries, although the statistical association is strongest in developed countries.

(iii) The indexes for copyrights and trademark rights are less strongly associated with technology transfer than the patent rights index.

(iv) Stronger levels of patent protection are positively associated with the inflows of high-tech products like pharmaceutical goods, chemicals, aerospace, and computer services.

Park and Lippoldt's (2008) case study evidence corroborates the findings from the regression analysis that the technology content of inward FDI and foreign trade has been substantive, particularly in the BRIC countries, and that this has taken place in association with significant IPR reforms.

Javorcik's (2004) study on *"The Composition of foreign direct investment and protection of intellectual property rights: Evidence from transition economies"*, gives a useful insight into the impacts of IPRs on FDI. It uses company-level data rather than aggregate data, as seen in many other studies. Javorcik concludes that weaker IPRs deter FDI flows from technology-intensive companies that rely heavily on IPR protection. It also concludes that weaker IPRs will encourage investors to undertake lower level FDI in sales and distribution rather than production.

Javorcik (2004) used a dataset compiled by the European Bank for Reconstruction (EBRD)[42] in 1995 that asked companies about their FDI behaviour in 24 Eastern European countries. Given that there was little FDI inflow into these countries before 1989[43], Javorcik could be relatively confident that data obtained was limited to between 1989 and 1995. The EBRD surveyed about 9,500 companies listed in Worldscope[44] located in more than 50 countries. They received 1,405

[42] See: http://www.ebrd.com/home

[43] The Fall of Communism in 1989 symbolised by the fall of the Berlin Wall in November of that year.

responses to questions about actual and planned investments in Eastern Europe and the former Soviet Union. Additionally, subjects were asked about the nature of these investments.

Javorcik's paper tests two hypotheses that emerge from Mansfield (1994) and (1995). First, whether MNEs in IPR sensitive sectors (drugs, cosmetics, healthcare products, chemicals, machinery and equipment, and electrical equipment) are more impacted by the strength of IPRs than companies in general (Mansfield, 1994). Secondly, whether the strength of IPRs impacts the nature of investments made by companies (Mansfield, 1995).

Javorcik's (2004) study employs two measures of IPR protection. She chose to use Ginarte and Park (1997) Index supplemented by Javorick's enforcement data drawn from the International Intellectual Property Alliance assessments. She gave each country a score of between 1 and 3 with '1' indicating inadequate IPR legislation, '2' denoting close to adequate legislation but no enforcement, and '3' close to adequate legislation with some enforcement efforts made. Javorcik also considered variables for the size of the market that had been demonstrated as attractors for FDI by Dunning (1993) and Caves (1996). Other variables considered include the corporate tax rate in each country as a proxy for localisation advantages (Dunning, 1993), and R&D outlays as a percentage of net sales by the companies as a proxy for their R&D intensity.

Javorick's results showed that, in five out of six regressions, IPR protection impacts the probability of investments from high-tech companies, but not other industries. However, in four regressions, the impact of stronger IPRs does seem relevant to all industries. She explains this through the idea of signalling (Lall, 1997), which suggests that higher IPRs signal to MNEs the openness of a market even where IPRs are less critical to their investment decisions. This theory on the signalling impacts of IPRs is discussed in Sherwood (1990), who identified that population size impacts the FDI decisions in all industries and that a higher level of corruption and high taxes deter FDI. Javorcik went on to further analyse the relationship between IPRs and the choice of project function. Her data was broken down into two broad functions: distribution and production. She concluded that local production was more likely to occur where IPRs are stronger, and this was seen across all sectors.

[44] See: https://www.rimes.com/data/thomson-reuters-worldscope/

Javoricik's work is helpful regarding its analysis of country-level data and the fact that it draws from a broad set of company interviews. It supports work by Mansfield (1994) and others relating to the impact of IPRs on FDI decisions and goes some way to supporting the theory that companies will make different decisions based on the IPR regime in place. However, it would have been interesting to see these choices broken down further as in Mansfield (1994).

Braga and Fink (1998) estimate the joint effects of stronger IPR protection on U.S. arms-length exports and overseas sales by U.S. affiliates in 42 countries, pooling data across three manufacturing industries. Overall, their results suggest "*At best* [..] *a weakly negative relationship*" (p.178). Braga and Fink (1998) also report estimations of the effects of IPRs on German MNEs' exports and FDI decisions in 25 countries, with data pooled across four industries. The IPR estimated coefficient has a statistically significant positive impact for total exports but is close to zero (-0.026) and insignificant for German FDI stock.

Using French MNEs' data for the periods 1981-1983 and 1988-1992, Mayer and Pfister (2001) find that stronger IPRs negatively affect the location decisions of MNEs. After disaggregating their sample into developed and developing host countries, they find that the strength of a developing country's IPRs has a statistically insignificant impact on the likelihood that French MNEs locate their investment in that country. They also find that the strength of a developed country's IPR protection has a quadratic (inverse-U) effect on the firm's probability of locating in the developed country; that is, increasing the probability and then decreasing it after some tipping point of IPR strength is reached. However, it should be noted that Mayer and Pfister's (2001) study focuses on 'investment location decisions', not FDI flows (or FDI stock) as such. Such location data cannot capture the level of FDI and/or intensity of technology transfer in response to changes in IPR strength of MNEs already operating in the host country.

Less clear-cut results are obtained by Pfister and Deffains (2005) who observe that, on the one hand, the reduction in competition that follows greater patent protection can attract foreign subsidiaries. On the other hand, FDI can 'strategically' deter local competitors. If so, FDI and patent protection are substitutes, and stronger IPR enforcement may reduce the strategic incentives to invest in a country, especially in large markets. On average, IPRs exert only a negligible influence on the location choices of French MNEs. If the market potential of host countries is sufficiently large or if expenditures on R&D are sufficiently small, a greater effectiveness of patents decreases the probability of FDI. Yet, this study only compares locations at a given time point. For a given economy, FDI may increase with IPR protection as years go by. Moreover, they were unable to test for the economic importance of the subsidiary: countries combining stronger IPRs with large market size or low R&D intensity may attract fewer subsidiaries, but those established there, may be associated with greater investments, higher employment, more R&D or more affiliate sales, as other studies listed in Appendix 1 indicate.

Using an extensive database on investments in chemical plants by 153 MNEs from up to 75 countries over 1981-1996, Fosfuri (2004) finds that patent protection does not play a significant role in fostering international activity or in influencing its mode in terms of a wholly-owned subsidiary, joint-venture, or technology licensing. Nevertheless, the study only analyses data from one industry, thus limiting the generalisability of the findings. Moreover, as observed by Park (2011), chemical plants largely consist of firms with process innovations. For such innovations, patents may not be the most effective mechanism for appropriating the returns to innovation. The results, therefore, do not preclude the importance of other types of IPRs. Finally, although alternative foreign entry market modes that imply the transfer of production are considered, the FDI trade-off with a firm's ability to exploit its technological advantage abroad simply by serving the foreign market through exports is ignored.

Nunnenkamp and Spatz (2003) also sought to look at the impacts of IPRs on FDI decisions at a sectorally and regionally disaggregated level. They sought to understand if IPRs impact not only the *quantum* of FDI but also the *quality* of FDI received using proxies for this measure of local R&D expenditure, licence fees paid to the parent company, value-added, employment and exports from the subsidiary. They also compared the much favoured Ginarte and Park (1997) index of IPRs with their measure of IPRs taken from the World Economic Forum (2002[45]) survey results which they argued gave a better representation of actual IPR operation than the Index.

Nunnenkamp and Spatz (2003) concluded that the role of IPR protection in attracting FDI is limited in markets with a very high population or an abundance of natural resources. This perhaps goes some way to explaining the dichotomy of China receiving large amounts of FDI

[45] I was unable to locate the World Economic Forum (2002). The Global Competitiveness Report 2001-2002 used by Nunnenkamp and Spatz but the following link gives access to the 2016-17 version of the report. https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1

while still having a weak (as perceived by companies) IPR system – the size of the market opportunity is just too high (Wang and Swain, 1995). They also found that imitative capacity, as measured by them through a proxy using the average years of schooling, was also a key determinant on whether IPRs made a difference to investment decisions. In this situation, it seems to make sense that if there is limited capacity to imitate, there is little requirement for laws to prevent it. Their analysis showed that their measure of IPRs using the WEF was a better measure of the actual state of IPRs in a country than the Ginarte and Park Index. However, these differences were less marked when looking at industry-specific data. In assessing the impact of IPRs on the quality of FDI they did find a positive correlation between better IPRs and an improvement in local R&D expenditure, value-added, and exports, but little correlation on licence fees paid to the parent or employment. However, they urge caution with these findings as there appear to be relatively advanced complementary factors at work with, for instance, higher value add appearing to be at the expense of employment. In line with Mansfield (1994), they conclude that IPRs are more relevant to companies with high levels of human capital and technology-rich industries.

Kyrkilis and Koboti (2015) considered the impacts of IPRs on the entry modes of MNEs into Greece. Their paper assumes two relevant entry modes that of a wholly-owned subsidiary or a joint venture only partially owned by the parent company. They considered the differing effects on companies with different technology intensities using the sector operating type models developed by Smarzynska (2000). They estimated the level of IPRs in Greece using the Ginarte and Park (1997) index (GPI) combined with the rating given in the Corruption Perceptions Index to give an effective GPI score for Greece. Their results did suggest that IPRs impacted the entry mode into Greece with weaker IPRs leading to more wholly-owned subsidiaries than joint ventures. This is logical given the need for the parent company to maintain total control over intellectual property. However, their study also demonstrated negligible differences between companies in areas of high-technology and low technology. This does not make immediate sense given the relative importance of IPRs to these companies. However, the authors did attempt to explain this anomaly by sighting the high imitation capability in the Greek economy as being a possible reason, for example even low technology products would be quickly imitated crowding out the benefits to the company carrying out FDI. It could also be that the low level of protection of IPRs was signalling a reluctance to support FDI and therefore drove companies to take the safest approach. Companies may also have followed the example of other companies in the market. However, the paper did not further break down the types of FDI into those described by Mansfield (1994), an approach that by its greater granularity would have provided greater insight and enlightened the debate.

Chen (2013) considered the impact of changing IPRs as a determinant of the mode of FDI. Chen analysed wholly-owned investments and JV investments in vertically related industries. He cites work by Leahy and Naghavi (2010) who through a theoretical model where an MNE produces final goods through FDI – increasing IPR tends towards JVs as leakage is reduced because of strong enforcement. Studies by Lee and Mansfield (1996), Chun (2008) and Chen (2013) support the thesis that stronger IPRs will tend towards more JVs. However, Javorcik and Saggi (2010) do not support this hypothesis.

Interestingly, as China's IPRs have improved, the percentage of investments that have chosen to take the WFOE route has increased from below 30% in 1994 to above 70% in 2012, again contrary to the main studies. Chen (2013) considers these anomalies and proffers an explanation based on competition issues. He suggests that if leakage exists in either a joint venture or wholly-owned subsidiary, then if IPRs are weak, it makes sense to consider a JV to reduce competition in the market. If IPRs are strong - and therefore leakage is reduced - the MNE will be able to hold on to more of its IP for longer and consequently the need to reduce the domestic competition is limited. This theory related to competition is relatively new and therefore requires further study to understand the determinant of a cross-section of companies.

Watkins and Taylor (2010) test the effect of IPRs on U.S. FDI in 22 emerging economies from 2006 to 2008. They use the Ginarte and Park index and the executive opinion survey-based IPR index of the World Economic Forum (WEF). The analysis benefits from the disaggregation of FDI data across nine industries and eight sectors within the manufacturing industry (see Appendix 1). The results of the various multivariate models consistently fail to support the hypothesis that emerging economy IPRs strongly affect the level or distribution of advanced country FDI, "*Instead, the results support the hypotheses that no relationship or an ambiguous relationship exists between IPRs and FDI in emerging economies*" (p.427). However, these results should be taken with caution, given the short sample period of only three years.

Notwithstanding the findings of the studies reviewed so far, the empirical evidence that has emerged to date is skewed in support of the view that stronger IPRs favour FDI.

Lee and Mansfield (1996) employ OLS and Tobit regressions using data obtained from almost 100 U.S. firms regarding their perceptions of how weak or strong IPR protection was in 14 developing countries, as perceived by managers in Mansfield's (1994) survey. They regress the volume of U.S. FDI on this index over 1990-1992, including several controls (see Appendix 1). They find that, if the percentage of firms regarding protection in a country as inadequate falls by 10 points, U.S. FDI in that country increases by about $140 million per year. Lee and Mansfield's results have been criticised for a country selection bias in favour of the role played by IPRs on FDI due to a disproportionate representation of countries with some technological capabilities and in which IPR disputes are not uncommon (Braga and Fink, 1998). Data limitations, the short sample period and possible specification errors also limit the reliability of the results. Heald (2004) also questioned their survey-based IPR measure, arguing that it is wrongly built and has been misinterpreted.

Using the same endogeneity corrected index of patent laws of Maskus and Penubarti (1995), Maskus (1998b) estimates a set of simultaneous equations on a panel of 46 destination countries over 1989-1992 for the joint impacts of U.S. firms' patent applications filed in the host country, total sales of foreign affiliates of U.S. parents, U.S. exports shipped to affiliates, and total assets of foreign affiliates of U.S. parents. His equations control for several factors, including investment incentives and disincentives provided by local authorities. The level of average patent strength across countries is strongly associated with patent applications, though the effect is relatively weak in developing countries. Exports to affiliates are positively affected by patent strength in developing economies. While average patent strength has little effect on affiliate sales, the impact is significantly positive in developing countries. Also, the coefficient of the patent variable is negative and significant in the assets equation, but the impact in developing countries is significantly positive.

These results are revisited by Maskus (2000), with coefficients transformed into elasticities. From this fresh interpretation of Maskus' own (1998b) results, FDI reacts positively to patent protection strength in developing countries, with a 1% increase in the degree of patent protection expanding the stock of U.S. investment in that country by 0.45%. However, the sample period used is far too short to draw reliable inferences, especially in the absence of robustness tests to alternative IPR measures.

Nicholson (2007) carried out an empirical study on the impact of industry characteristics and IPR policy on investment decisions of MNEs whether to engage in FDI or licence products to a non-related company. He used cross-sector, cross-country panel data for 1995 obtained from the U.S. Bureau of Economic Analysis (BEA) census to gain data on the numbers of U.S. companies engaging in FDI and licensing in 42 countries. He used industry data disaggregated into three-digit industry sectors. This allowed him to investigate the differences in responses to variables by a more granular sector, and to distinguish between manufacturing and non-manufacturing MNEs. In addition to the fixed FDI and licensing variables, Nicholson (2007) used the Ginarte and Park (1997) index as a measure of IPR for each of the countries considered. He acknowledged the limitations of this index in that it is not a measure of the actual performance of IPR regimes.

Nicholson (2007) found that MNEs with high capital costs would be more likely to take part in licensing than FDI in line with the proposition made by Dunning (2012), that if the costs of setting up in the country are too high, they will look to enter through different methods such as exporting or licensing as long as the IPR protection was sound. Nicholson found that his regressions were not supportive of the hypothesis that firms that engage in large amounts of R&D are more likely to engage in FDI and licensing. Nicholson felt this might be because R&D expenditure decisions are detached from internationalisation ones. His analysis did, however, support the proposition that an increase in IPRs would support growth in FDI and licensing, as proposed by Glass (1997). Interestingly, Nicholson (2007) found that the measure for anti-corruption was negative for FDI but not so for licensing. This may be because licensing is a much more arm's length activity than FDI and, therefore, companies are more likely to take part in this activity than setting up in a country with high levels of corruption. Nicholson (2007), is helpful in understanding some of the key drivers for FDI and the impacts of IPRs on the decisions of MNEs. However, his analysis does not cover China, unfortunately, and it would be interesting to see if, within his analysis, some of the market indicators for a country like China would outweigh problems with IPRs.

In 1989, Smith (2001) analysed the effect of Foreign Patent Rights (FPRs) on U.S. exports, outward investment and licenses (grouped as bilateral exchange), in 50 countries, both developing and developed. Smith applied the concepts of ownership, location and internalisation advantages (Dunning, 1977) to link FPRs to decisions on how a U.S. company might choose to service a market. Interestingly, Smith considered the relative impacts of FPRs on the three modes of bilateral exchange.

Smith (2001) considers the impact of foreign property rights (FPRs) on how a company might service a market through the choices made for the transfer of knowledge. Smith describes exporting as maintaining the knowledge within the company, FDI as allowing the transfer of the knowledge to another country but maintaining it within the company, and licensing as transferring the knowledge to another company. This is a simplification of the three modes of bilateral exchange and the impacts on the transfer of knowledge, as exports can be reverse engineered to expose the knowledge capital of the product, much FDI takes part in joint ventures, and therefore there is a transfer of some knowledge to the partner company, and licenses are dependent on their contracting arrangements to protect the knowledge in the product. However, given the interplay between ownership benefits and FPRs on the location decisions, one would expect to see higher FPRs supporting both FDI and Licensing to the detriment of exports, where the cost of exporting is higher than the cost of local production (Markusen and Venables, 1998; Glass, 2000; Glass and Saggi, 2002).

Smith (2001) analysed her data through the application of a standard gravity model. Smith was unable to carry out her analysis by industry as the data for affiliate sales and licensing were insufficient for regressions. For the measure of patent protection, Smith used Rapp and Rozek's (1990) index but carried out sensitivity checking using the Ginarte and Park (1997) Index and a measure of the number of patent lawyers by country. Smith (2001) found that the Rapp and Rozek index was a robust measure for the analysis. Smith also created a dummy variable for the imitative capacity of the country concerned and checked the sensitivity of this variable using measures such as the R&D expenditure as a percentage of GDP, R&D scientists and engineers per million population, R&D technicians per million population and educational attainment.

Smith (2001) demonstrated a positive market expansion effect on FDI and licensing and that the quantum of this effect is larger in countries with a high imitative capacity. Smith unveiled weak statistical evidence that higher FPRs confer market power in countries with weak imitative abilities. Smith also demonstrated that FPRs have a larger effect on the transfer of knowledge outside a company, relative to transfer within the company. Specifically, her estimations showed that a one index value in the strength of FPRs leads to a 1.33% increase in knowledge flows to affiliates, on average, and to a 2.04% increase in countries with a high imitative capacity. Yet, subsequent literature is not consensual on the view that as the strength of IPRs increases, licensing is preferred to FDI. For example, McCalman's (2004) analysis of the behaviour of Hollywood studios in both the feature film and video markets in 40 foreign countries reveals that although moderate IPRs are associated with a high degree of market-based relations such as licensing, both high and low standards of IPRs encourage more integrated governance structures that entail equity-based investments such as FDI.

Smith's (2001) analysis is particularly useful as it uses the lens of the OLI model (Dunning, 1997). However, it makes simplifying assumptions about the flow of knowledge and only focuses on the manufacturing sector. It is also deficient in assuming that all FDI in a country would be broadly the same, and as shown by Mansfield (1994), this is not necessarily the case.

Of the few empirical studies that have examined the impact of IPRs on FDI flows, hardly any focus on how this relationship fares in the context of China. This is striking not only because China has experienced a tremendous surge of inward FDI over the past two decades [46] but also because of the record of China regarding IPR protection (and the significant policy reforms to China's IPR laws over the last ten years). One notable exception is the study by Awokuse and Yin (2010a), who investigated the impact of China's IPR laws on its ability to attract FDI over the period from 1992 to 2005. They also examine the possibility that the effects of IPR protection on FDI may vary by the level of economic development in partner countries, thereby explicitly testing the hypothesis advanced by Smith (2001). Unlike most studies based on cross-sectional data from a single year, they employ panel data for 38 countries, an analytical feature that allows for the consideration of the dynamic nature of the relationship between FDI and policy changes in IPR regimes. Their analysis also benefits from the use of two alternative measures of IPR as a proxy for IPR regimes: (i) annual foreign patent applications as a measure of the strength of IPR protection in China; and (ii) the IPR index developed by Ginarte and Park (1997). Methodologically, Awokuse and Yin (2010b) specify a standard bi-lateral gravity model of FDI

[46] According to the World Investment Report (2015) produced by UNCTAD, China is now the second largest recipient economy of FDI flows in the world (after the US) and continues to record increasing levels of inward FDI, year-on-year. In 2014, FDI in China amounted to $129 billion, up 4% from 2013.

that also includes as an additional regressor a measure of (China's) IPR protection. Their main empirical results (which stay robust to alternative model specifications, different measures of IPR protection and segmentation of the data sample) indicate that the strengthening of IPR protection in China has a positive and significant effect on FDI. Their results also suggest that FDI from Hong Kong and Taiwan (to China) behaves differently from FDI originating in other high-income countries. Awokuse and Yin (2010a) take this result to signify that:

> "*other factors' (e.g., ethnic and language similarities) beyond China's large domestic market motivates such FDI"* (Awokuse and Yin, 2010a, p.223).

Despite the significance of the study particularly insofar as it offers evidence in relation to China, Awokuse and Yin's claim that the findings indicate that IPRs might play a positive role in attracting FDI "*and thus promote technology transfer*" (ibid, p.223), is somewhat debatable since they did not specifically test for technology transfer promotion.

More recently, Hsu and Tiao (2015) test the IPR-FDI relationship using panel data for 11 Asian countries (see Appendix 1 and Annex 1) over the period 1985-2010 using a general gravity model estimated using OLS, fixed and random effects, and sys-GMM. They find that stronger IPR protection increases Asian countries' global FDI inflows. However, while their model accounts for many factors such as GDP, trade volume, R&D, openness, etc., many other FDI determinants are omitted, including exchange rates and free trade agreements. Furthermore, the study is based solely on country-level data with no industry disaggregation.

Zhang and Yang (2016) considered the impact of TRIPS on FDI and innovation. They took the dramatic increase in global FDI from 1994 and sought to understand if there was a causal link between the growth in a country receiving FDI and it enacting the TRIPS agreement. In other research into the impact of TRIPS, research from Smith *et al*. (2009) concluded that there had not been substantial gains for developing countries for enacting TRIPS. Indeed Smith found that the main benefit had been seen in the increase in pharmaceutical trade between developing countries. However, Di Vita (2013) does conclude that TRIPS has prompted innovation in developed countries. Zhang and Yang (2016) used a standard gravity model to consider the impacts of TRIPS on FDI and Innovation. They concluded that TRIPS had impacted positively on the prevalence of FDI. Their data demonstrated this effect in each of the developing countries they considered except Indonesia, Philippines, Thailand, Malaysia and Turkey. They believed that in these latter country's instability, military involvement in politics and ethnic tensions had a significant impact on FDI masking the increase they would have expected to see. The effect in Nigeria and UAE was also insignificant; a result attributed to the fact that both economies are dominated by the oil industry where IPRs are not as required due to the regulated nature of these industries (imitation is not practical). R&D development in Brazil, China, Indonesia and the Philippines was negatively correlated to TRIPS. Zhang and Yang believe that the high imitation capacity of these economies may have dampened the expected increase in innovation in the countries. However, overall TRIPS was shown to be positively correlated to both FDI and R&D.

With the notable exception of the contributions by Mayer and Pfister (2001) and Pfister and Deffains (2005), who consider the investment location choices of French MNEs, and Braga and Fink (1998), who also report estimations of the effects of IPRs on German MNEs' FDI decisions, none of the econometric studies discussed above has focused on a country other than the U.S. as the source of FDI. This may constitute an important source of bias since as Watkins and Taylor (2010, p.427) argue, "*The United States may have unique historical or strategic relationships with several of the recipient states that skew the results*". This consideration makes the study by Ushijima (2013) a particularly useful addition to this literature. Ushijima (2013) estimates the link between Japanese FDI and foreign IPRs with a non-standard gravity-type cross-country regression (in a negative binominal framework) based on aggregated data, and a logistic regression based on firm-level data. The sample period spans from 1985 to 2004, using FDI data from the Toyokeizai Shinposha database, a directory of foreign subsidiaries of Japanese firms. Foreign country IPR strength is measured by the Ginarte-Park index while FDI by the number of new subsidiaries established abroad, with a final sample of 5,378 subsidiaries in 58 countries. Regressions on data aggregated and disaggregated in a variety of ways reveal three key findings. First, the positive IPR–FDI link is only present in countries with a high ability to imitate foreign technology. Second, the link with foreign IPR is positive and significant only for FDI in technology-intensive industries. Finally, the sensitivity of a firm's FDI to foreign IPRs increases with its patent intensity relative to industry peers. The effect diminishes considerably when a firm has previous investment experience in the same country.

Very few studies consider the impacts of enforcement, on the investment decisions of MNEs. As highlighted previously, the empirical literature uses a varied set of data to measure patent strength but most of these concentrate on the strength of the IPR system. Most (Rapp and Rozek, 1990; Ginarte and Park, 1997) use patent laws in place as a proxy for overall IPR system quality. Papageorgiadis, Cross and Alexiou (2013), building on the work of Papageorgiadis, Cross and Alexiou (2014) attempt to consider the impacts of not only patent system quality but patent system strength on these decisions. They do this by considering panel data of U.S. firms from the U.S. Bureau of Economic Analysis (BEA) dataset on royalty and fee receipt of U.S. MNEs parent companies from affiliate (FDI) and non-affiliate (licencing) companies abroad.

They argue that although a comprehensive legal framework is a necessary component of a patent protection system, it is insufficient to protect technology from pirates. The patent holder needs to be able to rely on and work with government agencies such as police, customs and courts as well as civil agents such as investigators and lawyers to enforce their rights against infractions (Papageorgiadis *et al*., 2013). Looking at U.S. investment data into 21 countries they carried out a series of regressions considering dependent variables for patent system quality (Park, 2008a) and strength (Papageorgiadis *et al*., 2014) against independent variables covering market size, exchange rates, openness, geographic distance, trading block membership, political risk and cultural distance.

Their results are interesting and show that stronger book laws (quality) and stronger enforcement (strength) have a strong and highly significant relationship to affiliated and non-affiliated licencing. However, while stronger book laws induce higher amounts of FDI, stronger enforcement induces more non-affiliated licencing. Where enforcement is weak, MNEs will be more likely to internalise their IPR activities. These results, while illuminating, fail to understand how IPR enforcement impacts companies within different sectors and undertaking different forms of FDI and is limited to the experience of U.S. companies.

3.4 Qualitative, Survey-Based Studies

Very few researchers have looked at the impact of IPRs on the investment decisions of MNEs through the simultaneous use of survey data, interviews and statistical analysis, the methodological blueprint pioneered by Mansfield (1994). Given that the intended product of this thesis is to carry out such a review of survey data to identify the challenges to UK companies investing, or intending to invest in China, Mansfield deserves special coverage in this literature review. In 1991, Mansfield chose a random selection of 100 U.S. MNEs using a list of major firms listed in Business Week of June 1990. He received a high response rate to his survey achieving complete or partial returns from 94 companies. His respondents included patent attorneys who worked in the firms, specialists in the MNEs' international operations, and top executives. In addition to the surveys, he followed up with interviews with a cross-section of the companies.

Mansfield's (1994) company selection is helpful as it included a cross-section of different sectors of industry, these were; chemicals (including pharmaceuticals), transportation equipment, electrical equipment, machinery, food and metals. Mansfield did not choose companies from the services sector. Each company was asked to provide information about the importance of IPRs on their FDI decisions. Mansfield chose 16 countries to ask the MNEs about; these were Argentina, Brazil, Chile, Hong Kong, India, Indonesia, Japan, Mexico, Nigeria, Philippines, Singapore, Republic of Korea (South Korea), Spain, Taiwan (China), Thailand, and Venezuela. Unfortunately, although Hong Kong and Taiwan were included, China itself was not included because it was considered to have such weak IPRs in 1991 that there was little chance of U.S. companies setting up joint ventures with Chinese companies. Mansfield also asked companies about the nature of their foreign investments and the impact of IPRs on these specific modes of investing. The five different types of investment he highlighted were:

> *"Sales and distribution outlets, rudimentary production and assembly facilities, facilities to manufacture components, facilities to manufacture complete products, and research and development facilities"* (ibid, pp.1-2).

This enabled Mansfield to identify the differing requirements for IPRs based on sector and nature of the investment. Below, in Table 11, is a recreation of Mansfield's results showing how the requirement for strong IPRs varies by industry and type of investment from his 1994 paper.

Table 11

Percentage of Firms Claiming that the Strength or Weakness of IPRs has a Strong Effect on Whether Direct Investments will be Made, by Type of Facility, 1991

Sector	Sales and Distribution	Basic Production and Assembly	Component Manufacture	Complete Products Manufacture	R&D Facilities	Average
Chemicals*	19	46	71	87	100	65
Transport Equipment	17	17	33	33	80	36
Electrical Equipment	15	40	57	74	80	53
Food	29	29	25	43	60	37
Metals	20	40	50	50	80	48
Machinery	23	23	50	65	77	48
Mean	20	32	48	59	80	48

Notes: The number of firms in the sample in each industry is chemical, 16; transport equipment, 6; electrical equipment, 35; food, 8; metals, 5; machinery, 24. However, not all firms in the survey responded to all questions.

*Chemical industry includes pharmaceuticals.

Source: Mansfield (1994, p.3).

Mansfield (1994) also developed a measure of the perceptions of IPRs by the MNEs relating to countries in the survey. He asked the companies three questions about the countries in the survey, namely:

- Did the MNE believe that IPRs in the reference country were too weak to set up a JV with a local partner?
- Did the MNE believe IPRs were too weak to warrant the transfer of their newest or most effective technology to a wholly-owned subsidiary in the reference country?
- Did the MNE believe that the IPR protection was too weak to licence the newest or most effective technology to a company in the reference country?

Mansfield then compared the responses to these questions against the Rapp and Rozek (1990) index of patent protection. He found a considerable correlation between his measure of the strength of IPR protection and the Rapp and Rozek index.

Mansfield also surveyed the MNEs on recent (1991) changes in the IPRs of three countries, the Republic of Korea (South Korea), Mexico and Taiwan (China). In addition to the responses used for statistical analysis, he also obtained several statements from the companies that help to illuminate the thinking of the MNEs. He concluded that MNEs, when trying to identify if IPRs were too weak to invest, needed the answer to three questions:

- Can the country's laws protect their technology? (some countries do not protect certain technologies);
- Are there adequate legal structures in the country? (Enough patent attorneys, etc.);
- Do the relevant agencies effectively enforce the laws and provide prompt and equitable treatment of foreign firms?

Mansfield produced several findings of considerable interest. Overall, he found that a large proportion of the ninety-four U.S. firms that responded to his survey did think that IPRs had a substantial impact on their FDI decisions. However, the importance varies markedly with it being much more critical to the chemicals (and pharmaceutical) industry than transport and food industries. For some companies who felt their technology was relatively easy to copy, they would not consider investing at all.

There was also evidence that companies may look to transfer older technology rather than their newest or most profitable to countries with weaker IPRs. The changes in IPRs in the Republic of Korea, Mexico and Taiwan (China) had made an impact on the perceptions of the companies intending to invest. Mansfield also concluded that the type of intended investment impacted on the requirement for IPRs, with sales and distribution investments requiring a lower level of IPRs while at the other end of the scale R&D facilities being impacted much more by the strength or weakness of IPRs.

Despite the canonical nature of Mansfield's work and the almost ubiquitous citing of it in literature, this work has received criticism. Heald (2004, p.59) considers the 94% response rate Mansfield achieved as "*astonishing*". Heald (2004) also criticises the act of bracketing all intellectual property rights (patents, copyrights, etc.) together as a deficiency. While accepting the response rate at face value, the additional granularity around individual property rights would have been interesting additional evidence. However, Heald also criticises Mansfield for not limiting his survey to executives primarily in charge of direct investment decisions, who may or may not have been familiar with the intricacies of the different forms of intellectual property.

Mansfield (1995) extends his 1994 study in two ways: the survey is expanded to include Japanese and German MNEs, and an econometric model is used to estimate the effects of the strength or weakness of IPR protection in a developing country on the amount of U.S. FDI. The findings confirm that in relatively high-technology industries a country's system of IPR protection often has a significant effect on the amount and kinds of FDI to that country by Japanese and German as well as U.S. MNEs.

Mansfield's work is most helpful when considering a model to look at the impact of Chinese IPRs on the investment decisions of UK companies. By choosing a sample of UK companies and expanding the sector coverage to include services and agriculture, it should be possible to expand on this seminal work and illuminate this area of research considerably.

You and Katayama (2005) considered the impacts of strengthening IPRs on the profitability of Japanese companies that invested in China and the levels of imitation of their products. They carried out a qualitative survey of Japanese firms who had invested in China. They were looking to understand the problem that despite increasing levels of IPR protection in China, still 27% of all imitations of Japanese products worldwide were produced in China according to the Japanese Patent Office (2000) Annual Investment Report[47]. They created a five-point index scale to measure the overall state of IPRs in China and moderated their data for those companies that had patentable products and those that did not. They chose to study patents and trademarks as this is the part of the IPR landscape they considered to be performing most effectively. They chose 412 randomly sourced companies from the Japanese business database Toyokeizai Shinposha[48]. All the companies were investors in China, and they sent questionnaires to the presidents of the companies. They received 98 responses; a 23.8% response rate (some of the responses covered multiple sites and subsidiaries, giving a total number of subsidiaries in the dataset of 228). The responses covered several sectors and investing cities across China. They asked questions about the location, sector, and partner set-up, level of investment and length of the investment. They also asked about imports that competed with the production in China, either from Japan or elsewhere. They questioned whether product produced in China had been imitated by Chinese companies illegally or if similar illegally copied products from other jurisdictions were imported into China. They also asked if the subsidiary was reaching expected

[47] http://www.jpo.go.jp/english/reference_room/annual/index.html
[48] Toyokeizai Shinposha is a business database providing firm level data. See http://www.toyokeizai.co.jp.

profitability in China and if not, was the problem of imitation a significant factor in reduced profitability. Additionally, they asked each of the companies to rate the level of IPR protection in China on a five-point scale with '5' being top-ranked.

The average score for 188 observations was 2.6 (with a high score of 3.2 for Qindao, and a low score of 2.0 in Dongguan, Xiamen, Fuzhou and Shenyang). 62% of the companies stated that their products had been patented or trademarked registered. The companies reported that, on average, nearly 30% of their products had been imitated in China. 47% of the Japanese subsidiaries had not met their profit expectations. The results of this survey and analysis indicate that there was no statistical evidence that IPR ensures profits of Japanese companies. This might be because there is competition from imports of imitated goods. There was little statistical evidence that the local production of similar goods in the same category influenced the profits of the Japanese subsidiaries, perhaps because the quality of these goods meant they were not directly competitive.

The most alarming finding was that patenting or trademarking of products increased the likelihood of imitation. The authors believed that there might be evidence of patents being used as a source of information to make copies of products. That trademark signalled the value of a product and therefore focused imitation effort on those products. These are disturbing findings: The very system used to protect IP may be being used to undermine the ownership of that property, and the lack of credible enforcement was likely to exaggerate these impacts.

The majority of the literature demonstrates a positive link between stronger IPRs and FDI, or at least in those sectors and types of FDI where IP is of particular importance. One could expect weak IPRs to negatively impact on investment decisions (Mansfield, 1994; Javorcik, 2004; and others). Nunnenkamp and Spatz (2003) concluded that the strengthening of an IPR regime affects not only the amount of FDI but the quantum of R&D expenditure made by the subsidiary plus increasing the value-added and exports from the subsidiary.

However, Minyuan Zhao (2006) highlights a paradox: despite weak IPRs, countries like China and India are receiving FDI from countries like the USA and in sensitive areas such as R&D. The Bureau of Economic Analysis (BEA, 2000) reports that spending on R&D by U.S. firms is growing in a significant number of emerging economies, including Brazil and China. Zhao (2006) interviewed managers and researchers in China and discovered that the MNEs were investing in vertical R&D where they were developing products and services to be used internally within the company and integrated into wider enabling technologies that were held centrally by the MNE. This gave the MNE access to talented researchers at a significantly lower cost than in their home country.

Zhao (2006) evidences this phenomenon further by looking at the patent data of 1567 innovating firms headquartered in the U.S. and showing that patents originating in weak IPR countries receive a proportionally higher level of self-citations. Zhao proffers the theory that there are three pre-conditions for imitation to take place, firstly that there is motivation to imitate, secondly the ability to imitate and exploit the imitation, and finally the possibility of circumventing the law. Imitation is costly (Mansfield *et al.,* 1981) and for there to be the motivation the imitator will need to be able to make a profit from the imitation. Zhao suggests that when the technology depends heavily on a company's proprietary knowledge, platform or internal resources, the motivation to innovate is low as the costs of achieving a profitable outcome for the imitator is high. The MNE also benefits from maintaining its complementary knowledge in a stronger IPR jurisdiction adding additional challenges of distance, and legal risks to the act of imitation. This is an interesting finding and questions many of the orthodoxies suggesting that weak IPRs may be a barrier to the most sensitive types of FDI. Zhao's theories, although based on anecdotal evidence, do seem to offer a sensible response to the real-world paradox he proposes. This structural framework that protects the essential IPR in the company seems a practical solution allowing the MNE to benefit from knowledge endowments and lower wages in developing countries.

3.5 Critical Synthesis and Conceptual Framework

The main conclusions that can be drawn from this critical review of relevant literature are that:

(i) Theoretically, given the different positive and negative channels postulated, the net effect of IPR protection on FDI by MNEs is ambiguous;

(ii) Empirically, the evidence that has emerged to date is skewed in support of the view that stronger IPRs favour FDI. But this effect may depend on several factors such as type of investment, sector of provenance, IP and technological content, and whether firms would be able to maintain control over their proprietary knowledge/assets in the absence of protection, to name but a few.

Moreover, most of the relatively scant evidence available on the impact of IPR protection on MNEs' FDI decisions stems from econometric work based on cross-sections of countries. Albeit valuable to unveil average net effects on the impact of IPRs on FDI flows, such econometric-based evidence sheds no light on *how* exactly IPRs influence the FDI decision of different firms to invest in specific overseas markets/locations such as China. Additionally, to the author's knowledge, none of the few qualitative surveys of foreign investors has examined the particular role that the Chinese IPR environment plays in UK MNEs' decision to invest (or not to invest) in China. As a result, some theoretically charged questions remain mostly unanswered.

To answer the central question of this PhD study, namely, *How does the perception of IPR protection in China influence the FDI decisions of UK MNEs?* A set of sub-questions have been created which can be summarised as follows.

Dunning's OLI framework suggests that IPRs, being part of the regulatory host environment, can constitute a location advantage, but ***What is the nature of UK MNEs? What behaviours do UK MNEs display when engaging in FDI? What is the importance of IPRs to UK MNEs? What are the impacts of IPRs on the FDI decisions of UK MNEs? How do UK MNEs perceive China's IPR system? What is the behaviour of UK MNEs in China? How do China's IPRs impact the decisions of UK MNEs? In other words, what is the impact of the perceived Chinese IPRs on the FDI decision of UK companies?*** Given the conflicting theoretically predictions, it will also be crucial to answering the question ***Does the perception of high/low protection induce or deter UK MNEs' FDI in China vis-à-vis alternative entry modes such as exporting or licensing?***

Once again, drawing from the theory and limited evidence reviewed earlier in this chapter, it will also be paramount to address the question, ***is the influence of the Chinese IPRs on UK MNEs' FDI in China contingent upon*:**

(a) **the nature of ownership advantages of UK MNEs;**
(b) **the extent of imitability;**
(c) **the sector of investment**;
(d) **the type of FDI;**

Addressing such questions and sub-questions will ensure a significant theoretical, and empirical contribution and valuable implications for both policy and practice to flow from the findings. Conceptual Framework to Discover the Influence of Chinese IPRs on the FDI Decisions of UK MNEs.Table 12 maps how the Dunning's OLI triad informs the sub-questions guiding the analysis to be undertaken in Chapter five, the key theoretical sources justifying each question, and the analytical methods to be used to investigate each of them. Figure 5 provides a diagrammatic representation of the conceptual framework showing the links between multinational enterprises (MNEs), and the core analysis to be undertaken in this thesis, focusing on the links between IPRs and FDI. It identifies the company, IPR and FDI variables that will be investigated, and the core questions drawn from Dunning's (1997) OLI triad. It identifies the requirements for clarity on the nature of UK MNEs and the importance of IPRs to these companies when making overseas investment decisions. It also demonstrates the links that need to be understood between the perception of IPRs and the mode and quality of FDI. Given that China is the backdrop for this research, it identifies the key questions to be answered through identifying the perceptions of China's IPR regime and the internalisation responses to these perceptions.

Table 12

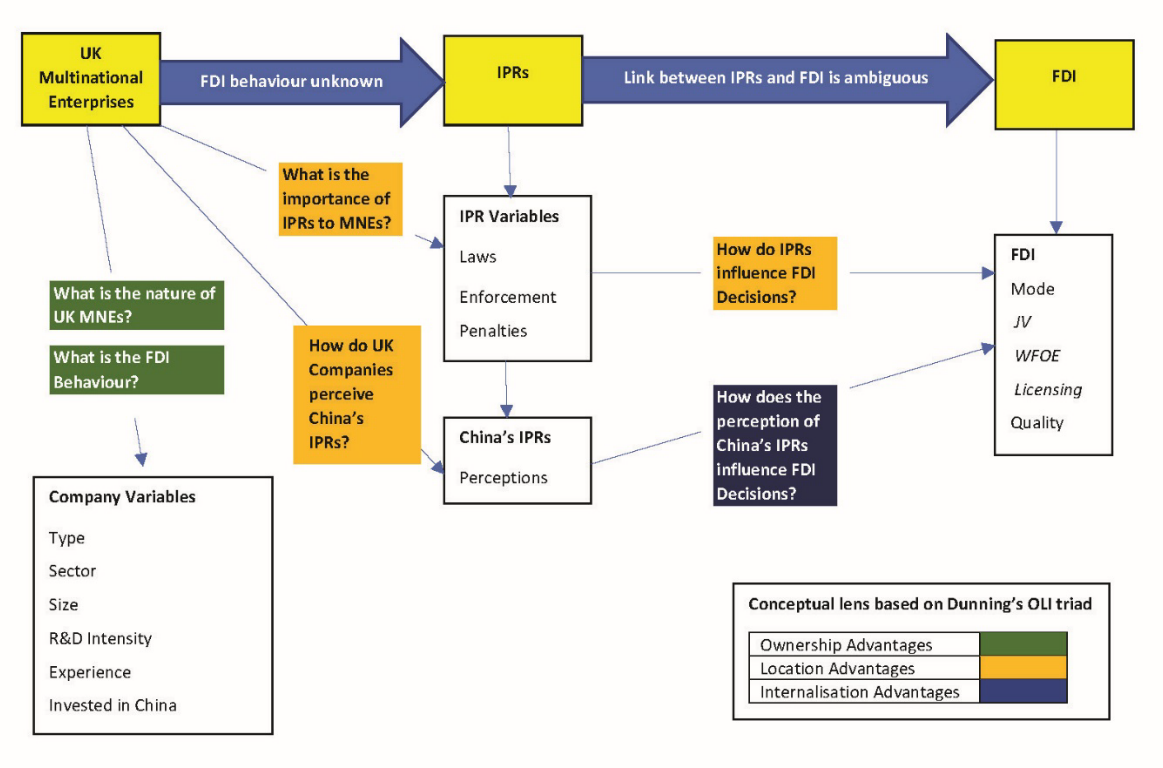
Conceptual Framework to Discover the Influence of Chinese IPRs on the FDI Decisions of UK MNEs.

	Framework	Research Sub-Question	Key questions for analysis	Analytical methods	References
Dunning (1997)	Ownership Advantages	I	**What is the nature of UK MNEs?**	Secondary Data and Survey	Nicholson (2007) Mansfield (1994) Nunnenkamp and Spatz (2003) You and Katayama (2005)
			Technology level and levels of imitability	Secondary Data and Survey	Mansfield (1994) Tanaka and Iwaisako (2014) Javorcik (2004)
			Sector	Secondary Data	Mansfield (1994) Javorcik (2004)
			Type of FDI preferred (JVs, WFOE)	Survey and Interview	Kyrkilis and Koboti (2015) Sun, Tong and Yu (2002) Sun (1999)
	Location Advantages	II & IV	**What behaviours do UK MNEs display when engaging in FDI?** **What are the impacts of IPRs on the FDI decisions of UK MNEs?**	Survey and Interview	Awukose and Yin (2010ab) Zhang and Yang (2016) Adams (2010)
		V	**How do UK MNEs perceive China's IPR system?**	Survey and Interview	Zhao (2006) Ginarte and Park (1997)
		VI	**What is the behaviour of UK MNEs in China?**	Survey and Interview	Dunning (1997) Yang (2013) Fink and Braga (2005) Adams (2010)
		III	**What is the importance of IPRs on the FDI decisions of UK MNEs?**	Survey	Dunning (1997) Markusen (2002) Yang (2013)
	Internalisation Advantages	VI	**What is the behaviour of UK MNEs in China**	Survey and Interview	Glass and Saggi (2002) Seyoum (1996) Javorcik (2004)
		VII	**How do China's IPRs impact the FDI decisions of UK MNEs?**	Survey and Interview	Smith (2001) Zhao (2006) Sun (1999)

Source: Author's own research

Figure 5

Diagrammatic representation of the Conceptual Framework showing the Links between MNEs, IPRs and FDI.



3.6 Chapter Summary

At both the theoretical and empirical level, research on the specific link between FDI and IPR protection remains scant and ambiguous. As a result, the relationship between improvement in IPRs or weak IPRs and propensity to invest is unproven and seemingly dependent on many variable factors such as sector and type of FDI. Interestingly, there does appear to be evidence of the strength of IPRs altering the breadth and depth of investments, but no specific evidence is available as to whether this effect pertains to UK MNEs' investment decisions in China.

As well as gaining a better understanding of the impacts of Chinese IPRs on UK companies the question can be broadened to understand how this impact varies by sector and technology level as well as the imitability of the product or service. Also, there is an opportunity to understand whether IPRs are impacting the type and form of FDI of UK MNEs. Furthermore, except for Mansfield (1994), there is little evidence of the nature of investment and how they are impacted by IPRs and none relating to China and UK MNEs.

As evident from the thorough review of the literature undertaken, there is a clear research gap on the drivers' behind UK MNEs' decisions to invest in China and the impacts of the perceived level of Chinese IPRs on these decisions. In an attempt to fill this critical gap in the literature, this thesis will look to build on the work of Ginarte and Park (1997), Mansfield (1994) and Dunning (1976) and others through the lens of UK companies and seek to broaden the sum of knowledge in this complex and interesting area as specified in the conceptual framework highlighted in this chapter.

Chapter Four: Methodology

4.1 Chapter Overview

This chapter presents the overall research strategy and then examines, in-depth, the approach to obtaining the data required to answer the research questions identified in Chapters Two and Three stemming from the critical review of relevant literature. It sets out the reasoning behind the choices made and the methodologies for data collection and analysis. It describes the process to ensure a sound research design is employed, considering the time and cost constraints as well as ethical considerations. This chapter is structured as follows. Section 4.2 describes the research philosophy considering the author's epistemological, ontological and axiological positions (as advised by Sumner and Tribe, 2004). Sections 4.3, 4.4 and 4.5 consider the research strategy, approach and techniques plus the justifications for these approaches regarding their ability to answer the research questions effectively. Sections 4.6 details the approaches used to generate secondary data for quantitative analysis and to identify and secure access to a sufficient set of respondents to carry out a reliable survey and subsequent interviews. Section 4.7 covers the development of the survey instrument and interviews. Section 4.8 outlines the process for pilot studies of the survey instrument. Sections 4.9 and 4.10 set out the appropriate use of coding to ensure participant anonymity, along with the strategies used to provide a representative sample of respondents and maximise the response rate. Section 4.11 details the profile of respondents who took part in surveys. Section 4.12 considers the profile of non-respondents. Section 4.13 discusses the purpose and process of carrying out interviews with a selection of UK MNEs. Section 4.14 focuses on the critical issues of reliability, validity, replicability and objectivity of the research sample and data collection methods employed. In section 4.15, the ethical issues of a research process of this nature are considered including details of the institutional process followed to receive ethical approval for the study. Section 4.16 addresses the methodological limitations and issues encountered in undertaking this research and the mitigations taken to counteract these limitations. Section 4.17 and 4.18 consider the statistical tools used in the analysis and the use of CADQAS software.

4.2 Research Philosophy: Epistemological, Ontological and Axiological Positioning

The choice of a research philosophy has direct implications on the approaches taken to collect data and data analysis (Collis and Hussey, 2003). It is, therefore, essential to explore the epistemological, ontological and axiological positions for the research (Johnson and Duberley, 2000). Saunders and Lewis (2012) describe four approaches used to select a research philosophy. These include *Positivism*, which is the study of observable and measurable variables. Using experiment enables outcomes to be predicted and hypotheses tested by controlling variables. This philosophy concentrates on logic and reasoning using empirical evidence to establish a causal link between variables (Lincoln and Guba, 1985; Crotty, 1998). *Realism* (or *Objectivism*) describes scientific enquiry into real objects. With direct realism, one considers that what you see, and can measure, is a true representation of what you have. In contrast, *Critical Realism* suggests that what you experience are sensations or interpretations of things that exist in the real world. *Interpretivism* is the study of social phenomena in their natural environment and considers people as 'actors' playing roles as an interpretation of the context in which they operate. It is often used in qualitative research which might be concerned with interpreting human behaviours and understanding complex social constructs (Remenyi and Williams, 1998). In a *Pragmatist Philosophy,* the most important determinant of the research philosophy used is the research questions themselves and the objectives of the research.

This thesis considers the behaviour of people (senior managers) and companies when making complex decisions in a complex environment. It necessarily requires interpretation of the data collected through the three research methods and uses a pragmatic assessment regarding the selection, collection and analysis of the data. This PhD study into the FDI behaviours of UK MNEs aims at uncovering more in-depth knowledge relating to the impact of Chinese IPRs on such behaviours and decisions. Given the need to draw general inferences from the observations (Bryman and Bell, 2007), an interpretive approach is most appropriate to this area of study.

Robson (1993) and Neuman and Kreuger (2003) describe three categories employed in research design, namely, exploratory, descriptive and explanatory research. This research seeks to be exploratory to find out '*what is happening*' (Robson, 1993, p.42). It aims to use mainly qualitative data collection using survey instruments and interviews to understand "*what is going on here*" (Schutt, 2011, p.13). Given that the postulated links between FDI in China and UK MNE behaviour are ambiguous and poorly understood, this research aims to observe, gather information and construct an explanation (Ghauri and Grønhaug, 2005). This research will also collect quantitative secondary data from publicly available business databases that will enable a macro assessment of investor behaviour based on company size, sector and investor experience. Finally, this research intends to identify if there is a causal link between the perceptions of

Chinese IPRs and the decisions made by UK MNEs on whether to invest or not and the type of investment they choose to make considering the theoretical postulations highlighted in the critical literature review in Chapter Three (Saunders *et al*., 2016; Schutt, 2011).

Throughout this research, the author is seeking to understand a complex decision (whether to invest from the UK into China or not) that is influenced by multiple exogenous and endogenous drivers to draw broader conclusions from evidence obtained from multiple sources. This analysis requires an understanding of the conceptual framework used to assess the data collected and accepts that the data will not necessarily fit a single model or paradigm. The author has accepted this position and undertaken the research and analysed the data, including all relevant material and excluding the irrelevant, but reporting truthfully on the findings obtained, thus setting the axiological perspective for this research (Saunders *et al.*, 2016).

Saunders *et al.* (2016) discuss the three research approaches available, namely, deduction, induction and abduction. The key to choosing a research approach is based on the nature of the research topic (Creswell, 2013, p.21). A deductive approach looks at a situation from a position that infers that if the logic is true, then the conclusions must also be true. This approach looks to collect data to evaluate propositions relating to an existing theory which it either verifies or falsifies. It often used in conjunction with quantitative data where a large sample enables generalised conclusions (Hyde, 2000).

Inductive approaches take a known premise to generate untested conclusions. Data are used here to explore a phenomenon, identify themes and patterns to create a conceptual framework. The inductive approach is concerned with understanding the behaviours of human beings and is more concerned with the collection of qualitative data (ibid). With inductive approaches to research, the researcher is part of the research process, for example, devising a questionnaire or conducting an interview and while generalisations may be desirable this sort of research is likely to produce generalisable inferences out of observations (Bryman and Bell, 2007).

Abduction uses a known premise to generate testable conclusions. Data collection is used to explore a phenomenon, to locate patterns and themes to identify a conceptual framework against which subsequent data can be tested. This method is used to generate or modify theory.

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This research uses three methods of data collection to support triangulation of the data, and deductive analysis. Moreover, given that there are no previous studies of UK MNEs responses to their perceptions of Chinese IPRs, an inductive approach to explore the phenomenon observed and to identify themes and patterns of behaviours will be employed. Secondary data are used to generate both a sample of companies that meet the key criteria and to undertake a quantitative analysis of investment patterns by company size, sector, investment experience and technology level. A survey of companies supplements and complements this secondary data by probing the companies on their approaches to investments in China and corroborating the secondary data by checking information. Finally, interviews are used with a sample of companies to clarify questions raised in the secondary data analysis and survey data analysis to broaden and deepen the understanding of the company behaviours. The author remained cognisant throughout the data collection and analysis process that the data might not fit with the theory. Therefore an inductive approach to the development of theory may have been required that is pertinent to the analysis (this acknowledgement is consistent with the advice of Corbin and Strauss, 2008).

4.3 Research Strategy

A research strategy is a plan that, within the time and cost constraint, clarifies how the research question is to be addressed (Saunders *et al.,* 2016). The main purpose of this research is to understand how the perception of Chinese IPRs impacts the investment decisions of UK MNEs.

In preparation for this research a comprehensive and critical literature review was undertaken on the nature of FDI and IPRs, the postulated links between IPRs and FDI both theoretical and empirical and a study of Chinese IPRs and their impacts on international companies. The literature review frames the research undertaken, provides a context and theoretical framework and places the research within the wider body of knowledge (Creswell, 2007). The research for the literature review considered relevant academic papers from journals, texts from books and internet content and was directly related to the research aims and objectives (Gall, Gall and Borg, 2006). The literature review did not consider those texts not related to these subjects, such as the links between IPR and exporting and other drivers for FDI such as tax policy. The author continued to review the literature throughout the development of this thesis to ensure that new thinking was included as it emerged (Tranfield *et al*., 2003; Saunders and Rojon, 2011).

The literature review also aims to be a critical analysis of relevant knowledge highlighting gaps in understanding, some of which this thesis seeks to remedy (ibid).

Three linked, but independently administered research methods were selected to explore the main question fully. The first method collects secondary data on UK MNEs, their sector of operation, company size, R&D intensity, investment experience, and whether they have invested in China. This method was chosen to enable an efficient collection of data of a population of UK MNEs, plus enable simple quantitative analysis (using IBM, SPSS[49] and Microsoft Excel[50]) of investor behaviour in aggregate (Bulmer *et al.*, 2009). This method of data collection is both cost and time effective, giving objective data that is readily available and supports the second and third research methods. However, such a data collection approach is not without limitations, such as incomplete data entries and constraints in the timing and accuracy of the data collected. Given the function of this secondary data and the subsequent opportunities for data triangulation, the author considers the limitations to be acceptable. Further discussion on limitations and mitigations can be found in sub-section 4.16.

The second data collection, used to collect primary data, used a survey instrument to deliver a structured survey to a selection of UK MNEs (Saunders *et al.,* 2016). This survey instrument seeks to understand the impacts of IPRs on the investment decisions of UK MNEs, the perception of Chinese IPRs, and the impacts these perceptions have had on investment decisions. It seeks to understand the nature of investments made in China and serves as a check of the data collected through the secondary data collection and completes any missing data. The primary data were analysed using IBM SPSS, Microsoft Excel and NVivo[51].

Finally, a relatively small number (9) of face to face interviews were carried out to further probe and understand the phenomenon described in the data collections. These interviews took the form of semi-structured discussions aimed at exploring the context more completely and probed

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[49] IBM SPSS Statistics is a leading statistical software used to solve business and research problems by means of ad-hoc analysis, hypothesis testing, geospatial analysis and predictive analytics.
[50] Microsoft Excel is a spreadsheet developed by Microsoft for Windows, macOS, Android and iOS. It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications.
[51] NVivo is a qualitative data analysis (QDA) computer software package designed for qualitative researchers working with very rich text-based and/or multimedia information, where deep levels of analysis on small or large volumes of data are required.

participants for more in-depth explanations (Saunders *et al.,* 2016) and were analysed using NVivo. All three data collection methods employed help to create a broader and richer picture of what is happening and enable the development of the investigation as an understanding of the phenomenon to answer the research question (Saunders and Bezzina, 2015).

4.4 Research Approach and Justification

This thesis uses both quantitative and qualitative data and seeks to draw on both generalised and firm-specific data to understand the phenomenon. In this case, both a deductive and inductive research approach is most appropriate (Tashakkori and Teddlie, 2010).

This thesis employs three different methods of gathering and analysing data. This is a mixed-method approach; defined as an approach, including "*at least one quantitative method and one qualitative method*" (Green *et al.*, 1989, p256). This mixed-methodology provides three distinct advantages to the research; *triangulation*, *complementarity* and *development*. *Triangulation* assumes that all methods have inherent biases and limitations and so seeks to offset counteracting biases in investigations to strengthen the validity of the results (Mathison, 1988). To achieve triangulation, the methods employed should be different but concentrated on understanding the same phenomenon (Green *et al*., 1989). It is, of course, essential that the biases and limitations of the different methods do not all work in the same way as the triangulation will not be effective, and the biases and limitations amplified (Shotland and Mark, 1987). The investigations should also sit within the same paradigmatic framework (Kidder and Fine, 1987). Also, of the three methods used, all will be given equal weighting regarding their influence on the analysis.

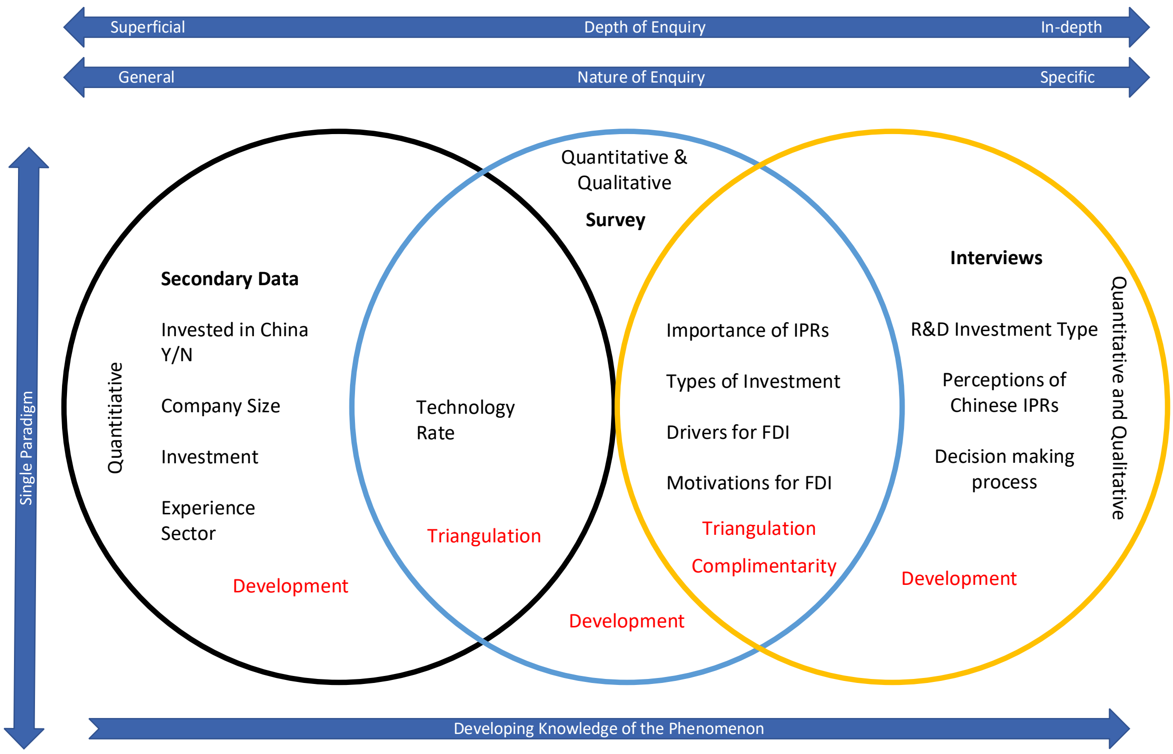
Complementarity seeks to provide an enriched and elaborated understanding of the phenomenon by looking at overlapping and different facets of the phenomenon (Mark and Shotland, 1987). To achieve complementarity, this research considers various aspects of the key questions through different methods to gain a broader understanding of what is going on.

The final reason for choosing a mixed method is to support *development* by using the results from one method to inform subsequent methods. This enables cross-checking, probing and development of specific areas of inquiry, thus increasing the understanding and validity of the inquiry (Madey, 1982). To ensure this, the three methods were carried out sequentially.

However, this sequential approach poses potential risks to the benefits of triangulation and complementarity which according to Green *et al*. (1989), require simultaneous timing of the individual methods to ensure that each method is considering the same characteristics of the same phenomenon. However, Mark (1988) does concede that different methods need not be implemented simultaneously if the phenomenon of interest is stable over time. Given IPRs are relatively stable over time, and investment decisions are multi-annual decisions, undertaking the three methods will enable development and retain the efficacy of drawing both triangulation and complementary conclusions for the data. Figure 6 shows the design of the research method and the associated benefits of a mixed-method approach.

Figure 6

Research Design



Source: Author's own research

4.5 Research Techniques: Secondary Data, Survey Instrument and Follow-up Interviews

This research takes a snapshot at a particular time to understand the motivations of UK MNEs regarding the current or recent perception of Chinese IPRs. As the author is seeking to understand the impact of Chinese IPRs on the investment decisions of UK MNEs and not the impact of changing IPRs in China over-time, this research does not attempt a longitudinal study

(Saunders and Lewis, 2012). The author considers this snapshot approach the most effective method of study to answer the research questions within the time and cost constraints present.

This research uses secondary data that was collected to create a population of UK MNEs to sample by survey instrument and interview; and to generate quantitative data that can be analysed to draw aggregate results across the population selected (Bulmer *et al.,* 2009). In this research, the data from which the population was drawn is the FAME[52] database available through subscription via the Coventry University Library. This database is collated by Bureau van Dijk. It is a source of global company financial, subsidiary and business data with over 69 million active and 454 million archived links providing information on 66 million companies. The database is continually growing, with up to approximately 20,000 links added each month (Bureau van Dijk Introduction, last updated November 2016). The database contains lists of companies but does not include organisations such as charities, governments and educational institutions (registered as charities). For this research, it is necessary to draw a population of UK MNEs defined as:

> *"all of the units (individual, household, organisations) to which one desires to generalise survey results"* (Dillman, 2000, p.196).

This will be the universe from which the sample is to be selected (Bryman and Bell, 2007). For this research, a UK MNE is defined as a company whose ultimate owner is registered in the UK (England, Northern Ireland, Wales, Scotland), and holds at least 10% ownership in an overseas (outside of UK) subsidiary. From this database information on company size, sector, expenditure on research and development[53], the number of overseas subsidiaries and the existence or not of a subsidiary in China was drawn. In each case, the data was selected on a 'last available' case rather than a specific year to offset for different filing dates and completion of records. The

[52] FAME (**F**inancial **A**nalysis **M**ade **E**asy) is a financial database of public and private British and Irish companies. Each detailed record contains the profit and loss account, the balance sheet, financial and profitability ratios and financial and profitability trends. It is provided with searching and analysis software. This means that it is possible to carry out searches using criteria such as company name or registration number, trade description or SIC codes, number of employees, geographical area (postcode, post town or country) or accounting or financial data such as turnover.
[53] Research and development expenditure is not compiled on many of the companies on the FAME database so such data is also gathered through the survey instrument and interviews.

sector information was returned from the database as a six-digit UK SIC code but has later been reduced to a two-digit code to enable an analysis of broader sector groupings.

A number of filters on the FAME database, to create the sample frame, were employed. These are set out in Table 13, which describes the filter, action taken, and resulting company count.

Table 13

Manipulation of the FAME Database to Achieve the Population of UK MNEs.

Filter	Action	Result
Select active companies in the UK active database	Filter for active companies	166,220
Select UK companies	Filter for England, Scotland, Wales and Northern Ireland	147,434
Select only MNEs	Filter for companies with 10 % ownership of a foreign subsidiary	9,619
Cleanse of data of those MNE's without a UK SIC Code	Deleted 277 companies that had no UK SIC code	9,342
Deleted MNE's in inappropriate SIC Code	Three companies deleted as activities of households	9,339

Source: Author's own research

The data fields drawn to enable the assessment of the secondary data analysis and to provide the required information to select and inform both the survey and interviews are detailed in Table 14.

Table 14

Data Fields Drawn from FAME

Data Field	Data Type	Reasoning
Company Name	Text	To identify multiple or duplicate fields and as a locator for additional data research (particularly contact details)
Latest Operating Revenue (Turnover). Last available year.	Pounds thousands	Used for quantitative analysis of investment activity in relation to company size
Primary UK SIC Code (2007)	Six-figure code	Sector code reduced to two figures to group into broader sectors
Research and Development Expenditure. Last available year	Pounds thousands	To estimate the technology intensity of the company

Data Field	Data Type	Reasoning
Subsidiary in China ISO Code 'CN'	Yes/No	To assess if the company had a Chinese subsidiary
Latest Number of Employees Last available year	Number	To support company size classification analysis.
Email, web address and phone number	Text	To enable contact with the company for electronic survey and face to face interviews.

Source: Author's own research

Once the population of UK MNEs was collected, it was sorted by two-digit SIC code into 19 sectors detailed in Table 15. This produces 19 sample frames segmented by sectors which are each further segmented into two subcategories of those UK MNEs that have invested in China and those that have not. Table 15 also shows the sample frame of companies by sector and the number within the frame that have invested in China.

The sample size is critical in ensuring the statistical significance, reliability and validity of the results. Small sample size may limit the validity of the survey (Hair *et al.,* 1998), while a large sample size would expend significant resources (Sekaran, 2000). Saunders *et al.* (2016, p.659) suggest the following formula to estimate the minimum sample size:

$$n = p\% \times q\% \times \left[\frac{z}{e\%}\right]$$

Where n is the minimum sample size;

p% is the proportion belonging to a specific category;

q% is the proportion not belonging to a specific category;

z is the level of confidence required;

e% is the margin of error required.

Before the sample is taken, it is difficult to estimate the proportion of responses that can be expected and so the sample size should be cautious considering a potential low response level (De Vaus, 2002). While sampling error is important, it is only one component of error in the estimate. Other factors that need to be taken into account when considering a sample size include time constraints, the type of analysis to be done, the number of different variables investigated and the total size of the population from which the sample frames are drawn (Bryman and Bell, 2007). Given this, some judgment on sample size needs to be used (Hoinville and Jowell, 1978). Sekaran (2000, p.298) suggests the following:

I. *Sample sizes larger than 30, and less than 500 are appropriate for most research;*
II. *Where samples are broken into sub-samples, a minimum sample size of 30 for each category is necessary.*

In this study, the companies can be broken down into 21 subcategories by two-digit sector code see Table 15**.** However, two sectors – 'Active Households' and 'Extraterritorial' - have been excluded as not appropriate for this study of UK MNEs. This leaves 19 subcategories of MNEs each of which has a subset of entries of those MNEs that have investments in China. Thus, if the approach employed follows Sekaran's (2000) suggestion, a minimum sample size of 19 x 2 x 30 = 4,370 companies would be required. This would have been a very onerous task and beyond the scope and resources of this PhD thesis. Therefore, the decision was taken to maximise the sample size understanding that the opportunities to generalise by sector may be limited. However, other useful generalisations such as overall population, company size and experience, R&D intensity and behaviour would be possible with a sample size of around 150.

Table 15

UK Nature of Business: Standard Industrial Classification (SIC) Codes and Derivation used in this Research

Sector	**Five-digit UK SIC Code Range**	**Two-digit SIC code used**	**Number of MNEs who have not invested in China**	**Number of MNE's invested in China**
Agriculture, Forestry and Fishing	01110-03220	01	71	1
Mining and Quarrying	05101-09900	05	246	12
Manufacturing	10110-33200	10	1291	123
Electricity, gas, steam and air conditioning supply	35110-35300	35	40	0
Water supply, sewerage, waste management and remediation activities	36000-39000	36	23	2
Construction	41100-43999	41	187	3
Wholesale and retail trade; repair of motor vehicles and motorcycles	45111-47990	45	785	36
Transportation and storage	49100-53202	49	353	13
Accommodation and foodservice activities	55100-56302	55	74	7
Information and communication	58110-63990	58	1033	43
Financial and insurance activities	64110-66300	64	1362	77

Sector	Five-digit UK SIC Code Range	Two-digit SIC code used	Number of MNEs who have not invested in China	Number of MNE's invested in China
Real estate activities	68100-68320	68	126	1
Professional, scientific and technical services	69101-75000	69	1907	116
Administrative and support service activities	77110-82990	77	999	47
Public administration and defence; compulsory social security	84110-84300	84	12	2
Education	85100-85600	85	48	3
Human health and social work activities	86101-88990	86	67	3
Arts, entertainment and recreation	90010-93290	90	84	2
Other service activities	94110-96090	94	136	3
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97000-98200	97	3	0
Activities of extraterritorial organisations and bodies	99000-99999	99	0	0

Source: Companies House website http://resources.companieshouse.gov.uk/sic/ and authors own research.

There are four principal methods of probability sampling as set out in Table 16.

Table 16

Principal Sampling Methods

Random Sampling	The sampling frame is created, and then a random selection is taken from the frame
Systematic sampling	The first choice is made from the frame at random, and then the selections are taken at a defined interval throughout the sampling frame
Stratified sampling	The sample frame is made of categories, and a random sample is made within each of the categories within the sample frame
Multistage cluster sampling	The sampling frame is created by drawing a random sample of clusters and then selecting at random from within the sample frame

Source: Gill and Johnson, 2010, p.127

To ensure a selection that represents each sector, the data were categorised into a two-digit SIC code. A stratified sampling method was chosen, followed by a systematic sampling method within each stratum. In this case, each cluster will be its own sample frame. These sample frames are further split into those MNEs that do not invest in China and those that do. Therefore, a further stratification takes place within each sector cluster to ensure a sample includes companies that have invested and those that have not.

To ensure a margin of error of 5% of the total sample of 9,339, it would be necessary to sample 370 MNEs (Saunders *et al*. 2016, p.281). However, the sample is broken down into two groupings: those that have not invested in China (8,842) and those that have (451). To achieve a similar 5 % margin of error, the researcher would need to survey 370 and 217 respondents, respectively. Furthermore, to enable an analysis of the individual sectors, it would be necessary to seek a sector sample size of around thirty MNEs (Sekaran, 2000 p.298). To ensure all sectors were covered, the researcher selected a number of respondents from each sector based on the ratio of their contribution to the total population. However, if this number was less than 30, then 30 were selected, or in the case of those sectors with a smaller population than 30, the total population was approached. A random start point was generated, and then a selection made at an incremental point related to the required sample size.

Given that it is unlikely that all MNEs approached would respond, it is wise to take a conservative approach and to attempt to sample more MNEs than required (De Vaus, 2013). The process of rounding up the sample sizes to 30 or the whole sample increases the numbers of MNEs approached to 677 for those not invested in China and 264 for those invested in China. Table 17 sets out the sample frames, proportions selected, start position and systematic increments to achieve the stratified random sampling for the survey instrument.

Table 17

Sample frames, proportions approached, start position and selection increment

		Not Invested in China					Invested in China				
Sector	**2 Digit code**	**Total Frame**	**Proportion of 370**	**No. If less than 30 = 30**	**Start point**	**Choice increment**	**Total Frame**	**Proportion of 217**	**No. If less than 30 = 30**	**Start point**	**Choice increment**
Agriculture, Forestry and Fishing	01	71	3	30	2	2	1	0	1	1	1
Mining and Quarrying	05	246	10	30	2	8	12	6	12	1	1
Manufacturing	10	1292	54	54	20	24	123	59	59	1	2
Electricity, gas, steam and air conditioning supply	35	40	2	30	1	1	0	0	0	0	0
Water supply, sewerage, waste management and remediation activities	36	23	1	23	1	1	2	1	2	1	1
Construction	41	187	8	30	6	6	3	1	3	1	1
Wholesale and retail trade; repair of motor vehicles and motorcycles	45	785	33	33	11	24	36	17	30	1	1
Transportation and storage	49	353	15	30	4	12	13	6	13	1	1
Accommodation and food service activities	55	74	3	30	1	2	7	3	7	1	1
Information and communication	58	1033	43	43	1	24	43	21	30	1	1
Financial and insurance activities	64	1362	57	57	16	24	77	37	37	1	2
Real estate activities	68	126	5	30	3	4	116	1	0	1	1
Professional, scientific and technical services	69	1907	80	80	10	24	116	51	51	2	2
Administrative and support service activities	77	999	42	42	3	24	47	23	30	1	1
Public administration and defence; compulsory social security	84	12	1	12	1	1	2	1	2	1	1
Education	85	48	2	30	2	2	3	1	3	1	1
Human health and social work activities	86	67	3	30	2	2	3	1	3	1	1
Arts, entertainment and recreation	90	84	4	30	2	3	2	1	2	1	1
Other service activities	94	136	6	30	4	5	4	3	3	1	1
Totals		**8845**	**370**	**677**			**494**	**217**	**281**		

Source: Author's own work.

4.6 Identification and Access to Target Respondents

The survey must target the person most appropriate to answer on behalf of the company to ensure the research question is adequately responded to (Malhotra and Grover, 1998).

Using the contact details retrieved from the FAME database, a total of 2650 emails were despatched from a university email address. They described the nature and length of the survey and assurances on the anonymity of the respondent and company. 22% (586) of these emails were rejected immediately by either spam filters or because the address was incorrect. Rejections were also received stating that the person had moved, or that the company no-longer-used this type of communication. Twenty-five companies had become insolvent or closed. In total, only five respondents agreed to participate in the survey as a result of this initial communication.

A further round of communications to 654 companies through online contact forms on the company's website was undertaken; this resulted in an additional three respondents agreeing to participate in the survey.

Both emailing companies directly and communicating through online web forms required someone within the company to represent the researcher, reading the communication, then identify and pursue a suitable executive respondent. Hard to reach populations include those with relatively low numbers in the sample frame, or are hard to identify, people who do not want to disclose they are members of the population (for instance criminals) and where the behaviour of the population is difficult to determine (Marpsat and Razafindratsima, 2010). Populations are also hard to reach if the subject of the survey is obscure or not thought to be salient to the respondent (Bean and Roszkowski, 1995). Furthermore, external distraction, for instance, how busy the potential participant is, will decrease the recipient's ability to interact with the research (Dillman, 2011). The researcher considered C-Suite executives as being an elite, hard-to-reach population (Zuckerman, 1972). They are limited in numbers, hard to approach (having gatekeepers), a high social position (Stephens, 2007) and, have broad job roles so are unlikely to find research of this nature salient. They are also busy, distracted people.

While sending out emails is a relatively convenient, cost-effective activity (Simsek and Veiga, 2000), following up rejections and inputting data into online contact forms takes a considerable effort, and was ineffective in engaging with respondents (Im and Chee, 2004). This finding confirms research from Sappleton and Laurenço, (2016) who found that five email surveys carried out in 2014 achieved an average response rate of only 0.24%.

To generate a viable response rate for the survey, a technique using LinkedIn was developed that targeted the right interlocutors. Making use of Dillman's (1978; 1991; 2000; 2011) Tailored Design Methodology, insight from Groves *et al*. (1992) and the experience of Gerard (2012) and Dusek *et al*. (2015), the researcher chose to explore the use of LinkedIn as a conduit to connect with potential survey participants. A review of LinkedIn was undertaken to identify if the sample frame of companies and key respondents at a senior enough level were represented on LinkedIn (Messer and Dillman, 2011; Horrigan, 2009). The researcher assumed that C-Suite executives would have a high level of internet literacy (Converse et al., 2008; Shih and Fan, 2008). This review included a search of companies covering each sector accompanied by searches of senior executives using keywords such as "Chief Executive", "Director", "Managing Director", "Vice President", "Founder", "Owner", "Partner", "Counsel" and "International". This activity demonstrated a wide and comprehensive coverage of the sample frame, validating the work of Chiang et al., (2013) who found that LinkedIn was 277 percent more effective at generating professional leads than Facebook and Twitter. This more targeted sampling technique could provide a more effective approach to identifying and persuading the hard to reach population of C-Suite executives to participate (Watters and Biernacki, 1989; Schmidt, 1997). See Annex 2 for a full description of the methodology and academic underpinning for this approach to using LinkedIn to target and persuade C-suite executives to take part in the survey.

Dillman, (2000) discusses the need to develop trust (de Leeuw, 2005; Claybaugh and Haseman, 2013) with the respondent to encourage participation. The use of the LinkedIn profile offered the researcher an opportunity to communicate information (Hirsch, 1995) about the researcher, the researchers' organisation and the nature of the research, enabling trust development activity. Herbelien and Baumgartner, (1978) detailed the need to establish the legitimacy (Bickman, 1974) and authority (Bushman, 1984) of the organisation undertaking the survey and therefore as an initial activity the researcher's LinkedIn profile was reviewed and enhanced. Improving the profile included ensuring the personal elements of the profile were up to date, and the relationship with the university, including a background image of the university, was highlighted (Dillman, 1978). Academic awards and honours were updated, and a new, more professional profile picture selected to enhance the online personal brand (Arruda, 2009) and increase the likelihood of the profile being viewed (Shontell, 2012). The improvement of the researcher's LinkedIn profile proved important to the success of the research as there was a marked increase in views of the profile during the research period, reaching over 600 per week at one point compared to a steady-state of less than 30 per week outside of the research period.

Using LinkedIn's search function, target companies, taken from the stratified random sample of companies derived from the FAME database, were identified. Filters for location (UK) were used to remove employees of the company's foreign subsidiaries (although there were some cases where the decision maker for the UK MNE was resident outside the UK – where this was found to be the case the specific person was contacted directly). Some companies had a different registered company name (as found on the FAME database) to the one used in their public profile on LinkedIn. Crosschecking the website address from FAME enabled the researcher to identify the public profile of the company and to search LinkedIn accordingly.

Once the correct company was identified, a search was undertaken on the keywords refined in the pilot study to identify potential participants. In many cases, multiple potential participants were identified (such as CEO, International Director, General Counsel). Screening based on the potential participant's experience and time in the organisation was used to identify the correct participant (Yun and Trumbo, 2000).

The initial searches often identified that the target respondents were not within the appropriate degree of separation or had a secured account. In some cases, intermediate connections (McCurdy *et al*., 2004) were identified (senior staff with 'Open Profiles' or within the necessary degree of separation).

Out of those approached, a proportion did connect to the researcher following the request. As these acceptances built over time, degrees of separation within the sector reduced increasing the opportunities to connect within that sector. By going back to those companies where a connection had not been possible additional contacts to potential respondents became available.

Once the target respondent connected they were approached through the LinkedIn message service with a request to participate in the survey which served as a pre-notice of the research (Mehta and Sivadas, 1995; Fox *et al*., 1988).

Following the initial message, sent via LinkedIn, the author received either no response, a rejection of the request, a request for more details on the survey, a referral to a more appropriate respondent or an acceptance to participate in the survey. Given that multiple contacts improve response rates (Smith and Leigh, 1997; Van Mol, 2017), by up to 25 percent (Sheehan and Hoy, 1999), where no response was received a short reminder message was again sent through LinkedIn between two weeks and one month of the original message.

The follow-up message was short and informal and appealed to the respondent to participate and gave instructions on how to do this. It also served as a prompt of urgency to the potential respondent. The follow-up message was successful in prompting non-respondents with an approximate 20 percent connection rate following this message.

Those who accepted participation in the survey following the approach through LinkedIn were sent an email link to a personalised, multi-platform, version of the survey to complete. The survey was delivered through Bristol Online Surveys[54] (now Online Surveys), consisted of 33 questions and took around 30 minutes to complete. In total, 466 C-suite respondents from 465 companies (there was one multiple acceptance) agreed to undertake the survey. Each participant was sent up to five reminders, through the survey tool, to complete the survey at two-week intervals resulting in 207 responses of which 205, covering 18 of the 19 sectors, were usable (two respondents did not give consent to the survey). A total response rate of 44% was achieved, see Table 18 for details of the final disposition codes and formula used (AAPOR, 2016).

[54] https://www.onlinesurveys.ac.uk/

Table 18

Final Disposition Codes

Final Disposition Code	Description	Outcome
RR	Response Rate	44%
I	Complete Interviews	207
P	Partial Interviews	0
R	Refusal break-off	2
NC	Non-Contact	257
O	Other	0
UH	Unknown if household /occupied	0
UO	Unknown other	0

Using outcome rates from final disposition distributions using RR1 (the minimum response rate):

$$\mathbf{RR1=}\ \frac{\mathbf{I}}{\mathbf{(I+P) + (R+NC+O) + (UH+UO)}}$$

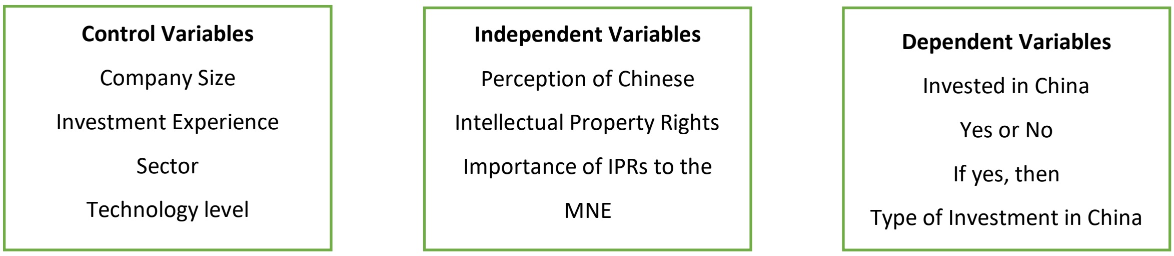
Source: AAPOR, 2016

4.7 Survey Instrument Development and Design

Given the importance of the survey instrument to the validity of the survey data, considerable effort went into ensuring a high response rate while reducing both biases and errors. The following section discusses the development of the survey instrument, the measures considered, and the format developed to achieve the research objectives. The research variables to be measured are set out in Figure 7.

Figure 7

Research Variables



Source: Authors own research.

To ensure effective development of a survey, the author sought to use the guidelines established by Malhotra and Grover (1998) where they detail a series of ideal survey attributes (ISAs) to reduce errors, to maintain validity and to reduce statistical errors. Table 19 sets out the key criteria to ensure the quality of the survey.

Table 19

Malhotra and Grover's (1998) Ideal Survey Attributes (ISA)

Types of Error	ISA	Attribute	Requirement
General	1	Is the unit of analysis clearly defined for the study?	A formal statement defining the unit of analysis was needed for a positive assessment of this attribute. Justification of why that unit of analysis was selected was desirable, though not considered crucial.
	2	Does the instrumentation consistently reflect the unit of analysis?	The items in the questionnaire would need to be set at the same level of aggregation as the unit of analysis.
	3	Is the respondent(s) chosen appropriately for the research question?	The person most knowledgeable at the selected unit of analysis must be the preferred respondent.
	4	Is any form of triangulation used to cross-validate results?	Triangulation was judged to have been considered if more than one respondent belonging to the same unit of analysis filled out the survey questionnaire.
Measurement Error	5	Are multi-item variables assessed?	Multiple items or questions would have to be used. A positive assessment was made of both multi-item, and single-item variables were made in the study.
	6	Is content validity assessed?	Content validity would need to be assessed through prior literature, or opinion of experts who are familiar with the given construct.
	7	Is field-based pretesting of measures performed?	Must be done to clean-up the survey instrument and establish its relevance.

Types of Error	ISA	Attribute	Requirement
Measurement Error	8	Is reliability assessed?	Cronbach's Alpha analysis or test-retest analysis would be required.
	9	Is construct validity assessed?	Construct validity (discriminant/convergent) analysis in the form of exploratory factor analysis; item constructs correlation etc.
	10	Is pilot data used for purifying measures or are existing validated measures adapted?	Constructs and associated items are evaluated by pre-testing before collection of actual data
	11	Are confirmatory methods used?	Confirmatory factor analysis results need to be reported to establish construct validity.
Sampling Error	12	Is the sample frame defined and justified?	A discussion on the sample frame is required.
	13	Is random sampling used?	Sampling procedure (random or stratified) must be discussed.
	14	Is the response rate over 20%?	A formal reporting of the response rate over 20% is required
	15	Is nonresponse bias estimated?	A formal reporting of nonresponse bias is required.
Internal Validity Error	16	Are attempts made to establish internal validity of the findings?	At the very minimum a discussion of results with the objective of establishing cause and effect relationships, elimination of alternative explanations etc.
Statistical conclusion error	17	Is there sufficient statistical power to reduce statistical conclusion error?	A least a sample size of 100 and an item to sample size ratio of more than 5 are required.

Source: Malhotra and Grover (1998, pp.422-424).

Malhotra and Grover (1998) do state that surveys are mainly used to collect quantitative data, but this research uses the survey instrument for both quantitative and qualitative data. However, given the significant triangulation, complementarity and development techniques used through the three research approaches, the author believes that the collection of qualitative data can be effective using the survey instrument.

This research is exploratory in nature (Kerlinger, 1986) as discussed in previous paragraphs, as it is attempting to understand better the drivers for FDI decisions and the impacts of Chinese IPRs on those decisions. This research is concerned with the behaviour of UK MNEs as defined and there is, therefore, a clear statement of the unit of analysis meeting the criteria of **ISA 1**. Every effort was made, within the constraints of the resources available, to ensure the survey was delivered to people of sufficiently high seniority having both knowledge of the investment decisions and an understanding of the corporate drivers for those decisions. The survey reached out to board-level, CEOs and Managing Directors using LinkedIn, identifying the most appropriate respondents from the company. The survey instruments are consistent in asking questions at a company level, thus fulfilling the attributes of **ISAs 2 and 3**. Malhotra and Grover (1998) define triangulation as multiple responses from the same unit of analysis completing the same instrument. Triangulation in the current research is achieved using secondary data and interviews and, therefore, is believed to at least partially meet the requirements of **ISA 4**.

Throughout the development of the survey, the author was cognisant of the need to reduce measurement errors that could be generated by poorly worded questions, the length of the instrument and biases due to the method of collection (ibid). The questions and measurement instruments were checked via a piloting process to ensure they made sense and were coherent. Where possible measurement instruments also made use of known categorisations such as SME turnover and employee number definitions. The variables generally used multi-item responses rather than binary ones as the latter are considered too limiting through uniqueness and can have significant measurement error (Churchill, 1979 p.66). These measures were assessed for validity through references to the literature reviewed and through the pilot testing phase meeting the requirements of **ISAs 5, 6 and 7**. The author also undertook a test-retest methodology (De Vaus, 2002) to ensure the internal validity of the test instrument and produced a reliability coefficient (Cronbach's Alpha) of .762 meeting the requirement of **ISA 8**. While the reliability coefficient was below the standard of 0.8, usually accepted as a good result, the author did consider the time difference between the last available accounts available on the FAME database and the confirmatory questions asked in the survey instrument. The pilot testing also enabled the fine-tuning of the measures within the survey instrument. This ensured the instrument complied with **ISA 9, 10 and 11**.

To avoid sampling errors, it is important to ensure that the sample frame is robust (Fowler, 1984) and contains all the population of UK MNEs and that it does not include companies that do not qualify as MNEs. As previously discussed, the sample frame was drawn from secondary data contained in the FAME business database. While this provides an extensive and comprehensive dataset, it does have inherent limitations including the absence of some data points, and data on charities including educational institutions (that could qualify as MNEs). The author carefully considered rectifying this gap in the data by drawing information from other sources. However, this may have brought with it additional biases and inaccuracies and the particular problem of data not being comparable. These inconsistencies may have skewed the aggregate data by including organisations who may have a non-profit motive to invest in China. On balance, and considering the resource constraints of the research programme, the author decided not to broaden the data collection in this way. This process of defining and justifying the sample frame meets the requirement of **ISA 12**. As discussed earlier in this chapter, the sample was taken from the frame using a stratified random sample and therefore satisfies the requirements of **ISA 13** fully.

Every effort, within the resource constraints, was made to ensure a high response rate, a rate of 44% was achieved meeting the requirement of a minimum response rate of 20% required in **ISA 14**.

The author considered the value of measuring the biases of non-respondents through a further survey of nonrespondents carefully. However, with the availability of time and resources in this research project and the significant amount of secondary data available, it was considered by the author unnecessary to carry out an additional survey. The attributes of non-responders were identified and reported using analysis of the secondary data (Armstrong and Overton, 1977), thus meeting the requirements of **ISA 15.**

To ensure the validity of the findings from the survey, it is important to check the causality between dependent and independent variables and to ensure there is not some confounding variable not evident in the survey design process. To ensure these relationships are valid, the results of the survey were discussed in a series of face-to-face interviews meeting the requirements of **ISA 16**.

Finally, to ensure there is sufficient robustness to the statistical assessment to reduce statistical conclusion error (Straub, 1989), Malhotra and Grover (1998) suggest that a sample size of at least 100 is desirable and given the sample size of this research is 205 it comfortably meets the requirements of **ISA 17**.

The author has attempted to follow best practice throughout the development of the survey cognisant of the fact that errors can accumulate (Malhotra and Grover, 1998). Through careful adherence to the guidance set out by Malhotra and Grover (1998), the author believes that validity, replicability and ultimately confidence in the research methodology has been improved.

As a key strategy to answer the research question is to survey UK MNEs, the survey requires careful construction. Foddy (1994, p.17) puts it well as follows:

> *"The question must be understood by the respondent in the way intended by the researcher and the answer given must be understood by the researcher in the way intended by the respondent."*

This ensures that the survey asks the right questions in the right way to draw the responses required to answer the research question. The construction must also seek to minimise bias and obtain the maximum number of responses. Given that the researcher is not present when the survey instrument is completed, and that given the resource and time constraints there is a single opportunity to gather the data, the construction, testing and validity of the survey is paramount (Dillman, 1978).

To ensure the research instrument was clearly specified the questions were developed using a review of the relevant literature, the developed conceptual framework, internet searches and discussions with academic and business experts. Question construction, ordering and design were also refined as part of the pilot testing process. Each question was developed using the procedures outlined by Gill and Johnson (2010). Particular attention was paid to the focus of the survey instrument to ensure it answered the research questions. The question phrasing was clear and unambiguous to ensure reliable answers. The form of response was crafted to ensure bias was reduced. Question sequencing was managed to reduce hypothesis guessing and to clarify the areas of research being undertaken. Finally, a clear and easy to use instrument was developed. The survey instrument was divided into five sections, namely:

1. Confirmatory Data
2. Foreign Direct Investment Drivers
3. IPR Considerations
4. Investments in China
5. Perceptions of Chinese IPRs

Questions Q1, Q1_a, Q1_b and Q1_c were used by the research instrument to carry-over analytical data from the secondary data for test/retest analysis and were not visible to the participant.

Question Q2 was the first question asked of the participant and asked that they confirm they had read and understood the survey information sheet and gave consent for their data to be used as part of the research study. A negative response at this point closed and finished the survey instrument.

Question Q3 was used as a selection question and asked the respondent to choose if their company mainly operated in the manufacturing, services sectors, or if they carried out both activities. The response to this question led the participant to appropriate questions crafted to meet the needs of the company.

The first section of the instrument confirms the data collected through the FAME database on the company, to ensure that the responses relate to the same company and to gather data on the person completing the survey, see Table 20. This section of the instrument asks the name of the respondent (Question Q4) to enable cross-checking of data at a later stage as the respondent may not have been the person who received the email containing the survey. The email request did allow the initial respondent to choose another or additional respondent from the company if they thought there was a more suitable respondent having read through the research briefing. However, the anonymity of the respondent was again confirmed at this point in the survey through a survey note. Question Q4_a, asked about the respondent's position in the company, to assess the credentials of the respondent to answer the questions. The survey instrument was targeted at senior managers within the organisation who might have knowledge of the MNE’s investment behaviour (Huber and Power, 1985). The respondent was asked to enter the company name (Question 4_c) as a check to the data, to ensure the data received did relate to the company in question.

The respondent was asked to confirm the MNE's turnover (Question Q4_c) given that the data drawn from the FAME database may be out of date. A five-choice answer was offered to the participant. These options were developed from the European Commission's user guide to the SME definition[55]. The range 'up to £500m' was included to measure UK Mid-Sized businesses as defined by the Department of Business Innovation and Skills in 2012[56]. This enables assessment of the outputs of this research in the context of micro, SME, mid-sized and large businesses in the UK context.

Question Q4_d asked about employee numbers again as set out in the EU definition of SMEs, but this time does not have an option for mid-sized businesses as this is not a criterion in the UK Government's definition.

The final question (Question Q4_e) in this section measured R&D intensity, given that this is one area where the FAME database was particularly deficient. Measuring R&D intensity can be complicated, and indeed, Mansfield (1994) only made an assessment based on the broad sector of the respondent. This research uses a measure of the percentage of turnover spent on R&D as a proxy for R&D intensity. The author considered other methods of measuring intensity, however, the relationship between R&D inputs and R&D outputs through patents is established (Griliches 1990; 1998), and there is evidence that R&D inputs give some indication of R&D capabilities (Duysters and Hagedoorn, 2001). The author, therefore, considered R&D expenditure an adequate measure of R&D intensity (Hagedoorn and Cloodt, 2003). The range offered as answers were derived from an interrogation of the secondary data and broken down into four groups: Low, Medium, High and Very High representing 0-5%, 6-10%, 10-25% and over 25% of turnover invested in R&D.

[55] http://ec.europa.eu/DocsRoom/documents/10109/attachments/1/translations/en/renditions/native

[56] https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwiGmdDjmqXTAhUkJcAKHShxDHcQFggqMAE&url=https%3A%2F%2Fwww.gov.uk%2Fgovernment%2Fcollections%2Fmid-sized-businesses&usg=AFQjCNEzJdG8CftFkdzymNwumxhtxVrAVA&sig2=NIJRXtnkzBbstKyLr78ycA&bvm=bv.152479541,d.d24

Table 20

Confirmatory Data - Questions

Question	Question Number	Type of response				
Data storage questions	Q1, Q1_a, Q1_b and Q1_c	N/A not seen by the participant				
Consent	Q2	Yes			No	
Company Type	Q3	Manufacturing	Services			Both manufacturing and services
Name of the person completing the survey	Q4	Text				
Position in the company	Q4_a	Text				
Company Name	Q4_b	Text				
Company Turnover	Q4_c	Up to £2m	Up to £10m	Up to £50m	Up to £500m	Above £500m
Number of Employees	Q4_d	0-9	0-49		50-250	250+
Research and development as a percentage of company turnover	Q4_c	0-5%	6-10%		10-25%	25%+

Source: Authors own work.

The next set of questions considers the MNE's experience with FDI, see Table 21. It starts with a contextual statement underscoring that the following questions relate to the company's investment decisions generally and not to decisions about China alone. This provides a baseline of information regarding motives to compare against their investments in China. The generalisation of the FDI experience, however, is limiting given that the drivers and motives for FDI can change based on the country in which the investment takes place. However, given this is supplemental information to the core research question and the need to limit the size and complexity of the survey, the author considered this as an acceptable compromise.

The first question in this section (Question Q5) sought to understand the general motivations for FDI based on the taxonomy developed by Buckley *et al.* (2007), Dunning (1988) and Makino *et al.* (2002). Each of the main motives was explained in detail to aid understanding of the question and support the validity of answers. Respondents could choose all responses that were relevant to the company. Question Q5_a offered the respondent an opportunity to expand on their response to ‘other’ in a free-text box. This type of open question allows the respondent to answer in his or her own way (Fink, 2012). Given the need to understand the specific ownership advantages of the company (Dunning, 1976) a further text box (Question Q5_b) was placed at this point asking the respondent to describe the core products and services of the company concerned. Question Q6_1 sought to identify the imitability of the MNE’s products and services, asking the respondents to rank imitability as either low, medium or high (Zhao, 2006). This type of closed or forced question seeks to push the respondent to choose from the options available to categorise the response (De Vaus, 2013). Question Q6_a aimed to understand the nature of investment using the descriptions set out by Markusen (1984), Helpman (1984) and Giroud and Mirza (2015). Again, a brief but illuminating description of these options is supplied to support understanding of the question. Question Q6_a_i provided an additional free text box again enabling an expansion should the company have selected ‘Other’.

Questions Q6_a_ii_1, 2, 3, 4 and 5 looked at the specifics of investments and draws directly from the work of Mansfield (1994). This question not only gives data on the MNE’s FDI record, but it also starts to familiarise the respondent with the types of FDI definitions that will be used to understand the impacts of IPRs. However, Mansfield’s question/answer formulation is deficient for this research as it only considers the investments of manufacturing companies. As highlighted in Chapter Two services make up a significant proportion of investments overseas, in addition to the development of the concept of ‘servicisation’ of manufacturing where manufactured products are sold as a service rather than as a stand-alone item (Quinn *et al.,* 1990, p.79). To ensure the questions applied to the services sectors the author supplemented the work of Mansfield by the reformulation of the questions using additional information from Markusen (2005) and Howells (2000) whom both considered the nature of services industries. The question development is set out in Table 22.

Table 21

Foreign Direct Investment Drivers - Questions

Question		Question Number	Type of response				
Drivers for FDI		Q5	Resource seeking	Market Seeking	Efficiency Seeking	Strategic Asset Seeking	Other reason
Description of Other from the previous question		Q5_a	Free TextBox				
Please detail your company's key products and services		Q5_b	Free TextBox				
How easy are your products or services to copy or imitate		Q6_1	Very Easy	Moderate	Very Difficult		
General type of FDI undertaken		Q6_a	Horizontal	Vertical	Global Value Chain	Other	
Description of Other from the previous question		Q6_a_i	Free TextBox				
Types of FDI engaged in							
M1	Type of company dependent	Q6_a_ii_1	Never	Sometimes	Regularly		
M2		Q6_a_ii_2					
M3		Q6_a_ii_3					
M4		Q6_a_ii_4					
M5		Q6_a_ii_5					

Source: Author's own work

Table 22

Development of Mansfield's FDI Types to Include Services

Question code	Original formulation by Mansfield, 1994	Additional requirements for service industries	New formulation
Survey split	**Manufacturing**	**Services**	**Both Manufacturing and Services**
M1	Sales and Distribution	Marketing of services and products	Sales, marketing and distribution of goods and or services
M2	Rudimentary production and assembly	The intra-firm trade of services (offshoring). (Markusen, 2005)	Rudimentary production and assembly, services to current clients and intra-firm services.
M3	Facilities to manufacture components	Services to indigenous companies (Markusen, 2005)	Facilities to manufacture components and or services to indigenous companies.
M4	Facilities to manufacture complete products.	Full-service provision (Markusen, 2005)	Facilities to manufacture complete products and or full-service provision.
M5	Research and Development Facilities	Service development including the positioning of core senior staff in the country (Howells, 2000)	Research and development facilities and or service development, including positioning of some core senior staff.

Source: Mansfield, 1994; Markusen, 2005; Howells, 2000; and Author's own work

The next section of the survey considered IPRs and how they impact MNEs (see Table 23). It asked several questions about the importance of IPRs based on the destination and type of FDI (Questions Q7_1_a, Q7_2_a and Q7_3_a). Location questions were broken down into three groupings by development levels; most developed, developing and least developed. The countries chosen to illustrate these levels are taken from the upper, middle and lower tertile of the revised Ginarte and Park index produced by Park (2008b) see Appendix 2. The countries selected also fall into the UN development definitions[57] linked to most developed, developing and least-developed status.

[57] Country classifications taken from the World Economic Situation and Prospects (WESP) country classification report 2014 at http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf Last seen August 2017

Table 23

Countries used to Describe IPR Development Levels

First Tertile	Second Tertile	Third Tertile
Most developed	**Developing**	**Least Developed**
United States United Kingdom Australia New Zealand	India Brazil Malaysia Kenya Saudi Arabia	Angola Nepal Tanzania The Gambia

Source: Author's work

The author purposefully did not include China, (which sits in the first 'most developed' tertile) in the illustration of development, as the perception of the level of IPR development in China was tested later in the survey instrument. The second set of questions (Questions Q7_a_ (1 through 5)_a) again used the revised investment types (M1-M5, adjusted for company type) to understand the importance of IPRs to these particular types of investment.

To compare the importance of IPRs to other FDI drivers, nine questions (Questions Q8_(1 through 9)_a) asked about the significance of IPRs compared to market size, market growth, financial incentives, access to infrastructure, availability of human capital, cost of human capital, corruption and stability, cultural closeness, and exchange rate stability.

Table 24

Intellectual Property Rights Considerations - Questions

Question		Question Number	Type of response			
How important are the Intellectual Property Right protections in a country when making the following choices?			Not important	Some consideration given	Of major concern	
Destination of FDI						
Developed		Q7_1_a				
Developing		Q7_2_a				
Least Developed		Q7_3_a				
Type of FDI						
M1	Type of company dependent	Q7_a_1_a				
M2		Q7_a_2_a				
M3		Q7_a_3_a				
M4		Q7_a_4_a				
M5		Q7_a_5_a				
How important is a country's intellectual property protection strength relative to other factors influencing your company's investment decisions?						
Factors			Very Important	Equally Important	Less Important	Don't know
Market size		Q8_1_a				
Market Growth		Q8_2_a				
Financial Incentives		Q8_3_a				
Access to Infrastructure		Q8_4_a				
Availability of Human Capital		Q8_5_a				
Cost of Human Capital		Q8_6_a				
Corruption/Political Stability		Q8_7_a				
Cultural closeness		Q8_8_a				
Exchange Rate Stability		Q8_9_a				

Source: Author's work.

The penultimate section of questions concentrated on the MNE's investments and trade with China. Firstly, it asked questions about the MNE's exports and licensing (see Table 25 Questions Q9 and Q10). Question Q11 asked the respondents how they would characterise the social and business culture in China compared to what one might find in the UK. Question Q12 was used as a filter question to identify companies that have a subsidiary in China (Dillman *et al*., 2014). If the answer to this question was negative, this section finished at this point. If positive, the instrument considered the ownership structure (Questions Q13_1_a and Q13_2_a), the company's investment experience (Question Q13_a) in China, the type of investment undertaken (Question Q13_b) and if R&D was undertaken in China and the nature of that R&D (Question Q13_c).

Table 25

Investments in China - Questions

Question	Question Number	Type of response				
Do you export to China?	Q9	Yes		No	Don't Know	
Do you make products under licence in China?	Q10	Yes		No	Don't Know	
How would you characterise the social and business culture prevalent in China	Q11	Similar to the UK		Different to the UK	Very different to the UK	
Do you have a subsidiary in China (at least 10% ownership)	Q12	Yes		No	Don't Know	
Do you have a subsidiary as a joint venture with a Chinese company	Q13_1_a	Yes		No	Don't Know	
Do you have a subsidiary that is a WFOE or partnership with another foreign company	Q13_2_a	Yes		No	Don't Know	
How many subsidiaries do you have in China	Q13_a	1	2-5	6-10	10-49	50+
Type of FDI in China (check all that apply)	Q13_b	M1	M2	M3	M4	M5
		Adjusted for company type				
R+D	Q13_c	Is R&D carried out in China reliant of R&D carried out in other parts of the world			Is the R&D standalone products or services	

Source: Author's work.

The final section considered the perceptions of IPRs in China using the question technique employed by Mansfield (1994) of relating the confidence in IPRs to the willingness to deploy differing levels of knowledge capital into China (see Table 26, Question Q14). However, to enable a more in-depth examination of the perceptions of IPRs, the questions used by Mansfield have been built into a 5-step Likert scale similar to the work of Shi, Pray and Zhang (2012) who used a 7-point scale. The author chose a simpler, more descriptive 5-point scale to focus the respondent's answers more effectively. In this set of questions, the respondent could provide a direct response to the main research question through a free-form text box. These responses provided useful background information, capture information not gathered by the other questions and form a basis for further exploration within the interview phase of the research. Questions Q14_b_(1 through 3)_a, gauged the MNE's engagement with the Chinese IPR system by asking about the number of times various forms of IPR had been registered in China. While these questions sat outside of the core research question, the author considered the information gathered through this set of questions useful to illuminate the behaviours of UK MNEs who had invested in China. Questions Q14_c, Q14_c_i and Q14_c_ii asked the same questions posed by Mansfield (1994) about the quality of China's intellectual property rights to set up joint ventures, a wholly foreign-owned subsidiary or to licence products and services in China. Question Q14_d, e and f asked the respondent about the ability for China's IP laws, legal structures and agencies to protect the firm's technology. Question Q15 asked if the company had products or services copied or imitated in China and Question Q16 if these products or services were protected in China through IPRs.

Table 26

Perceptions of Chinese IPRs - Questions

Question	**Question Number**	**Type of response**				
How would you describe IPR protection in China?	Q14	Very poor	Acceptable for non-critical items	Acceptable for general items	Good in some areas	Would be comfortable with business-critical items
How do Chinese IPRs impact your investment decisions into China	Q14_a	Text				
Has your company filed for the following in China Patents Trademarks Copyrights	Q14_b_1_a Q14_b_2_a Q14_b_3_a	Never	1-5 times	More than 6 times	Don't Know	

Question	Question Number	Type of response		Question		Question Number
Are intellectual property rights in China too weak to set up a joint venture with a Chinese partner?	Q14_c	Yes		No		Don't Know
Are intellectual property rights in China too weak to transfer the newest or most effective technology to a company in China?	Q14_c_i	Yes		No		Don't Know
Are Chinese Intellectual property rights too weak to licence the newest or most effective technology to a company in China?	Q14_c_ii	Yes		No		Don't Know
Can China's intellectual property laws protect the technology of your company?	Q14_d	Yes		No		Don't Know
Are their adequate legal structures in China to protect your intellectual property?	Q14_e	Yes		No		Don't Know
Do the relevant agencies in China effectively enforce the intellectual property laws and provide prompt and equitable treatment of foreign firms?	Q14_f	Yes		No		Don't Know
Have your company's product or services been copied or imitated in China?	Q15	Yes		No		Don't Know`
Was this product or service protected by China's intellectual property laws?	Q16	Patent	Trademark	Copyright	Another form of IPR	Don't Know

Source: Author's work.

Finally, the respondent was asked if he or she would be available for follow-up research and if affirmative to enter their email address to confirm.

4.8 Pilot Testing

Before the instrument could be used it was necessary to pilot test the questions with a small group to ensure it made sense and answered the research questions (Saunders and Lewis, 2012; Malhotra and Grover, 1998). Fink (2012) suggests that an appropriate number of pilot tests for research of this nature is at least ten tests with companies and academics experienced with surveys of this type. A total of 14 pilot tests were undertaken. Each participant was asked to complete the survey instrument, asked for feedback on how long it took to complete, clarity of instructions, any ambiguous questions, if any questions made them feel uneasy, major topic omissions, the layout and any other comments (Bell, 2014). This feedback led to changes in the format of the questions and answers and some re-ordering of questions. Feedback from the participants indicated that the instrument was adequately designed and would obtain the data necessary to answer the research question. This process met the requirements of ISA 7 (pre-testing) and ISA 10 (pilot-testing) (Malhotra and Grover, 1998).

The pilot testing produced several changes to the format of the survey. The critical change was that a senior manager form a service-based company indicated that the questions that offered a combined response from either a service or manufacturing company were confusing. This led the researcher to create three surveys one for manufacturing companies, one for service companies and one that covered companies that undertook both manufacturing and services. This was done by splitting out the descriptions from the original survey into those relevant to manufacturing and services. However, the three survey instruments asked the same questions in the same order with slightly different descriptions based on the type of company. A sifting question (Question Q3) was added to the start of the survey and then dependent on this answer, the participant was directed to the appropriate survey. See Table 27 for the details of each of the 14 pilot tests.

Table 27

Results of 14 Pilot Tests.

Pilot Test	Problem Identified	Changes Made
1	Use of the participant information sheet – The pilot suggested a full copy of the survey would be useful to participant in advance of the survey.	Re worded and put on a complete page at the start of the survey. PDF also made to be able to send directly to participants. A copy of the whole survey to be made available
2	No comments	
3	Some difficulty in understanding questions for Service Companies	The survey was split into three different surveys; for manufacturers, service companies and those companies both deliver services and manufacture goods.
4	No comments satisfied with the survey	
5	Some small changes to punctuation and spelling	Modifications made to Q5, Q11 and Q14_e
6	Broken Questions Q6_1 and Q6_a	The pilot tester was able to disrupt the survey at this point by giving a false answer. This was a design error, and the whole survey was retested to ensure each question operated effectively
7	No comments satisfied with the survey	
8	Colours not working correctly on a mobile telephone	Colours changed for the final survey, internally tested
9	No comments requiring a change	
10	Survey worked on a mobile phone	
11	Survey worked on a PC	
13	Survey worked on an iPad	
14	Final review of the survey thoroughly tested with all the in-survey information checked – all OK	

Further small changes from the pilot testing included wording, format and grouping suggestions that were incorporated into the final survey. See Appendix 4 for the complete survey.

4.9 Coding

Coding is used to represent categories and values of the variables to support the statistical analysis and ensure data is manageable by grouping responses (De Vaus, 2002). Although the data used in this thesis sits at the company/organisation level and does not include personal information on individuals, it nevertheless contains some information of a business-sensitive nature. As discussed later in the section relating to ethical considerations, the author afforded the participants anonymity, including data relating to their company (Gringer, 2002). To achieve this, each company was given a unique identifier based on the following format:

Table 28

Coding development for MNEs

Random Number – 4 digits generated by Excel	**China Investor – an indicator if the company has invested in China or not**	**Sector – 2-digit sector code taken from 6 digit SIC**	**Random Number – 4 digits generated by Excel**
RRRR	Y or N	SS	RRRR

Where there are possible multiple answers to questions (such as "choose all options that apply"), a multi-dichotomy approach was used to coding giving every possible answer its own variable (De Vaus, 2002, pp.12-13).

Nonresponses to answers were coded as 'xxx' to identify them within the dataset. It is generally accepted that a respondent should be given the opportunity to say that they do not know a specific answer rather than forcing them to guess a response if they are unclear (Foddy, 1994). For this research, a non-response has been treated as missing data as this is considered the 'safest' method (De Vaus, 2002, p.73).

4.10 Strategies used to Maximise Response Rate

Achieving a high response rate to the instrument was essential to ensure the validity of the data, to reduce bias and to be able to make acceptable, credible and robust generalisations from the data (Groves and Peytcheva, 2008; Rogelberg and Stanton, 2007). Once the survey participants had been identified, the survey instrument was sent within seven days to the potential respondent. The covering letter to the instrument (transmitted by email) was carefully constructed to look professional (Sappleton and Lourenço, 2016). It set out the purpose of the research, the length of the instrument and explained that the results would remain anonymous (Saunders *et al.*, 2016). The covering email contained a link to the instrument that was specific to the company concerned as this allowed data from the survey instrument to be linked to the secondary data drawn from the FAME database. It also reduced the size of the research instrument as data did not have to be collected twice. Each email was sent individually to guard against the email being filtered out as spam. Distribution of the survey instrument by email was considered acceptable, given the likelihood that respondents would be IT Literate and have access to suitable devices to complete the survey effectively (Saunders, 2012). Grid questions were made available to respondents as separate questions to support the use of screen readers.

While a range of techniques have been tested to improve response rates from companies, only follow-ups and monetary inducements have proved effective (Jobber and O'Reilly, 1996; Kanuk and Berenson, 1975). The author did not consider it appropriate to offer a financial incentive for a survey of this nature and indeed believed this might have reduced the response rate as it may have complicated the process. Therefore, follow-up emails were employed as the primary method of inducing a response. Company responses were monitored, and on completion, the respondent was sent a 'thank you' email, which, again, explained the respondent's right to withdraw from the research and how to do this. Those who had not responded within two weeks were sent a follow-up email requesting a response and again at bi-weekly intervals up to a maximum of five times. This message was sent through the Bristol Online Survey tool.

The survey instrument was created using Bristol Online Surveys, the survey tool sanctioned for use by Coventry University. It enabled the author to produce individualised surveys using the URL generator function that allowed data from each survey to be merged with the secondary data. The author concentrated on ensuring the instrument was both as short as possible to ensure respondents were not deterred (Tull and Hawkins, 1990) and had a pleasing, professional appearance (Hoinville and Jowell, 1978). The survey instrument was also available to complete on multiple platforms such as PC, MAC, IPad or mobile telephone; to maximise the response rate (Saunders and Lewis, 2012). The response rate achieved was 44% which ranks favourably with data produced by Baruch and Holtom (2008) who studies response rates in 1,607 studies between 2000 and 2005 in 17 refereed academic journals and found that an average response rate of 35.7% for organisations with a standard deviation of 18.8.

4.11 Respondents' Profiling

LinkedIn was used to target only those participants with the requisite knowledge to complete the survey. Responses were received from 207 executives broken down as follows (see Table 29):

Table 29

Survey Respondents

Business Development Directors	12
Directors (other including MD)	54
CEO	68
Chief Commercial Officer	2
Founder/Owner	9
Board Chair	15
Chief Digital Officer	1
Chief Financial Officer	3
Chief Operating Officer	4
Company Secretary	1
Director Global Strategy or equivalent	8
President	4
Senior/Vice President	9
General Manager	5
International Director	5
Director Mergers and Acquisitions	1
Director Legal	2
Partner/Principal	4
	207

Source: Authors own work.

4.12 Analysis of Non-Respondents

From the 464 survey instruments that were delivered 207 received responses and 257 were not completed. To meet the requirements of ISA 15, one is required to report non-response bias. Resurveying the non-respondents was not considered an effective use of time nor a potentially fruitful exercise. However, a set of independent sample t-tests were carried out to compare the means of each group (respondents and non-respondents) to identify if there was a significant difference across the variables 'Operating Revenue', 'Latest Number of Employees' and 'Number of Recorded Subsidiaries' all data taken from the FAME database. Table 30 shows that in every case, the null hypothesis remains valid. The sample of respondents and non-respondent had statistically similar means across all three variables. This would suggest that there was no non-respondent bias within this research given the those who did not respond were broadly the same as those that did.

Table 30

Independent T-test Results for Respondents and Non-respondents

	Non-Participant		Participant				
Variable	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	**t**	**df**	**p**
Operating Revenue	2.74	1.529	2.69	1.515	.302	464	.763
Latest Number of Employees	4568.07	36214.711	2815.29	13858.005	.598	389	.550
Number of Recorded Subsidiaries	268	26.98	198	22.78	.557	464	.578

4.13 Interviews

The purpose of interviewing a selection of participants allows the researcher, through qualitative enquiry, to get closer to the phenomenon being studied (Lieber, 2009). The objective of the interviews was to generate rich data from a subset of survey respondents to gain a deeper perspective (Oun and Bach, 2014). The interviews enabled broad questions to be discussed and for the interviewer to probe on specific areas of interest to the research topic. To ensure the right participants, were selected to answer the research questions, a purposive sample was drawn from the survey population (Lieber, 2009), see Table 31.

Table 31

Selection of Interview Participants from Subcategories of Survey Participants

Grouping	Number in Sub Population	Random Sample (participant coded)
Companies invested in China but not invested from FAME data	55	5476N646175 7879N454365 1217N6922 3793N54231 3528N103122
High-tech Companies	41	1116N695628 4763N583477 8903N582931 6327N368071 2429N644668
High-tech manufacturing companies	5	5465N105022 4439N104117 7368N696562 6327N368071 1116N695628
Service Companies	97	1377N13458 6295Y45736 7879N454365

		1226N775777 8491N692279
Invested in China	69	7751Y1040 4266Y642049 3528N103122 6261N58626 2802N103037
Small companies	40	3362N495867 4930N645847 9028N775597 3133N587999 7447N684127
Vertical R&D in China	20	2452N642712 8491N692279 1217N6922 1660Y107186 1105N947604
Horizontal R&D in China	7	4083N942616 5900Y691644 8426N582429 5402Y10311 2452N642712

Duplicate random selections highlighted

From within each subsample, a random sample was drawn of potential participants. This sample produced some duplicate companies (highlighted in Table 31). The first two respondents in each subgroup were approached. If the participant had either not agreed to participate in the interviews, or rejected the approach, then the next potential interviewee was approached. Duplicate participants were only approached once.

Each participant was approached through an email, offered either a face to face or telephone-based interview and sent details of the interview participation information sheet and consent form. Those who accepted were then followed up and a suitable date, time and venue were arranged to undertake an interview. Four interviews were undertaken face to face, and five interviews were conducted over the telephone.

One of the main advantages of interviews is that they allow clarification of issues through a broader and less structured conversation on the topic concerned (May, 2011). Saunders *et al.* (2016) describe an interview as a purposeful conversation between two people, which considers broader themes and can be exploratory, explanatory and/or evolvative in nature. Of course, the utility of interviews depends on the participant, their coverage of the subject under review and the quality of responses (Alvesson and Ashcraft, 2012).

The themes for the interview were derived from several sources, including the literature review, responses to primary data collection (survey) and secondary data. In each case, the interviews probed the data already gathered and more general issues raised from the literature to understand the phenomenon (Patton, 2015). Participants were chosen based on the coverage they gave to the key questions being discussed. Where there were information gaps from the literature reviews and surveys, participants were selected to fill these gaps specifically. In all nine interviews were undertaken. While this number is not within the total of 15-60 interviewee norm described by Saunders and Townsend (2016), this number did ensure that the research purpose was met, and the epistemological and ontological positions fulfilled (ibid). While Saunders and Townsend do estimate that 50 participants would be a credible number for research covering many organisations, the author took into consideration the resources available for this research and the fact that the interviews were only one part of a three-part research process.

Interview preparation included a web search for each participant and their company in addition to the data already known from the secondary and primary data collections. An interview guide (see Table 32) was prepared drawing on the data available that set out the key themes to be covered. Each interview also included some confirmatory questions to check the understanding of the survey instrument.

The interview included the presentation of a graphic (see Figure 50 on page 268) pre-prepared by the researcher (Prosser and Loxley, 2008). This method of graphic elicitation was chosen to present the quality of IPR laws on a continuum from strongest (USA) through to the weakest (Myanmar) based on the Park Index of International Patent Protection 2005, (Park, 2008b). The respondent was asked to place China on this continuum to assess the perception of China's IPR laws. The researcher noted the place on the continuum and then revealed China's actual position. This provided an additional measure of the subject's perceptions of Chinese IPRs and provided a basis for further discussion on the phenomenon (Crilly *et al*., 2006). Enough flexibility was maintained within the interview to be able to explore issues in more depth to gain a rich description of the business behaviours of interest (Geertz, 1973).

For face to face interviews, a location was chosen that was convenient for the participant, and this ranged from a private room in Coventry University to interviews that took place in the participant's business (Saunders *et al.,* 2016).

Table 32

Interview Guide

Semi-structured interview	
Confirmatory question:	Could you give me an overview of your business, including its international reach? Describe your company's international strategy What are the reasons for investing abroad?
Tell me about your experience in China	Type of investment What activities do you undertake in China? What R&D do you undertake in China?
What is R&D used for in your business?	New products, protection of ideas products etc.
How important are IPRs to your business?	
Where would you place China on this continuum from Countries with the strongest IPRs to those with the weakest? To what extent do you think the laws, legal structures, and enforcement can protect your IP in China?	*[show graphic]*
How do Chinese IPRs impact your investment decisions?	

Each participant was asked to complete a 'consent form' before the interview that set out the nature of the research, explained that participation was voluntary and that any quotes used in the research would be anonymised. Each participant was asked to agree to the recording of the conversation, which was undertaken using a digital voice recorder. See Appendix 8 for the interview consent form used in this research.

See Table 33 for the profile of each company interviewed and the identifier used in Chapter Six to link comments to the specific companies. All participants were board-level employees of the company with knowledge of the company's international operations.

Table 33

Profile of Interview Respondents

Identifier	Activity Type	Sector	Parameters [Turnover, Employees, R&D as a Percentage of Turnover]	Description
SY1	Services	Financial and Insurance Services	£50-£500m >250 0-5% R&D	Financial services company with a subsidiary in China
SN1	Services	Financial and Insurance Services	£10-£50m >250 6-10% R&D	A trading company without a subsidiary in China
BN1	Both manufacturing and delivering services	Agriculture, Forestry and Fishing	£50-£500m >250 10-25% R&D	Biotechnology company without a subsidiary in China
SN2	Services	Information and Communications	£50-£500m 50-250 10-25% R&D	Information and communications company without a subsidiary in China
BY1	Both manufacturing and delivering services	Manufacturing	>£500m >250 6-10% R&D	Manufacturing and services company with several subsidiaries in China
MY1	Manufacturing	Manufacturing	£50-£500m >250 6-10% R&D	A manufacturing company with a Chinese subsidiary
MN1	Manufacturing	Other service activities	>500m >250 0-5% R&D	A manufacturing company without a Chinese subsidiary
BY2	Both manufacturing and delivering services	Manufacturing	£50-£500m >250 6-10% R&D	A manufacturing company with a subsidiary in China
SY2	Services	Professional, scientific and technical services	>£500m >250 0-5% R&D	Services company in the professional services sector with many subsidiaries in China

Each interview was recorded and then transcribed into NVivo. The interviews lasted between 35 and 55 minutes. In total 432 minutes of recording was generated. In targeting interview participants, coverage of companies were sought that were invested in China and those that had not, plus a cross-section of company types, sizes and R&D intensities. Table 34 details the distribution of interview participants.

Table 34

Distribution of Interview Participants

	Manufacturing	**Services**	**Both deliver services and manufacture products**
Invested in China	MY1	SY1, SY2	BY1, BY2
Not invested in China	MN1	SN1, SN2	BN1

4.14 Reliability, Validity, Replicability and Objectivity

Validity considers whether the tools being used are the correct ones to measure what is being considered in the research. Reliability considers if the tool measures the right things consistently (De Vaus, 2002). To ensure reliability, the test-retest method was employed during the pilot stage of the design of the survey instrument (Saunders and Lewis, 2012). This test and retest method were used to reduce both participant and researcher errors and bias. Similar questions were also asked across the various research instruments providing for level or parallel-form reliability checking (Sekaran and Bougie, 2013). To ensure content validity, the survey instrument was tested with potential respondents and academic experts with experience in this field.

The survey was undertaken as a snapshot in time. It was carried out broadly simultaneously with all participants to reduce the chance of a change in the external environment impacting on the validity of the responses. While the respondents were given an overview of the research topic, they were not given details of the full research question to reduce the chance of testing bias (Saunders *et al.,* 2016).

Replicability is '*a hallmark of scientific research'* (Sekaran and Bougie, 2013, p.21). Given the data are drawn from FAME, a publicly available database, and the survey instrument is detailed in this thesis, the research conducted, except the interviews, should be readily replicable.

At all times, the author sought to remain objective throughout the implementation of this research. All data collected have been reported without interpretation. Only the analysis of the data and the relevant literature contains the views of the researcher.

Much research methodology literature highlights the problems with the validity and reliability of interviews. Many of these issues relate to the relatively small numbers of interviews undertaken, the involvement of the interviewer in the process, and the replicability of interviews (Lecompte and Goetz, 1982). These concerns lead to problems in drawing generalisable analysis from interviews and is a particular concern with heterogenic samples (Bryman, 2016). These issues about the use of interviewing to gain qualitative insight are valid and were considered carefully in designing this research. Given this is a mixed methodology research design, the researcher considered the lack of generalisability a reasonable trade-off to get a deeper insight into the behaviour of businesses (Lofland and Lofland, 1995).

The questioning in the interviews was open and attempted to lead the participant into discussing specific topics without leading them towards specific answers (Guba and Lincoln, 1994). By taking a random sample within a purposive sample, the research sought to interview people with varied viewpoints who were representative of different types, sizes and activities of companies.

4.15 Ethical Considerations

This research project received ethical approval from Coventry University's Research Ethics Committee (see Appendix 5). In setting the ethical framework for this research, the author drew on the EPSRC Framework for research ethics (2015)[58] , which sets out six fundamental principles of ethical research, namely:

- Research participation should be voluntary.
- Research should have a value that outweighs any risk or harm to participants.
- Participants should be given appropriate information about the purpose, methods and intended uses of the research.
- Research participant anonymity preferences should be respected.

[58] EPSRC Framework for research ethics (2015): see https://esrc.ukri.org/files/funding/guidance-for-applicants/esrc-framework-for-research-ethics-2015/ last downloaded July 2019.

- Research should be designed, reviewed and undertaken with integrity.
- The independence of the research should be clear, and any conflicts of interest or partiality explicit.

Participation in both the survey and interviews was voluntary. All participants were given information on the nature of the research, the time required to participate, and the research purpose. Participants had the right to withdraw at any point within a reasonable timescale after participation (a cooling-off period) to enable an analysis of the data and completion of the thesis. Each participant was asked to sign an informed consent in person or electronically. Although the nature of the research related to business decisions and was, therefore, unlikely to cause harm or distress to the participant, the promise and maintenance of strict participant and company anonymity was maintained.

There were no conflicts of interest throughout the collection of data. Each participant was informed that the research was neither funded nor supported by an external body.

Throughout the interview stage, every effort was taken to ensure that participants did not feel pressured to answer any questions nor to answer in any specific way.

The researcher considered issues of safety in carrying out interviews in the offices of the participants. The researcher has, outside of this research, many experiences in meeting business people in their place of work. Each meeting was diarised to ensure the researcher’s whereabouts were known. All the interviews took place in the UK. Given the researcher's experience and the relative dangers of interviewing senior business people, the risks were considered minimal.

Coding of data was used to ensure that data could not be easily attributable to either the companies or the respondents. The data was stored on University issued computer systems and protected by passwords and encryption. Only the author was able to connect data to companies or respondents readily and ensured the anonymity of both was maintained throughout.

The comments from interviews are used *ad verbatim* in the analysis and discussion chapters but have been anonymised by the author. All data collected will be destroyed after three years following completion of this thesis and subsequent production of any follow-on academic papers.

4.16 Methodological Limitations and Issues Encountered

There were some methodological limitations within this research. The data drawn from the FAME database was deficient in several ways. In particular, the recording of data for R&D as a percentage of turnover was unreliable, with much of the data missing and other data, recorded as either positive or negative figures. This led the researcher to discount this part of the data from the final analysis. Contact details from the FAME database were also deficient, and the method of contacting people within the sample frame impossible using these data. The FAME data also included companies that had either ceased trading or closed entirely and therefore; an additional choice was required to be made from the population to identify suitable respondents. It was also found that companies had multiple registrations, and therefore, the sample population needed additional manipulation to remove these companies where necessary. Because the research took data that was the last published (for instance, turnover), there was not a coherent list of comparable data with the same or very similar dates. However, the researcher believed this was a sensible compromise to make within the parameters of the research programme.

While the 44% response rate to the survey was considered acceptable, it did mean that compromises needed to be made in generalising from the data collected. It proved possible to generalise across the whole survey population, by company size (turnover and employee numbers), company type and R&D intensity but not by individual sector. Limitations in the length of the survey instrument driven by needing to balance data collection with the cost of completion for the participants meant that data could only be collected that was of direct relevance to answering the research questions. For example, additional questions relating to broader behaviours or longitudinal data would have provided additional information further illuminating the phenomenon.

The interviews proved helpful in drawing rich data from participants, but the time involved in undertaking the interviews and analysing the data was significant. The researcher took a pragmatic approach to balance the desire for more data and the need to stay within the time available for the research. Thus, a limited number of interviews were undertaken, and the diversity of the companies investigated reduced, but sufficient given the breadth of other data available to meet the needs of the research questions.

4.17 Statistical Tools used for Quantitative Analysis of Survey and Secondary Data

Throughout the analysis of data in this thesis, a series of statistical tools were used (Rumsey, 2015; Pedace, 2013). These included a set of Pearson's product-moment correlations used to assess the relationship between different aspects of the secondary data drawn from FAME. These correlations produce a value between +1 and -1, where 1 is the total positive linear correlation, 0 is no linear correlation, and -1 is a total negative correlation. To carry out similar correlations with the non-parametric survey data, the researcher used a series of Spearman's rank correlations to assess monotonic relationships (whether linear or not). A Spearman's correlation of either +1 or -1 occurs when each of the variables is a monotone function of the other.

To carry out statistical hypothesis testing, p-values or probability values were calculated. To assess the probability of the outcome, a standard p-value of $p<0.05$ was used, and the relevant p-values are detailed in each instance.

To compare different responses to similar questions from different participants, the researcher used standardised scores or z-scores, which plot the results against a normal distribution normalising the results for easier comparison.

Within this research, an Eta and Eta squared measure has been used to measure the proportion of variance in a dependent variable that is derived by the independent variable.

Throughout the analysis of the primary data, histograms were used to assess the distribution of data. Appendix 7 details a number of additional distributions of the data for reasons of transparency.

In tables for example Table 46, Table 47 and Table 59 a colour heatmap is superimposed on the data to show the intensity of the particular finding with darker green indicating a higher positive intensity and darker red a higher negative intensity with white indicating a neutral intensity.

A chi-squared test was used to check data between the primary and secondary data sets to determine whether there is a significant difference between the expected frequencies and observed frequencies. Likewise, a t-test was used to determine if there was a substantial difference between the means of samples from the secondary and primary data. Finally, to assess the validity of data, a Cronbach's (alpha) test is used to determine if the survey population is an accurate representation of the total population drawn from FAME.

The statistical software platform used in the analysis of data in this thesis was IBM SPSS with some basic analysis and graphing undertaken in Microsoft Excel.

4.18 The use of CAQDAS in Data Analysis

To make sense of vast amounts of qualitative data produced from interviews, it was important to have effective mechanisms to code, categorise, label and allocate units of meaning (Basit, 2003). Within this research, it was essential to be able to understand complex decisions and be able to connect these decisions with data retrieved from the qualitative study. Therefore, the use of a CAQDAS (Computer-assisted qualitative data analysis software) was considered an appropriate tool for the analysis of the qualitative data. The software package NVivo12 Plus produced by QSR International is both an industry standard and preferred package of Coventry University and so was chosen for this thesis.

Concerns in the academic literature on the use of CAQDAS include the driving of qualitative data into the realms of quantitative analysis, thus undermining the inferential or descriptive nature of the data (Hesse-Biber, 1996). Other concerns include the fragmentation of data through coding and categorising impacting on the narrative richness of data which has been decontextualized (Fielding and Lee, 1998). Benefits of using CAQDAS include the utility and efficiency of using computer-aided support, and the addition of a replicable, describable and therefore more transparent methodologies (Mangabeira, 1995). Appendix 9 sets out the process of analysing the qualitative data produced through the interviews in NVivo, including the coding template and examples of participants quotes.

Chapter Five: Analysis of Results from the Secondary (FAME) and Primary (Survey) Data

5.1 Chapter Overview

This chapter analyses the data collected from the FAME database and the survey of UK MNEs to answer the research questions and sub-questions set out in the conceptual framework (see Figure 5). These data are analysed through the lens of the Eclectic Paradigm (Dunning, 1997), leading to the consideration of investment decisions through the three company advantages of ownership, location and internalisation.

The chapter is structured as follows. Section 5.2 reviews the secondary data drawn from the FAME database and describes the nature and distribution of UK MNEs. Section 5.3 analyses the primary data obtained from the survey to understand the distribution and frequencies of this data and the similarities and differences between the surveyed data and secondary data. Section 5.4 considers the ownership advantages identified in the survey data. Section 5.5 analyses the location advantages important to UK MNEs, including those advantages relating to China. It considers the motivation for FDI and the impacts of the perceptions of IPRs on the location decisions of UK MNEs. Section 5.6 discusses the internalisation behaviour of UK MNEs and how this is realised in the context of China. Finally, section 5.7 brings the analysis of this chapter together by identifying the key outcomes of the research and the opportunities for further exploration through a series of follow-up interviews.

5.2 Secondary Data

The data collected from the FAME database contained 9,339 companies registered in the UK with an overseas subsidiary with at least 10% ownership[59]. However, many companies had multiple company listings (for example Holdco 1, Holdco 2, etc.) and while these companies have separate company registrations, they were often devoid of data on turnover, staff, etc. To 'clean' the data of these companies, a search was carried out on the company websites listed, and this produced 1,290 duplicates which were removed from the database leaving a final population of 8,049 companies.

[59] See the OECD Benchmark Definition of Foreign Direct Investment (fourth edition, 2008) at: https://www.oecd.org/daf/inv/investmentstatisticsandanalysis/40193734.pdf

The distribution of companies by sector is set out, in Table 35. The largest three sectors for UK companies with overseas subsidiaries are: ‘Professional, scientific and technical services’; ‘Manufacturing’; and ‘Financial and insurance services’.

To understand the experience of UK companies’ overseas investments, one can consider the mean number of overseas subsidiaries by sector. These data show that the greatest mean number of subsidiaries held by sector is 84 for ‘Public administration and defence; compulsory social security’, followed by ‘Financial services’ (44) and ‘Construction’ (41). These data also show that, even if there is little FDI activity in certain sectors, when companies do invest overseas, they, on average, invest multiple times as demonstrated by a mean number of subsidiaries of 18.65 per company across the whole population. Of MNEs that invested in China, the highest proportion was found in the ‘Manufacturing’ sector, with 26.2% having a Chinese subsidiary.

Table 35

Companies Surveyed by Sector, Invested in China and Mean Number of Subsidiaries.

		Not invested in China		Invested in China		Mean number of recorded subsidiaries
	Number of MNE's in sector	Count	Percent of total	Count	Percent of total	
Agriculture, Forestry and Fishing	71	70	0.9%	1	0.2%	6
Mining and Quarrying	237	226	3.0%	11	2.6%	33
Manufacturing	1315	1203	15.8%	112	26.2%	13
Electricity, gas, steam and air conditioning supply	35	35	0.5%	0	0.0%	24
Water supply, sewerage, waste management and remediation activities	23	21	0.3%	2	0.5%	21
Construction	175	172	2.3%	3	0.7%	41
Wholesale and retail trade; repair of motor vehicles and motorcycles	779	749	9.8%	30	7.0%	13
Transportation and storage	301	288	3.8%	13	3.0%	19
Accommodation and food service activities	74	67	0.9%	7	1.6%	36
Information and communication	988	950	12.5%	38	8.9%	11
Financial and insurance activities	1155	1091	14.3%	64	15.0%	44
Real estate	118	117	1.5%	1	0.2%	17
Professional, scientific and technical services	1570	1477	19.4%	93	21.8%	14
Administrative and support service activities	889	850	11.2%	39	9.1%	10
Public administration and defence; compulsory social security	12	10	0.1%	2	0.5%	84
Education	39	36	0.5%	3	0.7%	5
Human health and social work activities	66	63	0.8%	3	0.7%	17
Arts, entertainment and recreation	80	78	1.0%	2	0.5%	16
Other service activities	122	119	1.6%	3	0.7%	9
Totals	**8049**	**7622**	**1**	**427**	**1**	

As a measure of R&D intensity, the author had intended to use the ratio of 'Research Expenditure' as a proportion of 'Turnover', taken from the FAME data. However, the record of 'Research Expenditure' was inconsistent (included negative and positive totals) and was only available for a small proportion of companies. Given these deficiencies, this measure was disregarded from the secondary data but is discussed further within the primary survey data.

However, data on 'Invested in China' (China), 'Company Turnover' (Turnover), 'Number of Employees' (Employment) and 'Number of overseas subsidiaries' (Investment Intensity) were robust; hence, analysis of the interplay between these data was possible. To understand the relationship between these data, a series of Pearson's Product Moment Correlations (PPMC) were performed. Table 36 shows a positive but weak relationship between 'Invested in China' and 'Turnover' and 'Employment' and a moderate relationship between 'Investment Intensity'. And - as one might expect - a positive and relatively strong relationship between 'Turnover' and 'Employment', 'Turnover' and 'Investment Intensity', and 'Employment' and 'Investment Intensity'. This tells one that companies increase their overseas investments, as they grow (as measured by employment and turnover) and that they are more likely to invest in China. Larger companies are also more likely to have more overseas subsidiaries.

Table 36

Overall Correlations for the Total Population.

Measure	Turnover	Employment	Investment Intensity
Invested in China	.195**	.228**	.339**
Turnover		.421**	.481**
Employment			.388**

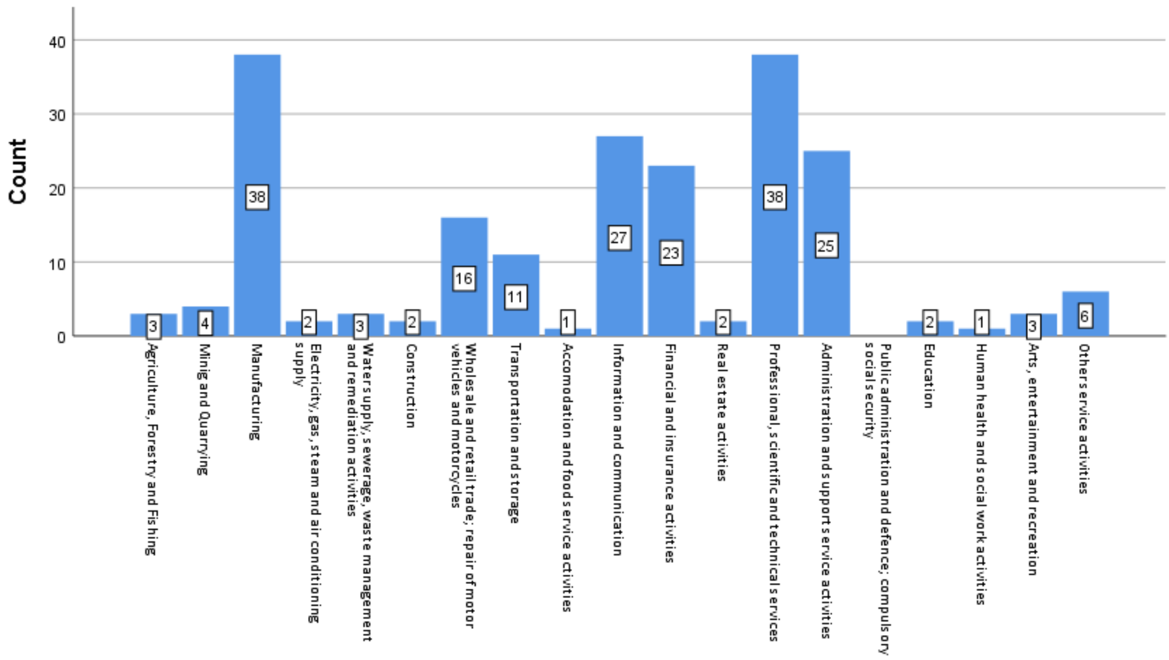
Note. **p<.01

5.3 Survey Data

In this section, the descriptive statistics of the survey participants are analysed. In total, 207 participants responded to the survey with 205 completing the survey instrument, either full or partially. This represents a 44% response rate to the 464 surveys issued. Responses were received from every sector except 'Public administration and defence; compulsory social security'. The survey instrument responses are broadly in line with the distribution of companies from the secondary data drawn from the FAME database. Responses were received from 38 'Manufacturing' sector companies, 38 companies from the 'Professional, scientific and technical services sector', 27 from 'Information and communications', and 27 from 'Administration and support services'. The sector holding the largest number of UK MNEs, 'Financial and insurance services', returned 23 responses. A chi-square test of goodness of fit was performed to determine whether the survey responses were representative of the total population. This showed that the survey population (sample) was equally distributed across the total population, $X^2(18, N=205) = 0.15, p>.05$. See Figure 8 for the frequency of responses distributed by sector.

Figure 8

Count of Survey Responses by Sector



A vital feature of the survey design was that it enabled the researcher to analyse companies by type: those that mainly manufacture products, those that mainly deliver services and those companies that deliver both manufacturing and services. This enabled the researcher to test the robustness (representativeness) of the study by Mansfield (1994), who only surveyed manufacturing companies. It also recognises the growth in the importance of service industries (see, e.g., Castellani *et al*., 2016), thus allowing for a better understanding of the determinants of FDI (Jeong, 2014) by company type. In total, responses were received from 55 (27%) companies focussed on manufacturing, 98 (48%) focussed on services, and 52 (25%) focussed on both manufacturing and services. The preponderance of service-based companies broadly matches the Office for National Statistics' estimates that services contributed 79% of GDP in the UK in 2015 (ONS, 2015).

The survey instrument also enabled the researcher to understand the impacts of IPRs across the range of company sizes, by collecting confirmatory data, as measured by turnover and number of employees. This adds significant richness to the data as many governmental and super-national interventions to support companies are moderated by company size. Companies are generally broken down into classifications by size as a micro, small, medium and large business. The MNEs responding to the survey do fall into the larger end of the spectrum of companies with only 20% having an annual turnover under £10 million and 22% having annual turnovers over £500 million (see Table 37). Likewise, over half of all the respondent companies had more than 250 staff members (see Table 38).

Table 37

Number of Companies Surveyed by Annual Turnover.

Annual Turnover									
£0-£2 million		£2 million to £10 million		£10 million to £50 million		£50 million to £500 million		Over £500 million	
Count	%	Count	%	Count	%	Count	%	Count	%
13	6.4%	27	13.2%	62	30.4%	58	28.4%	44	21.6%

Table 38

Number of Companies Surveyed by Number of Employees

Number of Employees							
1-9		10-49		50-250		more than 250	
Count	%	Count	%	Count	%	Count	%
10	5.0%	24	12.0%	63	31.5%	103	51.5%

The main question of this thesis relates to the impact of IPRs on the investment decisions of UK companies. Dunning (1997) explains the importance of ownership advantages to companies when making their decisions about investing overseas. A key way to measure the value of ownership advantages is to understand the intensity of a company's R&D activity (Duysters and Hagedoorn, 2001). Given the data drawn from the FAME database was deficient in this respect, a question was asked directly to the survey participants. Over 50% of the participants reported between 0 and 5% of their annual turnover as being invested in R&D activities. However, the survey instrument did gather data from 40 companies who invested over 10% of annual turnover in R&D, see Table 39.

Table 39

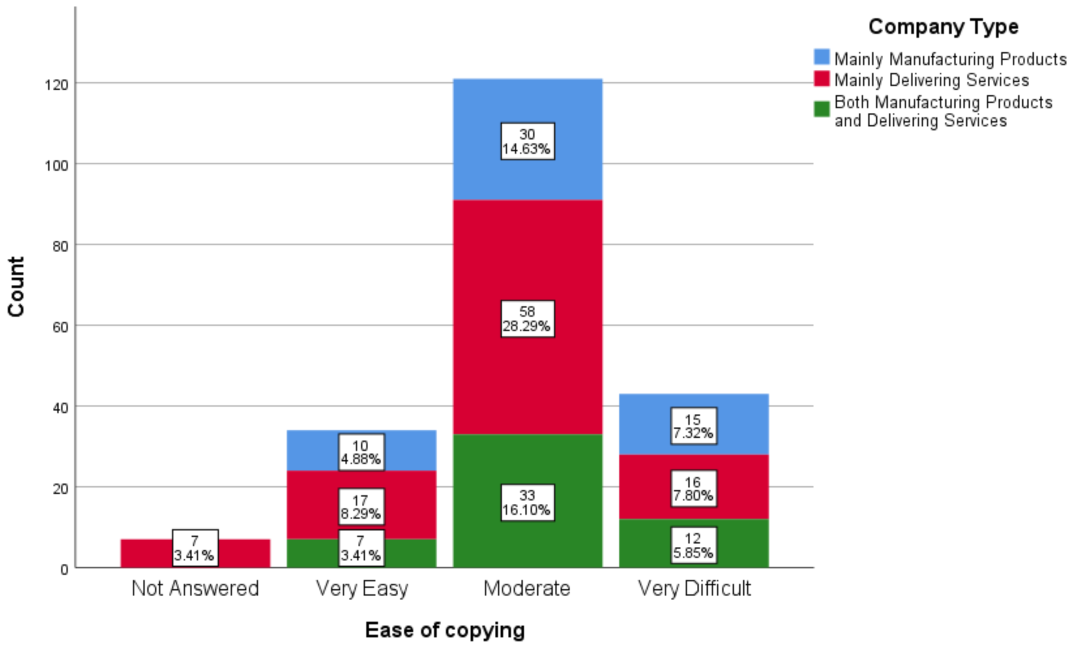
Number of Companies Surveyed by R&D as a Percentage of Turnover.

R&D as a percentage of turnover							
0-5 %		6-10 %		10-25 %		Over 25 %	
Count	%	Count	%	Count	%	Count	%
110	54.5%	52	25.7%	28	13.9%	12	5.9%

A further useful measure is the company's assessment of the ease of copying their products or services. This is an important criterion for companies as products or services that are difficult to copy or imitate should depend less on the strength of IP protection (Mansfield, 1994; Naghari *et al*., 2013). 59% of respondents rated their products or services as being moderately difficult to copy; 21% rated them as being very difficult. Figure 9 details the frequencies of companies by company type who assess their products and services as either very easy, moderate or very difficult to copy.

Figure 9

Ease of Copying Products or Services by Company Type.

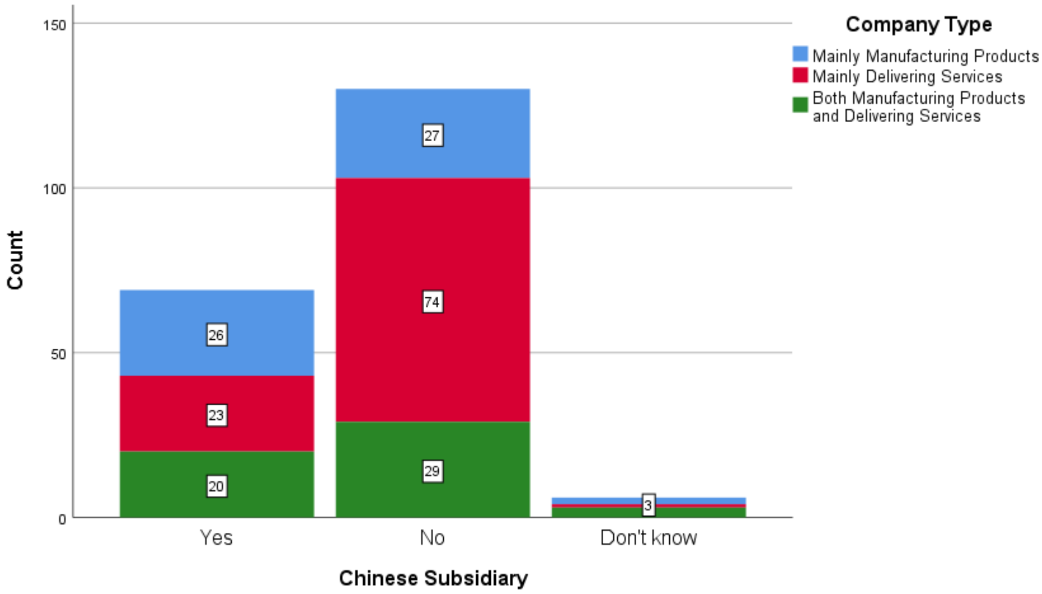


One might expect some correlation between the amount of R&D undertaken and the ease of copying a product or service. However, a Spearman correlation of these two variables gives a moderate positive correlation of .309, significant at the 0.01 level (2-tailed), suggesting that increased investment in R&D does not necessarily lead to products and services that are more difficult to copy or imitate. One might infer from this that R&D investment may increase the quantum of products and services, or the utility of them but not necessarily the complexity of them.

When comparing the survey data with the FAME database on the operation of a subsidiary in China, one would have expected 189 of survey participants (or 91.3%) to not have a subsidiary in China with only 18 companies (8.7%) having Chinese investments. However, given the FAME data was somewhat historical, taking data from the last published accounts, it could have been expected to see an increase in the number of companies surveyed having Chinese subsidiaries. This was indeed the case and overall from the survey data; 69 (33%) companies said they had a subsidiary in China. This is a significant, almost four-fold increase on the return expected from the FAME data. While some of this increase may be due to a time lag, the researcher believes that there may be either an error in the FAME data or an under-reporting of Chinese subsidiaries by UK MNEs through their annual accounts. Figure 10 shows the number of companies by company type that had a subsidiary in China, showing a broadly even spread of manufacturing, services and those that carry out both activities.

Figure 10

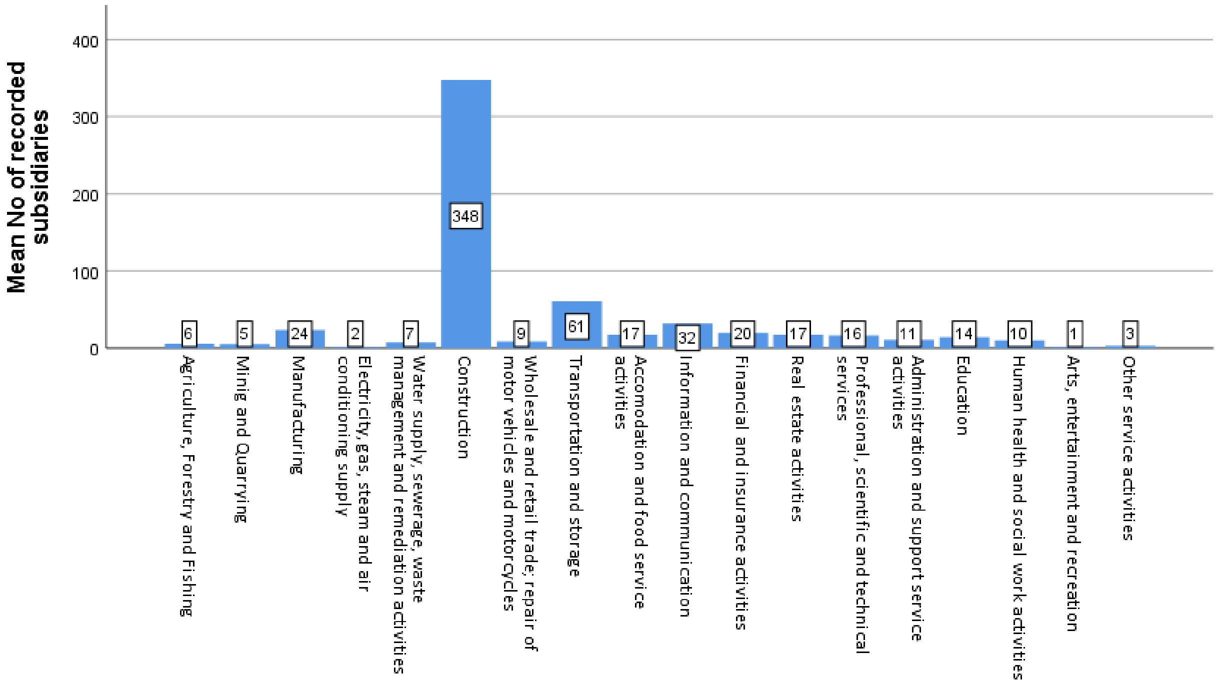
Companies with a Chinese Subsidiary by Company Type.



An additional factor in understanding companies' behaviour is to understand how experienced they are in FDI. Figure 11 shows the mean number of subsidiaries per company by sector. 'Construction' has a very high mean at 348 subsidiaries. However, this is taken from just two very large (with turnover over £500m) companies, and the author, therefore, considered this to be an outlier observation, with a high mean due to the small sample size. From the remaining data, 'Transportation and storage' companies have a high mean of 61 with other sectors ranging from a mean of 1 to 32 subsidiaries. A one-sample t-test comparing the means of numbers of subsidiaries from the FAME data (M=18.65, SD 98.18) and the primary survey data (M=23.09, SD 67.8) demonstrates that the difference between means 4.437, CI (-4.87 to 13.7), t (207) =.940, p=.348, were not significantly different (p< .05).

Figure 11

Mean Number of Subsidiaries by Sector



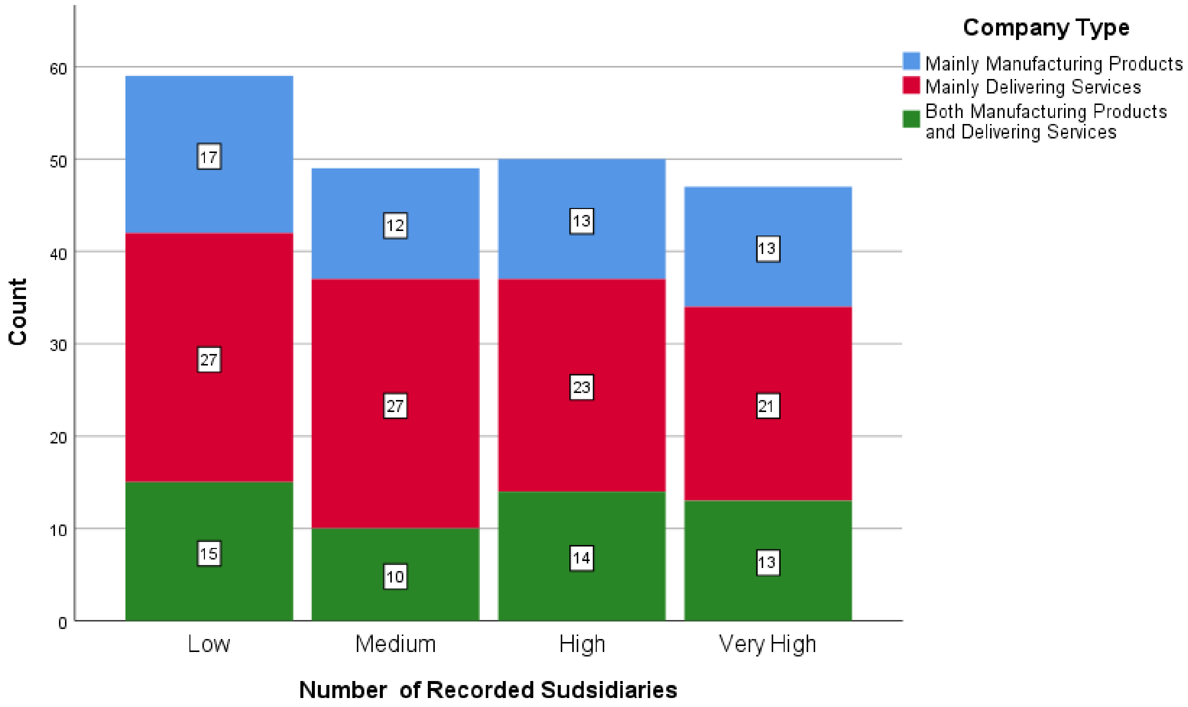
Additional analysis of the survey respondents' FDI experience by company type shows a mean of 10 subsidiaries for companies mainly manufacturing products, 24 subsidiaries for service companies, and 27 subsidiaries for companies undertaking both manufacturing and services activities.

Furthermore, as expected, companies that invest in China are likely to have more experience of FDI than those that do not. The analysis of the FAME data demonstrated a positive and relatively strong relationship of .339 at $p<0.1$ for a Pearson correlation between the number of subsidiaries and investment in China. Within the survey data, the mean number of subsidiaries for companies that invested in China is 31, and those that did not invest in China is 16. The Eta measure for the relationship between the number of subsidiaries and 'invested in China' is .448, and Eta squared of .20 showing that 20% of the difference in whether or not a company has a subsidiary in China can be explained by the total number of subsidiaries a company has.

To support the analysis of FDI experience, companies were classified into groupings of the number of subsidiaries as Low (1-2 subsidiaries), Medium (3-5 subsidiaries), High (6-12 subsidiaries) and Very High (13+ subsidiaries). See Figure 12 for the distribution of companies across the four groups of FDI experience.

Figure 12

Distribution of Companies by FDI Experience



5.4 What are the Ownership Advantages of UK MNEs?

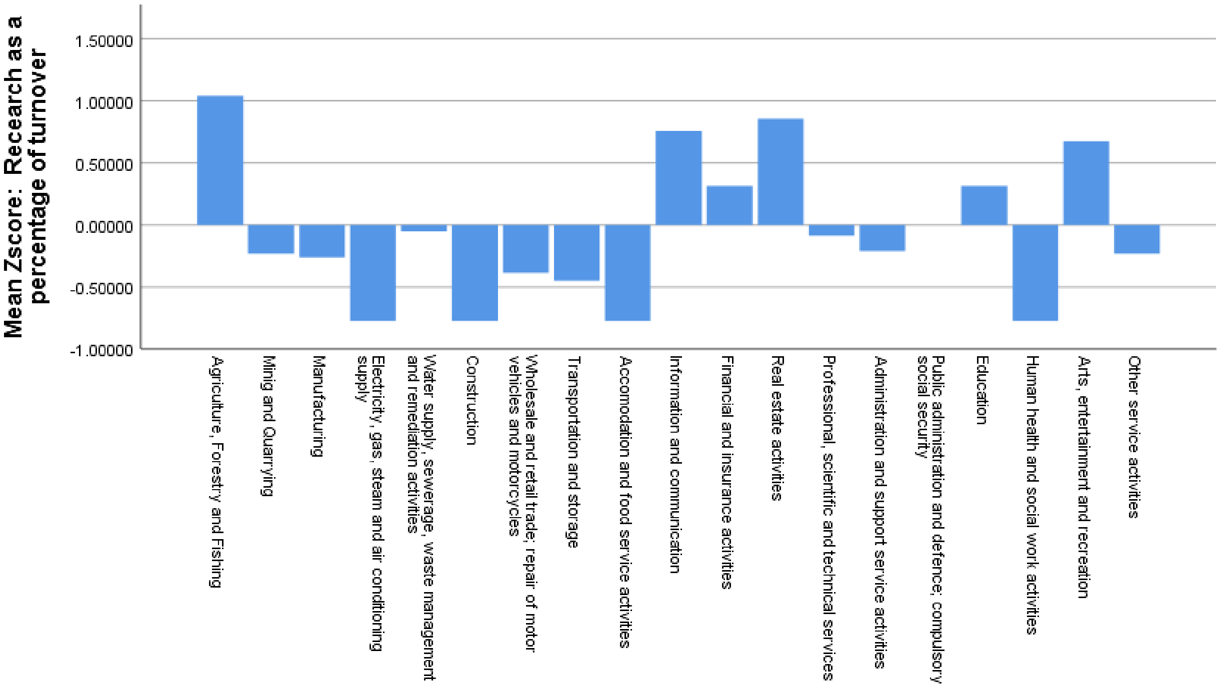
Having identified that ownership advantages (Dunning 1976, 1977, 1979a and 1979b) are a key determinant to an MNE's drive to create overseas subsidiaries, the researcher considered the primary data gathered from the survey instrument to understand these advantages found in UK MNEs.

Firm-specific assets (Dunning, 1976) include management skills and reputation while those directly linked to IPRs, the variable to be assessed, include technology, trademarks, designs and patents, practices and products, and innovative capacity. The following set of figures and tables looks at the ownership advantages of UK MNEs by sector, size, investment experience, R&D intensity and ease of copying.

Figure 13 plots the R&D as a percentage of turnover Z-score against each of the sectors. Those companies with the highest median R&D spend are found in 'Agriculture, forestry and fishing', 'Information and communications', 'Financial and insurance services', 'Real estate activities', 'Education', and 'Arts, entertainment and recreation'. Interestingly, Mansfield (1994) identified Chemicals (including Pharmaceuticals) as a proxy for companies that had a high R&D spend and most sensitive to IPR protection. Both Chemicals and Pharmaceuticals fall within the shortened SIC for 'Manufacturing' which shows a Z-score of -.26, with a standard deviation of .66 (number 38). However, when those companies surveyed that fall within the Primary SIC range of 20130 and 20590 (which includes Chemicals and Pharmaceuticals) where selected, a mean Z-score of .64 with a median of -.15 standard deviation of .503, and a minimum of -.24 and maximum of .81 (number 4) is achieved. The one company in this subgroup with a greater than the mean Z-score is a large manufacturing company concentrating on 'Defence and aerospace products' that do not invest in China. This would suggest that proxies of R&D intensity based on sector participation are not a sound measure of this variable.

Figure 13

Z-score of R&D Intensity as a Percentage of Turnover by Sector.



Mansfield (1994) only surveyed manufacturing companies; however, in this study, the research is extend to also consider service-based companies and those companies that carry out both service and manufacturing activities. Figure 14 plots the Z-score of R&D as a percentage of turnover against the company activity type. The highest mean Z-score is for companies carrying out both manufacturing and services activity, with the lowest mean score for those carrying out manufacturing only. Services companies have, on average, a higher mean than the mean for all companies. These results suggest that to understand the impact of IPRs, it is necessary to disaggregate companies by types of activity. Research, based solely on manufacturing companies (e.g., Mansfield, 1994 and 1995; Maskus and Eby-Konan, 1994; Lee and Mansfield, 1996; Maskus, 1998b; Nunnenkamp and Spatz, 2003) and research that does not disaggregate by types of activity (Ferrantino, 1993; Seyoum, 1996; Mayer and Pfister, 2001; Smith, 2001; Lesser, 2002; Javorcik, 2004) is unlikely to give a complete picture of the phenomenon given the heterogeneity of MNEs.

Figure 14

Z-score of R&D Intensity as a Percentage of Turnover by Company Activity Type.

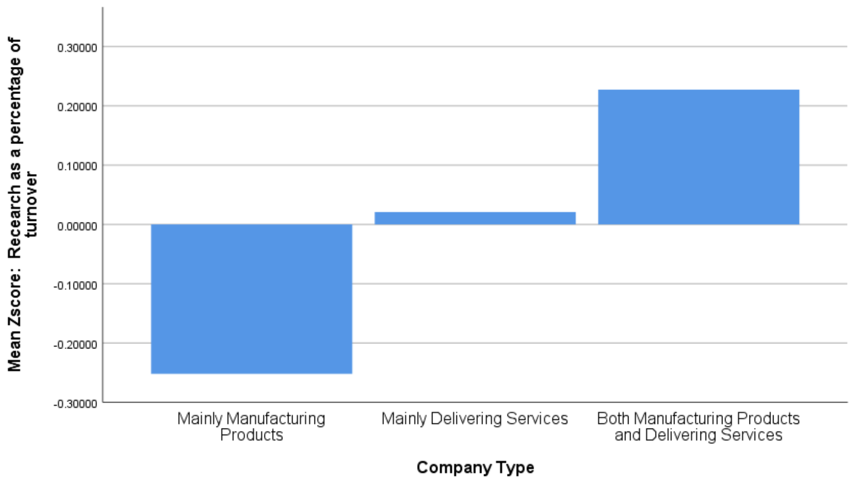


Figure 15 shows the distribution of R&D as a percentage of turnover Z-scores by company turnover. Smaller companies have a higher ratio of R&D to turnover than larger ones. While this is not a measure of the quantum of R&D investment but the intensity within a particular company, it is at odds with much of the literature that suggests that larger companies have more capital and better management structures and are therefore more likely to invest in R&D (Fishman and Rob, 1999; Park *et al*., 2010; Tsai and Wang, 2004; Lai *et al*., 2015). In the case of

UK headquartered MNEs who engaged with the survey, R&D is a more important facet for smaller companies than for the larger ones.

Figure 15

Z-score for R&D Intensity as a Percentage of Turnover by Company Turnover.

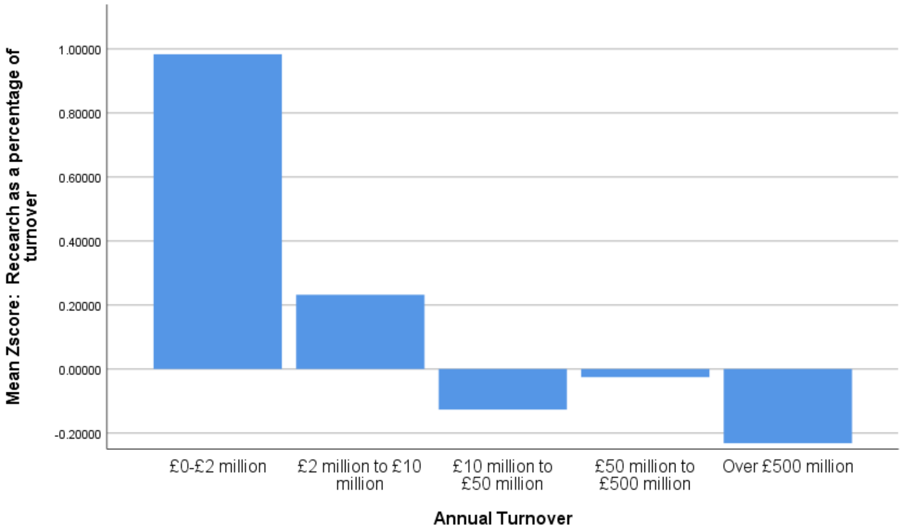
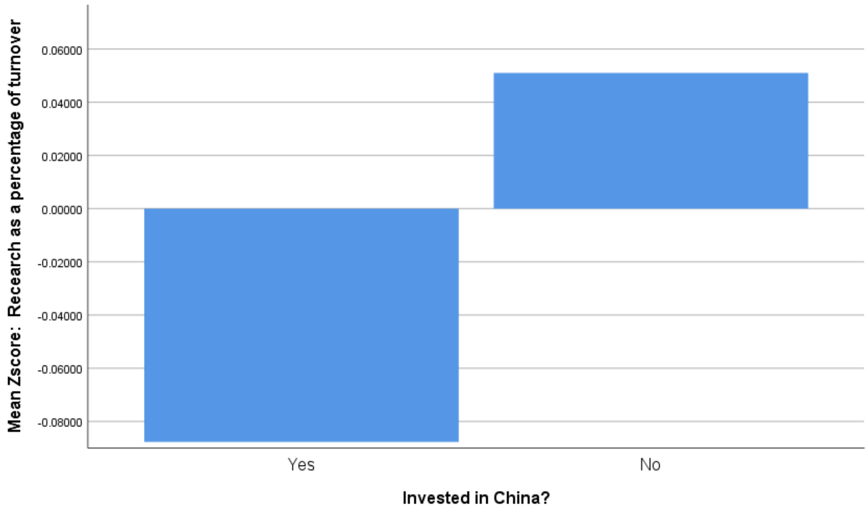


Figure 16 considers the average R&D intensity of companies that invested in China. The average Z-score of companies invested in China (Z=-.087) and those not invested (Z=0.05), supports the hypothesis of Mansfield (1994) and others that high R&D intensive companies are less likely to invest in countries where there are, or perceived to be, weaker IPR regimes.

Figure 16

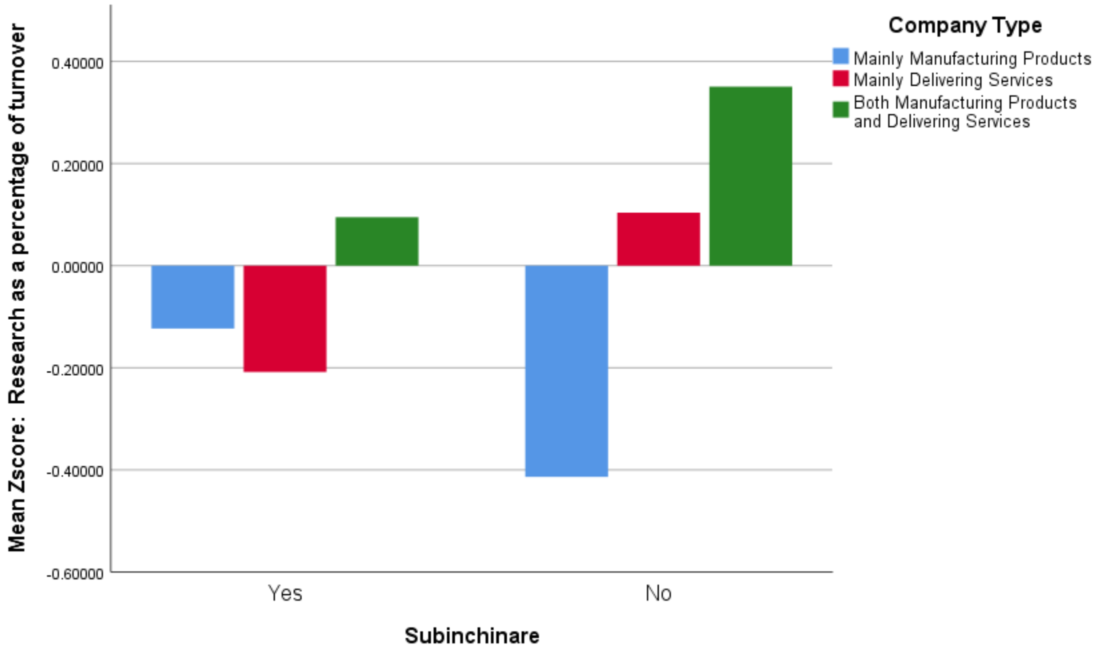
Z-score of R&D Intensity as a Percentage of Turnover by Investment in China



However, considering invested in China against a Z-score of R&D as a percentage of turnover, but split out by company type, one sees that for manufacturing companies those invested in China are likely, on average, to be more R&D intensive. This directly contradicts the findings of Mansfield (1994), see Figure 17.

Figure 17

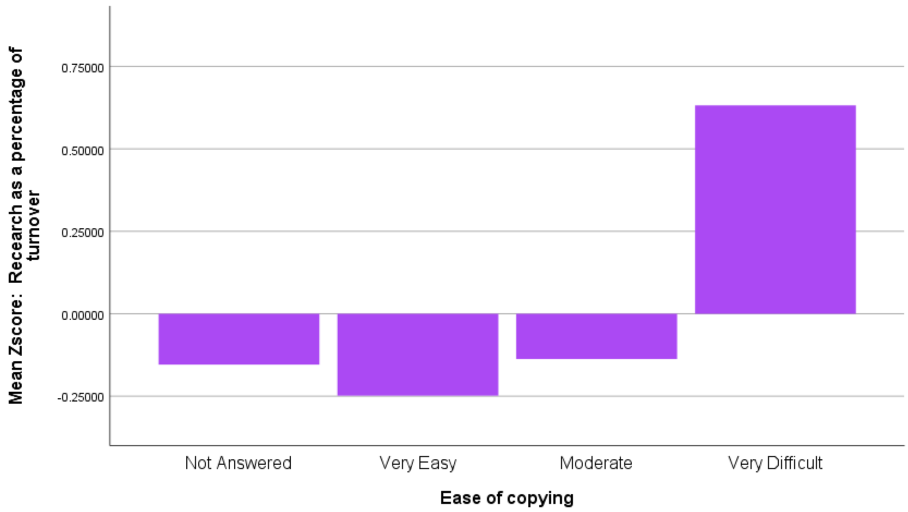
Z-score of R&D Intensity as a Percentage of Turnover, Invested in China by Company Type.



It is also important to understand the perceived ease in which a company's products or services can be copied. Investment decisions are likely to consider risks to products or services, and the company's assessment of these risks include their view of the ease of copying or imitating their product or services. Ease of copying was measured through a specific survey question asking the respondent to rank the ease of copying of their products or services as either very easy, moderate or very difficult. Figure 18 plots the ease of copying responses against the Z-score of R&D as a percentage of turnover. Consistent with Taggart (1997), the companies who have more confidence in their ability to protect their products and services are likely to be those with higher R&D intensities. This graph illuminates the only moderate correlation of .309 (p=0.01, two-tailed) identified through a Spearman correlation of these two variables. It shows that the bulk of the positive correlation happens in those companies that judge their products as being very difficult to copy.

Figure 18

Ease of Copying by Z-score of R&D Intensity.



By creating a standardised score (Z) for ease of copying (where a positive score signifies 'more difficult to copy' and a negative one 'easier to copy'), it is possible to compare means against additional variable sets. Figure 19 considers company type against ease of copying and shows that service-based companies are least likely to be confident about protecting their products and services.

Figure 19

Z-score of Ease of Copying by Company Type.

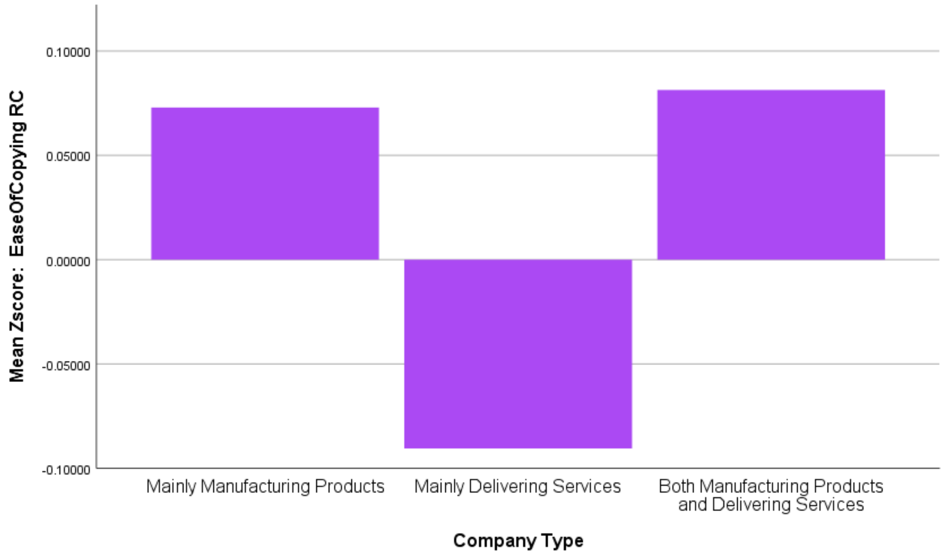


Figure 20 considers the FDI experience of MNEs against ease of copying (broken down into four groups: 1-2 subsidiaries = low; 3-5 subsidiaries = medium; 6-12 subsidiaries = high; and 13+ = very high). Inexperienced MNEs have greater confidence in their ability to protect their products and services while experienced MNEs have much less confidence. Likewise, smaller companies have greater confidence in their ability to protect their IP than larger companies, see Figure 21. This is an interesting finding as it may indicate that if the protection of a company's IP, either through product complexity or IPR protection, is critical to the success of that company, it may limit that company's international reach and growth potential. It may also be possible that as companies expose themselves to international markets, they become more aware of the vulnerability of their products and services and the accompanying risk to ownership value.

Figure 20

Z-score Ease of Copying by FDI Experience.

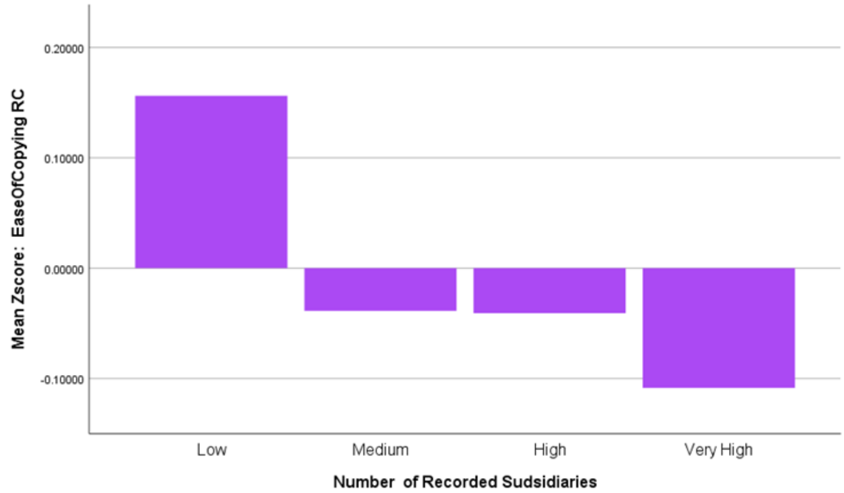


Figure 21

Z-score Ease of Copying by Company Size

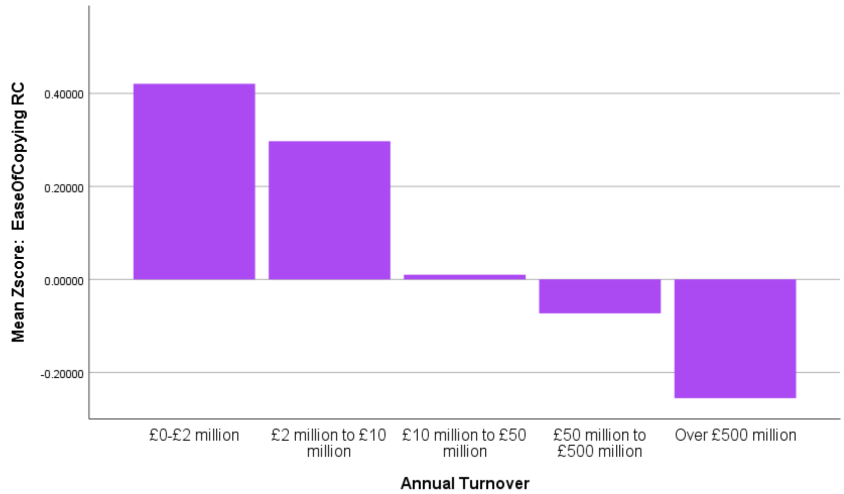
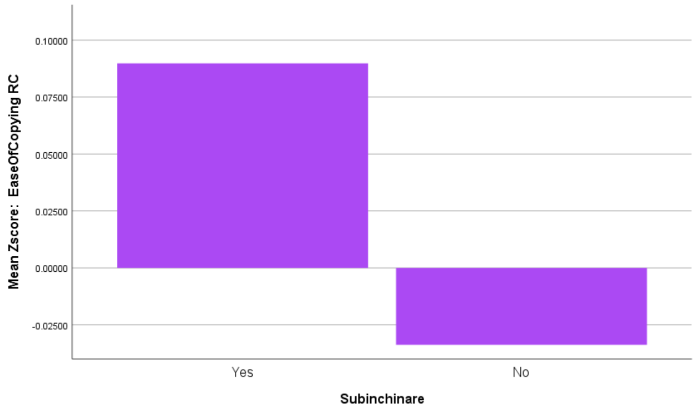


Figure 22 shows that companies who have invested in China have much greater confidence in their ability to protect their IP than those that have not. This supports the view of Mansfield (1994) and others that, in countries where IP protection is considered weak, firms will have to have additional confidence in their ability to protect their IP before they invest.

Figure 22

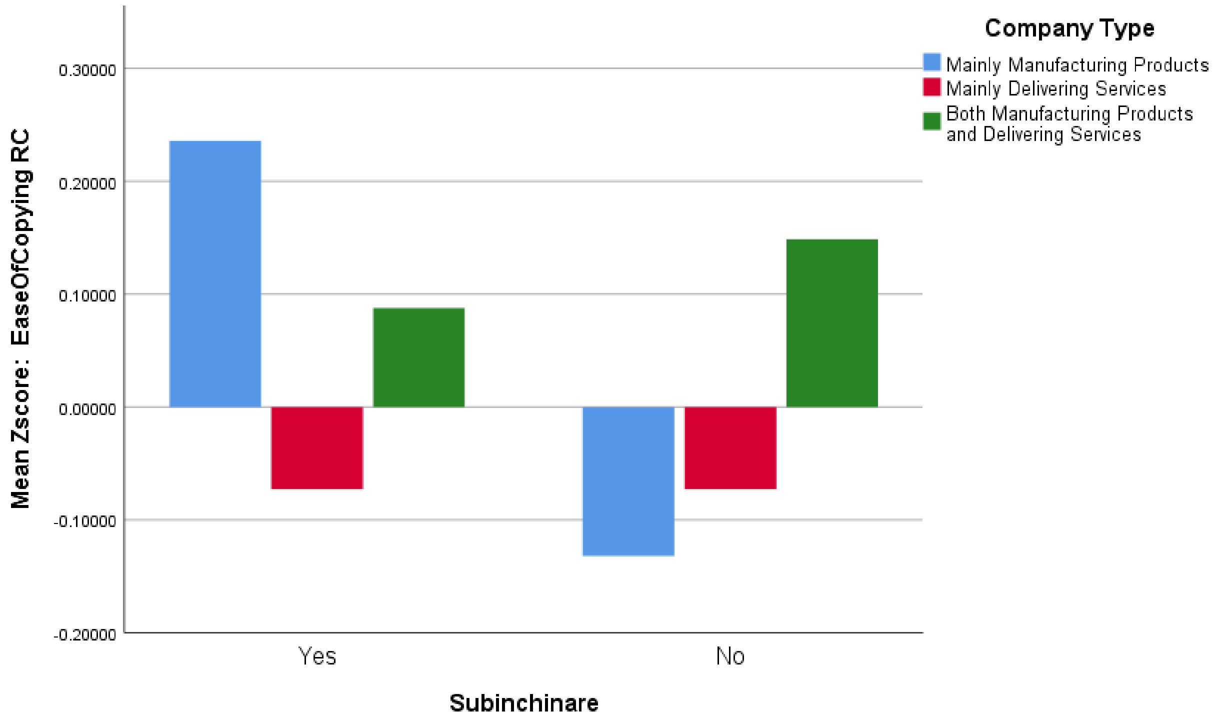
Z-score Ease of Copying by Invested in China.



However, while the aggregate data for ease of copying supports Mansfield’s (1994) proposition, again, when the data is broken down by company type, one finds that while manufacturing companies act as Mansfield predicts this behaviour is less pronounced in services companies. For companies that both manufacture and deliver services, Figure 23 shows that companies invested in China are less confident about their ability to protect their products and services from imitation than those who do not invest in China. This questions the generalisability of Mansfield’s (1994) findings.

Figure 23

Z-score of Ease of Copying, by Invested in China, by Company Type.



5.5 What are the Location Advantages that drive UK MNEs to invest in FDI?

The second strand of Dunning's (1977) eclectic paradigm relates to the question of 'where' an MNE will undertake FDI, the country FDI location choice. The advantages of a particular country over another country can vary and add to the complex decisions' companies have to undertake when deciding to invest. Location parameters overall consider the advantages and disadvantages to the company from its presence in a market. They can include navigating trade barriers, reducing transport costs and reducing exchange rate risks. Other reasons include access to the market, the character of the market, the availability of resources and incentives. This section considers the importance of location advantages for UK MNEs, including the importance of the IPR system and underpinning regulatory framework.

5.5.1 Types of FDI and Motivations for FDI

To consider the types of investments that companies undertake, companies can be categorised by those carrying out horizontal (Markusen, 1984), vertical (Helpman, 1984) FDI and those engaging with a global supply chain (Giroud and Mirza, 2015). Question 6_a in the survey instrument explored investment types and also offered the respondent the opportunity to state 'other' and to complete a free text box detailing their main FDI activities. Company investment type against R&D intensity shows in Figure 24 that companies who undertake vertical FDI are far more likely to be R&D intensive than those carrying out horizontal FDI or supplying a global supply chain. Likewise, companies undertaking vertical FDI are more confident about their ability to protect their IP, see Figure 25. This suggests that R&D intensive companies prefer vertical FDI.

Figure 24

Z-score for R&D Intensity Against the Type of FDI Usually Undertaken

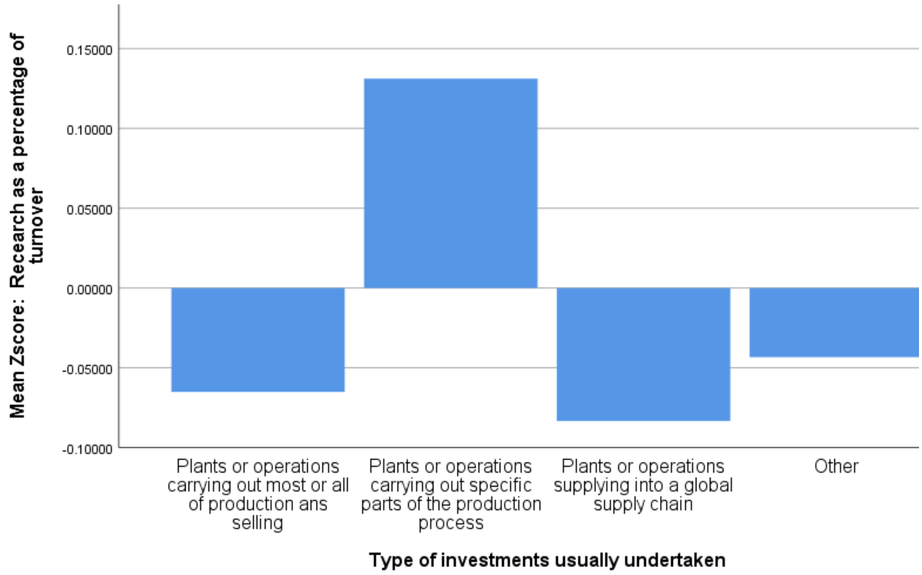


Figure 25

Z-score for Ease of Copying against the Type of Investment

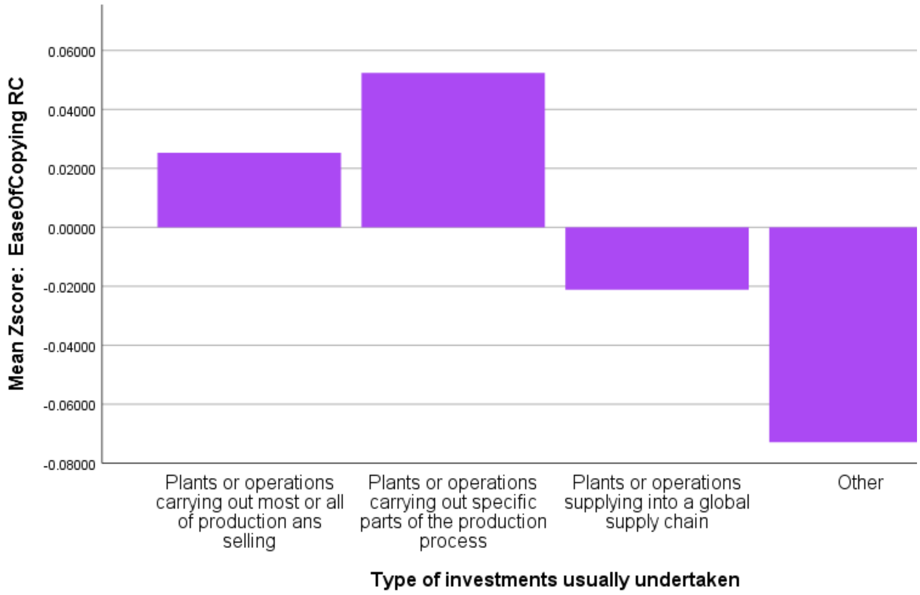


Figure 28 below shows the distribution of companies split by company type against the three types of FDI. A broadly even distribution of companies across the three main types is evident; however, a significant proportion of the companies who selected 'Other' fall within service industries. This perhaps shows that service companies find it more difficult to identify with the concepts of vertical and horizontal FDI and supply to a global supply chain. In 'Other' the largest grouping identified that they carried out FDI to provide in-country services (11 companies) and to recruit talent (10 companies).

Table 40 below details the broad categories of responses to 'Other' in the question relating to FDI choices.

Figure 26

Distribution of Companies by Usual Type of FDI Split by Company Type.

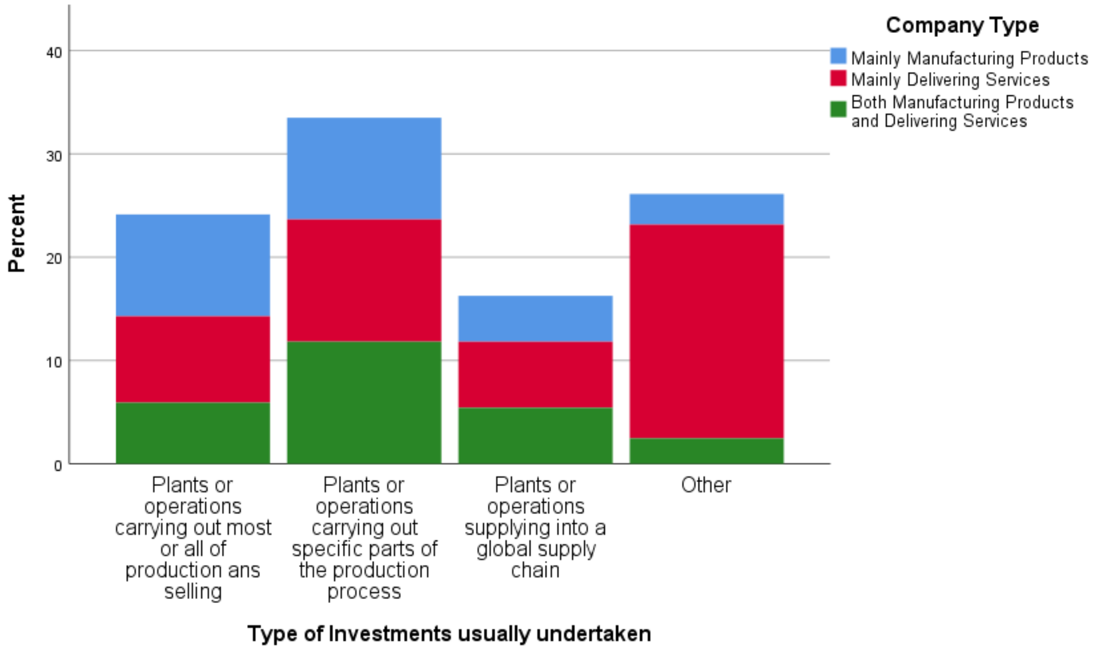


Table 40

Count of Answers to 'Other' Selection in Question Relating to Usual Types of FDI Undertaken.

Reason for FDI	Number of MNEs	Reason for FDI	Number of MNEs
Provide in-country services	11	Recruit staff/attract people	10
Deliver financial services	4	Software and communications	4
Bespoke design	3	Support a global customer	3
Strategic acquisitions	2	Real estate	2
Research and technology	2	Trials	1
Back-office support	1	Importing from a third country	1
Hospitality	1		

Using the taxonomies set out by Buckley *et al*. (2007); Dunning (1988) and Makino *et al*. (2002), it is possible to consider the motivations companies have for undertaking FDI and whether it is primarily resource-, market- or efficiency-seeking or motivated by a desire to secure strategic assets. Figure 27 shows the distribution of motivations split by company type from the survey[60].

[60] The responses shown in Figure 27 were not exclusive and respondents were able to select all the motivations that applied to their businesses.

The evidence demonstrates a preference by UK MNEs to undertake market-seeking FDI to supply goods and services overseas.

Figure 27

Distribution of Companies by FDI Motivation and Split by Company Type

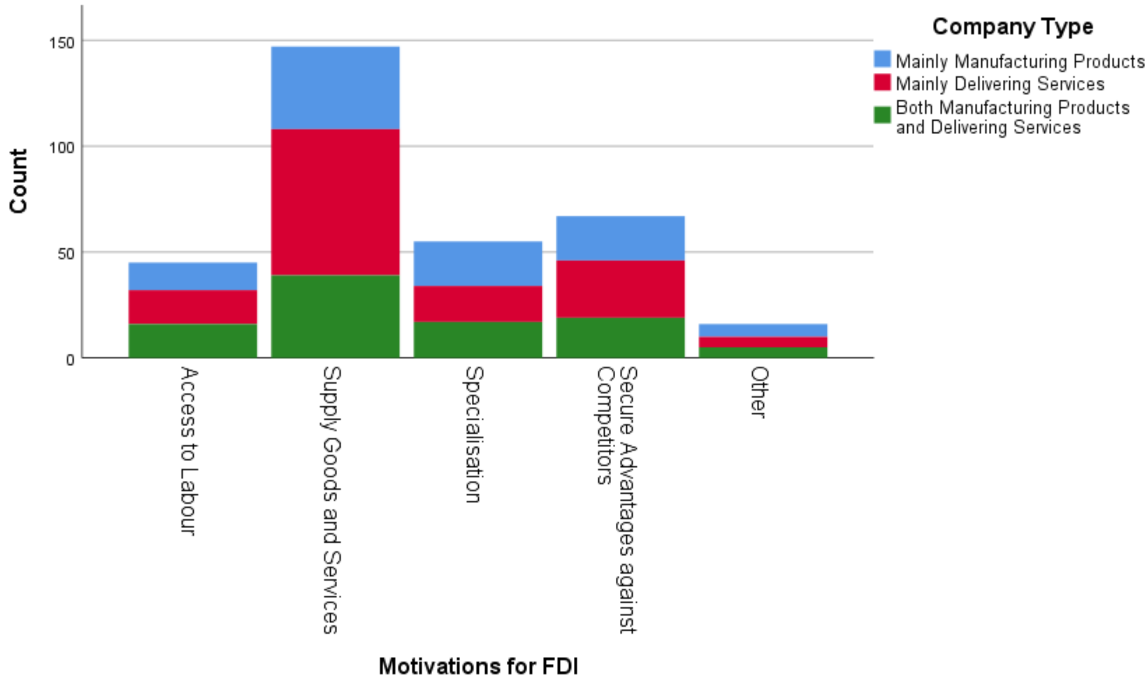


Figure 28 plots the Z-scores for R&D as a percentage of turnover and ease of copying against the five FDI motivation categories. This plot shows that those companies with higher R&D intensities and higher confidence in their ability to protect their products and services are more likely to be motivated to specialise their products and services, secure advantages against competitors or have 'Other' motivations for FDI.

Figure 28

Plot of Z-scores for R&D Intensity and Ease of Copying against FDI Motivations

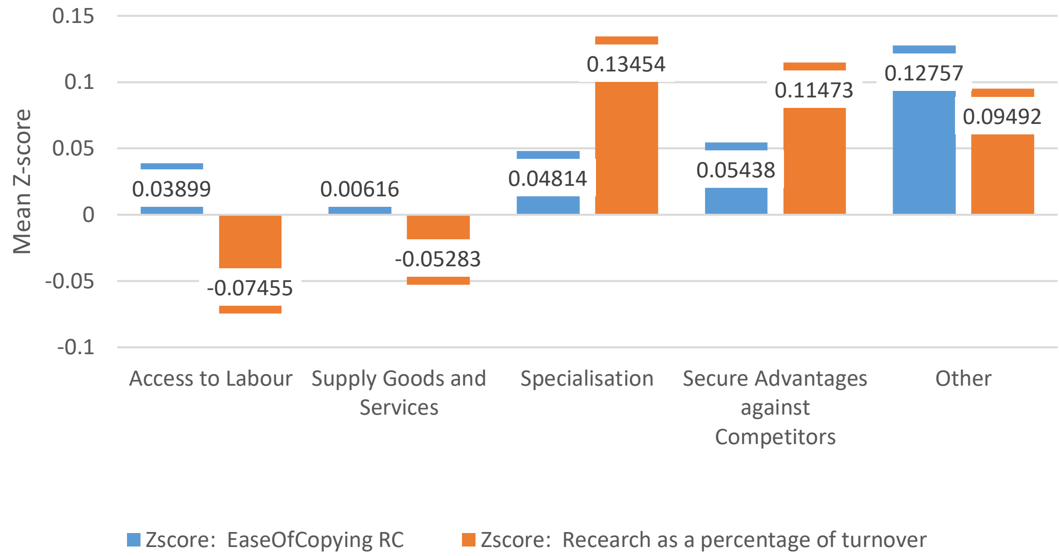


Table 41 considers motivations for FDI against several variables and shows that while the supply of goods and services remains the primary motivation for UK MNEs, seeking to secure advantage against competitors is a particularly strong motivation for companies at the smaller end of the scale, £0-2m turnover and R&D intensive companies.

Table 41

Motivations for FDI by Company Type, Annual Turnover, Number of Employees, R&D as a Percentage of Turnover, Ease of Copying, Number of Subsidiaries and Subsidiary in China

		Access to Labour		Supply Goods and Services		Specialisation		Secure Advantages against Competitors		Other	
		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
		Row %									
Company Type	Manufacturing	76.4	23.6	29.1	70.9	61.8	38.2	61.8	38.2	89.1	10.9
	Services	83.7	16.3	29.6	70.4	82.7	17.3	72.4	27.6	94.9	5.1
	Manufacturing and Services	69.2	30.8	25.0	75.0	67.3	32.7	63.5	36.5	90.4	9.6
Annual Turnover	£0-£2 million	84.6	15.4	53.8	46.2	84.6	15.4	46.2	53.8	92.3	7.7
	£2 m to £10 m	85.2	14.8	25.9	74.1	92.6	7.4	66.7	33.3	85.2	14.8
	£10 m to £50 m	71.0	29.0	32.3	67.7	72.6	27.4	66.1	33.9	95.2	4.8
	£50 m to £500 m	89.7	10.3	13.8	86.2	65.5	34.5	75.9	24.1	91.4	8.6
	Over £500 million	65.9	34.1	34.1	65.9	68.2	31.8	65.9	34.1	93.2	6.8
Number of Employees	1-9	90.0	10.0	50.0	50.0	100.0	0.0	60.0	40.0	90.0	10.0
	10-49	70.8	29.2	41.7	58.3	91.7	8.3	62.5	37.5	95.8	4.2
	50-250	79.4	20.6	23.8	76.2	68.	31.7	63.5	36.5	93.7	6.3
	more than 250	76.7	23.3	25.2	74.8	68.9	31.1	71.8	28.2	91.3	8.7
R&D as a percentage of turnover	0-5 %	76.4	23.6	26.4	73.6	75.5	24.5	70.9	29.1	93.6	6.4
	6-10 %	78.8	21.2	26.9	73.1	73.1	26.9	61.5	38.5	90.4	9.6
	10-25 %	78.6	21.4	21.4	78.6	64.3	35.7	71.4	28.6	92.9	7.1
	Over 25 %	83.3	16.7	58.3	41.7	66.7	33.3	50.0	50.0	91.7	8.3
Ease of Copying	Very Easy	76.5	23.5	35.3	64.7	85.3	14.7	79.4	20.6	88.2	11.8
	Moderate	80.2	19.8	24.8	75.2	67.8	32.2	63.6	36.4	95.0	5.0
	Very Difficult	74.4	25.6	32.6	67.4	79.1	20.9	72.1	27.9	86.0	14.0
Number of Recorded Subsidiaries	Low	81.4	18.6	35.6	64.4	83.1	16.9	71.2	28.8	89.8	10.2
	Medium	77.6	22.4	24.5	75.5	65.3	34.7	65.3	34.7	98.0	2.0
	High	76.0	24.0	32.0	68.0	74.0	26.0	68.0	32.0	98.0	2.0
	Very High	77.6	22.4	22.4	77.6	69.4	30.6	65.3	34.7	83.7	16.3
Sub in China	Yes	68.1	31.9	27.5	72.5	65.2	34.8	63.8	36.2	94.2	5.8
	No	82.3	17.7	27.7	72.3	77.7	22.3	70.0	30.0	90.8	9.2

1st Choice	2nd Choice	3rd Choice

Mansfield (1994, pp 1-2) offered a helpful taxonomy of a spectrum of investment types that companies could undertake. He postulated that as companies become more secure in a country's IPR protection, they became more likely to move through this spectrum from 'sales and distribution' through to 'facilities carrying out research and development'. He concluded that high-technology companies (which he identified as those in the chemicals sectors, including pharmaceuticals) were particularly sensitive to IPR regimes when they made investment decisions. However, Mansfield (1994) only surveyed manufacturing companies which, demonstrated in earlier sections of this chapter fails to recognise the heterogeneity of UK MNEs. The present study updates the Mansfield taxonomy to include analogues for service-based companies and those that carry out both manufacturing and services, thereby developing a new investment taxonomy that reflects the complex nature of MNEs see Table 22 on 144 in Chapter Four.

Considering the propensity to invest in the five Mansfield type taxonomy responses (normalised) across all the sectors (see Table 42); one sees that sectors 'Accommodation and food services activities', and 'Education', are the most likely to invest in sales and marketing facilities while 'Real estate activities' are the least likely.

Investment in rudimentary production and assembly or delivery of services to current clients and intra-firm services is most likely in the sectors 'Arts, entertainment and recreation', 'Transport and storage', 'Information and communications', and 'Financial and insurance services', with the least likely to be in 'Real estate' and 'Agriculture, forestry and fishing' sectors.

The highest likelihood of companies investing in facilities to manufacture components, and or services to indigenous companies by sector are found in 'Human health and social work activities', 'Accommodation and food service activities', 'Arts, entertainment and recreation' and 'Other services activities. This activity was least likely to be seen within the 'Electricity, gas, steam and air conditioning supply' sector.

Investment in facilities to manufacture complete products and or full-service provision are most likely to be seen in 'Human health and social work activities', 'Other services activities', 'Arts, entertainment and recreation'. The least likely sectors are 'Real estate', 'Accommodation and food services activities', and 'Electricity, gas, steam and air conditioning supply'.

Companies investing in R&D facilities and or service development including the positioning of core senior staff by sector are 'Agriculture, forestry and fishing', 'Arts, entertainment and recreation', 'Other service activities', 'Human health and social work activities', 'Information and communication', and 'Water supply, sewerage, waste management and remediation activities'. Those sectors most unlikely to invest in R&D facilities include 'Real estate', 'Accommodation and food service activities', 'Construction' and 'Mining and quarrying'.

Table 42

Z-score of the Likelihood of Investing Types of FDI by Sector.

	Agriculture, Forestry and Fishing	Mining and Quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Water supply, sewerage, waste management and remediation activities	Construction	Wholesale and retail trade; repair of motor vehicles and motorcycles	Transportation and storage	Accommodation and food service activities	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical services	Administration and support service activities	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities
Z-score: Sales, marketing and distribution	0.90557	-0.03546	0.52916	-0.60008	0.15275	-0.60008	-0.31777	0.01587	-0.60008	-0.09819	-0.20730	-0.60008	-0.30291	0.12263	-0.60008	-0.60008	-0.60008	0.90557
Z-score: Rudimentary production and assembly, services to current clients and intra-firm services	-0.45001	0.21536	0.04026	-0.45001	0.43715	-0.45001	-0.28366	0.27585	-0.45001	0.04286	0.01286	-0.45001	0.11030	-0.02417	-0.45001	-0.45001	-0.45001	-0.00643
Z-score: Manufacture of components, develop services to indigenous clients	-0.36973	0.39561	0.03308	-0.36973	-0.36973	-0.36973	-0.36973	0.74349	-0.36973	-0.14296	-0.23663	-0.36973	0.19420	-0.12482	-0.36973	-0.36973	-0.36973	1.16095
Z-score: Manufacture complete products, provision of full services to indigenous and neighbouring market	0.65072	-0.36973	0.27477	-0.36973	-0.36973	-0.36973	-0.17839	0.46519	-0.36973	-0.02958	-0.36973	-0.36973	0.03308	-0.24727	-0.36973	-0.36973	-0.36973	1.16095
Z-score: R&D, positioning key staff, service development	0.91275	-0.29840	0.27530	-0.29840	-0.29840	-0.29840	-0.07131	0.36223	-0.29840	-0.02925	-0.14042	-0.29840	-0.10716	-0.29840	-0.29840	-0.29840	-0.29840	0.91275

Table 43 considers R&D as a percentage of turnover and other variables against the Mansfield type taxonomy. As one might expect, companies with a high level of R&D intensity are more likely to invest in R&D facilities globally. Indeed, all companies with more than 6% of their turnover invested in R&D are likely to choose the most R&D intensive of FDI investments. Smaller companies (£0-2m turnover), are also more likely to want to invest in R&D facilities than other companies and larger companies more likely to invest in facilities to manufacture complete products and the provision of full services to indigenous and neighbouring markets.

Considering the Mansfield type investments by the experience of FDI as measured by the number of overseas subsidiaries shows that the least experienced companies are the most likely to invest in manufacturing complete products and/or provision of full services to indigenous and neighbouring markets, and to undertake R&D and the positioning of key staff, and development of services.

Table 43

Z-score of the Likelihood of FDI Types by R&D as a Percentage of Turnover, Annual Turnover, Number of Employees, Number of Subsidiaries, and Invested in China.

		Sales, marketing and distribution	Rudimentary production and assembly, services to current clients and intra-firm services	Manufacture of components, develop services to indigenous clients	Manufacture complete products, provision of full services to indigenous and neighbouring market	R&D, positioning key staff, service development
		Mean Z-score				
R&D as a percentage of turnover	0-5%	-0.15842	-0.01434	-0.08500	-0.02839	-0.35528
	6-10%	0.16894	0.00583	0.13255	0.10571	0.28003
	10-25%	0.31316	0.14556	0.21294	-0.02634	0.48214
	Over 25%	-0.18962	-0.19884	-0.38994	-0.29310	0.86429
Annual Turnover	£0-£2m	0.02808	-0.30544	-0.33995	-0.16924	0.42832
	£2m to £10m	-0.17887	-0.05671	-0.21014	-0.39313	-0.03671
	£10m to £50m	-0.15817	0.27244	0.08639	0.00415	-0.11664
	£50m to £500m	0.18212	-0.10408	0.00728	-0.09184	-0.01284
	Over £500m	0.06609	-0.10747	0.09298	0.37040	0.07387
Number of Employees	1-9	0.11677	-0.19884	-0.29828	-0.07291	-0.05609
	10-49	-0.14545	0.13486	-0.25842	-0.35502	0.11240
	50-250	-0.11129	0.06582	-0.01182	-0.13665	-0.15297
	more than 250	0.10064	-0.02740	0.10276	0.20358	0.08726
Number of Recorded Subsidiaries	Low	0.01455	-0.00933	-0.04365	0.15415	0.09929
	Medium	-0.07170	0.04611	-0.05384	-0.12445	-0.01397
	High	-0.02287	-0.03554	0.16005	0.07846	0.02636
	Very High	0.08129	0.00015	-0.06378	-0.13828	-0.13315
Sub in China	Yes	0.20678	0.03732	0.13857	0.20618	0.08231
	No	-0.11648	-0.03244	-0.08259	-0.10169	-0.05209

5.5.2 How does IPR Protection Influence FDI decisions?

Understanding the influence of IPRs on the location decisions for UK MNEs is a key output (and contribution to knowledge) of this PhD research. This issue was addressed through a set of questions within the survey instrument that asked respondents about the importance of IPRs when making investment decisions into three country groupings (tertiles). The groupings were constructed by ranking countries on their 2005 Index of International Patent Protection (Park, 2008b). The countries were then split into three groups of high, medium and low levels of protection according to the Index (see Appendix 2 for the full list of countries and their respective tertile allocations). The respondent was asked to state the importance (either ‘not important’, ‘some consideration given’, or ‘of major concern’) of IPRs when investing in the group of countries. Several countries were selected from each tertile to aid the respondent in understanding the types of country groupings being considered in the questions. China was not included in any of the descriptive lists of countries from the tertiles.

Table 44 shows that manufacturing companies are most concerned about IPRs when investing in countries within the second tertile (countries such as India, Brazil, Malaysia, Kenya and Saudi Arabia). However, services-based companies are most concerned about IPRs in first tertile countries such as USA, Australia and New Zealand. Companies that both manufacture and deliver services are, on average, more concerned about IPRs in general and most concerned about investing in third tertile countries such as Angola, Nepal, Tanzania and The Gambia. When considering IPR concerns by ‘Turnover’, micro-companies are particularly concerned about their IP protection in first tertile countries, and the largest companies more concerned about IP in all three country groupings particularly in the most developed first tertile countries.

In terms of company size, by numbers of employees, micro-companies are more worried about IPRs when investing in first tertile countries whereas mid-sized businesses (50-250 employees) are generally concerned by IPR protection in second tertile countries

When R&D intensity is considered, low-intensity companies are generally less concerned by IP protection but as R&D intensity grows the level of concern grows except for the most intensive companies who show little concern about IP regulations in second tertile countries.

Companies who consider their products or services are very easy to copy report that IPRs are less relevant to them across all country groupings. Those companies who assess the ease of copying of their products or services as moderate are most concerned about IPRS in second tertile countries. Companies with a high level of confidence in protecting their products are most concerned about IPRs in first tertile countries.

Companies that have invested in China are, on average, more concerned about IPRs across all tertiles. This is a particularly interesting finding, suggesting that the process of investing in China, or a country with weaker IPR protection, raises the concern for IPR protection across all investments regardless of the country's IPR strength.

Table 44

Z-score of the Importance of IPRs in the Three Tertiles Reviewed by Company Type, Annual Turnover, Number of Employees, R&D as a Percentage of Turnover, Ease of Copying, Number of Recorded Subsidiaries and Subsidiary in China.

		First Tertile	Second Tertile	Third Tertile
		Mean Z-score		
Company Type	Mainly Manufacturing Products	-0.12598	0.11832	-0.05340
	Mainly Delivering Services	0.01210	-0.12036	-0.03811
	Manufacturing Products and Delivering Services	0.11114	0.09474	0.12679
Annual Turnover	£0-£2 million	0.33817	-0.41917	-0.25002
	£2 million to £10 million	-0.01499	-0.17445	-0.11840
	£10 million to £50 million	0.00943	0.02764	-0.13063
	£50 million to £500 million	-0.27072	0.02976	0.08844
	Over £500 million	0.26130	0.16349	0.19709
Number of Employees	1-9	0.26754	-0.57579	-0.41675
	10-49	-0.20582	-0.43194	-0.37211
	50-250	0.17801	0.24429	0.09107
	more than 250	-0.11039	0.00630	0.07527
R&D as a percentage of turnover	0-5%	-0.12839	-0.09947	-0.08518
	6-10%	0.21353	0.12785	-0.02889
	10-25%	-0.05102	0.22409	0.25141
	Over 25%	0.35499	-0.21524	0.11560
Ease of Copying	Very Easy	-0.18163	-0.39841	-0.21280
	Moderate	-0.01795	0.07438	-0.00627
	Very Difficult	0.22788	0.03384	0.08844
Number of Recorded Subsidiaries	Low	-0.00171	0.12522	0.12561
	Medium	0.16314	0.06827	0.11560
	High	0.11013	-0.09223	-0.09780
	Very High	-0.29137	-0.12764	-0.17592
Sub in China	Yes	0.00329	0.04757	0.00936
	No	-0.00823	-0.05074	-0.01977

The next set of questions in the survey instrument sought to unveil the importance of IPRs when companies are undertaking specific types of investments as defined by the reformulated Mansfield type taxonomy, see Table 22 on page 144.

Table 45 shows that manufacturing companies are particularly concerned with the protection of IPRs when they are investing in facilities to manufacture complete products; and when investing in R&D facilities. This confirms the findings in Mansfield (1994). Service only companies show, on average, less concern about IPR protection across all types of investment they undertake and concern diminishes as they progress through the Mansfield type taxonomy. This confirms earlier findings that services-based companies consider IPRs to be less important and that such companies respond to IPRs differently to manufacturing companies. Companies that undertake both manufacturing and service provision show an above-average concern with IPR protection across all modes of investment, and while concern increases as they progress through the Mansfield type taxonomy, concern about IPRs diminishes when they undertake R&D.

Table 45 also shows that smaller companies are concerned about IPRs when they invest in sales, marketing and distribution of goods and services. The largest companies are more concerned than average across the range of investment types with a particularly high concern when investing in facilities to manufacture components and or develop services to indigenous companies or clients. Only the grouping turnover £10-50m shows the shape of the distribution that would be expected had Mansfield (1994) been generalisable across all MNEs. Again, this demonstrates the benefits of the present study in disaggregating companies by size as well as industry type and sector to understand the IPR FDI nexus more effectively.

Considering the importance of IPRs when undertaking Mansfield type investments by numbers of employees, one sees that micro-companies show little concern for IPRs across all but sales, marketing and distribution of goods and services with concern increasing across all investment types as the number of employees increases.

Mansfield (1994) postulated that high-tech companies were more concerned about IPRs when making investments in R&D facilities. Table 45 confirms this, showing that as companies become more R&D-intensive, they do indeed become more concerned about IPRs. It is also interesting to note that concern about IPRs is lowest for sales, marketing and distribution and rudimentary production for the most R&D-intensive companies. These data seem to confirm Mansfield's (ibid) findings, particularly for the most R&D-intensive companies.

The same data set against ease of copying shows that companies with products and services that are relatively easy to copy are much less concerned about IPRs than companies with either moderate or very difficult products or services to imitate. This would counter a belief that ease of copying and IPRs are substitutes.

Companies that have invested in China are likely to be more concerned about IPR protection across all investment types than those that have not invested in China except sales, marketing and distribution of products and services. This is an interesting finding as companies that are concerned about IPRs are investing in China. Later this thesis examines the types of investments companies they are making in China to see if the quality of investments is impacted by the actual or perceived weaknesses of Chinese IPRs.

As companies become more experienced in FDI, they, on average, become less concerned about IPRs when making specific investment types but concern peaks when the company has a medium level of investment experience to then fall away as they become more experienced. This might suggest that the importance of IPRs also changes as companies grow and develop.

Table 45

Z-score Importance of IPRs when Making Different Types of Overseas Investments by Company Type, Annual Turnover, Number of Employees, R&D as a Percentage of Turnover, Ease of Copying, Number of Recorded Subsidiaries and Subsidiary in China.

		Importance of IPRs Sales and Marketing	Importance of IPRs Rudimentary product	Importance of IPRs Components	Importance of IPRs Complete products	Importance of IPR R&D
		Mean Z-score				
Company Type	Manufacturing	-0.07860	-0.04389	-0.05388	0.17615	0.28705
	Services	-0.01801	0.01544	-0.07020	-0.24569	-0.20980
	Manufacturing and Services	0.11604	0.01458	0.18057	0.27592	0.10829
Annual Turnover	£0-£2 million	0.06530	-0.16814	-0.24395	-0.36873	-0.34084
	£2 million to £10 million	0.06530	0.12389	-0.22729	-0.36873	-0.24810
	£10 million to £50 million	-0.04108	-0.08039	-0.09575	-0.04606	-0.06589
	£50 million to £500 million	-0.00412	-0.05310	-0.02736	0.07361	0.18233
	Over £500 million	0.03463	0.17699	0.39499	0.27824	0.11842
Number of Employees	1-9	0.06530	-0.51326	-0.41722	-0.64692	-0.82305
	10-49	-0.04463	0.17699	-0.02736	-0.15943	-0.29060
	50-250	0.27807	0.17699	-0.02736	0.01162	0.13277
	more than 250	-0.13061	-0.06249	0.08208	0.13441	0.09869
R&D as a percentage of turnover	0-5%	-0.05572	-0.05967	-0.10456	-0.11068	-0.26922
	6-10%	0.06530	0.09416	0.20197	0.20685	0.31016
	10-25%	0.25376	0.12389	0.02262	-0.12891	0.28426
	Over 25%	-0.26449	-0.16814	-0.02736	0.14289	0.42633
Ease of Copying	Very Easy	-0.13457	-0.28318	-0.40464	-0.31177	-0.49639
	Moderate	0.06530	0.03540	0.05174	0.01414	0.03986
	Very Difficult	-0.15456	0.03540	0.14363	0.18345	0.30831
Number of Recorded Subsidiaries	Low	0.04295	0.08178	-0.07461	0.09914	0.08216
	Medium	0.22683	0.26327	0.11389	0.01907	0.08780
	High	-0.07211	-0.21744	-0.00028	0.03897	-0.00739
	Very High	-0.22147	-0.16814	-0.02736	-0.21045	-0.19732
Sub in China	Yes	0.02707	0.11424	0.21630	0.28146	0.23323
	No	0.00298	-0.09238	-0.14550	-0.16127	-0.11356

5.5.3 The Importance of IPRs Relative to other Location Factors

To investigate the importance of IPR protection relative to the other factors influencing the investment (location) decisions of UK MNEs, a set of questions were asked of the respondents to assess the importance of the other investment factors when compared with IPR protection. The factors assessed were; market size, market growth, financial incentives, access to infrastructure, availability of human capital, cost of human capital, corruption/political stability, cultural closeness/similarity, and exchange rate stability (De Vita, 2001; De Vita and Lawler, 2004; Blonigen, 2005). These scores were converted into a Z-score with a higher than 0 score indicating the factor is more important than IPRs and a lower Z-score than 0 that the factor is less important than IPRs.

Table 46[61] shows that manufacturing companies regard all location advantages, except cultural closeness/similarity, as being more important than IPR protection. For services companies, only the availability of human capital and cultural closeness/similarity were considered more important than IPR protection. For companies undertaking both manufacturing and delivering services, corruption/political stability was the most important investment factor with access to infrastructure, cultural closeness/stability and exchange rate stability less important than IPR protection. This is a puzzling finding as services-based companies had indicated IPR protection as less important to them (see Table 45). This may suggest that these companies are influenced by the availability of human capital and cultural closeness to the exclusion of other drivers.

For the smallest companies, IPRs are the most important factor for investment. As companies grow larger, the findings switch where the largest companies only see market size and market growth as marginally less important than IPRs. For the largest companies, corruption/political stability is the most important investment factor. This picture is broadly mirrored when one considers the size of an organisation by employee numbers.

The most R&D intensive companies see IPRs as only being more important than access to infrastructure, availability of human capital and corruption/political stability. This would seem to undermine the findings of Mansfield (1994) that the most R&D-intensive companies are more

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[61] A colour heatmap is superimposed on the data to show the intensity of the particular finding with darker green indicating a higher positive intensity and darker red a higher negative intensity with white indicating a neutral intensity.

concerned about the strength of IPRs. For the most R&D-intensive companies, financial incentives appear to be particularly important.

When a companies' investment experience is considered, one observes a complex distribution. Market size and growth dominate with companies who are relatively inexperienced, and this drops away as companies invest in more countries. Against the basket of factors, IPRs become more important as companies grow their international footprint.

Companies with very difficult to copy products or services view IPRs as less important than other drivers. This is possibly because of the complexity of imitation undermines the requirements for stronger IPRs. IPRs are much more important to companies with moderately easy to imitate products and services.

Companies that have invested in China consider, on average, only financial incentives, cultural closeness and exchange rate stability as being less critical than IPR protection. The availability and cost of human capital are crucial drivers for companies that invested in China.

Table 46

Z-scores of the Importance of Different Location Motivations Against Company Type, Annual Turnover, Number of Employees, R&D Intensity, Ease of Copying, FDI Experience and Subsidiary in China.

		Market Size	Market Growth	Financial Incentives	Access to Infrastructure	Availability of human capital	Cost of human capital	Corruption/ Political Stability	Cultural Closeness /Similarity	Exchange rate stability
		Mean Z-score								
Company Type	Manufacturing	0.07116	0.06455	0.20107	0.18174	-0.028	0.03773	0.15427	-0.07114	0.23436
	Services	-0.1262	-0.13356	-0.10294	-0.08339	-0.03221	-0.06376	-0.15404	0.05289	-0.06908
	Manufacturing Services	0.15092	0.16609	-0.01364	-0.04822	0.08646	0.06968	0.11292	-0.0195	-0.12768
Annual Turnover	£0-£2 million	-0.1138	-0.17307	-0.07971	-0.41239	-0.59091	-0.43004	-0.35225	-0.12075	0.04363
	£2 million to £10 million	0.29027	0.24625	0.03261	-0.05728	-0.14527	-0.03692	-0.46428	-0.10834	-0.36621
	£10 million to £50 million	-0.13834	-0.08162	-0.09153	-0.02666	-0.02962	-0.11791	-0.03512	-0.0546	0.15633
	£50 million to £500 million	0.04632	0.01912	-0.00483	-0.03262	0.09188	0.13709	0.06218	-0.01404	-0.00941
	Over £500 million	-0.01873	-0.01135	0.1331	0.21589	0.18939	0.16278	0.29899	0.21806	-0.01272
Number of Employees	1-9	-0.26593	-0.1058	-0.00483	-0.27922	-0.69411	-0.53698	-0.41832	-0.26958	-0.10665
	10-49	0.37454	0.25707	-0.01844	-0.01289	-0.0146	0.09496	-0.47838	0.06825	0.06736
	50-250	0.09899	0.09972	0.01324	-0.04223	-0.00574	-0.02271	0.12344	-0.08375	0.05817
	more than 250	-0.14357	-0.11968	0.01449	0.02216	0.05905	0.07411	0.05225	0.06308	-0.02008
R&D as a percentage of turnover	0-5%	-0.01873	-0.02893	-0.0258	0.01375	0.00109	0.04741	-0.0397	-0.04608	0.04363
	6-10%	-0.0672	-0.12785	0.03261	0.00614	-0.07951	-0.01337	0.06438	0.03999	-0.06908
	10-25%	-0.01873	0.15297	-0.18338	-0.02313	0.15964	-0.08976	-0.02663	-0.089	-0.10665
	Over 25%	0.43072	0.35982	0.45939	-0.20524	-0.06211	-0.11186	-0.03512	0.49262	0.22396

		Market Size	Market Growth	Financial Incentives	Access to Infrastructure	Availability of human capital	Cost of human capital	Corruption/ Political Stability	Cultural Closeness /Similarity	Exchange rate stability
		Mean Z-score								
Ease Copying	Very Easy	0.13109	0.09483	0.11593	-0.19599	-0.06904	0.17922	0.1061	0.0932	0.11407
	Moderate	-0.0711	-0.03473	-0.05606	0.04486	0.00056	-0.0445	-0.06097	-0.02773	-0.0248
	Very Difficult	0.16667	0.17527	0.2091	0.16467	0.06335	0.10862	0.05941	0.0777	0.0812
Number of Recorded Subsidiaries	Low	0.20199	0.17811	-0.10562	0.0537	0.20655	0.08037	0.04056	0.0777	0.06867
	Medium	0.03387	0.07344	-0.07971	0.11423	-0.1055	-0.1743	0.00107	0.03139	0.10374
	High	0.03172	0.07011	0.02066	-0.10553	-0.09445	0.02504	0.15619	-0.25586	-0.31703
	Very High	-0.31429	-0.36108	0.18671	-0.06736	-0.03008	0.06049	-0.20575	0.14605	0.14023
Sub in China	Yes	0.01763	0.07423	-0.07971	0	0.08458	0.05151	0.05895	-0.02773	-0.03386
	No	-0.01873	-0.05256	0.04384	0.00291	-0.03347	-0.024	-0.06485	0.00682	0.01642

Table 47 shows the Z-scores for each factor by sector with the green highlighted scores being those factors considered more important than IPR protection, and those shaded pink being less important. For the sectors ‘Manufacturing’, and ‘Arts, entertainment and recreation’, all factors are considered more critical than IPR protection. For the sectors ‘Wholesale and retail trade’, ‘Repair of motor vehicles and motorcycles’, and ‘Education’, IPRs are, on average, the most essential factor.

Table 47

Mean Z-scores of Relative Investment Factors Compared to IPRs by Sector.

	Agriculture, Forestry and Fishing	Mining and Quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Water supply, sewerage, waste management and remediation activities	Construction	Wholesale and retail trade; repair of motor vehicles and motorcycles	Transportation and storage	Accommodation and food service activities	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical services	Administration and support service activities	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities
Market Size	0.80527	0.29027	0.01380	-0.01873	0.39327	-1.25472	-0.09598	0.25594	-0.01873	-0.11380	-0.07758	1.21726	-0.19039	0.27791	-0.63672	-1.25472	0.39327	-0.22473
Market Growth	0.85194	0.33143	0.01912	1.26835	0.85194	-1.23011	-0.05896	0.15792	0.01912	-0.08082	0.08158	0.64374	-0.15438	-0.03085	-0.60549	-1.23011	0.01912	0.01912
Financial Incentives	0.14492	0.25723	0.34912	0.59417	0.14492	1.94191	-0.12463	-0.30433	0.59417	-0.10900	-0.04762	0.59417	-0.11934	-0.13586	-0.75358	-0.75358	0.59417	-0.30433
Access to Infrastructure	0.38661	-0.27922	0.16467	-0.27922	-0.50117	-0.94506	-0.36245	-0.18410	0.38661	0.08396	-0.24418	-0.27922	0.19078	0.05370	-0.94506	-0.94506	0.38661	0.16467
Availability of human capital	0.56619	0.15964	0.19352	-1.06001	-0.45018	-1.06001	-0.60264	0.00718	0.15964	0.15964	-0.42114	-1.06001	0.15964	0.15964	-0.45018	-1.06001	0.97274	0.15964
Cost of human capital	1.19031	0.34773	0.17219	-0.91614	-0.28420		-0.57911	-0.12622	0.34773	-0.12622	-0.22101	-0.91614	0.20730	0.08443	-0.91614	-0.91614	0.76902	0.13709
Corruption/Political Stability	0.63877	-0.15404	0.07719	-1.34326	0.44057	-1.34326	-0.22837	-0.15404	-0.15404	-0.10648	-0.21067	1.03518	0.17629	0.09371	-0.15404	-0.15404	0.24236	0.24236
Cultural Closeness/Similarity	-0.05460	-0.59205	0.11739	-0.26958	-0.91452	-0.91452	-0.18896	0.37536	0.37536	-0.12937	0.25252	-0.26958	-0.14059	0.10664	-0.26958	0.37536	0.80532	-0.05460
Exchange rate stability	0.94527	-0.18178	0.23147	-0.85801	0.49445		-0.31703	0.04363	0.49445	-0.38759	0.22396	0.49445	-0.07932	0.09998	-0.85801	-0.85801	0.94527	-0.40719

Table 48 shows the mean Z-score across all sectors for the importance of investment factors against IPR protection. On average, across all sectors, financial incentives have the highest mean Z-score and along with market growth and exchange rate stability are considered more important than IPRs. All the other factors are, on average, considered less critical than IPRs with the availability of human capital being the least important investment factor.

Table 48

Mean Z-scores of Investment Factors.

Investment Factor	Mean Z-score
Financial incentives	0.14236
Market growth	0.04848
Exchange rate stability	0.00153
IPR Protection	0.00000
Market size	-0.01328
Corruption/Political stability	-0.05866
Cultural closeness/Similarity	-0.07722
Cost of human capital	-0.10268
Access to infrastructure	-0.17484
Availability of human capital	-0.19260

5.5.4 How do UK MNE's Perceive the Business Culture in China?

To examine how UK MNEs perceive the business culture in China the survey instrument asked the respondents to assess the similarity between the UK's and China's business culture. Respondents were required to rate China as either similar, different or very different to the UK. Figure 29 shows that most UK companies see China as either very different or different from the UK. While this difference is marked, how it does or does not impact on the investment decisions of UK MNEs is beyond the scope of this research, but may indicate a drag on the propensity to invest and the need for experienced local collaborators (Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977).

Figure 29

Assessment of China's Business Culture compared to UK Business Culture

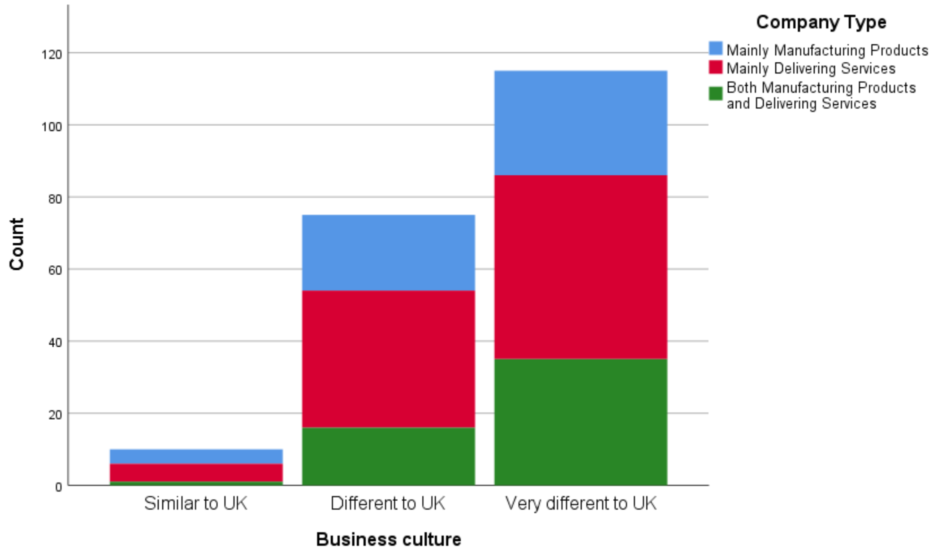


Figure 30 illustrates that as companies become more R&D-intensive, they are more likely to see the Chinese business culture as different or very different from the UK's. Figure 31 shows that having a subsidiary in China helps companies feel more comfortable about the business culture in China.

Figure 30

Business Culture in China by R&D Intensity

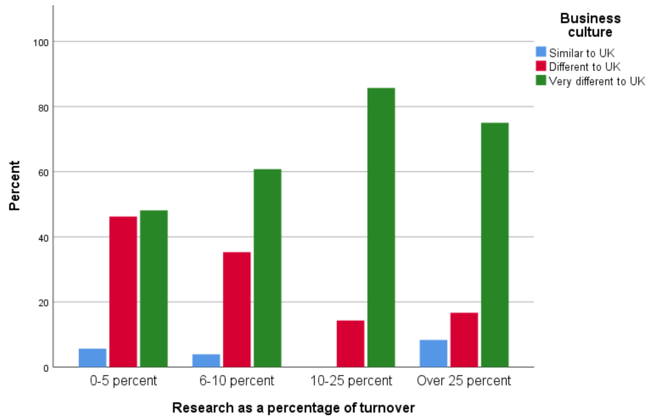
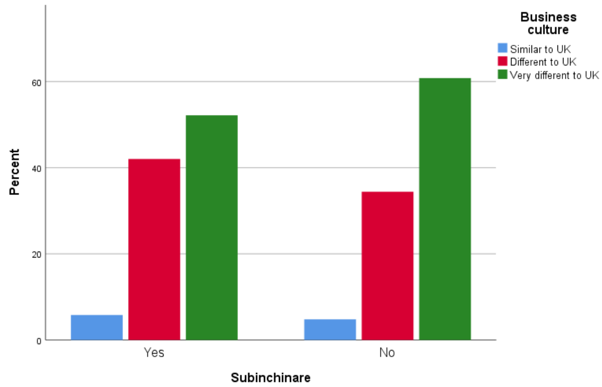


Figure 31

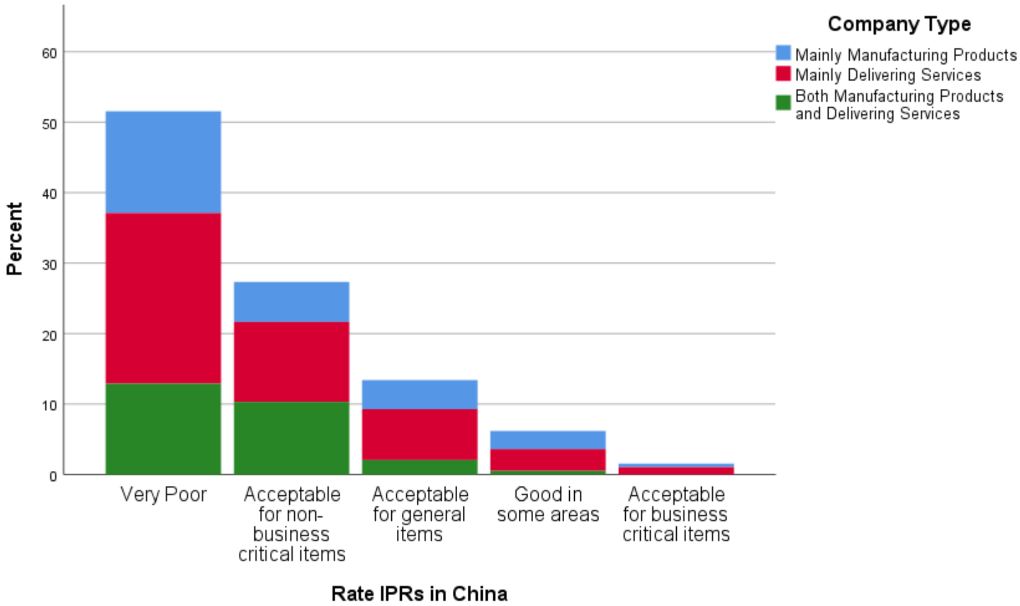
Business Culture in China by Invested in China



Mirroring the questions asked by Mansfield (1994), respondents were asked to consider the perceptions of China's IPRs directly. Figure 32 shows that over 50% of companies surveyed believe that Chinese IPRs are very poor, and over 75% that they are either very poor or only acceptable for non-business critical items. Only 1.55% of respondents stated that Chinese IPRs were suitable for business-critical items.

Figure 32

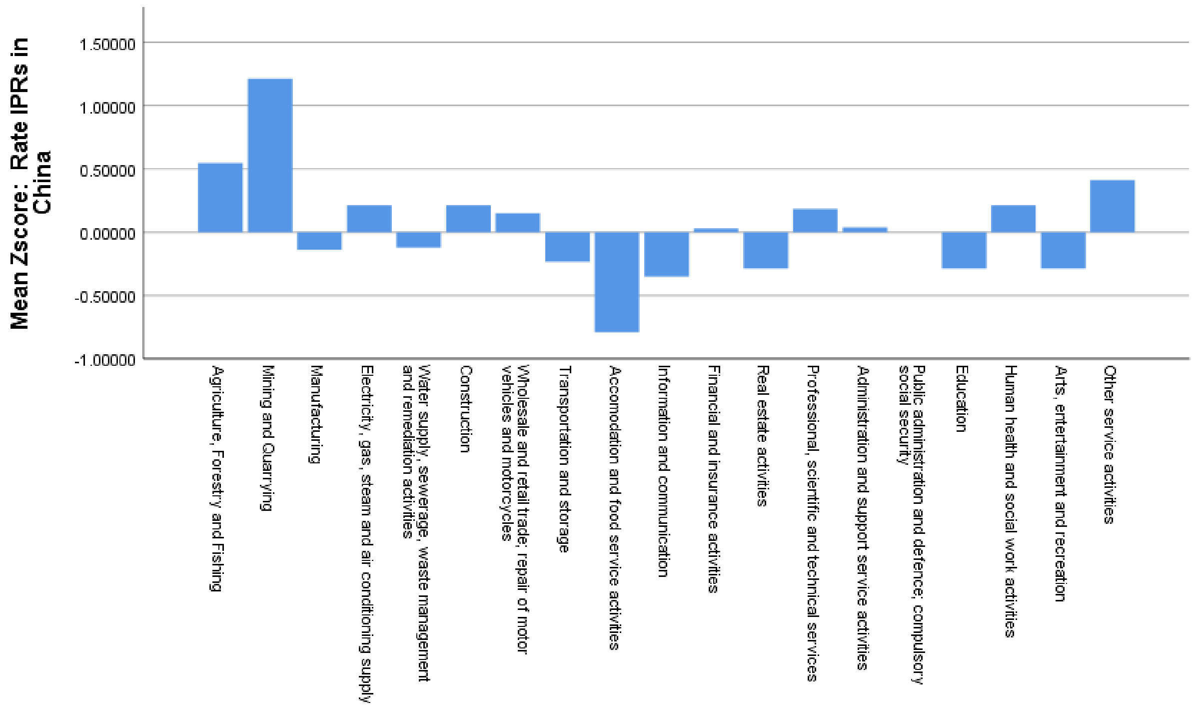
Perceptions of Chinese IPRs



Considering a sector breakdown of Z-scores of perceptions of Chinese IPRs, one sees that 'Mining and quarrying' and 'Agriculture, forestry and fishing' (the sector surveyed with the highest mean R&D intensity - see Figure 13) are the sectors most positive about Chinese IPRs. Companies in the 'Accommodation, food and services activities' sector show the least confidence in China's IPRs, see Figure 33.

Figure 33

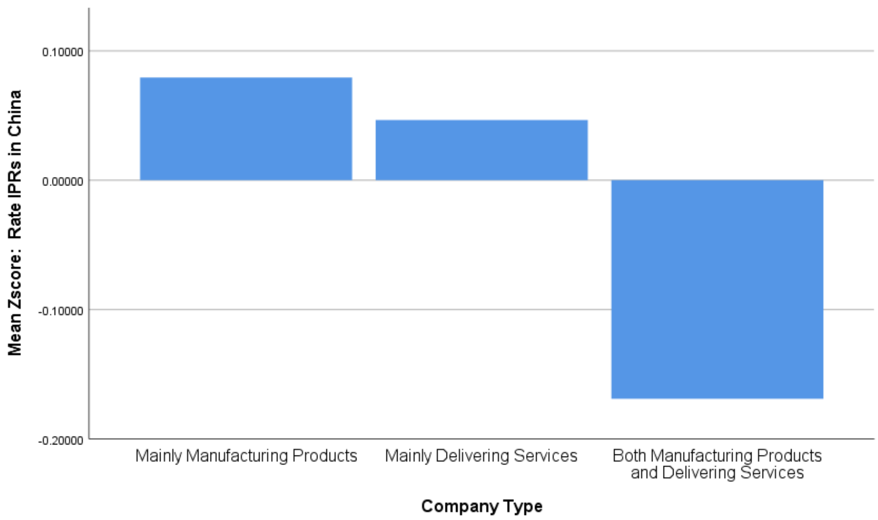
Perceptions of Chinese IPRs Z-score by Sector



Companies that both manufacture products and deliver services have the most negative view of Chinese IPRs' ability to protect their products and services, see Figure 34.

Figure 34

Perceptions of China's IPRs Z-score by Company Type.



The smallest companies surveyed are most likely to be positive about the ability of Chinese IPRs to protect their products and services. Companies with between £50 and £500 million turnover are the most negative about Chinese IPRs, see Figure 35. Companies with less than 50 staff are more positive about Chinese IPRs, while companies with between 50 and 250 employees were the most concerned about the protection afforded by Chinese IPRs, see Figure 36.

Figure 35

Perceptions of Chinese IPRs Z-score by Company Size.

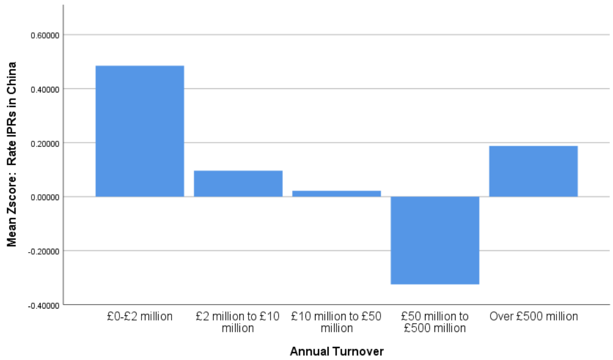


Figure 36

Perceptions of Chinese IPRs Z-score by the Number of Employees.

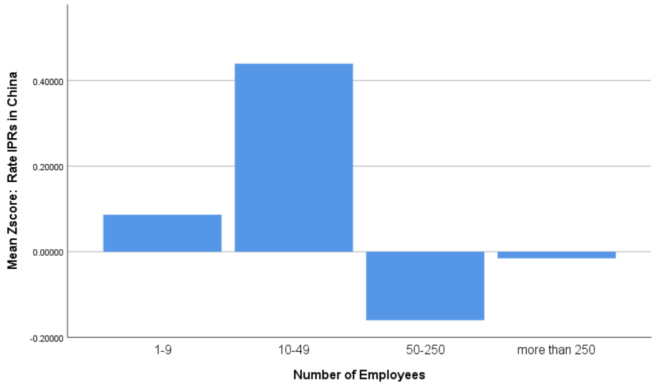


Figure 37 shows the distribution of perceptions of Chinese IPRs is strongly skewed towards a negative perception. This graph shows that despite China's efforts to improve the legislative strength of its IP laws, driven by its accession to the WTO and criticism of its IPR protection, UK MNEs still hold a negative perception of China's IPR regime.

Figure 37

Histogram of Distribution of Perceptions of Chinese IPRs

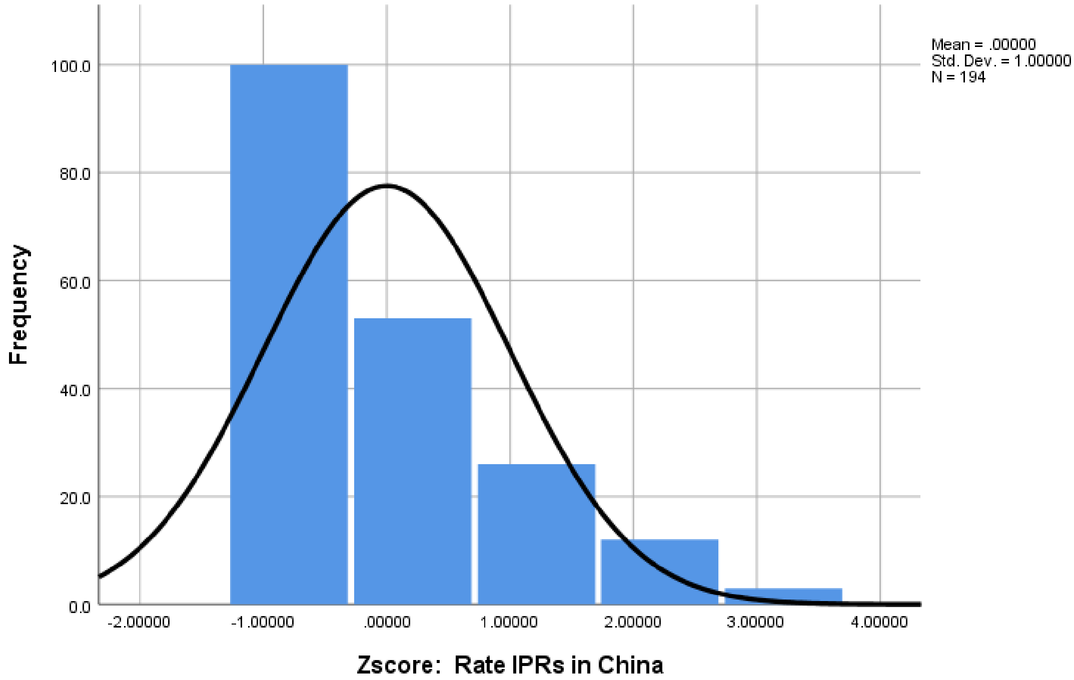


Figure 38 interestingly shows an increasing positivity in sentiment for Chinese IPRs as R&D intensity increases, but that companies with between 10% and 25% of turnover invested in R&D are significantly more cynical about the ability for Chinese IPRs to protect their products and services. As companies grow in confidence about their ability to protect their products and services, they also increase the positive sentiment about the ability of Chinese IPRs to protect them, see Figure 39.

Figure 38

Perceptions of Chinese IPRs Z-score by R&D Intensity

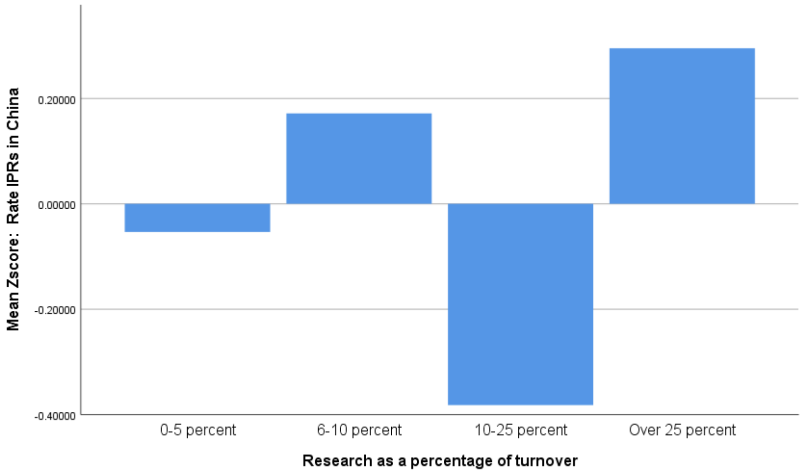
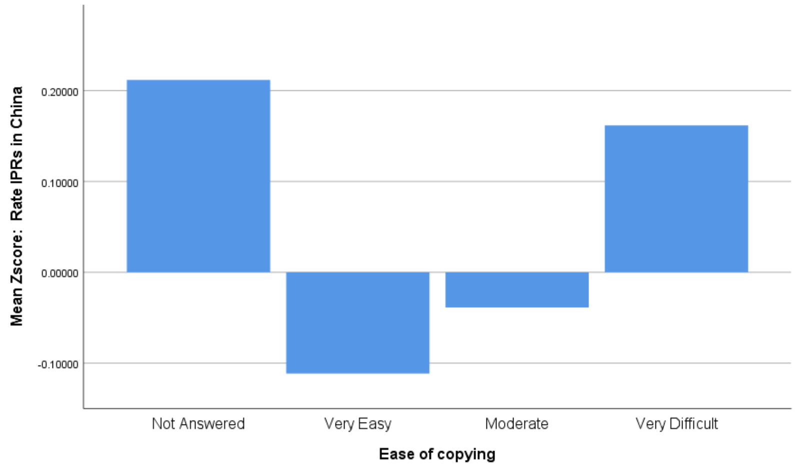


Figure 39

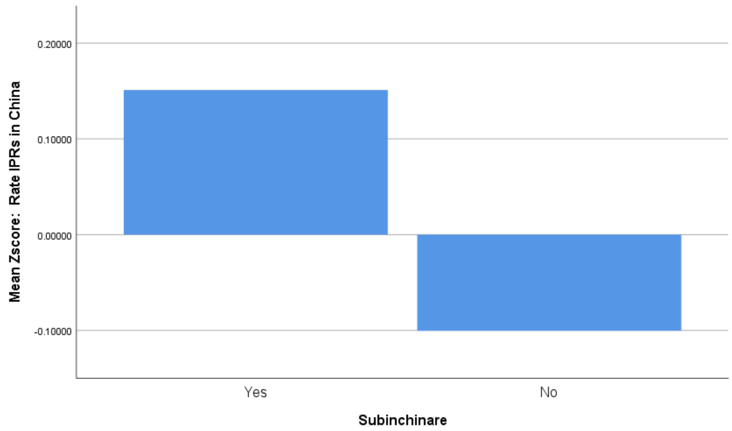
Perception of Chinese IPRs Z-score by the Ease of Copying



Companies that have invested in China do have greater confidence in the country's IPRs to protect their products and services, suggesting that experience of China's IPRs improves the perception, see Figure 40.

Figure 40

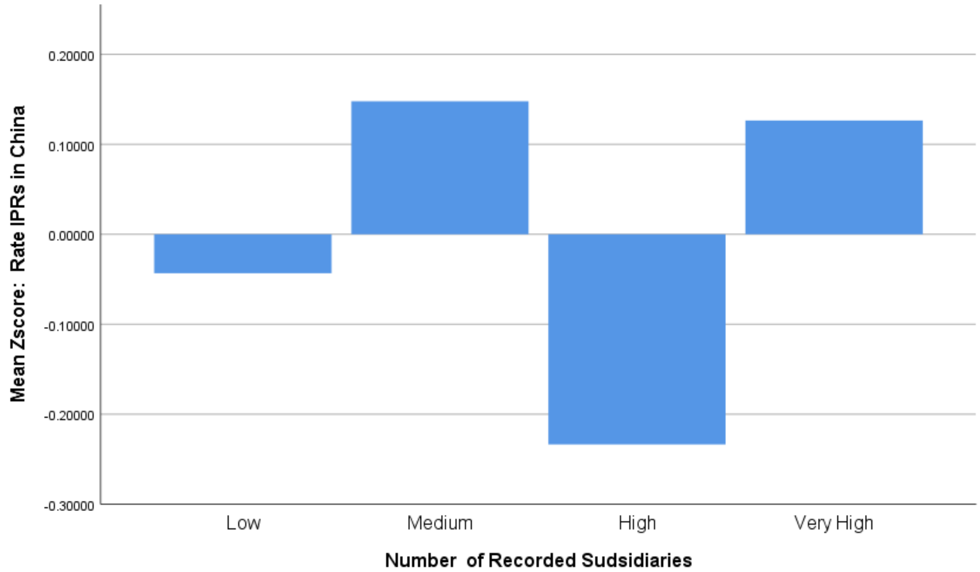
Perception of Chinese IPRs Z-score by Invested in China.



The pattern of distribution of sentiment is unclear with companies that are rated as having a high-level experience in investments overseas being the most negative about Chinese IPRS, see Figure 41.

Figure 41

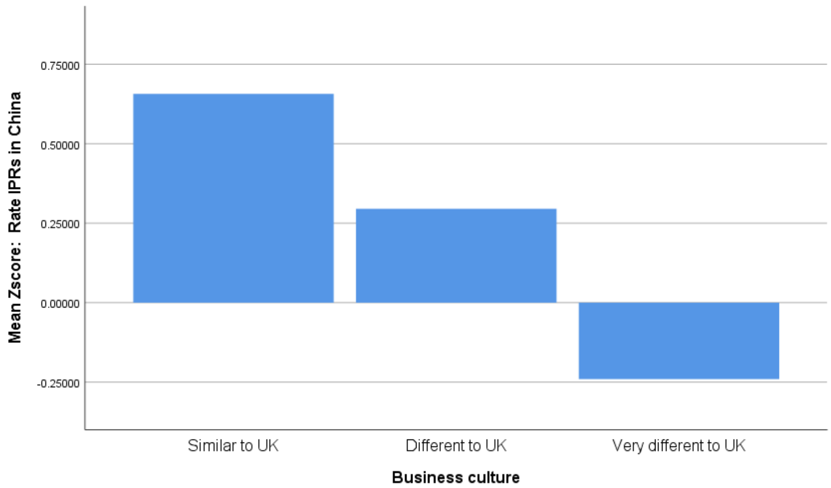
Perceptions of Chinese IPRs Z-score by Investment Experience



Companies that felt that China's business culture was similar to the UK's had much more confidence in the ability of Chinese IPRs to protect their products and services than those who felt China was very different from the UK, see Figure 42.

Figure 42

Perception of Chinese IRPs Z-scores by Perception of China's Business Culture



5.5.5 How do UK MNEs Interact with China's IPR System?

This section considers the experience of the companies surveyed in engaging with China's IPR system. Experience with filing for patent protection in China was surprisingly limited, with the majority of companies not having filed for a patent in China (see Table 49). As companies grow, they are more likely to file patents in China. Interestingly, interlocutors from companies that had a turnover of over £500m were less likely to know about the patenting activity of their businesses. This perhaps reflects larger companies having IP managed either externally or by separate teams within the business that creates less visibility of the concerns for IPRs at the executive level of the organisation. Companies that are more R&D intensive are more likely to have filed for patents in China, which is intuitively plausible. Companies with products and services they consider to be very difficult to copy are more likely to have 1 -5 patents in China. Those whose products have only a moderate level of protection against copying are more likely to have more than six patents in China. Although having a subsidiary in China is not a prerequisite for filing patents in China, those companies that do have a subsidiary are twice as likely to have filed 1-5 patents and more than six patents. The level of FDI experience seems to make little difference to the likelihood of a company filing for patents in China.

More than 60 companies surveyed had registered a trademark in China. However, given that 129 of the companies surveyed either export, produce under licence or have a subsidiary in China, this number seems low. It suggests that many companies are taking significant risks with their corporate brands. As one might expect, the numbers of companies registering trademarks in China increases with the size of the company in terms of both turnover and employee numbers. As observed with patents, firms that consider their products/services moderately difficult to copy are most likely to have registered larger numbers of trademarks in China. Overall, the pattern of trademark activity in China does increase with investment experience, although the pattern of growth may not be linear. Unsurprisingly, companies with subsidiaries in China are far more likely to have registered trademarks in China. It is concerning that over 30% of companies with subsidiaries in China have not registered a trademark in China (see Table 49).

Copyrights under the Berne Convention (of which China is a signatory) are automatically protected. This means the owner of the rights, does not need to register copyrights. However, China does implement a 'voluntary copyright registration' process. Rights-holders complete a registration procedure and are granted a certificate that can serve as proof of ownership. The number of copyrights registered in China by UK MNEs is low. Having a subsidiary in China, once again, significantly increases a company's propensity to interact with the Chinese IPR system, as seen in Table 49.

Table 49

UK MNE Engagement in Chinese IPR regime by company type, annual turnover, number of employees, R&D intensity, ease of copying, FDI experience and investment in China

		Patents				Trademarks				Copyrights			
		Never	1-5 Times	More than six times	I don't know	Never	1-5 Times	More than six times	I don't know	Never	1-5 Times	More than six times	I don't know
		Row %											
Company Type	Manufacturing	49.1%	24.5%	11.3%	15.1%	30.2%	39.6%	18.9%	11.3%	53.1%	12.2%	14.3%	20.4%
	Services	84.2%	6.3%	1.1%	8.4%	75.5%	13.8%	3.2%	7.4%	78.7%	8.5%	5.3%	7.4%
	Manufacturing and Services	67.3%	7.7%	15.4%	9.6%	55.8%	15.4%	15.4%	13.5%	59.6%	9.6%	11.5%	19.2%
Annual Turnover	£0-£2 million	75.0%	16.7%	0.0%	8.3%	81.8%	9.1%	0.0%	9.1%	81.8%	9.1%	0.0%	9.1%
	£2 million to £10 million	85.2%	7.4%	3.7%	3.7%	77.8%	18.5%	0.0%	3.7%	88.9%	3.7%	0.0%	7.4%
	£10 million to £50 million	72.9%	16.9%	6.8%	3.4%	62.7%	22.0%	11.9%	3.4%	73.7%	7.0%	14.0%	5.3%
	£50 million to £500 million	70.7%	12.1%	10.3%	6.9%	53.4%	27.6%	13.8%	5.2%	66.7%	15.8%	3.5%	14.0%
	Over £500 million	58.1%	2.3%	9.3%	30.2%	41.9%	14.0%	14.0%	30.2%	41.9%	9.3%	18.6%	30.2%
Number of Employees	1-9	88.9%	0.0%	0.0%	11.1%	88.9%	0.0%	0.0%	11.1%	88.9%	0.0%	0.0%	11.1%
	10-49	78.3%	8.7%	4.3%	8.7%	60.9%	26.1%	4.3%	8.7%	73.9%	8.7%	4.3%	13.0%
	50-250	71.0%	16.1%	11.3%	1.6%	64.5%	21.0%	14.5%	0.0%	78.0%	5.1%	13.6%	3.4%
	more than 250	67.3%	9.9%	6.9%	15.8%	51.0%	22.0%	11.0%	16.0%	57.0%	14.0%	9.0%	20.0%
R&D as a percentage of turnover	0-5%	71.0%	7.5%	8.4%	13.1%	56.1%	19.6%	14.0%	10.3%	66.3%	8.7%	10.6%	14.4%
	6-10%	66.0%	18.0%	8.0%	8.0%	61.2%	18.4%	10.2%	10.2%	67.3%	4.1%	12.2%	16.3%
	10-25%	82.1%	10.7%	3.6%	3.6%	67.9%	25.0%	3.6%	3.6%	78.6%	17.9%	0.0%	3.6%
	Over 25%	66.7%	16.7%	8.3%	8.3%	50.0%	33.3%	0.0%	16.7%	50.0%	25.0%	8.3%	16.7%

		Patents				Trademarks				Copyrights			
		Never	1-5 Times	More than six times	I don't know	Never	1-5 Times	More than six times	I don't know	Never	1-5 Times	More than six times	I don't know
		Row %											
Ease of Copying	Very Easy	87.1%	3.2%	0.0%	9.7%	78.1%	9.4%	0.0%	12.5%	80.0%	3.3%	3.3%	13.3%
	Moderate	68.3%	9.2%	11.7%	10.8%	52.9%	22.7%	16.8%	7.6%	65.3%	8.5%	13.6%	12.7%
	Very Difficult	59.5%	26.2%	2.4%	11.9%	51.2%	29.3%	2.4%	17.1%	60.0%	20.0%	0.0%	20.0%
Number of Recorded Subsidiaries	Low	67.9%	14.3%	7.1%	10.7%	59.6%	21.1%	10.5%	8.8%	70.4%	9.3%	9.3%	11.1%
	Medium	69.4%	10.2%	6.1%	14.3%	55.1%	26.5%	6.1%	12.2%	62.5%	12.5%	8.3%	16.7%
	High	70.8%	14.6%	6.3%	8.3%	65.2%	15.2%	10.9%	8.7%	71.7%	8.7%	8.7%	10.9%
	Very High	74.5%	6.4%	10.6%	8.5%	53.2%	21.3%	14.9%	10.6%	63.8%	8.5%	10.6%	17.0%
Sub in China	Yes	50.0%	20.6%	13.2%	16.2%	32.4%	36.8%	16.2%	14.7%	43.9%	21.2%	13.6%	21.2%
	No	83.3%	7.1%	4.8%	4.8%	73.6%	13.6%	8.0%	4.8%	82.1%	4.1%	6.5%	7.3%

Mansfield (1994) asked a series of specific questions to his interlocutors about their perception of the strengths of IPR protections in the 16 countries considered in his study. The questions asked were phrased as 'Did country X have IPR protection that was too weak in 1991 to allow it to transfer its newest or most effective technology through a) joint ventures and b) wholly-owned subsidiary and c) licence the technology'.

Table 50 shows that companies, surveyed in the current research, of all types, view investing their most important IP through a joint venture in China as the most effective method of investing while protecting their most sensitive IP. Licensing was considered the riskiest activity in China, with 87.5% of manufacturing companies believing that Chinese IPRs are too weak for their newest or most effective technology. This would support the view of Sun (1999) who while considering social-cultural differences, also found that Western European companies were most comfortable investing through the establishment of a joint venture.

Mansfield (1994) identified that in 1991 for the most high-tech companies/sectors (defined as being in the Chemicals, including pharmaceuticals), India and Nigeria (2nd tertile countries) were the countries where most companies felt that IPRs were too weak to transfer their newest or most important technology through a joint venture with 80% and 64% respectively claiming this. Across all companies, the mean percentage for India was 44% and for Nigeria 33%. The current research shows that China; despite having stronger IP laws on the books (1st tertile), produces a mean of 40.32% and for high-tech companies (measured as a percentage of R&D as a proportion of turnover and taking responses from companies with over 10% of turnover spent on R&D) a mean of 53.85%.

When looking at transferring technology through a wholly foreign-owned entity (WFOE) again India and Nigeria were considered the riskiest with 81% and 67% respectively answering in the positive from Mansfield's high-technology sector grouping. Mansfield found a mean across all sectors of 43% and 30% respectively for these two countries. UK high-tech MNEs rated China with 69.23% of companies and a mean of 66.1% for all companies feeling China's IPRs were too weak to invest their newest or most effective technology through a WFOE.

Mansfield found that companies were less confident about transferring their most important IP through licencing, and this is also reflected in the responses seen to this question when considering China. 83.33% of high-tech UK MNEs feel that China's IPR laws are too weak to invest their newest or most effective technology through licensing and 77.77% of all companies showing a similar sentiment. These findings would suggest that despite China's relatively strong IPR laws, UK MNEs are very cautious about investing their most important IP in China.

Table 50

Responses to Mansfield questions relating to China's IPRs by UK MNEs in 2018

Percentages answered 'Yes.'								
Question	**Manufacturing All Companies**	**High-tech**	**Services All Companies**	**High-tech**	**Manufacturing and Services All Companies**	**High-tech**	**Mean**	**Mean High-tech**
Too weak to set up a joint venture?	47.50	100	34.62	50	40.63	44.44	40.32	53.85
Too weak to transfer newest or most effective technology to a WFOE?	70.00	75	64.44	76.92	63.64	55.56	66.1	69.23
Too weak to licence newest or most effective technology in China?	87.50	100	71.43	84.62	74.29	75	77.77	83.33

Through a further set of questions to the UK MNEs, the companies were asked about their confidence in Chinese IP laws, legal structures and enforcement. Table 51 shows that only a mean of 22.22% of all companies and a higher mean of 26.09% of high-tech companies believe Chinese IP laws can protect their IP. A mean for all companies of 19.78% and 22.73% for high-tech companies believe the legal structures are in place to protect their IP in China. Finally, only a mean of 6.9% for all companies surveyed and 9.52% of high-tech companies believe that enforcement in China is adequate to protect their IP. The interesting finding here is the higher level of sentiment (although still low) from high-tech companies perhaps a result of their requirement to interact with Chinese IPRs. These are stark findings for China's IPR regulators. Nearly 75% of high-technology companies believe China's IPR laws are not fit to protect their most valuable technology. Nearly 80% of respondents question the ability of the legal structures available in China, and over 90% of companies believe China's agencies are unable to protect their IP.

Table 51

Questions Relating to Chinese IRP Laws, Legal Structures and Enforcement

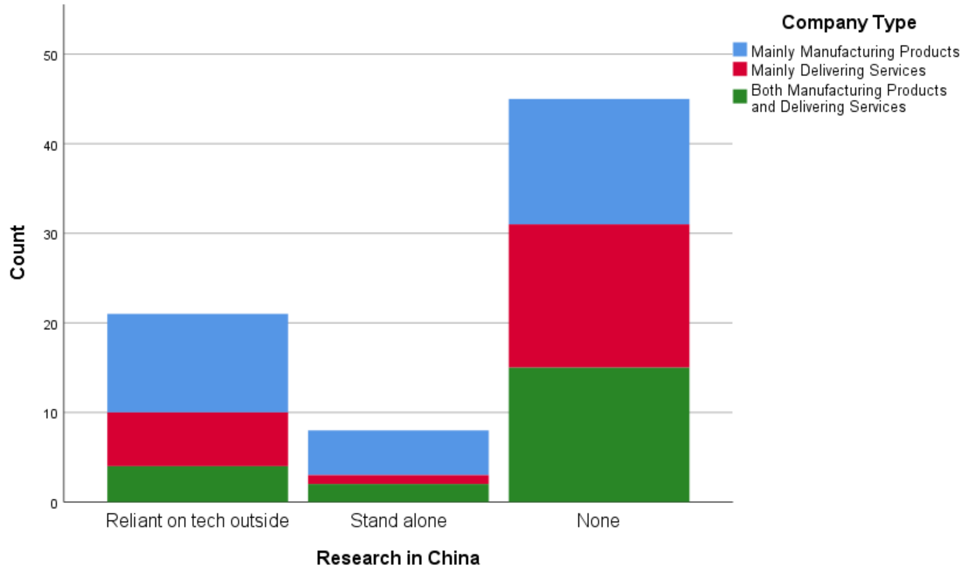
Percentages answered 'Yes.'								
Question	**Manufacturing All Companies**	**High-tech**	**Services All Companies**	**High-tech**	**Manufacturing and Services All Companies**	**High-tech**	**Mean**	**Mean High-tech**
Can China's IP laws protect the technology of your company?	22.58	50	21.05	25	23.33	14.29	22.22	26.09
Are there adequate legal structures in China to protect your IP?	27.59	50	11.11	16.67	23.08	16.67	19.78	22.73
Do China's agencies effectively enforce IPRs and provide prompt and equitable treatment?	4.00	0	8.33	9.09	7.69	12.5	6.9	9.52

5.5.6 What Types of Investment do UK MNEs Make in R&D in China?

Figure 43 considering the type of R&D undertaken by UK MNEs in China, shows that most is reliant on technology that is held outside of China. This supports the view of Zhao (2006) that companies navigate concerns about IPRs in China by undertaking vertical rather than horizontal type R&D. This is an interesting finding and proof that UK MNEs are making R&D decisions that allow them to operate in China despite a weak IPR regime. Of the companies surveyed, companies in the manufacturing sector have the most R&D in China and the most that are reliant on technology held outside of China. Of the companies surveyed only eight out of 29 R&D facilities carried out standalone R&D (horizontal). This is a significant finding and empirical evidence of this phenomena in China.

Figure 43

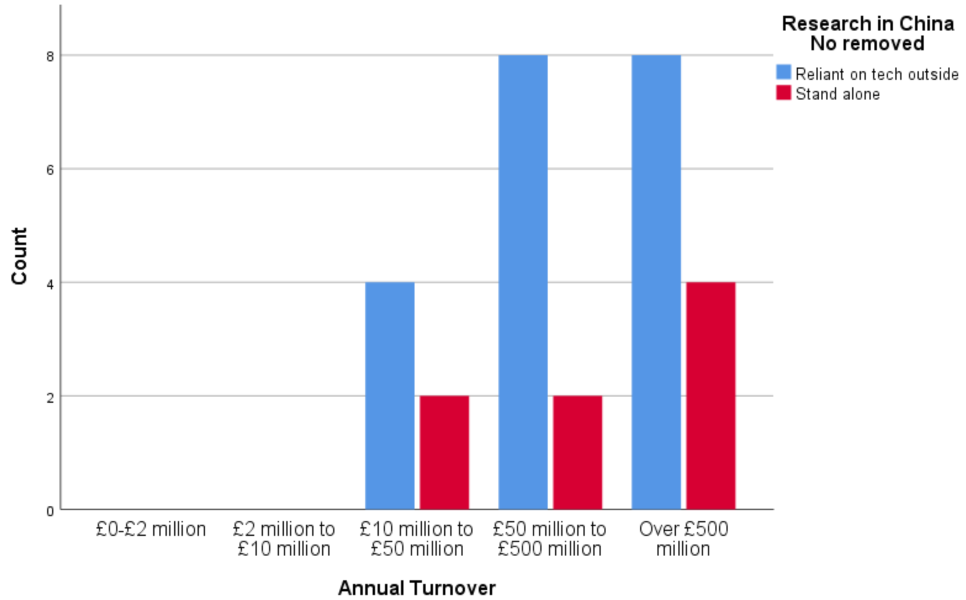
Types of R&D Undertaken in China by UK MNEs



Considering company size; Figure 44 shows, that no companies invested in China, below £10 million turnover, have R&D facilities in China. Across all sizes of companies that invested in R&D in China, most companies have invested in vertical rather than horizontal R&D supporting the anecdotal evidence offered by Zhao (2006).

Figure 44

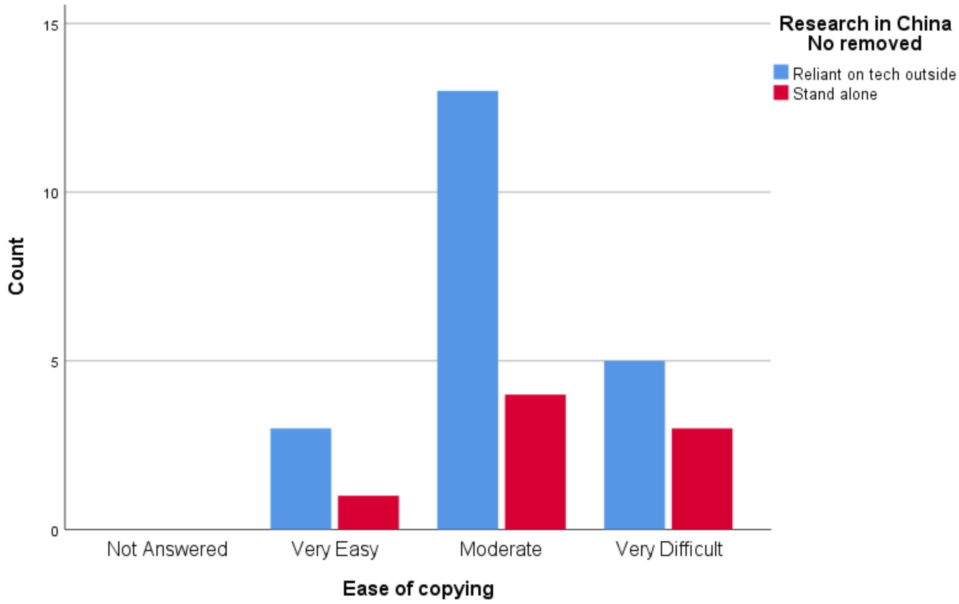
Type of R&D in China by Company Size



Most companies that invested in R&D facilities in China believe that their products or services are moderately difficult to copy. Companies with products that are considered very difficult to copy are more likely to undertake standalone R&D in China but still show a preference for R&D that is reliant on technology held outside of China, see Figure 45.

Figure 45

Types of R&D in China by the Ease of Copying



Interestingly, there were no companies surveyed that reported R&D investment in China that fall within the highest bracket of R&D intensity and as companies increase their R&D intensity the likelihood of them investing in R&D in China reduces. This supports the findings of Mansfield (1994) that companies that are more R&D intensive are less likely to invest in countries with weaker IPRs.

Figure 46 shows that 41.82% of manufacturing companies and 44.23% of companies surveyed that both manufacture and deliver services have had their products or services copied or imitated in China. This is a startling finding and perhaps underlines why the perception of UK MNEs of China's IPR system is so low. However, service companies appear to be much less at risk, with only 15.31% having their products or services imitated or copied in China.

Figure 46

Have your Product and Services been Copied or Imitated in China by Company Type?

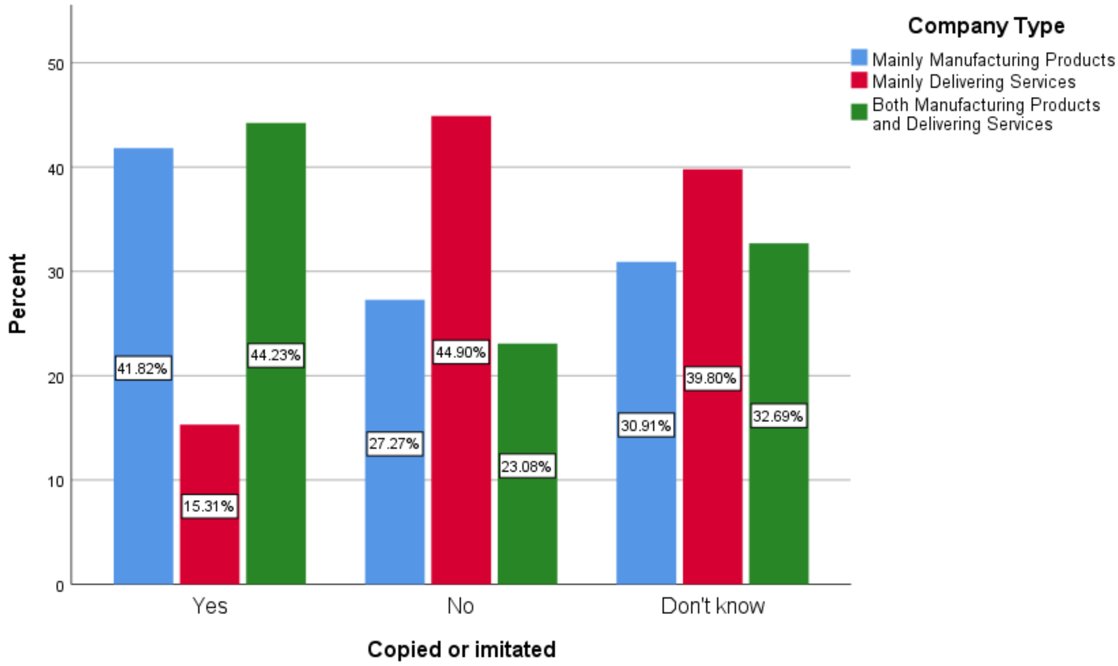


Figure 47 shows that as one might expect, having a subsidiary in China increases the likelihood that a company will have a product or service copied in China. Nearly 50% of the companies surveyed that have subsidiaries in China have had a product or service copied or imitated in China.

Figure 47

Product or Services Copied or Imitated in China by Subsidiary in China

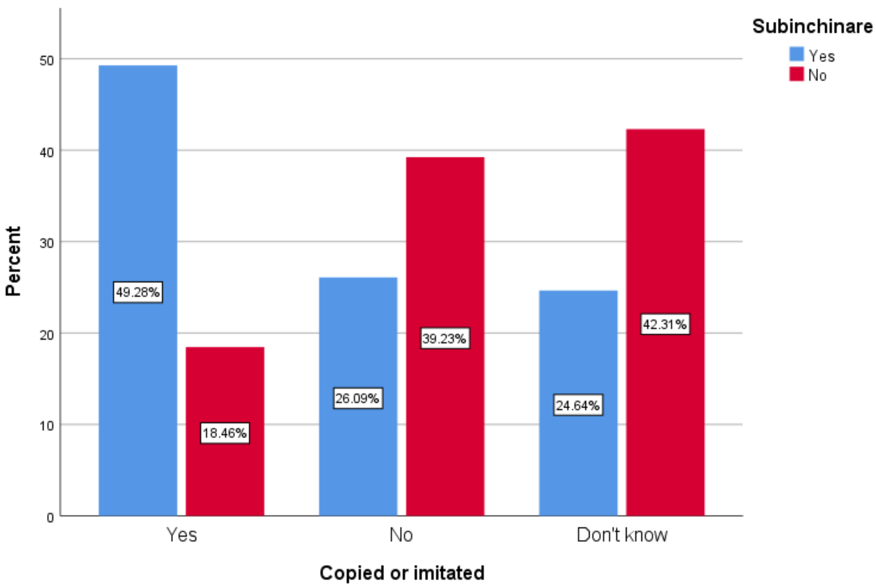
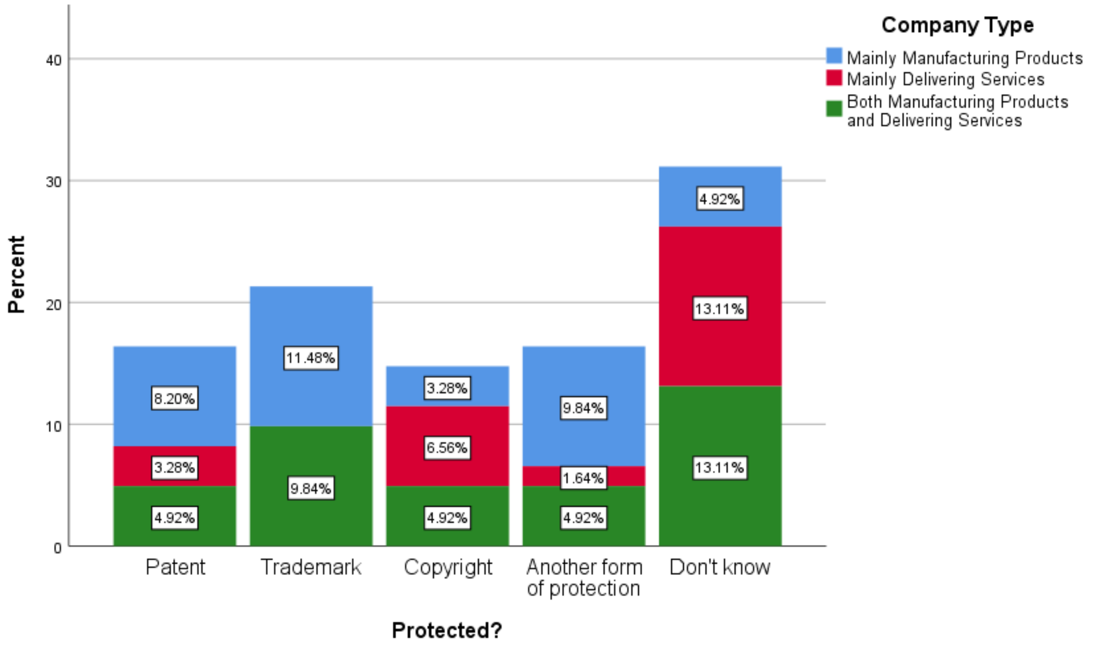


Figure 48 shows that of those products or services that had been copied or imitated in China, over two-thirds had been protected by some form of IPRs in China. This is concerning as the protection of a company's IPRs in China does not appear to protect a company's product or service from imitation.

Figure 48

Was the Product or Service Copied or Imitated in China Protected by Chinese IPRs (Answered Yes)?



All of the UK MNEs surveyed were asked 'How do Chinese IPRs impact the investment decisions of your company?' Interlocutors were given a free format field to complete their answer. Overall, 138 answers were received from the 205 companies that took part in the survey. Responses to these questions were analysed using NVivo software and categorised into 12 response groupings. See Table 52 for a breakdown of the responses to this question.

Table 52

Categorised Responses to 'How do Chinese IPRs Impact the Investment Decisions of Your Company?

#	Answer Grouping	Frequency	Valid %
1	Important to secure IP, a significant investment	3	2.2
2	Won't transfer IP to China, limits business activity	15	10.9
3	Not important/applicable	37	26.8
4	Impacts our customers	1	0.7
5	Very cautious, expect to be copied	44	31.9
6	Need to build a strong, reliable partnership to invest	6	4.3
7	We develop China-specific products	1	0.7
8	We protect know-how rather than IP	2	1.4
9	Subsidiary in China protects our IP	1	0.7
10	Difficult but the market opportunity overrides the decision	5	3.6
11	Only work in HK, the business model has to flex	5	3.6
12	Won't invest or trade with China	18	13.0
	Total	**138**	**100.0**

The first set of responses were categorised as it being important for a company to secure IP before entering the market and that this was a significant investment. Three companies gave answers that fell into this category. This would suggest good practice from companies understanding the challenges of IPRs and looking to protect IP before entering the market. It also shows a level of trust in China's IPR system to protect the companies' IP assets.

CEO, Transportation and storage sector, £10m-£50m turnover, 10-49 employees, R&D 0-5% of turnover delivering services.

'It's important, securing rights and registrations has been a significant investment prior to launch in China'

Group CEO, Manufacturing sector, £50m-£500m turnover, more than 250 employees, 0-5% of turnover spent on R&D, delivering both manufactured products and services.

'Registering names, trademarks, patents and designs before entering manufacturing'

The next category (2) grouped companies that chose not to send important IP to China or to limit their business activity due to concerns about Chinese IPRs. Fifteen companies answered within this category (10.9% of the total). This response mirrored earlier survey responses that companies have little confidence in IPR regulation or enforcement in China, and that this is impacting the quality of IP being transferred. For example:

Vice President Strategy; Professional, scientific and technical services sector; greater than £500m turnover, greater than 250 employees, 6-10% of turnover spent on R&D, delivering both manufactured products and services.

'There is an implicit assumption that the most business-critical IP will not be transferred to China'

Board Director, Information and communication sector, £10m-£50m turnover, greater than 250 employees, 6-10% of turnover spent on R&D, delivering mainly services.

'Would not place mission-critical software at Chinese disposal'

CEO, Manufacturing sector, £50m-£500m turnover, greater than 250 employees, 0-5% of turnover spent on R&D, mainly manufacturing products.

'Unwilling to share any critical or sensitive information with China'

The next grouping (3) of answers had 37 responses (26.8%) and covered those companies that felt that Chinese IPRs had little or negligible impact on their company's investment decisions. This is an interesting cluster of companies who are not concerned with IPR protection in China. 21 of the 37 companies had a subsidiary in China. 24 of the companies delivered services and included 43% of all the responses from this group. The majority of companies in this group (32) considered their products either easy or moderately difficult to copy:

President Europe, the Middle East and Africa, Administration and support service activities sector, greater than £500m turnover, greater than 250 employees, more than 25% of turnover spent on R&D, delivering mainly services.

> *'No impact as a service company. Neither performing R&D nor manufacturing'*

Global Business Development, Manufacturing sector, £50m-£500m turnover, greater than 250 employees, 6-10% of turnover spent on R&D, mainly manufacturing products.

> *'Minimal as we only have sales and services facilities'*

The next grouping (4) only contained one respondent and related to the impact of IPRs on their customers:

Senior Legal Director; Professional, scientific and technical services, turnover greater than £500m, 50-250 employees, 0-5% of turnover spent on R&D, mainly manufacturing products.

> *'They are important in relation to how they also affect our customers'*

The next set of responses (5) were grouped as describing that they were very cautious about investing in China as they expected to be copied. Overall there were 44 (31.9%) responses that fell within this category. This group of companies showed extreme caution about investing in China due to IPRs. Seventeen companies had a subsidiary in China. The companies were evenly split across the company activity types. 33% of all the highest R&D intensity companies fell into this cluster of responses:

President and Managing Director, Manufacturing sector, £50-£500m turnover, 50-250 employees, 6-10% of turnover spent on R&D, mainly manufacturing products.

> *'Greatly. We have been the victim of product copying in China, a case which happened recently'*

CEO, Administrative and support services sector, greater than £500m turnover, greater than 250 employees, 0-5% of turnover spent on R&D, both manufacturing products and delivering services.

'We work on the basis that anything we do will be copied'

CEO, Information and communication sector, £50m-£500m turnover, greater than 250 employees, 10-25% of turnover spent on R&D, delivering services.

'Major deterrent to establishing direct operations'

Six companies fell within the category (6) that stated that their company needed to build strong and trusting relationships with business partners in China.

CEO; Water supply, sewerage, waste management and remediation activities sector; £2m-£10m turnover; 10-49 employees, 0-5% of turnover spent on R&D, both manufacturing products and delivering services.

'Seek to build relationships with partners and distributors before opening up detailed product/process conversations'

Global Director of Strategy and Marketing; Agriculture, forestry and fishing sector; £50m-£500m turnover, greater than 250 employees, 10-25% of turnover spent on R&D, both manufacturing products and delivering services.

'Need very strong local partner to be able to transfer IP to China'

The next grouping (7) had only one response which related to focus on the development of products specifically for China:

CEO, Information and communication sector, £50m-£500m turnover, greater than 250 employees, 6-10% of turnover spent on R&D, mainly manufacturing products.

'we tend to develop new versions of existing products for China'

The next group (8) of answers contained two responses and discussed protecting know-how rather than IP:

Chairman; Professional, scientific and technical services sector; £0-£2m turnover; 1-9 employees; greater than 25% of turnover spent on R&D; mainly manufacturing products.

'it is a concern but not insuperable. We have chosen to keep know-how rather than patenting more widely'

Group 9 contained one response and discussed the use of their subsidiary in China to protect their IP:

Chief Commercial Office, Information and communications sector, greater than £500m turnover, greater than 250 employees, 10-25% of turnover spent on R&D, engaged in both manufacturing products and delivering service.

'part of the reason we have a subsidiary is to protect IP'

There were five companies in the next group (10) of responses who highlighted the difficulties around IPRs being overridden by the other drivers to invest in China. These companies were driven by other investment factors such as market size and growth and were, therefore, prepared to operate in a weak IPR regime:

Managing Director, Other services activities sector, £10m-£50m turnover, greater than 250 employees, 0-5% of turnover spent on R&D, mainly delivering services.

'Always considered a risk, but China is such a large market that you are brave to make it a red line'

Non-Executive Director, Finance and insurance activities sector, £10m-£50m turnover, greater than 250 employees, 0-5% of turnover spent on R&D, both manufacturing products and delivering services.

'Sadly, we work on an assumption they will be breached, but take that into account as a risk alongside the market opportunity'

Two companies sighted that they have chosen to invest in Hong Kong rather than mainland China due to the issue of IPRs:

Founder, Information and communication sector, £2m-£10m turnover, 1-9 employees, 0-5% of turnover spent on R&D, mainly delivering services.

'We opened in Hong Kong rather than mainland China, and this was a contributing factor'

The final group (12) of 18 responses (11%) had ruled out investment in China as a result of concerns with IPR protection there:

Managing Director, Manufacturing sector; £10m-£50m turnover; 50-250 employees; 6-10% of turnover spent on R&D; manufacturing products.

'Currently do not wish to invest in China due to the difficulty in protecting our IP'

CEO; Professional, scientific and technical services sector; £10m-£50m turnover; 50-250 employees; 10-25% of turnover spent on R&D; mainly delivering services.

'It has meant that China is towards the bottom of the list in terms of new markets'

CEO; Professional, scientific and technical services sector; greater than £500m turnover; more than 250 employees; 0-5% of turnover spent on R&D; mainly delivering services.

'We have held off investing in China to see how IPR protection and business ethics change'

5.6 What are the Internalisation Behaviours of UK Companies?

Internalisation advantages relate to the business decisions companies make to manage risk in their markets and their investments and include exchange rates, competition and IP (Buckley and Casson, 1976). These decisions consider the management control required, quality assurance, and seek to reduce transaction costs (Dunning, 1977, 1979b). The decision to invest, internationalise through licensing or exporting, or to remain a company focussed on their home market set the context for internalisation behaviour along with ownership advantages and location advantages (Dunning, 1979b). By considering the choices made by UK MNEs in China, one can draw some understanding of the internalisation advantages for UK MNEs and the impacts of IPRs on these decisions.

Table 53 shows the distribution of companies surveyed that have invested in China by sector. The highest proportion of companies that invest in China was found in the 'Other services activities' sector. Overall, companies that have invested in China seek to do so through a WFOE except for companies in the 'Transportation and storage' and 'Financial and insurance activities' sectors, who prefer to invest through JVs.

Table 53

Percentage of Companies by Sector Broken Down by Investment Types in China.

Sector	Subsidiary			Joint Venture			WFOE		
	Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
Agriculture, Forestry and Fishing	66.7	33.3	0.0	50.0	50.0	0.0	50.0	50.0	0.0
Mining and Quarrying	25.0	75.0	0.0	0.0	100.0	0.0	100.0	0.0	0.0
Manufacturing	55.3	44.7	0.0	31.6	68.4	0.0	84.2	15.8	0.0
Electricity, gas, steam and air conditioning supply	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water supply, sewerage, waste management and remediation activities	33.3	66.7	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Construction	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wholesale and retail trade; repair of motor vehicles and motorcycles	25.0	56.3	18.8	0.0	100.0	0.0	50.0	0.0	50.0
Transportation and storage	40.0	60.0	0.0	75.0	25.0	0.0	25.0	50.0	25.0
Accommodation and food service activities	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Information and communication	25.9	74.1	0.0	0.0	100.0	0.0	71.4	28.6	0.0
Financial and insurance activities	21.7	73.9	4.3	80.0	20.0	0.0	80.0	0.0	20.0
Real estate activities	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Professional, scientific and technical services	26.3	68.4	5.3	30.0	60.0	10.0	80.0	10.0	10.0
Administration and support service activities	36.0	64.0	0.0	25.0	75.0	0.0	77.8	11.1	11.1
Public administration and defence; compulsory social security	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Education	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Human health and social work activities	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arts, entertainment and recreation	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other service activities	83.3	16.7	0.0	20.0	60.0	20.0	100.0	0.0	0.0

Table 54 considers the investment UK MNEs have made in China by company type. Those companies that mainly manufacture product have the highest percentage of investments, and 83.3% of these companies choose to invest through a WFOE. Only 23.5% of the service companies surveyed invest in China, and again a WFOE is the investment mode of choice. 38.5% of those companies surveyed that deliver both manufacturing and services had investments in China with 75% of them choosing to invest through a WFOE. This is an interesting finding, while China remains a country where UK companies feel the business culture is very different to the

UK's which would suggest the use of JVs as a method of investment, they choose to invest through a WFOE.

Table 54

Percentage of Companies that Invested in China Broken Down by Investment Type and Detailed by Company Type.

Company Type	Subsidiary			Joint Venture			WFOE		
	Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
Manufacturing	47.3	49.1	3.6	30.4	65.2	4.3	83.3	12.5	4.2
Services	23.5	75.5	1.0	39.1	56.5	4.3	69.6	17.4	13.0
Both Manufacturing and Services	38.5	55.8	5.8	23.5	76.5	0.0	75.0	15.0	10.0

Table 55 shows that as companies grow, they are more likely to have a subsidiary in China with 54.5% of companies with a turnover of over £500 million having a subsidiary. There were no micro-companies surveyed with subsidiaries in China. While the trend is broadly the same for company size, there is a dip in the percentage of companies with subsidiaries in China in the 50-250 employee range.

A mixed picture emerges when looking at R&D as a percentage of turnover. While the broad trend is that the proportion of companies that invested in China reduces as R&D intensity increases, there are increases between 0-5% and 6-10% and 10-25% and over 25%.

As a company's confidence in their ability to protect their product or services increases, the likelihood of investing in China also increases. This would support the proposition that as the risk of copying or imitation diminishes, the opportunities to invest increase.

As a company becomes more experienced in FDI, it is more likely to carry out FDI in China. However, 25 companies that responded to the survey who only reported one subsidiary overseas had a subsidiary in China, showing that they are willing to invest in the early part of their internationalisation strategies.

Table 55

Percentage of Companies Surveyed that Invested in China Broken Down by Investment Type Detailed by Annual Turnover, Number of Employees, R&D as a Percentage of Turnover, Ease of Copying and Number of Recorded Subsidiaries

		Subsidiary			Joint Venture			WFOE		
		Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
Annual Turnover	£0-£2m	7.7	84.6	7.7	0.0	100.0	0.0	100.0	0.0	0.0
	£2m to £10m	14.8	85.2	0.0	66.7	33.3	0.0	75.0	0.0	25.0
	£10m to £50m	27.4	71.0	1.6	35.7	64.3	0.0	87.5	6.3	6.3
	£50m to £500m	37.9	62.1	0.0	22.7	77.3	0.0	81.0	14.3	4.8
	Over £500m	54.5	36.4	9.1	34.8	56.5	8.7	62.5	25.0	12.5
Number of Employees	1-9	0.0	90.0	10.0	0.0	0.0	0.	0.0	0.0	0.0
	10-49	29.	66.7	4.2	50.0	50.0	0.0	71.4	0.0	28.6
	50-250	20.6	79.4	0.0	11.1	88.9	0.0	91.7	8.3	0.0
	more than 250	46.6	50.5	2.9	33.3	62.5	4.2	72.3	19.1	8.5
R&D as a percentage of turnover	0-5%	33.6	63.6	2.7	34.3	60.0	5.7	68.6	17.1	14.3
	6-10%	42.3	55.8	1.9	28.6	71.4	0.0	86.4	13.6	0.0
	10-25%	21.4	75.0	3.6	0.0	100.0	0.0	100.0	0.0	0.0
	Over 25%	25.0	75.0	0.0	66.7	33.3	0.0	33.3	33.3	33.3
Ease of Copying	Very Easy	29.4	61.8	8.8	33.3	55.6	11.1	70.0	20.0	10.0
	Moderate	34.7	64.5	0.8	30.8	69.2	0.0	75.6	14.6	9.8
	Very Difficult	39.5	55.8	4.7	33.3	60.0	6.7	81.3	12.5	6.3
Number of Recorded Subsidiaries	Low	28.8	66.1	5.1	14.3	78.6	7.1	82.4	5.9	11.8
	Medium	32.7	65.3	2.0	46.7	53.3	0.0	78.6	21.4	0.0
	High	32.0	66.0	2.0	31.3	62.5	6.3	75.0	18.8	6.3
	Very High	42.6	55.3	2.1	33.3	66.7	0.0	70.0	15.0	15.0

5.6.1 What is the Behaviour of UK MNE's when Trading with China?

Exporting to China is a key-way through which MNEs can deliver goods and services into the market. Figure 49 plots the number of companies exporting to China split by company type. Nearly 47% (97) of all MNEs surveyed (205) currently export to China. This ratio is higher for manufacturing companies and companies that manufacture and deliver services with more than twice as many companies exporting than those who do not. However, for services only companies, only 25% of the companies currently export to China.

Figure 49

Count of Companies Exporting to China Split by Company Type

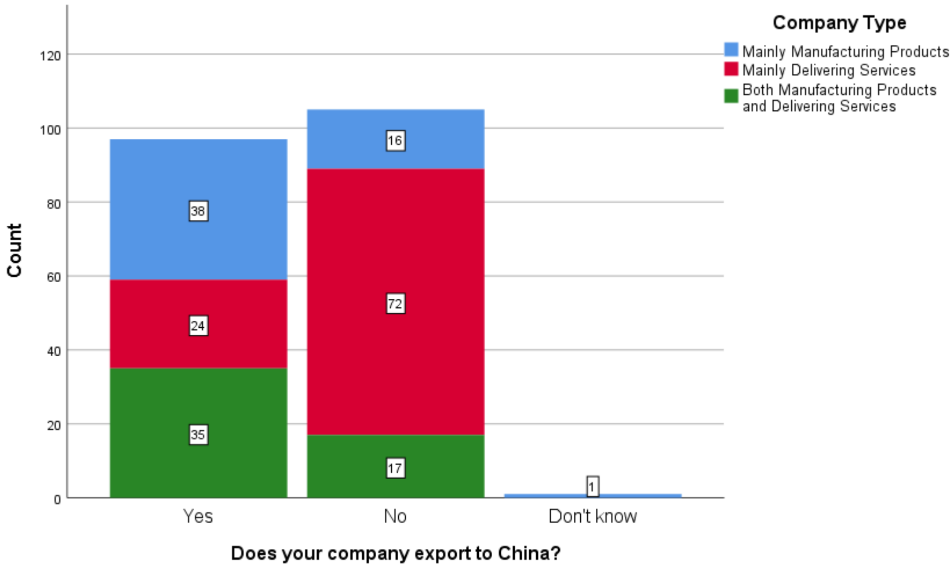


Table 56 shows that 100% of Construction companies surveyed and over 80% of companies from the Manufacturing sector export to China. Over 50% of companies from the ‘Agriculture, forestry and fishing’, ‘Water supply, sewerage, waste management and remediation activities’, and ‘Wholesale and retail trade repair of motor vehicles and motorcycles’ sectors, export to China. There were no companies that exported, invested or delivered services under licence to China from the sectors ‘Electricity, gas, steam and air-conditioning’; ‘Accommodation and food services activities’, ‘Real estate activities’, ‘Human health and social work activities’ and ‘Arts, entertainment and recreation’. The sector ‘Other services activities’ is the most likely to operate under licence in China.

Table 56

Internationalisation Behaviour by UK MNEs in China, by Sector.

Sector	Does your **company export** to China?			**Make products under licence**			**Subsidiary**		
	Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
	Percent								
Agriculture, Forestry and Fishing	66.67	33.33	0.00	33.33	66.67	0.00	66.67	33.33	0.00
Mining and Quarrying	50.00	50.00	0.00	0.00	100.00	0.00	25.00	75.00	0.00
Manufacturing	81.58	18.42	0.00	31.58	68.42	0.00	55.26	44.74	0.00
Electricity, gas, steam and air conditioning supply	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00
Water supply, sewerage, waste management and remediation activities	66.67	33.33	0.00	33.33	66.67	0.00	33.33	66.67	0.00
Construction	100.00	0.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00
Wholesale and retail trade; repair of motor vehicles and motorcycles	62.50	31.25	6.25	18.75	75.00	6.25	25.00	56.25	18.75
Transportation and storage	30.00	70.00	0.00	40.00	60.00	0.00	40.00	60.00	0.00
Accommodation and food service activities	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00
Information and communication	53.85	46.15	0.00	37.04	62.96	0.00	25.93	74.07	0.00
Financial and insurance activities	21.74	78.26	0.00	34.78	60.87	4.35	21.74	73.91	4.35
Real estate activities	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00
Professional, scientific and technical services	40.54	59.46	0.00	34.21	63.16	2.63	26.32	68.42	5.26
Administration and support service activities	32.00	68.00	0.00	25.00	75.00	0.00	36.00	64.00	0.00
Public administration and defence; compulsory social security	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	50.00	50.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00
Human health and social work activities	0.00	100.00	0.00	0.00	100.00	0.00	0.00	100.00	0.00
Arts, entertainment and recreation	0.00	100.0	0.00	33.33	66.67	0.00	0.00	100.00	0.00
Other service activities	50.00	50.00	0.00	66.6	16.67	16.67	83.33	16.67	0.00

Table 57 shows that as companies grow as measured by either turnover or number of employees, they are likely to increase their propensity to export to China except for the very largest companies.

As companies increase their R&D expenditure as a proportion of their turnover, they are more likely to export to China except for the most R&D intensive, which are the least likely to export to China. This suggests that China is not getting access to the most advanced technologies available due to the fear of IPR infringement. Also, as companies become more confident about the security of their products, they are more likely to export to China.

Companies that both manufacture and deliver services are most likely to operate under licence in China. Larger companies are more likely to make products or deliver services under licence in China. There was no evidence, from the survey, of micro-companies (less than ten staff) operating under licence in China.

As companies increase their R&D intensity and confidence in their products or services to withstand imitation, their propensity to operate under licence increases.

Overall, 46.9% of companies surveyed export to China and 30.4% make products or deliver services under licence in China.

Table 57

Internationalisation Behaviour of UK MNEs in China by Company Type, Turnover, Number of Employees, R&D as a Percentage of Turnover, Ease of Copying, and Number of Recorded Subsidiaries

		Does your **company export to China?**			**Make products under licence**			**Subsidiary**		
		Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
		Percent								
Company Type	Manufacturing	69.09	29.09	1.82	29.09	69.09	1.82	47.27	49.09	3.64
	Services	25.00	75.00	0.00	26.80	71.13	2.06	23.47	75.51	1.02
	Manufacturing and Services	67.31	32.69	0.00	40.38	57.69	1.92	38.46	55.77	5.77
Annual Turnover	£0-£2 million	7.69	92.31	0.00	7.69	92.31	0.00	7.69	84.62	7.69
	£2 million to £10 million	34.62	65.38	0.00	18.52	77.78	3.70	14.81	85.19	0.00
	£10 million to £50 million	50.00	48.39	1.61	29.03	70.97	0.00	27.42	70.97	1.61
	£50 million to £500 million	58.62	41.38	0.00	33.33	66.67	0.00	37.93	62.07	0.00
	Over £500 million	48.84	51.16	0.00	45.45	47.73	6.82	54.55	36.36	9.09
Number of Employees	1-9	0.00	100.00	0.00	0.00	100.00	0.00	0.00	90.00	10.00
	10-49	37.50	58.33	4.17	25.00	75.00	0.00	29.17	66.67	4.17
	50-250	56.45	43.55	0.00	28.57	69.84	1.59	20.63	79.37	0.00
	more than 250	50.00	50.00	0.00	37.25	59.80	2.94	46.60	50.49	2.91
R&D as a percentage of turnover	0-5%	44.04	55.05	0.92	27.52	69.72	2.75	33.64	63.64	2.73
	6-10%	52.94	47.06	0.00	36.54	63.46	0.00	42.31	55.77	1.92
	10-25%	60.71	39.29	0.00	28.57	71.43	0.00	21.43	75.00	3.57
	Over 25%	25.00	75.00	0.00	50.00	50.00	0.00	25.00	75.00	0.00
Ease of Copying	Very Easy	35.29	64.71	0.00	24.24	72.73	3.03	29.41	61.76	8.82
	Moderate	48.33	51.67	0.00	28.93	69.42	1.65	34.71	64.46	0.83
	Very Difficult	57.14	40.48	2.38	44.19	53.49	2.33	39.53	55.81	4.65
Number of Recorded Subsidiaries	Low	50.85	49.15	0.00	16.95	81.36	1.69	28.81	66.10	5.08
	Medium	46.94	51.02	2.04	40.82	57.14	2.04	32.65	65.31	2.04
	High	39.58	60.42	0.00	32.00	66.00	2.00	32.00	66.00	2.00
	Very High	53.19	46.81	0.00	36.96	60.87	2.17	42.55	55.32	2.13

Table 58 presents Spearman correlations for Exporting to China and making Products or Deliver services under licence in China, having a subsidiary in China and annual turnover. These correlations show the most significant positive indicator that a company will either export or operating under licence in China is that the company has a subsidiary in China.

Table 58

Spearman Correlations for Exporting to China and Production under Licence in China

Measure	Export to China	Make products under licence in China
Subsidiary in China	.308**	.414**
Export to China		.155*
Make products under licence in China	.155*	
Annual turnover	-.164*	-.182

Note. **p<.01

*p<.05

5.6.2 What is the Quality of UK MNE Investments in China?

Table 59 shows that manufacturing companies are most likely to have sales, marketing and distribution investments in China and least likely to be undertaking rudimentary production and assembly. Services companies are most likely to deliver services to current clients and intra-firm services in China. Companies that both manufacture and deliver services are most likely to have sales, marketing and distribution investments in China. Manufacturing companies are most likely to be undertaking the manufacture of complete products and undertaking R&D in China.

The smallest companies are most likely to be using their investments in China for rudimentary production and assembly, delivering services to current clients and intra-firm services; and manufacture of components, develop services to indigenous clients. Only as companies grow over £10m-£50m do companies start to invest in the manufacture of complete products, provision of full services to indigenous and neighbouring markets; and, R&D, positioning of key staff, service development. The very largest companies are most likely to be investing in the manufacture of components, develop services to indigenous clients. As companies grow, they increase the breadth of investments that they make in China.

Companies inexperienced in FDI are most likely to be engaged in sales and marketing activity in China. Companies with both a medium and higher level of FDI experience are more likely to have a mixed portfolio of investments. The most experienced companies in FDI are most likely to have sales and marketing and distribution in China, along with rudimentary production and assembly to current clients and intra-firm services.

Companies who believe their products and services are easy to copy are more likely to invest in facilities to deliver sales, marketing and distribution activity in China. While this activity remains the most likely to be undertaken by UK MNEs, one sees a more varied portfolio of investments as confidence in protecting their products and services increases. Companies with a moderate level of confidence in protecting their products and services are most likely to undertake investments at the highest levels of the Mansfield type investments.

As the intensity of a company's R&D increases, greater differentiation across types of investments made in China emerges. Companies that invest between six and 25% of turnover on R&D, are most likely to invest in R&D in China. The most R&D-intensive companies, however, are least likely to be investing in R&D in China.

Table 59

Z-scores of Investment Types in China

		Sales, marketing and distribution	Rudimentary production and assembly, services to current clients and intra-firm services	Manufacture of components, develop services to indigenous clients	Manufacture complete products, provision of full services to indigenous and neighbouring market	R&D, positioning key staff, service development
		Mean Z-score				
Company Type	Manufacturing	1.13721	0.36891	0.68997	1.04320	1.09908
	Services	1.16743	1.86431	0.96129	0.56199	0.17553
	Manufacturing and Services	1.31963	0.48151	0.54868	0.54868	0.42829
Shortened SIC	Agriculture, Forestry and Fishing	1.65840	-0.45001	-0.36973	1.16095	1.51832
	Mining and Quarrying	1.65840	2.21146	2.69162	-0.36973	-0.29840
	Manufacturing	1.44331	0.43715	0.35916	0.79650	0.73973
	Electricity, gas, steam and air conditioning supply					
	Water supply, sewerage, waste management and remediation activities	1.65840	2.21146	-0.36973	-0.36973	-0.29840
	Construction	-0.60008	-0.45001	-0.36973	-0.36973	-0.29840
	Wholesale and retail trade; repair of motor vehicles and motorcycles	0.52916	0.21536	-0.36973	0.39561	0.60996
	Transportation and storage	0.75501	1.14687	2.07935	1.46708	1.15498
	Accommodation and food service activities					
	Information and communication	1.33576	1.45104	0.50494	0.94228	0.73973
	Financial and insurance activities	1.20670	1.67916	0.24254	-0.36973	0.42829
	Real estate activities					
	Professional, scientific and technical services	0.52916	1.67916	1.77322	1.16095	0.42829
	Administration and support service activities	1.40746	0.73287	0.31057	-0.02958	-0.29840

		Sales, marketing and distribution	Rudimentary production and assembly, services to current clients and intra-firm services	Manufacture of components, develop services to indigenous clients	Manufacture complete products, provision of full services to indigenous and neighbouring market	R&D, positioning key staff, service development
		Mean Z-score				
Shortened SIC	Education					
	Human health and social work activities					
	Arts, entertainment and recreation					
	Other service activities	1.20670	0.08229	1.46708	1.46708	1.15498
Annual Turnover	£0-£2 million	-0.60008	2.21146	2.69162	-0.36973	-0.29840
	£2 million to £10 million	1.65840	0.88073	-0.36973	-0.36973	-0.29840
	£10 million to £50 million	1.25984	0.80245	0.53067	0.53067	0.12906
	£50 million to £500 million	1.35042	0.63877	0.18688	0.74349	0.85770
	Over £500 million	0.99968	1.21341	1.54362	1.16095	0.76135
Number of Recorded Subsidiaries	Low	1.25984	0.64589	0.53067	0.35059	0.12906
	Medium	0.95262	1.04707	0.77828	1.16095	0.60996
	High	1.09378	0.88073	0.96961	1.16095	1.06414
	Very High	1.24777	0.88073	0.60434	0.32603	0.52738
R&D as a percentage of turnover	0-5 %	1.04800	0.98862	0.70588	0.87136	0.29081
	6-10 %	1.35042	1.00170	1.16095	0.74349	1.02285
	10-25 %	1.65840	-0.45001	-0.36973	0.65072	0.91275
	Over 25 %	0.90557	2.21146	0.65072	-0.36973	-0.29840
Ease of Copying	Very Easy	1.43255	0.61458	0.54868	0.54868	0.42829
	Moderate	1.22821	1.00746	0.72361	0.94228	0.65322
	Very Difficult	0.99414	0.80245	0.89083	0.35059	0.55653

5.7 Chapter Summary

This chapter has considered the data collected from the FAME database alongside the primary data from the survey of executives in UK MNEs through the three lenses of ownership, location and internalisation (Dunning, 1997).

The FAME data showed that while there were 9,339 UK companies registered in the UK as having at least a 10% ownership of an overseas subsidiary, many of these companies (around 14%) were holding companies and not undertaking direct business activity. The UK's strengths in Professional services, Manufacturing and Financial and insurance services was also seen in the UK's FDI participation. The most FDI intensive sectors were 'Public administration and defence, compulsory social security', followed by 'Financial and insurance services'. The aggregate data from the FAME database confirmed *a priori* expectations that as companies grow and become more experienced in FDI, they are more likely to invest in China. The key requirement of the FAME database was to provide a list of participants to survey to understand better the links between IPRs and FDI decisions in China.

In total, this research was able to survey 207 executives in UK companies and received 205 useable responses. A chi-square goodness of fit analysis showed that the survey respondents were a good representation of the total population of UK MNEs. As a further check of validity, a one-sample t-test comparing the means of numbers of subsidiaries showed that the survey respondents were not statistically different from the whole population of MNEs. However, the number of companies who had a subsidiary in China was four times higher than would have been expected from the FAME database. This suggests a lack of reporting in company accounts of subsidiaries in China.

To fill the gap in the FAME data, and to explore the ownership (Dunning, 1997) advantages of UK MNEs, the survey asked specifically about R&D intensity measured as R&D spend as a percentage of annual turnover. This showed that using sectors as a proxy for R&D intensity would not be a successful strategy when considering UK MNEs. This leads to a key finding of this research identified through several behaviours namely: that to understand a phenomenon such as the decisions around FDI it is vital to disaggregate companies by sector, size, R&D intensity, the experience of FDI, company activity type and the ease of copying their product or service. Aggregated data would mask very different behaviours, making it impossible to understand this behavioural phenomenon effectively.

The generally accepted view (see, among others, Fishmann and Rob, 1999; Park *et al.*, 2010; Tsai and Wang, 2004) that larger companies are more R&D intensive does not hold for the UK headquartered MNEs. Smaller companies are, on average, more R&D intensive than larger companies. There is only a moderate correlation between R&D intensity and ease of copying (product complexity).

The survey did support Mansfield's (1994) proposition that high R&D intensive companies were less likely to invest in countries with weaker IPRs. However, when this data was disaggregated by company type, one finds that UK service and companies that deliver service and manufacture do not act in the way Mansfield proposed. Given this finding contradicts the accepted theory, it is explored in greater detail through the interviews in Chapter Six.

Smaller, less experienced companies had a greater level of confidence in their ability to protect their products and services from imitation than larger companies. It may, therefore, be deduced that the need to protect products and services against mimetic tendencies could be stifling the ambition or potential for companies to grow.

One would expect to find companies that invested in countries with a weaker IPR regime like China would be more confident about their ability to protect their products and services from imitation. Indeed, this was the case for the aggregate of companies surveyed, but disaggregated by company type, the survey showed that companies that manufacture and deliver services invested in China are, on average, less secure about their ability to protect their products and services.

UK MNEs seek vertical FDI, and this tendency increases as both R&D intensity and confidence in securing products and services from imitation increase. Interestingly, service companies do not necessarily identify with the concepts of horizontal, vertical and supplying into a global supply chain description of FDI motivations. The main motivations for UK MNEs do appear to be market-seeking FDI, and this is the case across all company types. However, companies with a high level of R&D intensity and who feel secure in their ability to protect their products and services from imitation are likely to be motivated by a requirement to specialise their products, secure advantages against competitors or have other motivations for FDI.

A key output of this research has been to develop a new taxonomy of FDI that builds on the work of Mansfield (1994) taking inspiration from Markusen (2005) and Howells (2000) to create a spectrum of investment types applicable to companies that manufacture, deliver services and both manufacture and deliver services. This allows, for the first time, an assessment of FDI behaviour across all company types and the aggregation and disaggregation of the data.

As one might expect, high R&D intensive companies are more likely to invest in FDI containing R&D. It is also interesting that the least experienced companies in FDI are more likely to make investments in the manufacture of complete products and R&D. This may suggest that the highest quality FDI often comes in the earliest investments and, therefore, that a country trying to attract experienced investors may get lower-quality investments.

Companies that manufacture products are, on average, more concerned about the strength of IPRs in ‘developing countries’ like India, Brazil and Malaysia. Companies delivering services are, in general, less concerned about IPRs but are more concerned in ‘developed’ countries such as the USA, New Zealand and Canada. And companies that both manufacture and deliver services are particularly concerned with IPRs in the ‘least developed’ countries such as Angola, Nepal and Tanzania.

In line with *a priori* expectations, as a company’s R&D intensity grows, its concern about a country’s IPR protection grows. Also, and less intuitively plausible, as a company’s confidence in its ability to protect its products and services increases, the importance of IPRs increases. Companies that have already invested in China, on average, are more concerned about the strength of IPRs. This phenomenon might be counterintuitive and perhaps shows that companies who are prepared to operate in countries that are seen to have weaker IPR regimes, may, through this act, make themselves more aware and therefore concerned around their needs for IPR protection.

The survey showed that for manufacturing companies, Mansfield’s proposition that companies increased their concern about IPRs as they progressed toward the manufacture of complete goods and R&D, applies to UK MNEs. However, no evidence was found that companies that delivered services, or both manufactured and delivered services, act in the same way. Understanding the relationship between service companies and R&D is addressed in the interview phase of this research. The link between R&D intensity and increasing concern about IPRs as manufacturing companies move through the investment spectrum as postulated by Mansfield 1994 does stand.

Considering a basket of location advantages compared to the strength of IPRs, produced a mixed picture. Overall, for UK MNEs, financial incentives, market growth and exchange rate stability are the only factors more important than IPRs. However, this order of importance varies across company types, size, R&D intensity, FDI experience and sector. This would lead policymakers towards defining an environment or crafting incentives focussed on the needs of specific clusters of companies with the attributes they are trying to attract.

A key driver to location choice highlighted by Sun (1999) was the cultural closeness of the business culture. The data showed that UK MNEs generally consider that China's business culture is different or very different from what they would find in the UK. However, as companies become engaged with China, they do become more familiar and comfortable with the culture. The perception of China's IPR system is very poor, with most companies considering it is not suitable to protect their IP assets effectively. Again, the perception of the IPR system does improve as companies engage with it.

Interestingly, UK companies had only a patchy experience in engaging with the Chinese IPR system with many not doing so despite trading or investing in China. It would appear somewhat risky behaviour to not protect products or services in a country that is considered to have a high mimetic capacity. Companies viewed licencing as the riskiest way of transferring IP into China and investing through a JV the least risky. This is an interesting finding as a JV requires a Chinese partner, and one might logically consider the use of a WFOE to be the safest in terms of IPRs. Perhaps the support from the Chinese partner in navigating the IPR system outweighs the risks of that partner being involved in undermining the company's IPRs. However, when considering UK MNEs' actual investment behaviour in China, the majority of UK MNEs surveyed chose to invest through a WFOE.

High R&D intensive companies were, as one might expect, on average, less confident about the strength of IPR protection when investing in China. Confidence in UK MNEs to transfer their technology to China is very low in general and compares with the weakest IPR regimes considered by Mansfield (1994). Trust in China's laws, legal system, and enforcement regime are also poor. Despite this poor view of China's IPR regime, some UK MNEs undertake R&D activity in China. However, many companies are investing in R&D that is dependent on technology held, and protected, in other jurisdictions. This 'vertical' R&D adds additional protection. While Zhao (2006) anecdotally suggested this phenomenon, this may be the first empirical evidence of this behaviour. To understand the actualities and drivers for this behaviour, it is discussed with interview participants in Chapter Six.

A startling finding of this research is that over 40% of companies outside of the services sector have had their products or services copied or imitated in China. Companies that have invested in China have increased risk of imitation of their products or services. This has led companies to be very cautious about approaching investments in China, many choosing to keep their IP away from China of choosing not to invest in China at all.

However, weak IPRs in China does not stop large amounts of trade and investment in China. The size of the market, rate of growth and competitive drivers, do ensure that UK companies engage with China. When companies do invest, their chosen method is through a WFOE. This is despite the advantages, in understanding the market and perceived benefits in terms of IPR protection, of a JV. Engagement in China through exporting or licencing was much higher for companies that undertook manufacturing activities and for those with high levels of R&D intensity except the most R&D-intensive companies (who also tended to be smaller companies). In general, investments in China are likely to be at the less valuable end of the spectrum with more sales and marketing and rudimentary production taking place.

This chapter has underlined the importance of considering the heterogeneity of UK MNEs and FDI and the need to disaggregate data to understand the behavioural phenomenon involved with FDI properly. UK MNEs are mainly driven to invest overseas to seek new markets. The importance of IPRs in these investment decisions varies dependent on the type of company, sector, experience, size, R&D intensity and ability to protect their IP from imitation. China's IPR regulations, structures and enforcement are considered poor, and this is backed up by a high level of imitation in the market. This impacts on the quantum and quality of FDI China receives from the UK.

Chapter Six: Critical Discussion Aided by Interview Evidence

6.1 Chapter Overview

This chapter discusses the findings from the analysis of primary data drawn from a survey of 205 executives of UK multinational enterprises (MNEs), and the analysis of secondary data based on 8,049 records on the FAME database, which was presented in Chapter Five. To supplement this analysis data collected from 9 interviews (Table 33 on page 159) with senior executives of UK MNEs is used to answer the main research question, namely: 'How does the perception of Chinese IPRs impact the FDI decisions of UK MNEs'. To answer this research question, the nature of UK MNEs and their behaviour when undertaking FDI will be discussed. In addition, this chapter explores the importance of IPRs to UK MNEs when making investment decisions of different types and, how these behaviours manifest in China. The perceptions of Chinese IPRs and the impact they have on actual investments in China by UK MNEs are also considered.

This research concentrates on the variable of IPRs both from a company and country perspective. It seeks to understand the interplay between IPRs and other variables and how these impact on FDI decisions. This research considers UK MNEs' experience and knowledge of China and its IPR systems given the importance of this market in the global economy in terms of both size and growth, and its relatively recent engagement with the world trading systems and frequently criticised IPR system (see, e.g., Yu and Zheng, 2000; Long, Yang and Zhang, 2015).

Despite the longstanding discussion at both a theoretical and empirical level, the relationship between IPRs and FDI decisions remains ambiguous (Noon *et al*., 2019). Theoretical postulations considering the interplay between IPRs and FDI are contradictory. Positive postulations (in terms of better IPRs increasing FDI) include better IPRs, strengthening ownership and location advantages (Dunning, 1997; Smith, 2001; Braga and Fink, 1998). Negative postulations identify results enabling monopolistic rents to be taken for longer and pushing up the cost of imitation closer to the cost of innovation eventually stimulating innovation, therefore, reducing the monopolistic advantages of foreign companies (Mansfield *et al.,* 1981). Others also suggest that stronger IPR regimes may encourage companies to engage with companies through licencing rather than FDI thus reducing the quantum of FDI (Braga and Fink, 1998; Maskus *et al*., 2005; Ferrantino, 1993).

A significant body of empirical work does offer at least weakly skewed evidence in support of the proposition that stronger IPRs support growth in FDI. Evidence on the strength of this effect is inconclusive and dependent on many factors, including sector, technology intensity, host-country characteristics to name but a few (Noon *et al*., 2019). With a few notable exceptions, most of the empirical research uses aggregated data and, therefore, argued in this thesis, misses the nuances of companies and the investment decisions MNEs are making. Much previous work is also based on manufacturing companies only, thus missing a large part of the globalised economy.

Of the few qualitative or mixed methods research studies undertaken, Edwin Mansfield's 1994 pioneering work is of particular relevance as it does consider specific decisions and particular companies. Mansfield (1994), through a survey of 94 manufacturing companies, was able to identify behaviour in certain types of companies and when making different types (quality) of investments in response to differing IPR regimes. Mansfield did show a relationship between better IPRs supporting better quality FDI in high R&D-intensive manufacturing companies. However, demonstrated in the analysis that follows, his results are not generalisable across all types of companies.

This research, therefore, seeks to fill the theoretical and empirical gaps in the literature by using a mixed-methods approach to understand the behaviour of a large cross-section of UK MNEs when investing overseas. It attempts to bring clarity to the theoretical pond and elucidate empirical contradictions. It seeks to understand better the diversity and the complexity of companies, and the FDI decision they undertake and how IPRs impact these decisions.

This chapter is organised as follows. Section 6.2 sets this research in the context of the current literature and the knowledge gaps being addressed through this study. Section 6.3 discusses the research questions posed. Section 6.4 critically discusses the research findings and is broken into sub-sections looking at the nature of UK MNEs and their activity; the importance of IPRs and how they impact on FDI decisions; the perceptions of IPRs in China; and the behaviour of UK

MNEs in China; and the impact on FDI decisions of Chinese IPRs. Finally, section 6.5 summarises the findings.

The interviews that supplement this analysis were undertaken in either the interviewee's workplace or over the phone. Each was recorded and transcribed into NVivo for analysis. The interlocutors were all senior-level staff, including several CEOs, and heads of strategy and innovation. The interviews lasted between 35 and 55 minutes, and each participant gave consent to their data being used. To support open dialogue, the anonymity of the interviewee and the company under discussion was assured.

In targeting interview participants, a cross-section companies that had invested in China and those that had not, plus a selection of different company type, size and R&D intensity were sought. See Table 34 on page 160 for the distribution of interview participants.

6.2 Research Context

This research is set within the context of the multinational enterprise (MNE) as the driver of international growth (globalisation) in trade and investment (De Vita, 2001). Specifically, it considers one aspect of international trade, foreign direct investment (FDI), where a company establishes, acquires or increases production (or service delivery) in a foreign country (Hamilton and Webster, 2015). The operation of an MNE involves a complex, multi-faceted set of variables relating to the nature of the business, aims and objectives of the activity and the strengths and weaknesses of the receiving country. Companies undertaking FDI will necessarily consider many variables relating to their business, competitors, customers and operations (Maskus, 1998a).

6.3 Research Questions

To properly answer the main research question of this thesis, namely, **'How do the perceptions of Chinese IPRs impact the investment decisions of UK MNEs**?', it is necessary to identify facets of the phenomenon through a set of sub-questions, building a picture of the behaviours of companies in response to several variables. As stated in the introduction chapter, the research sub-questions that this thesis addresses are:

I. What is the nature of UK MNEs (including ownership advantages, imitability, sector, FDI experience, R&D intensity and size)?

II. What behaviours do UK MNEs display when engaging in FDI?
III. What is the importance of IPRs to UK MNEs?
IV. What are the impacts of IPRs on the FDI decisions of UK MNEs?
V. How do UK MNEs perceive China's IPR system?
VI. What is the FDI behaviour of UK MNEs in China?
VII. How do China's IPRs impact the FDI decisions of UK MNEs?

Through answering the research questions, this research seeks to understand the theoretical implications of the data, and what it says about existing theory and draw out opportunities for a further, rich research agenda which are set out in Chapter Seven.

6.4 Critical Discussion of the Research Findings Complemented by Interview Evidence

6.4.1 What is the Nature of UK MNEs?

The analysis of secondary data of 8,049 UK MNEs from the FAME database and collection of primary data through a survey of 205 senior executives in UK MNEs, showed a diversity of MNEs spread across all 19 sectors. This diversity would be expected from a large developed country like the UK. However, there was a concentration of MNEs in three sectors with nearly 50% of the total in 'Professional, scientific and technical', 'Manufacturing', and 'Financial and insurance services' sectors with 19.4%, 15.8% and 14.3% of the population, respectively. The most FDI intensive sector was 'Public administration and defence, compulsory social security', followed by 'Financial and insurance services'. A diverse selection of companies by company size (measured by turnover and number of employees) was surveyed. While companies of all sizes were present in the population, the distribution of MNEs was skewed, as one would expect, in favour of larger companies.

A most valuable feature of this research lies in the ability to disaggregate companies across several variables including activity type, turnover, number of employees, R&D intensity, investment experience and ease of copying. Companies surveyed included 27% manufacturing, 48% delivering services, and 25% delivering both services and manufacturing products. Much of the previous research into the link between IPRs and FDI has either aggregated all companies (e.g., Ferrantino, 1993; Seyoum, 1996; Maskus, 1998b; Mayer and Pfister, 2001; Smith, 2001; Lesser, 2002; Seyoum, 2006; Zhao, 2006; Branstetter *et al*., 2007; Awokuse and Yin, 2010a) or concentrated on companies involved in one activity type, usually, manufacturing only (e.g., Mansfield, 1994; Maskus and Eby-Konan, 1994; Kondo, 1995; Kumar, 1996; Lee and Mansfield, 1996; Braga and Fink, 1998; Park and Lippoldt, 2003; Javorcik, 2004; You and Katayama, 2005; Ushijima, 2013). These methodologies fail to acknowledge the increasing importance of the services sector in globalisation or assume constant behaviour across all company types. As discussed later in this chapter, the practice of companies within these different groupings differs markedly and so to either develop a theory or properly analyse empirical data, it is necessary to be able to disaggregate the data. Indeed, this thesis postulates, supported by the views of Buckley and Casson (2009), Mansfield (1995) and Maskus (2000), that the reason both the theoretical and empirical research of the link between FDI and IPRs is ambiguous is, at least in part, due to the heterogeneity of MNEs and their behaviour.

Much of the literature does acknowledge that the intensity of an MNE's R&D, is an essential factor when considering the link between IPRs and FDI activity (Mansfield, 1994; Kumar, 1996; Maskus, 1998b; Javorcik, 2004, Ushijima, 2013). However, robust measures of R&D intensity are difficult to achieve as reporting of R&D expenditure in UK company accounts is, at best, sporadic. Some past studies use 'sector' as a proxy for R&D intensity, including Mansfield (1994) who selected companies in the Chemicals (including pharmaceuticals) sector as his population of high R&D intensive companies. Had Mansfield (1994) made a right choice in choosing these subsectors as a good proxy for R&D intensity, this research would have found the 'Manufacturing' and 'Professional, Scientific and Technical Services' sectors to be the most R&D intensive. However, the present study through directly surveying company executives has identified that using sectors as a proxy for R&D intensity is a poor choice. Several sectors such as 'Agriculture, forestry and fishing' and 'Real estate activities' reported higher average R&D intensities than 'Manufacturing' and 'Professional, scientific and technical services'. This suggests that additional proxies be chosen to identify R&D intensity in the absence of better financial statements or the direct surveying of the companies.

Much of the previous literature assumes that larger companies are most likely to be the most R&D intensive (Fishman and Rob, 1999; Tsai and Wang, 2004; Park *et al*., 2010; Lai *et al*., 2015). The present study questions this assumption as the analysis demonstrates that smaller UK companies are more R&D intensive, even if the quantum of R&D is higher within larger companies. While this finding contradicts much of the previous literature, this can perhaps be explained by larger companies moving the focus of their efforts, relatively away from R&D and into production and market exploitation activities. Given the current research has shown that the likelihood of MNEs engaging in FDI increases with the size of the company and that smaller companies are on average more R&D intensive, this may suggest that R&D-intensive companies limit their FDI activity. One could postulate this is a result of needing to protect their R&D outputs (i.e., their IP). It is not until they grow, exploiting the results of their R&D through manufacturing, licensing and service delivery, that they seek to engage in large scale FDI.

Manufacturing companies are, on average, less R&D intensive than services companies and those that delivered both services and manufacturing outputs. This challenges the orthodoxies in some empirical and theoretical literature that have produced only an ambiguous understanding of the link between IPRs and FDI behaviour. Generally, where a positive link between better IPRs and more FDI has been shown, this evidence is more pronounced within R&D intensive industries and sectors (Mansfield, 1994; Javorcik, 2004). However, data and hence studies that concentrate on manufacturers, or distinguish R&D intensity by sector or size, are likely to miss some of the most R&D intensive companies that fall outside of these proxies.

The current research measured the surveyed companies' assessment of the ability of their products or services to be copied. One might have expected, had the drivers for R&D been solely to improve the utility of products, that higher levels of R&D would have increased confidence in a product or service to withstand imitation. However, only an overall moderate correlation of .309 ($p=0.01$, two-tailed), of the relationship between R&D intensity and ease of copying was demonstrated. This was unpacked further through identifying in Figure 19 on page 183 that those companies with the most difficult-to-copy products and services had a very high R&D intensity. This shows that at least for the most R&D intensive companies their R&D had the effect of making their products and services more difficult to imitate. This seems logical as R&D that develops complexity and utility may well be more challenging to reverse engineer and require more production know-how. However, not all R&D appears to have the same impact on imitability. This may be because some R&D is used to localise products, making it more suitable for a local market rather than increasing the complexity of the product or service. Further research in this area would be fruitful in understanding the drivers for R&D more fully and the impact this makes on the imitability of products and services and how this affects decisions on exporting, licencing and FDI.

When considering the different types of companies, service companies were much less confident about their ability to protect their services from imitation. A large multinational services company explained that:

> *For companies like ours, there was generally a gentleman's agreement between us and our competitors that meant our products and services were respected; however, this is not the case in non-Western countries. As we have diversified our activities, we have had to be much more careful about IP.* (SY2).

This behaviour appears to be because the IP of service-based companies is often invested in people. The ability for people to move across companies and to take their knowledge with them provides specific challenges to service-based companies.

Smaller, inexperienced companies also had greater confidence in their ability to deter imitation of their products and services than larger, experienced companies. Whether this reflects an actual or perceived ability to protect products and services is unclear. Given smaller companies are more R&D intensive, their confidence in protecting from imitation could be a result of a more complex product or that their innovation is more process-driven than product-driven (Fosfuri, 2004). Also, companies did say that smaller operations give them confidence in managing product imitability because know-how is limited to a lower number of people. It was easier to retain a small amount of staff with higher salaries and better working conditions than with a larger workforce.

> *Our products and services belong to us, and there is a lot of know-how in using them. It would be very difficult for a company to copy what we are doing. We protect our software in the UK and without this our methods are pretty useless* (SN1)

Alternatively, this phenomenon could be because smaller, less experienced companies have had less exposure to imitation of their products and services and, therefore, consider the risks to be lower. The present research does identify that perception changes with experience, and this may be a manifestation of that phenomenon.

As expected, companies that had invested in China had, on average, a higher confidence in their products and services' resilience to imitation than those who had not invested in China. This would support theoretical postulations and empirical findings suggesting that companies would only invest in countries with weaker IPR regimes with products or services that are more difficult to imitate (see, e.g., Mansfield, 1994; Javorcik, 2004; Yang, 2013). However, disaggregation of the data by company type demonstrated that this phenomenon is only seen in manufacturing companies and does not apply to either service companies or those that deliver manufacturing and services. This dichotomy will be discussed further in this chapter when examining the drivers for FDI and the importance of people to companies that deliver services.

6.4.2 What Behaviours do UK MNEs Display when Engaging in FDI?

In terms of FDI, including in China, *a priori* expectations that as companies grow and become more experienced in FDI, they are more likely to invest overseas and in China were confirmed. Companies that both manufacture and deliver services have, on average, 2.7 overseas subsidiaries for every one subsidiary of a manufacturing company. Services only companies have, on average, 2.4 subsidiaries for every one manufacturing subsidiary. The finding that service-based companies are more R&D intensive and have more overseas subsidiaries than manufactures confirms the findings of Buckley and Casson (2009) that MNEs active in R&D are likely to have higher levels of internationalisation. The differences between company type behaviour underline the requirement to disaggregate between companies if investment experience is an essential variable in understanding company behaviour (Buckley *et al*., 2007). One company executive from a large company experienced in FDI explained how diverse their FDI engagements were, as follows:

> *you have to have the services that go with products, which is a general trend for lots of organisations, in lots of sectors. It's not just about putting things in boxes and shipping them. You have to have the technical capability, whether you want to call that research and development or just the system integration or whatever you want to call it, you have to have that locally, as well as R&D centres that develop products. So, we have a number of R&D facilities.* (MY1).

This diversity of experience was seen throughout the survey and interviews which included companies with only a few subsidiaries *' I will be hoping that they [our subsidiaries] will also be* *independent, and we will still be a group of 12 or 13 markets with a central point here in the UK'* (SY1) and companies with several thousand *'So about 6% of our businesses is in the UK, the rest is outside of the UK. In some countries, we do more than sales and putting production there, and we have three global centres for R&D in our major markets.'* (MY1). Differences in the span of control were also evident. Some operated through basic sales and marketing operations, essentially an export bridgehead. In contrast, others took part in the production of intermediate goods or delivering full market-specific services through to the production of whole finished products and R&D facilities, including positioning vital corporate leaders in overseas markets. Control ranged from a very centralised model where subsidiaries reported to headquarters, '*our subs report in HQ here in the UK. It's important we keep control of their activity to manage our business risks*' (BN1), and had very little independence; to models of very distributed control where subsidiaries had clear decision making control and had their own national and international subsidiaries and supply chain arrangements '*Some of our subsidiaries have their own production relationships in-country or in neighbouring countries.'* (MY1), '*those overseas businesses will be largely independent and be able to operate independently.'* (SY1). The choices of an overseas subsidiary and the activity of that subsidiary appear very closely related to the specific demands of the company, the sector they work within and their operating model.

The survey showed that UK MNEs take part in horizontal and vertical FDI, plus delivering into a global supply chain. However, many services only companies do not identify with these motivation descriptors. It is, therefore, necessary and useful to identify suitable taxonomies for service-based companies if the traditional vertical, horizontal and delivering into a global supply chain category are not relevant to this portion of the economy. Vertical FDI is a clear preference for R&D-intensive companies, and the separation of production operations is a key way companies protect their IP.

Most of the UK MNEs surveyed chose the supply of goods and services (market-seeking FDI; Buckley *et al*., 2007) as their primary motivation for undertaking FDI. R&D intensive companies are more likely to be motivated to FDI for reasons of specialisation (efficiency-seeking FDI; Eckel, 2003) and to secure advantages against competitors (market or strategic asset-seeking FDI; Dunning, 1991), or have other FDI motivations.

6.4.3 What is the Importance of IPRs to UK MNEs?

IPRs usually give the creator an exclusive right over the use of his or her creation for a certain period. Ghidini (2006, p.24) states that:

> "*the innovation already developed in such a way that the reward granted to the current inventor stimulates both the inventor to continue and third parties to develop subsequent innovation which might compete with the preceding one, thus also spurring on the first innovator, in a virtuous pro-innovation and pro-competition dynamic process.*"

The property right owner can, therefore, receive enhanced rents for its product due to its monopoly position. This incentivises companies to maintain innovation. The additional monopolistic rents are required to be above or equal to the cost of innovation to be effective in this way (Léger, 2006).

Service-based companies explained that much of their value came from the know-how, skills and expertise of their staff. They felt that the IPR regime was not there to protect these types of assets, and they were, therefore, less concerned with weaker IP regimes. Their strategies for safeguarding their knowledge assets was centred around recruiting and retaining key staff members, *'Most of our know-how sits within our people, and so we really look after them. If they leave, we can be burned.'* (SY1). This strategy of looking after staff was also seen in companies that both manufacture and deliver services. As one interlocutor explained:

> *We create them [operations in China] very much as a family. Most of our factories have got accommodation around them. We don't run sweatshops. Where we're bringing in people from towns, we actually build a proper family where the people that are working in the factory live in close proximity, and we pay for their accommodation, we pay for all their food, pretty much. We will look after them so well that very often they don't have a second option. And that makes them incredibly loyal. And this includes the engineers as well. Eventually, the engineers become, you know, paid well enough that they can do their own thing. But even then, we find that attrition in China is almost zero.* (BY1)

IP held in software, or manuals on ways of working were often protected outside of the weaker IP country. One company explained '*we protect our software in Wales; it's very well protected*' (SN1). Protection of brand and trademarks was a concern, but there was little evidence of this concern affecting investment decisions.

Companies that both manufacture and deliver services tended to be complex and treated the manufacturing and services sides of their business, in terms of IP, separately. They protected product and manufacturing know-how using IP and services through strategies around the management of knowledge and people. Some evidence was found that by linking the service portion of their business to their manufacturing, they were able to add an additional layer of protection. They believe that even if the product were reverse-engineered, it would not have full utility without the service know-how they were also able to protect.

> *Our business is complex, we patent our products, and what goes into them, some of this includes special alloys we own. Our supply chain is carefully managed and legally tied down. The know-how to service [the product], which is leased to the end-user, is also kept in-house or subbed out to trusted partners.* (BY1)

Discussing the importance of IPRs with interviewees, highlighted some key themes of interest. All the interlocutors were cognisant of the need for IPRs, and one company had an extensive IP portfolio which they carefully managed. They were prepared to defend their IP in the courts in several jurisdictions, including in China. However, all the companies with IP assets interviewed discussed the need to manage their IP provision carefully *'So we're quite selective about what we would patent for core technologies. And we do that on an ongoing basis, and we defend them, protect them in the courts when necessary.'* (BY2). IP in the form of patents was considered costly and time-consuming. Many interlocutors discussed this as being a barrier to using the IPR system. In markets where margins were tight, registering and maintaining patents was a cost to operations that impacted on profitability. Some companies would be selective about what they patented, choosing to leave a portion of their development un-protected.

In addition, companies explained that it was necessary to have the funds and resources available to defend the IP should it be required. All these considerations were in addition to that of the strength of a country's IP regime and the effectiveness of enforcement activities (Alexiou, 2013;

Papageorgiadis *et al*., 2014). Given these considerations, protecting knowledge through the IP regime was only one of the strategies employed, alongside protecting IP through know-how, holding and protecting IP centrally and not engaging with the IP regime. Some companies described that they just 'took the risk' effectively saying that the costs of protection were too high and not participating in the market is too great. These responses do chime with the findings of Nunnenkamp and Spatz (2003); Yu (2007) and Wang and Swain (1995) that the size of the market opportunity can override concerns about IPRs.

The survey of MNEs found that 41.8% of manufacturing MNEs, 15.3% of services MNEs and 44.2% of MNEs that manufacture and delvier services, had product or services copied in China. Over two-thirds of these companies had used China's IPR system, supporting the findings of You and Katayama (2005) that suggests that patenting can increase the risk of imitation, one manufacturer explained:

> *And the reasons being that often, patents can be reversed engineered. And if one is not serious in protecting the core patents with other patents, and the periphery. Publishing, patents can actually be a way to facilitate competition, we found that many times, we wouldn't be the only company to say that, I think, as well.* (BY2)

6.4.4 What is the Importance of IPRs as a Location Factor to UK MNEs?

Surveyed companies were asked about the location factors that were important to them when making FDI decisions. For manufacturing companies; financial incentives, access to infrastructure, and exchange rate stability were the most critical factors. This perhaps reflects the higher capital investment required of creating a manufacturing plant and the need to import and export raw materials, intermediate goods and finished product *'setting up a manufacturing plant is expensive; it's a big company decision for us. We do chase cheap labour and subsidies when its available'* (MN1). This, however, contradicts the findings of Scaperlanda and Mauer (1969) and Goldberg, (1972) that market size and market growth were the key location factors for manufacturers.

For service companies, cultural closeness and IPR protection were most important. This is probably reflective of the person-centred nature of service activities and broadly supports the findings of Jeong (2014) and Kolstad and Villanger, (2008). Being able to apply knowledge in a market will be dependent on the market's capacity to receive the support culturally. Given IP is not a particularly important factor considered for service companies, the choice of IP as a critical location factor is interesting. This may be due to the importance of brand for these types of companies or perhaps IPRs are a proxy for legal structures within which service companies work '*we are accountants and auditors, so we need to operate within generally accepted principles. If this is not available in a particular jurisdiction the most we will do is support our international clients in that market'* (SY2).

Those companies that both manufacture and deliver services, consider market size and market growth to be the most critical factors '*we are a big company we have to be where growth is, and this is, therefore, a big driver for us. China is definitely in this category, but up until recently, Brazil and India was a big opportunity for us too'* (BY2). This finding fits with much of the literature on location factors (Scaperlanda and Mauer, 1969; Goldberg, 1972; Jeong, 2014) and, the results of Wang and Swain (1995) who considered the location drivers for China.

Across all the variables measured, one sees different patterns of the importance of location factors. The most differentiated response came from companies with the highest R&D intensity who value market growth and market size along with financial incentives and cultural closeness very highly compared to other factors (including the strength of IPRs). Had the empirical and theoretical postulations that suggest high R&D intensive companies' FDI decisions are more sensitive to IPR protection been generally applicable (Mansfield, 1994; Jarvocik, 2004), one would have expected to see IPRs as a more prominent factor in FDI decisions for these companies. There could be several reasons this was not the case, including the heterogeneity of the most R&D intensive companies, but also the relative strength of IPRs against other investment factors as highlighted by Yu (2007) and Maskus (1998a). When questioned (BN1) about this with an R&D intensive company's, they explained that if IP were a barrier to their growth, they would have remained small, *'the risk of copying is everywhere. We are prepared to defend if necessary and use other strategies to protect our products and services. But we are driven as a business by growth, and our competitors are the same'* (BN1).

These data are interesting, showing a very intricate pattern of factors that makes picking out a single set of factors to attract FDI difficult for policymakers. However, with careful targeting and a good understanding of the company, it would be possible to create an optimum package of location factors to support their attraction. Of course, some of the factors are macro such as market size and market growth. In contrast, policymakers could tailor others, such as financial incentives and access to infrastructure or human capital for individual companies or sectors.

6.4.5 What are the Impacts of IPRs on the FDI Decisions of UK MNEs?

Understanding the importance of IPRs to MNEs is a key output of this research. Chapter Five showed that as a motivator for FDI, the importance of IPRs varies across company types, sector, company size, R&D intensity, etc. To understand further the importance of IPRs, companies were asked about their investment behaviour when investing in three distinct country groupings representing developed, developing and least developed countries, which also divided the countries by the strength of their IPRs as measured by Park (2008b). Manufacturing companies were most concerned about IPRs when investing in second tertile countries that can also be broadly identified as 'developing' with growing, advancing economies and middle-ranking IPR regimes. Manufacturers were the least concerned about investing in third tertile countries. Service companies were most concerned about first tertile, most developed, countries, and least in third tertile countries. Those companies that deliver both manufactured goods and services, while generally more concerned about IPRs across all country groupings, were most concerned in the third tertile, least developed, countries and least concerned in second tertile countries. These results contradict the findings of Kumar (1996), who suggested that IPR strength was only relevant in industrialised countries when attracting R&D investments.

These results obtained from primary data taken from the survey of UK MNEs were discussed in the interviews. A manufacturer explained that a country's ability to copy and produce was a key factor: *'Developing countries have the people and knowledge to reverse engineer and can do it, and have done it'* (MY1). For them, when assessing an FDI destination, they are balancing the quality of the IPR laws in the jurisdiction and the ability to enforce protection with the ability for companies in the jurisdiction to copy products and to exploit the copied products.

A service company explained that they had a high value-added product based around people, so first tertile countries were most likely to have potential competitors who could attract their key staff:

> *We really worry in developed countries as staff can move between companies. Our services are based around people and are valued very highly. The risk of losing staff is a real one* (SY2).

For service companies, IPRs were considered less important to their investment decisions, whereas the ability to recruit and retain good people was much more important to them. Companies that manufacture and deliver services were generally more worried about protecting IPRs as one might expect given their requirement to balance IPRs based in products against a country's ability and propensity to imitate and the need to retain key staff who hold knowledge assets. However, one company said that they were concerned about countries where low-cost manufacturing was available and the risk of selling ideas to competitors.

> *We worry about our people and products in all our operations, but the risk of our products being knocked off* [copied] *and then causing an accident is a core business risk* (BY1).

The largest UK MNEs were also most concerned about IPRs and in first tertile countries. They were particularly concerned about IPRs where the capability to lose staff or to reverse engineer product was highest. This, as discussed earlier, may reflect that exposure to IPR challenges faced by larger, more FDI experienced companies, increases a company's concern about IPRs.

The most R&D-intensive companies were mainly concerned with IPRs in first tertile countries, and this was mirrored in those companies that felt their products or services were difficult to imitate. This would suggest that for the most R&D intensive companies to invest, the capability to imitate needs to be mirrored by strong IPR protection.

> *To be honest, in many countries they don't have the technology to copy our products, in western countries, where our main competitors are, we need to be more careful. The systems (*for protecting IPRs*) are better, but they are able to copy our products and embed them within their solutions and its difficult for us to identify this activity.* (BY2)

The larger and more R&D-intensive companies were concerned about operating (and IPRs) in countries where their main competitors were active. These tended to be the first tertile countries. For service companies, the risk of losing key staff and potentially the accounts they service was a significant risk to them. Losing R&D know-how to competitors is also a concern for high-technology service companies, *'So one of our strategies is not to go to places where JP Morgan might nip across into the coffee shop and nick our staff'* (SY1).

While the preceding analysis of the importance of IPRs considers broad country groupings and general views on IPRs, Mansfield (1994) enabled researchers to consider the type or quality of the FDI. Mansfield postulated that as companies moved their investments through a spectrum of investment types from basic sales and distribution, through the manufacture of rudimentary components, the manufacture of intermediate goods to whole products and finally towards R&D, the importance of IPRs to these decisions would increase. He demonstrated that this was a particularly relevant phenomenon with high-technology-reliant companies. To enable an assessment of service-based companies and those that both manufacture and deliver services, the present research expanded the FDI investment type definitions proposed by Mansfield. This involved drawing information on the nature of service-based companies taken from Markusen (2005) and Howells (2000) to expand the spectrum of investment types to include these types of companies' investments.

The current research found that for manufacturing companies, Mansfield's (1994) proposition that companies increased their concern about IPRs as they progressed toward the manufacture of complete goods and R&D, applies to UK MNEs. Given Mansfield surveyed manufacturing MNEs, this is a strong justification for the efficacy of Mansfield's research. However, significantly, there was contradictory evidence from companies that delivered services, or both manufactured and delivered services. The current research found service companies were most concerned about IPRs when delivering services to current, non-indigenous, clients. Those companies that both deliver services and manufacture products were on average generally more concerned about IPRs across all investment types (as seen when considering location characteristics), but most concerned about IPRs when delivering services to the indigenous population or producing key components.

The most R&D intensive companies with over 25% of turnover invested in R&D, as Mansfield (1994) predicted, become more concerned about IPRs as they progress through the investment spectrum. The behaviour of less R&D-intensive companies is more mixed and does not clearly show this pattern.

This, once again, highlights different behaviours from different company types and makes the case that companies are likely to consider IPRs differently, dependent on how their knowledge-based assets are held within the company. These findings relating to the impacts of IPRs on the different types of investment, as highlighted by Mansfield (1994 and 1995), are important. Most studies into the link between IPRs and FDI treat FDI as a homogenous activity. It is not, therefore, not including the qualitative nature of FDI in either theory or empirical analysis leaves an important variable unexplained.

6.4.6 How do UK MNEs Perceive China's IPR Regime?

Overall, the survey data showed that UK MNEs view China's business culture as being different or very different from the UK's. This is, perhaps, not surprising given the different political and societal norms in China. Legal systems that are intrinsically aligned to government and politics rather than the arms-length legislator and executive found in the UK was highlighted as a significant difference between the two countries:

> *So it's, I think, you know, my personal opinion is that China is a difficult market. But a lot of the IP issues you see in China, you see elsewhere as well* (BN1).

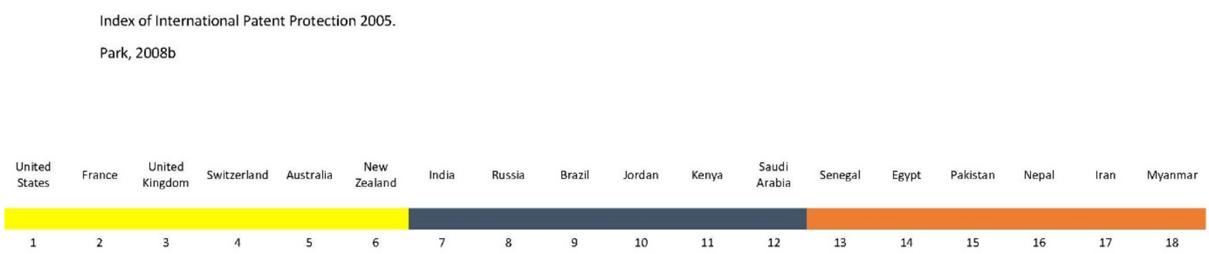
> *As you probably know, I think China used to be known as the hub of copying.* (MN1)

During the interviews, participants were asked to give their view on where China would sit on a continuum based on the Park (2008b) index of IPR law strength set out in Figure 50. This was used to draw an assessment from the executives interviewed on their perception of China's IPR laws. Responses varied from those who said they would expect China to sit between point 6 and 7 on the scale to one who placed China around point 14 on the scale. The average rating given by interlocutors was 11.07 – to the right of Kenya (worse IPRs) and left (better IPRs) of Saudi Arabia in the second tertile range. Park (2008b) places China between Australia and New

Zealand in the first tertile range. This demonstrates that the perception of China's IPR regime is that it is weaker than the actual assessment of the laws in place and could suggest, either a perception or reality, that enforcement and penalties for infringement of the laws do not match the strength of the legislation in place. This significant difference between perception and the reality of the strength of the laws is important; Lee and Mansfield (1996) and Lesser (2002) postulated that a 10% improvement in the perception of IPRs would increase FDI by US$140 million per year and a 1 point rise in IPR score would increase FDI by US$ 1.5b respectively. This would suggest that China is receiving significantly less FDI than it would attract had the perception of its IPRs matched the quality of its laws. This finding also questions the efficacy of Park's (2008b) Index of International Patent Protection.

Figure 50

Graphic of IPR Law Strength Shown to Interview Participants



The survey of UK MNEs shows as one might expect that operating in China improves the understanding of the Chinese way of doing things and helps UK MNEs become more comfortable operating in the market. Companies operating in China are more than twice as positive about IPRs in China than those companies that had not invested in China. As companies operate in China, experience replaces perception, and this is positive in terms of a company's view of China's IPRs. This finding confirms those of Ushijima (2013) that the effects of IPRs diminishes with experience.

When survey respondents were questioned about their thoughts of IPRs in China, over 50% rated them as being very poor. Companies that both manufacture and deliver services were by far the most sceptical about the ability of China to protect their company's IPRs.

China is a difficult market. But a lot of the IP issues you see in China, you see elsewhere as well. We're lucky because we are a Chinese entity. And we have Chinese staff. We've been able to take action in China successfully. But you know, it's a difficult environment, but then, you know, you could equally be talking about Turkey in a certain way. You know, there's lots of places where we're still regarded as decent business ethics to copy somebody else's design. (BN1)

Despite China having a relatively strong set of IP laws (in the first tertile of countries; Park, 2008b), the perception of UK companies was that they were weak, difficult to enforce and that penalties were not appropriate. One interviewee stated:

there were significant difficulties with being paid out of the China market. And there was also a fair amount of counterfeiting going on of our products. (SN2)

Companies that had invested in China were more positive about China's IPRs, and evidence from interviews suggests that the situation is improving. As China increases its own generation of IP, becoming an exporter rather than just an importer of knowledge, there appears to be evidence of a strengthening of the protection of IP, potentially driven by domestic requirements (in addition to international pressure):

But based on the various conversations that we have with regulators in China, and as we've heard, is, there may well be an opportunity to get the laws we need in the end, the mindset is changing in China. They are more keen on owning IP. So, they are getting more trustworthy with IP. They also seem to be more confident in inviting companies to directly invest. (BN1)

This is an interesting finding that highlights a notable change in the perception of UK companies of the strength of China's IPRs. As China has become more developed and technically adept, they are becoming more cognisant of the importance of being able to protect their own IP. This appears to grant benefits for UK companies operating in China and impacts on the way UK companies are interacting and perceiving China.

They're becoming developers rather than manufacturers, which is what the rest of the world has been capable for decades. So that's kind of like a sea change in the way that they operate, it could be from, what they're training engineers and universities or the way they're training. (MN1)

But nevertheless, there are now instances also where you can enforce confidentiality agreements and patents. (BY2)

Companies also highlighted that the recent US-China trade dispute was proving beneficial for UK companies operating in China. Some of the companies reported that China was now looking more widely for technology partners.

They're protecting their patents a lot more. And I think that's going to enhance with the U.S. trade war as well. There's nothing like being angry about something that makes you step up. And, you know, I think, what was probably happening in China now, there's a certain level of anger towards the US. And their reaction to that is we're just going to become better than you. (MN1)

Overall, the feeling from the companies interviewed was that the Chinese IPR system was improving and that this meant it would be a more accessible market for high-technology UK companies in the future. One high-tech company interviewed, that had not had a subsidiary in China when the survey was carried out, had subsequently agreed to open a subsidiary in China through a contractual JV. This had been a significant step for the organisation that was highly dependent on the protection of its IP. Without confidence in their abilities to protect their IP, an investment would have been impossible. As candidly put by the interviewee:

And I would say to be fair, I think in China over the past five or six years, it has become easier to challenge. The courts are more receptive. There was a time not that long ago, where Chinese companies would clearly have stolen our products, the courts would be slow in acting, and the action might be incomplete or unsatisfactory. (BN2)

6.4.7 What is the FDI Behaviour of UK MNEs in China?

Exporting to China was seen in the survey results as a key way through which MNEs can deliver goods and services into the market. Nearly 47% (97) of all MNEs surveyed (205) currently export to China. This percentage is higher for manufacturing companies and companies that manufacture and deliver services with more than twice as many companies exporting than those who do not. However, for services only companies, only 25% of the companies currently export to China. This is interesting as shown earlier; service companies are more FDI intensive than manufacturing companies by a ratio of 2.4:1. This would suggest that the people-centric nature of service company activity means that exporting is not the favoured internationalisation strategy preferring FDI with a fixed presence in the country instead. As one service-based company explained:

> *We deliver services to companies in a particular jurisdiction. There is some scope for delivering these from a distance, but if we want to be a player in the market, we have to set up a business there. There is really no other option for companies like ours. (SY2)*

As companies grow as measured by either turnover or number of employees, they are likely to increase their propensity to export to China. This finding chimes with the literature on company growth (Golovko and Valentini, 2011) and reflects the findings in this research for FDI. The smallest UK MNEs are 6.3 times less likely to be exporting to China. This may be evidence of barriers to entry that deter smaller companies engaging in exporting to China.

As companies increase their R&D expenditure as a proportion of turnover, they are more likely to export to China except for the most R&D intensive companies, which are the least likely to export to China. It could be postulated that the most R&D intensive companies are most sensitive to IPRs and that the lack of engagement in export activity of these companies will be at least in part due to concerns about imitation and an inability to enforce IPRs. This is likely to mean that China is not getting access to the most advanced technologies available due to the fear of IPR infringement.

As companies become more confident about the security of their products, they are more likely to export to China. This is an additional indication that China's IPR regime is impacting on international trade with the UK.

Companies that both manufacture and deliver services are most likely to operate under licence in China. The sector 'Other services activities' is the most likely to operate under licence in China. However, despite a significant amount of licensing being undertaken, we also found that 83% of high-tech companies felt that China's IPRs were too weak to licence their newest or most effective technology in China.

Larger companies are more likely to make products or deliver services under licence in China. There was no evidence, from the survey, of micro-companies (less than ten staff) operating under licence in China. This may suggest that licensing could be a complex activity that requires significant resources and confidence in a market. Smaller companies are on average more R&D intensive and therefore, more sensitive to IPRs, which may also deter licensing. Licensing technology was the least preferred method of operating in China. This would support the findings of, for example, Braga and Fink (1998), Ferrantino (1993), Papageordis *et al.* (2014) and Maskus *et al*. (2005) that increased IPRs stimulate the use of licencing and weaker IPRs deter it. Companies explained that they would not be open to licensing in China, mainly because of the risk of IP leakage:

> *We do not licence our technology in China; we need to ensure it is controlled and used for the right reasons and that we have a direct link to the end client. We would also worry that our designs and knowledge would be copied and we would lose the business*, (SN2).

However, as R&D intensity and confidence in products or services to deter imitation increases, the propensity for UK MNEs to operate under licence increases. Here R&D may be increasing the complexity of products improving its defence against imitation. Given 83% of high-tech MNEs feel China's IPRs are unsuitable for licencing their newest or most effective technology in China, they may be doing so with older model products. This was perfectly explained by a services company that had invested in China recently:

> *And we have been developing that trust. Trust in the end of the day, is a human thing. And as we have got more experience with the people who work with us, and they have us, we have incrementally started transferring more core technologies to China. And, of course, there are still instances where those innovations are misused or stolen or both. But I would say that our cautiousness and relative care, in how we introduce those innovations to China probably has helped to limit the negative outcomes.* (SN2)

A set of Spearman correlations on the survey data considering the variables for exporting to China and making products or deliver services under licence in China, having a subsidiary in China and annual turnover, found that the most significant positive indicator that a company will either export or operate under licence in China is that the company has a subsidiary in China. Operating in China increases the likelihood of a company engaging in international trade activity with China, more generally supporting the data that confidence in China's IPR system grows with experience of the market.

Considering the types of investments - Mansfield (1994) type definitions - in China. Manufacturing companies were most likely to have sales, marketing and distribution investments in China and least likely to be undertaking rudimentary production and assembly. This was a surprising finding as one might expect a higher proportion of manufacturing companies to be exploiting lower production and assembly costs in China. Instead, particularly in countries with weaker IPR regimes, this evidence suggests that their primary motivation for FDI was to support export growth.

Services companies are most likely to deliver services to current clients and intra-firm services in China. This is consistent with the interview evidence that suggested that servicing international clients was a key driver for service companies.

> *We follow our international clients into markets; once we are there, we find other clients following us.* (SY2)

Companies that both manufacture and deliver services are most likely to have sales, marketing and distribution investments in China.

Manufacturing companies are most likely to be undertaking the manufacture of complete products and undertaking R&D in China. This is an interesting finding given that services companies and those that deliver both manufactured goods and services are more R&D intensive than manufacturers. In addition, 70% of manufacturers and 75% of high-tech manufacturers regarded China's IPRs as too weak to transfer their newest or most effective technology to China. This may suggest that these companies are either investing with their sub-optimal IP or they have found methods to operate in China despite the poor IPR protection.

The smallest companies are most likely to be using their investments in China for rudimentary production and assembly, delivering services to current clients and intra-firm services; and manufacture of components, develop services to indigenous clients. Only as companies grow over £10m-£50m in turnover do they start to invest in the manufacture of complete products, provision of full services to indigenous and neighbouring markets; and, R&D, positioning of key staff, service development. The very largest companies are most likely to be investing in the manufacture of components and develop services to indigenous clients.

As companies grow, they increase the breadth of investments they make in China. This behaviour would be expected as companies become more complex and disbursed.

Companies inexperienced in FDI are most likely to be engaged in sales and marketing activity in China. Again, this is intuitively understandable, as companies start their FDI journey to support their export activity. Companies with both a medium and higher level of FDI experience are more likely to have a mixed portfolio of investments. The most experienced companies in FDI are most likely to have sales, marketing, and distribution in China, along with rudimentary production and assembly to current clients and intra-firm services.

Companies who believe their products and services are easy to copy are more likely to invest in facilities to deliver sales, marketing and distribution activity in China. While this activity remains the most likely to be undertaken by UK MNEs, the data shows a more varied portfolio of investments as confidence in protecting their products and services from imitation increases. Companies with a moderate level of confidence in protecting products and services are most likely to undertake investments at the highest levels of the Mansfield type investments. This supports Mansfield (1994 and 1995) that concerns about IPRs increase as companies progress through the different investment types. Therefore, more confidence in their products' resistance to imitation offsets some of the worries about IPRs.

As the intensity of a company's R&D increases, greater differentiation across types of investments made in China emerges. Companies that invest between 6% and 25% of turnover in R&D are most likely to invest in R&D in China. The most R&D-intensive companies, however, are least likely to be investing in R&D in China. It is difficult to postulate a reason for this inverse U-shaped distribution. There appears to be a cut-off point where the value of accessing R&D assets in China becomes less than the risk of products being imitated. It could also suggest that for the most technically advanced R&D, China is not yet ready to compete with western R&D or trusted to undertake the R&D.

6.4.8 How do China's IPRs Impact the FDI Decisions of UK MNEs?

Companies who invested in China chose to do so through a Wholly Foreign-Owned Enterprise (WFOE) rather than a Joint Venture (JV). The survey data showed that UK MNEs generally find China's business culture, either different or very different, from what they would find in the UK. This would suggest, if Sun (1999) applied to UK MNEs, that companies would look to invest in China through a JV to support the bridging of the social-cultural difference between the two countries (Hymer, 1976; Root, 1994; Sun, 1999). Interviewees explained that JVs held many positive advantages in terms of access and knowledge of the market which is in line with the findings of Goodnow and Hansz (1972); Gatignon and Anderson (1988); Shan (1991); and Hu and Chen, (1993). Partners were highlighted as being particularly important in getting the most out of an investment in China, but these tended to be contractual partnerships rather than JVs:

> *So, we want to have a partner that was going to bring to the table, regulatory capabilities, IP protection capabilities, commercial capabilities, as well as funding. So, we made a very conscious choice to seek a partner. And we have done this through a competitive process in which our partner, that happens to be a state-owned enterprise, was the best option.* (BN1)

However, for many companies, the WFOE was felt to be the simplest model of operation and gave the greatest protection to IPRs. This confirms the findings of Kyrkilis and Koboti (2015) and

Chen (2013), that weaker IPRs will push companies to invest through WFOEs rather than JVs. However, despite investing through a WFOE, there was significant evidence of UK companies holding back their most valuable and newest technologies from China, *'We don't send our latest products there [China] at the moment we are not confident enough right now'* (BY2). This withholding of technology supports similar findings of Javorcik (2004), Lee and Mansfield (1996), Chun (2008), Smith (2001), and Mansfield (1994).

The drive for companies to undertake R&D in China was substantial both to create products and services for the market but also to access the high-quality research and R&D facilities available in China.

> *But we have design engineers in Shanghai now. And they're probably some of the most innovative engineers that we have in our organisation nowadays. They're kind of completely different breed of engineer than they would have been in the same place five years ago.* (BY1)

> *As you will know, there is a continuing chronic shortage of science and engineering graduates. That's not the case at all in China. There are plenty of engineering and science graduates. And so, it serves everybody's interests to innovate locally. We are careful about what innovations what technology we transfer to those innovation groups. Generally, they work on local enhancements to our products. But we are careful and keep our most important IP in the UK and Sweden.* (BY2)

> *We're careful with how we share technology with some of our subsidiaries in China. Because there's a benefit to innovation locally in China, where there is a very large population of highly skilled engineers available to those who would hire them, compared to almost anywhere else.* (MY1)

While many companies were very positive about the R&D talent available in China, they also consistently highlighted deficiencies in areas such as design, creativity and problem-solving.

Very often the engineers are very knowledgeable about their industry, but they're not necessarily knowledgeable about the manufacturing process. So without the help from our engineers, the iteration from the design to manufacturing. And you know, there's quite a number of iterations, which means it costs a lot more. (BY1)

Where R&D was undertaken, it was mainly vertical in nature rather than horizontal. Zhao (2006) highlights the paradox: that despite weak IPRs, countries like China and India are receiving FDI from countries like the USA and in sensitive areas such as R&D. Zhao (2006) who interviewed managers and researchers in China discovered anecdotal evidence that MNEs were investing in vertical R&D where they were developing products and services to be used internally within the company and integrated into broader enabling technologies with IP that was held centrally by the MNE. This gave the MNE access to talented researchers at a significantly lower cost than in their home country. The analysis of respondents in the current research provides empirical evidence of the phenomenon of vertical R&D in China with the incidence of vertical R&D being more than double that of horizontal R&D. This is an interesting finding and questions many of the orthodoxies suggesting that weak IPRs may be a barrier to the most sensitive types of FDI (Yang, 2013; Mansfield, 1994; Javorcik, 2004; Nunnenkamp and Spatz, 2003). However, Zhao's (2006) theories confirmed by empirical evidence gained from this research thesis, do seem to offer a sensible response to the real-world paradox Zhao proposes. A structural framework for MNEs that protects the essential IPR in the company allowing the MNE to benefit from knowledge endowments and lower wages in developing countries. This strategy was recognised in the interviews with UK MNEs, described by one company executive of a company that both manufactures and delivers services in China:

That's an interesting point; we only do our most important R&D in either the U.S. or in the UK. Sending bits of R&D to other markets is possible and to be honest, we look to do this where we can because it is financially positive. We also have some constraints in terms of capacity in the UK. But I would say that it is still too risky for us to consider sending our most important development overseas at this point. [BY2]

The complexity and difficulty of operating in China, including concerns about IPRs certainly do impact on the decisions of UK MNEs. However, the size of the market and growth in the market means that China remains an important market for UK MNEs, as predicted by Yu (2007) *'so, you know China is becoming more important to us in terms of business growth', (SY1)*. Some companies did say that they felt more comfortable investing in Hong Kong rather than mainland China:

> *Now we distribute into China, from a Hong Kong-based agent who effectively acts as a buffer for the risk for us. I've done business in China with three other companies prior to this. And there's generally been similar difficulties.* (SN2)

The interviews also uncovered that more developed cities in China such as Beijing, Shanghai and Guangzhou, were the easiest in which to operate. Companies were able to access professional services from China-based subsidiaries of UK accounting and legal firms. With more experience of operating with international companies, the Chinese authorities were also more sympathetic:

> *Enforcement is done at a regional level. So, if you're in Shanghai or Beijing, you've got a much better chance. We're in Shanghai. If you're out in the sticks, it's very difficult. But it's I'd say it's improving rapidly.* (SY1).

Companies certainly felt more comfortable in these more developed provinces, even if the cost of doing business there had increased to a level equivalent to European countries. This evidence supports the findings of heterogeneity amongst Chinese provinces identified by You and Katayama (2005).

The FDI driver to access low-cost production labour was not reported in any of the interviews. Accessing the market, access to capital, skills and R&D were all highlighted as reasons why China was an investment destination choice:

> *Which comes back to this technical population with great infrastructure, you know, you've got the Great Firewall of China, but actually, within China, things work very well. It's no longer a cheap place to do business. From our perspective, there's not that much now between China and some of the lower-cost areas of*

> *Europe in terms of salaries and costs of doing things. It's not Switzerland, but it's, you know, in terms of costs, but it's the financial benefits of operating there have largely disappeared. So, It's now a market and development centre. And we've probably class China is being on a similar level to some of our European countries in terms of developing markets and cost.* (BN1)

For service companies, the requirement to be close to competitors and customers was a driver for investments in China and was more critical than IPRs:

> *we need to be close to our biggest clients, they expect it, so if they go to China, then we must follow* [SY2].

Some companies surveyed appeared to have little concern for the IPR environment in China. They either accept the risk or do not see it as applicable to their products or services. Others saw China as a 'market too far' and chose not to invest or operate in the market. Companies that operated in areas of national security and defence were particularly clear on this point. Of those that did invest and were concerned about IPRs, several strategies appear to have been followed. These strategies are highlighted below.

Verticalisation

This strategy sees only part of products and services manufactured or delivered in China. Critical aspects of the final product or service were produced or delivered from either the home market or one where IP security could be assured. This strategy also allowed companies to engage in R&D activity for both market specialisation requirements and to access skills for the development of parts of their products or services. This protects the company's primary IPR holdings allowing them to operate in China with products and services that are protected in the home country, Zhao (2006).

Partnering

One company interviewed suggested that their strategy for what was a high IP dependent product was to partner with a large state-owned enterprise (SOE) in China. Their strategy of partnering and sharing their IP with an SOE was in the hope that the powerful SOE would support the protection of their IP (Yu, 2000; and Yu, 2006). Many companies surveyed mentioned the importance of finding the right partner to promote understanding of the country and to help them navigate complex business and legal environments.

People Focus

Many companies, particularly those that delivered services, reported that retaining key staff was a distinct strategy for managing their knowledge-based assets. They discussed providing secure, well-paid jobs for their staff and including accommodation and support for families as their strategy to ensure they retained people and the knowledge assets they hold within their organisation.

Layering

Companies identified strategies for protecting their knowledge-based assets through a layering of protections; this was particularly evident in companies that both manufacture and deliver services. These layers included protecting IP through the IPR system but by protecting their most crucial IP externally. Also, they would protect the knowledge assets based on people through retention policies. By manufacturing and perhaps delivering their products as a service to end clients, they can provide levels of protection to their knowledge assets through these multiple layers of protection.

> *We patent our products, and what goes into them, some of this includes special alloys we own. Our supply chain is carefully managed and legally tied down. The know-how to service [the product], which is leased to the end-user, is also kept in-house or subbed out to trusted partners. This ensures we protect both the product and the service. This is a strategy we use to protect our core business (BY1)*

Withholding

Other companies spoke of only sending their older versions of products and services to China, assuming they would eventually be imitated but have new products or services ready to introduce into the market when this happens. Essentially, the companies were keeping China one step behind the R&D curve. At its extreme, this strategy meant companies would not operate at all in China, choosing not to send products or deliver services in the market. As one company that both manufactures and delivers services explained:

As our experience has grown we have incrementally started transferring more core technologies to China. (BN1)

6.5 Chapter Summary

This chapter has subjected the key findings from the analysis of secondary data and primary data carried out in Chapter Five to the scrutiny of interview data taken from senior executives in UK MNEs, concerning each research question/objective of this study. Clear links have been found between the strength of IPRs and the investment decisions of UK MNEs, which support the findings of Hsu and Tiao (2015), Javorcik (2004), Seyoum (2006) and Ushijima (2013). However, these links are not consistent across all companies and that the heterogeneity of companies makes it particularly challenging to create an all-encompassing theory that would generally apply to all companies. However, the efficacy of Mansfield's (1994) postulations that IPRs affect the quality of FDI, particularly with manufacturers and high-technology reliant companies, has been demonstrated. The evidence from companies that both manufacture and deliver services is inconsistent with Mansfield (1994). Also, service companies, according to the data from the current research, do not act on the strength of IPRs, except for them using IPRs as a proxy for business culture. This leads to the finding that treating all FDI as equal will miss important nuances in business decisions that are considering IPRs.

The view of China's IPRs is one of a poor regime that fails to enforce breaches of IPRs effectively. The growth and size of the Chinese market have attracted vast amounts of FDI. However, this research has robustly shown that the quality of this FDI has been sub-optimal, the method of FDI favoured a WFOE rather than a more beneficial JV, and, the ensuing technology transfer has been lower than it could have been supporting the findings of Awokose and Yin (2010a). Despite this, there is much evidence to suggest that perceptions of UK MNEs are changing, particularly concerning better R&D assets in China, higher costs of labour in China, and an improving IPR environment; especially in the most developed provinces.

Chapter Seven: Conclusion

7.1 Chapter Overview

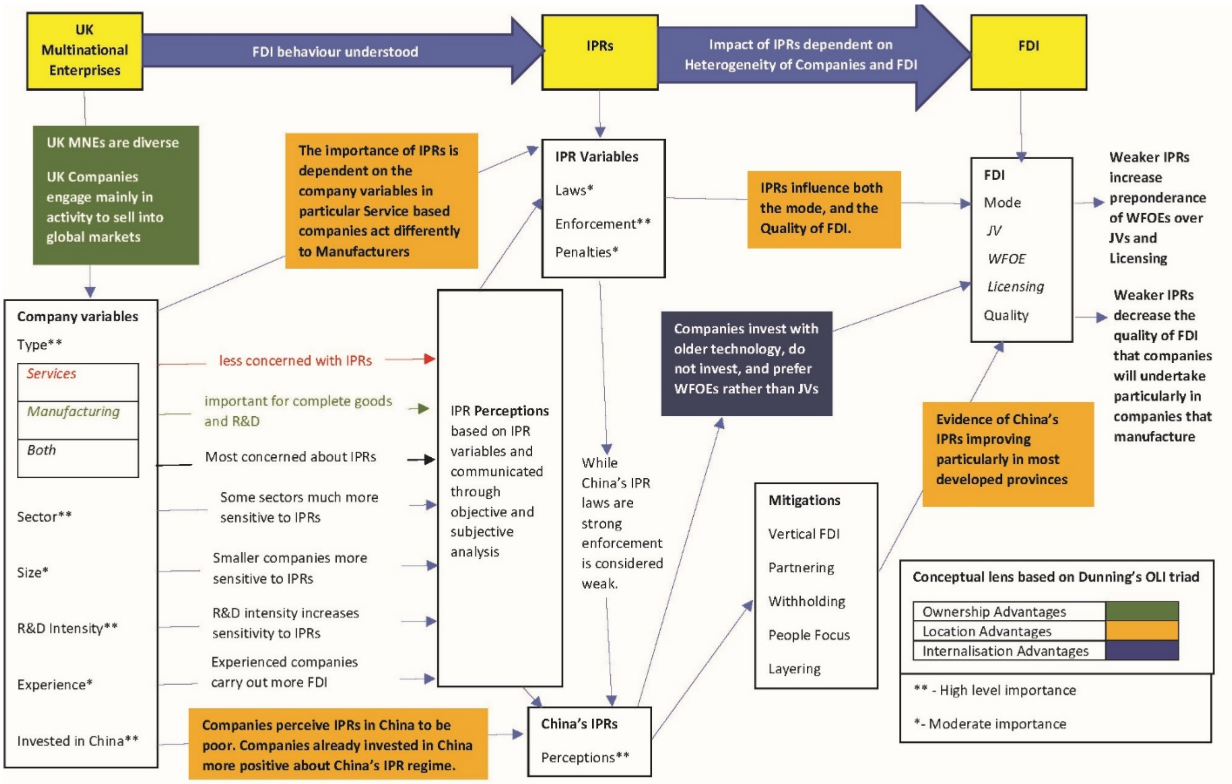
This chapter concludes this thesis, bringing together the findings, policy implications and contributions to knowledge, theory and methodology drawn from this research study and detailed in the previous six chapters. Section 7.2 summarises the key findings of this research, structured by the research questions. Section 7.3 sets out the policy implications flowing from these findings for business and policymakers. Section 7.4 highlights the contribution of this research to knowledge, theory and methodology, and its significance. Section 7.5 acknowledges the limitations of this research and identifies profitable avenues for further research into this topic. Finally, section 7.6 offers the authors reflections on completing this PhD study.

7.2 Summary of Key Findings

This section summarises the main original findings of this research. It is structured by answering first the main research question, followed by the seven sub-questions. But it is worth anticipating how this PhD study has advanced on what was known before in this debate through a visual depiction of the main findings of this research superimposed on the original conceptual framework developed at the end of the review of literature (see Figure 5, on page 112 at the end of Chapter 3).

Figure 51

Diagrammatic Representation of the Main Findings of this Research



At a glance, Figure 51 shows how this research has answered the research sub-questions and main research question. It highlights the impacts of different company variables on the importance and perceptions of IPRs. This links into the specific perception of China's IPRs and demonstrates the impacts of China's weaker IPRs (driven by a perception of weak enforcement) in terms of FDI mode of entry and the quality of FDI projects. It also demonstrates that UK MNEs have identified and employed several mitigating strategies to enable investment in higher quality (R&D based) FDI. To demonstrate the importance of different variables as evidenced by the findings of this PhD study, each one has been given an importance rating. Overall, this diagram demonstrates the crucial need to disaggregate companies and FDI to better understand the links between IPRs and FDI and that, overall, stronger IPR protection leads to more JVs and Licensing, and better quality FDI.

Main research question:

How does the perception of intellectual property rights protection in China influence the foreign direct investment decisions of UK multi-national enterprises?

Concisely, the overall answer to the main research question above - the key 'take-home message' of this research so to speak – can be stated as follows. This research has demonstrated that China's IPR system does indeed affect the FDI decisions of UK MNEs. It found evidence that the perception of weak IPR protection in China leads many companies to either invest in lower quality (less R&D intensive) investments, invest with older technology, or to choose to not invest in China. For those companies that do invest in China, the weakness of IPRs in China leads such companies to invest in Wholly Foreign-Owned Enterprises (WFOEs) rather than Joint Ventures (JVs). Also, UK companies have insufficient confidence in China's IPR regime to licence their most effective technology in China. Significantly, the study also highlights that the perception of IPR protection in China affects the FDI decisions of UK MNEs in different ways depending on the type of FDI, the sector of investment, the type of company, R&D intensity, company size and experience. This research has also identified five strategies UK MNEs use to mitigate weaker IPRs in China (see sub-question vii).

Sub-questions:

I. What is the nature of UK MNEs (including ownership advantages, imitability, sector, FDI experience, R&D intensity and size)?

UK MNEs are diverse in their size, R&D intensity, sector of operation, FDI intensity and type. This research allowed for a deeper understanding of UK MNEs through the analysis of the FAME data and subsequent survey of 205 companies and a selection of targeted interviews with senior UK MNEs' executives. While UK MNEs are distributed across all industrial sectors, the three most highly represented sectors are 'Professional, scientific and technical', 'Manufacturing', and 'Financial and insurance services'. Data from the FAME database, on the number of overseas subsidiaries of each company, show that 'Public administration and defence, compulsory social security' and 'Financial and insurance services' are the most FDI intensive sectors. As expected, larger companies are more likely to engage in FDI. Interestingly, both services companies and those that both deliver services and manufacture products are more FDI intensive than manufacturing companies. Companies that both manufacture and deliver services have, on average, 2.7 overseas subsidiaries for every one subsidiary of a manufacturing company, and that services only companies have, on average, 2.4 subsidiaries for every one manufacturing subsidiary.

As the R&D intensity of companies increases, the likelihood of them investing in R&D increases. Smaller UK companies are more R&D intensive, even if the quantum of R&D is higher within larger companies. Interestingly, manufacturing companies are, on average, less R&D intensive than both services companies and those that deliver both services and manufacturing outputs.

Companies that manufacture and those that both manufacture and deliver services are far more confident in their ability to protect their products and services from imitation than service companies. Smaller companies and those that are inexperienced in FDI have much greater confidence in their ability to protect their products and services from imitation than larger, more experienced companies.

II. What behaviours do UK MNEs display when engaging in FDI?

The heterogeneity of UK MNEs leads to different behaviours when engaging in FDI, including, their response to incentives and their FDI activity. Overall, financial incentives are the most important attraction factors for MNEs considering FDI, followed by market growth and exchange rate stability. IPR protection is, on average, a more important factor to UK MNEs than market size, corruption/political stability, cultural closeness, the cost of human capital, access to infrastructure, and availability of human capital. However, these aggregate data hide a much more complex pattern of factor importance that is sector-specific, and which varies across several different variables including company type, size, R&D intensity, ease of copying, and FDI experience.

The survey of UK MNEs showed that for manufacturing companies, financial incentives, access to infrastructure, and exchange rate stability, were the most critical location factors for FDI. For service companies, cultural closeness and IPR protection were the most important location factors. Although IP is not a particularly important ownership factor for service companies, the choice of IP as a critical location factor is interesting. This may be due to the importance of brand for these types of companies or perhaps IPRs are a proxy for legal structures within which service companies operate and is consistent with the findings of Jeong (2014). Those companies that both manufacture and deliver services consider the market size and market growth to be the most critical (country) location factors.

UK MNEs take part in horizontal and vertical FDI, plus delivering into a global supply chain, but service only companies do not identify with these motivation descriptors.

Most of the UK MNEs surveyed chose the supply of goods and services (market-seeking FDI; Buckley *et al*., 2007) as their primary motivation for undertaking FDI. These motivations were broadly distributed across company type. However, high R&D intensive companies are more likely to be motivated to FDI for reasons of specialisation (efficiency-seeking FDI; Eckel, 2003) and to secure advantages against competitors (market or strategic asset-seeking FDI; Dunning, 1991), or have other FDI motivations.

III. What is the importance of IPRs to UK MNEs?

The importance of IPRs to UK MNEs varies across different company types, sector of operation, R&D intensity, and size and the IPR regime under which they are operating. Manufacturing companies, particularly high-tech companies, do respond to IPRs becoming more concerned about IPRs as they move through the spectrum and quality of their investments. While service companies appear to see IPRs as a proxy for the legal system and business culture in a country, they are generally less engaged or aware of IPRs or see them as less relevant to their types of business. This behaviour appears to be because the IP of service-based companies is often invested in people rather than products. The ability for people to move companies taking their knowledge with them provides specific challenges to service-based companies. Companies that both deliver services and manufacture products are, on average, more concerned about IPRs. IPRs are particularly crucial to high-tech companies.

This thesis, through the survey of executives and targeted interviews, has demonstrated that many measures and actors influence the perception of a country's IPR regime. Stories from other businesses, through either face-to-face conversations or the business media, have real impact with UK MNEs. Objective measures of IPRs either through a country's membership of treaties and conventions or the academic literature, are enhanced with first and second-hand experiences. In addition, the strength of the IPR regime is also only a portion of the IPR consideration. The propensity and capability of a country to imitate are also important as is the effectiveness of enforcement mechanisms and dis-incentives to imitate such as penalties.

Different types of companies have different strategies when investing in different country groupings. Manufacturers were more concerned with the strength of IPRs in developing countries where they felt that there was the capability to imitate their products. Those companies that delivered services were more concerned about investing in first world countries as they perceived their risks to be centred on losing staff and know-how to competitors rather than product imitation. Companies that deliver both products and services were, on average, more concerned about IPRs in all country groups. The most R&D-intensive companies were most concerned about the strength of IPRs in first world countries where the ability to imitate products would be the highest.

Having a subsidiary in China increases the overall concern a company has about IPRs. This is potentially a result of operating in a market with weaker IPRs and, suggests that in markets with higher quality IPR regimes, the subject of IPR protection is given a lower priority in business decisions.

Companies that both manufacture and deliver services tended to be complex and treated the manufacturing and services sides of their business, in terms of IP, separately. They protected product and manufacturing knowledge assets using IP and services know-how through strategies around the management of knowledge and people. Some evidence was found that by linking the service and their manufacturing IP assets, companies add an additional layer of protection to their products and services. These companies believe that even if the products were reverse engineered, it would not have full utility without the service know-how.

Companies were prepared to defend their IP in the courts in overseas' jurisdictions, including in China. However, all the companies with IP assets interviewed highlighted the need to manage their IP provision carefully. IP protection was considered costly and time-consuming. Many interlocutors described the cost of IP protection as being a barrier to using the IPR system. In markets where margins were tight, registering and maintaining patents was a cost to operations that impacted on profitability. Companies, therefore, chose to be selective about what they protected, in some cases, choosing to leave a portion of their development un-protected.

In addition, companies explained that it was necessary to have the resources available to defend the IP should it be required. These considerations were in addition to the strengths of a country's

IP regime and the effectiveness of enforcement activities (Alexiou, 2013; Papageorgiadis *et al*., 2014). Given these considerations, protecting knowledge through the IP regime was only one of the strategies employed, alongside protecting IP through know-how, holding and protecting IP centrally or overseas and not engaging with the IP regime. A country's capability to copy products and services was a significant concern factor in the location choice for UK MNEs in addition to the strength of a country's IPR and enforcement regime. Companies also use internal management-led strategies to manage the protection of their IP.

IV. What are the impacts of IPRs on the FDI decisions of UK MNEs?

IPRs do impact the FDI decisions of UK MNEs in several ways, including the type of FDI they undertake in line with the predictions of Mansfield, 1994 and Yang, 2013. These impacts are not uniform across all companies and differ dependent on several variables, including R&D intensity and type of company. Weaker IPRs result in less of the high-value R&D type investments in a country and the use of sub-optimal technologies as companies withhold their latest technologies from the market in line with the findings of Ginarte and Park 1997. In the most extreme case, poor IPRs can stop companies operating at all depriving that country of the technology and economic benefit from the investment.

Mansfield's (1994) proposition that companies increase their concern about IPRs as they progress toward the manufacture of complete goods and R&D does apply to UK manufacturing MNEs. However, no evidence was found that companies that delivered services, or both manufactured and delivered services, act in the same way. Service companies were most concerned about IPRs when delivering services to current, non-indigenous, clients. Those companies that both deliver services and manufacture products were, on average, generally more concerned about IPRs across all investment types, but most concerned when delivering services to the indigenous population or producing key components.

Concern about IPRs of R&D-intensive companies does increase as they increase the quality of their investments overseas, but this is not seen in less R&D-intensive companies, a pattern consistent with the findings of Mansfield (1994).

V. How do UK MNEs perceive China's IPR system?

This thesis has demonstrated that the perception of China's IPR regime is that it is inadequate, that imitation and piracy are rife and that the enforcement of IPRs is deficient. However, there was significant evidence of these perceptions changing, of China improving its enforcement of IPRs and of increased opportunities for UK companies to engage more fully with China as a result confirming the virtuous circle findings of Long, Yang and Zhang (2015). Investing in China and working within the systems in place does significantly improve UK MNEs' perception of China's IPRs.

China's investment in its own R&D assets (people and facilities) is a strong attractor for UK companies. This attraction does appear to be accelerating as China strengthens its IPR enforcement activity in support of its own R&D assets. If this change in perception and experience for UK MNEs continues, it is reasonable to expect more substantial numbers of UK technology-reliant companies looking to China as a place to do more complex manufacturing and R&D.

VI. What is the FDI behaviour of UK MNEs in China?

Many factors drive FDI into China. However, China's weak IPR regime does impact UK MNEs' participation in FDI with many enacting strategies to counteract weaker IPRs. For UK MNEs, the size and growth of China are the most critical drivers to attract investments. This has replaced access to low-cost manufacturing labour as a critical driver for FDI in China, as predicted by Dunning (1991). However, access to high-quality R&D assets is attracting different types of investments from UK MNEs as they seek to take advantage of a well-resourced R&D environment. Service companies undertake FDI in China to be close to their international clients, and as a result of the behaviour of competitors.

Most R&D investments carried out in China by UK MNEs is reliant on technology that they hold outside of China. Companies are mitigating concerns about IPRs in China by undertaking vertical rather than horizontal R&D.

More robust IPR regimes, found in some of China's most developed provinces and municipalities, do suggest that companies will make in-country location choices based on the quality of the local IPR system in line with the findings of You and Katayama (2005).

There is evidence of the perception of Chinese IPRs improving and the behaviour of UK MNEs changing as a result. UK MNEs are becoming more open to taking their latest technologies to China either through remedial activities within the company, like verticalisation and/or through growing confidence in China's commitment to stronger IPRs.

There were no companies surveyed that invested in R&D in China that fall within the highest bracket of R&D intensity. As companies increase their R&D intensity, the likelihood of them investing in R&D in China reduces.

VII. How do China's IPRs impact the FDI decisions of UK MNEs?

China's IPR regime impacts the decisions of many UK MNEs, and it drives behaviour in China that may limit the utility of FDI and the spillover benefits the Chinese economy receives. For some companies, the state of China's IPR system had little or no impact on their propensity to invest in China. The requirement to follow customers, the size and growth of the market and the obligation to remain competitive, could all outweigh concerns about IPRs in line with the views of Yu (2007). 26.8% of UK MNEs felt that Chinese IPRs had a little or negligible impact on their company's investment decisions. 21 of these 37 companies had a subsidiary in China.

The largest group of respondents in the survey of executives were cautious about investing in China due to IPRs, and this was particularly pertinent to R&D intensive companies.

For most UK MNEs, the investment mode of choice in China is through a WFOE, despite the advantages of a JV. Concerns around IPRs drive this behaviour, a result that contradicts the findings of Fosfuri, 2004; and Javorcik and Saggi, 2010, who found that IPRs had no impact on investment mode but supports Kyrkilis and Koboti 2015; Lee and Mansfield, 1996; Chun, 2008; and Chen, 2013 who did predict this behaviour.

As a company's confidence in its ability to protect its products or services increases, the likelihood of investing in China also increases.

Manufacturing companies are most likely to have sales, marketing and distribution investments in China and least likely to be undertaking rudimentary production and assembly. In contrast, services companies are most likely to deliver services to current clients and intra-firm services in China. Companies that both manufacture and deliver services are most likely to have sales, marketing and distribution investments in China. Manufacturing companies are most likely to be undertaking the manufacture of complete products and undertaking R&D in China.

The smallest companies are most likely to be using their investments in China for rudimentary production and assembly, and or delivering services to current clients and intra-firm services; and manufacture of components, and or develop services to indigenous clients. Only as companies grow over £10m-£50m of annual turnover do they start to invest in the manufacture of complete products, and/or provision of full services to indigenous and neighbouring markets; and, R&D, and positioning of key staff and service development. The very largest companies are most likely to be investing in the manufacture of components, and/or developing services to indigenous clients. As companies grow, they increase the diversity of their investments in China.

Companies inexperienced in FDI are most likely to be engaged in sales, marketing and distribution activity in China. Companies with both a medium and higher level of FDI experience are more likely to have a mixed portfolio of investments. The most experienced companies in FDI are most likely to have sales and marketing and distribution in China, along with rudimentary production and assembly to current clients and intra-firm services.

Companies who believe their products and services are easy to copy are more likely to invest in facilities to deliver sales, marketing and distribution activity in China. While this activity remains the most likely to be undertaken by UK MNEs, more varied portfolios of investments emerge as confidence in protecting their products and services increases. Companies with a moderate level of confidence in protecting their products and services are most likely to undertake investments at the highest levels of the Mansfield type investments, such as the manufacture of complete goods and R&D.

As the intensity of a company’s R&D increases, more significant differentiation across types of investments made in China emerges. Companies that invest between 6% and 25% of turnover on R&D are most likely to invest in R&D in China. The most R&D-intensive companies, however, are least likely to be investing in R&D in China.

Despite UK companies finding China's business culture notably different from what they find in the UK, they choose, for IPR reasons, to invest in WFOEs rather than JVs. This contradicts Sun (1999) who postulates a JV being the investment mode of choice where cultural distance is more significant.

Five internal strategies that companies use to manage IPRs when dealing with China were identified. These are:

Verticalisation: Companies protect their most important R&D assets in their home or an alternative 'safe' country and use their operations in China to develop portions of their product or services. Protecting core parts of R&D and not releasing that technology into China enables them to develop new products, that are reliant on their core technology, without risking losing the core technology. This also maintains control over their China developed technology as utility is diminished without the core technology.

Partnering: Companies seek out an experienced partner in China to support their understanding of the market and business culture. This strategy also helps their understanding of the IPR regime. In some cases, both companies will share IP, creating a mutual incentive to protect each other's IP.

People Focus: Companies that invest their IP within people take additional care to retain their staff to reduce the incidents of them moving to competitors taking the company's IP with them. This strategy can include paying higher wages, offering accommodation as part of the employee's reward package and employing close family members.

Layering: This strategy sees MNEs layering their IP strategy, particularly evident in those companies that both manufacture and deliver services. They protect their products or portions of their products through the IPR system either in the country of investment or in a third country (see *verticalisation*). This is coupled with a focus on protecting IP held as know-how within their staff through the strategies highlighted above under *People Focus*. If either the physical IP was reverse-engineered or the know-how was secured through attracting staff, a core part of the protection of the product or service is maintained, and the utility of the IP lost is limited.

Withholding: This strategy sees companies only investing with older versions of their technology, assuming that it would eventually be reverse-engineered. When this happens, the company can introduce newer technology into the market to maintain a competitive advantage. In the most extreme cases, '*Withholding*' sees companies choosing not to invest or transfer technology to the country with weaker IPRs.

7.3 Policy Implications Flowing from Key Findings

7.3.1 Policy Implications for Chinese Policymakers

While China remains an attractive destination for UK FDI driven by the size and growth of the market, the weakness of China's IPR system means that it is not attracting the most valuable, R&D intensive investments (as predicted by Adams, 2010; Nunnekamp and Spatz, 2003; Mansfield, 1994; Javorcik, 2004). Success in marketing China as a low-cost production opportunity is waning. Continuing to increase the strength of its IPRs, particularly in the area of enforcement (as appears to be happening) should support, the attraction of higher quality FDI. This is particularly important for manufacturing companies. This medium-term strategy of supporting higher quality FDI attraction through better IPR enforcement should increase the value of spillover benefits to the Chinese economy and encourage their economic development, particularly in terms of high-technology growth.

Although some MNEs are not concerned about IPRs in China, the majority do change their behaviour as a result of the weakness of China's IPR regime. Given that confidence in China's IPR protection improves or concern diminishes with experience of the market, China might consider supporting lower quality FDI into the market as a precursor to higher quality FDI once confidence in its IPRs is increased. Financial incentives or access to funding and human resources may be useful in attracting FDI from more R&D intensive companies. But these companies will need confidence that their knowledge assets will be safe in China before they choose to invest in R&D. This would, in the short term, support the attraction of further FDI that would, over time, improve in quality becoming more R&D intensive as confidence in IPRs builds.

UK MNEs' perception of China's IPR system is that it is inadequate and does not reflect the strength of China's IPR laws. It will, therefore, be valuable for China to publicise the improvement in its laws and, most importantly, the enforcement of IPRs through the business media, improving the perception of China's IPR regime to MNEs. This would need to be a sustained approach to build a stronger understanding with MNEs that China's IPRs are suitable for MNEs to invest with their newest or most valuable technologies.

The most R&D intensive companies do not have the confidence to invest in R&D in China despite the opportunities to undertake R&D in the market. Policymakers could look to target these types of companies to build their confidence in the IPR system. Most companies that do invest in R&D choose to invest in vertical rather than horizontal R&D as a response to the weaknesses of the Chinese IPR system. Chinese policymakers could provide incentives to encourage this activity, perhaps through identifying partner research institutions that could support this type of investment. Not until the MNE has more confidence in the IPR system are they likely to invest in horizontal (full product) R&D. While China may prefer horizontal R&D, attracting vertical R&D would be beneficial in building a population of high-tech companies who could, over time, build confidence in China's IPR system and this may be a precursor to more valuable R&D investments.

Helping companies to understand and feel comfortable with the business culture in China, reducing the cultural differences, will increase the quantity of FDI, particularly from service-based companies. Service companies will also act as an amplifier for this activity as an essential role they play is to support their clients in understanding and navigating cultural distance.

If China wishes to increase the number of joint ventures it receives through FDI, supporting more spillover benefits, they will need to increase the strength or their IPR regime, and particularly enforcement activities. Licencing activity of the highest value technology is likely to be depressed until confidence in the IPR regime is improved significantly. Building familiarity with operating in China, which should be supported by JVs, is a key channel to enhance an MNE's confidence in the IPR regime, and this should, therefore, result in higher quality investments.

Companies with moderately high R&D intensities, between 6% and 25% of turnover, are most likely to invest in R&D in China. Policymakers may seek to target these companies for potential investments in China. This would increase the propensity of R&D intensive investments supporting the growth in spillover benefits.

7.3.2 Policy Implication for General Policymakers

There is a complex distribution of FDI drivers that attract different companies, in different sectors, at various stages of development to undertake FDI. This would suggest that policymakers should consider targeted measures that focus on the specific needs of the companies they would like to attract. It would be possible with careful analysis of the factors that attract FDI in this thesis, to construct a bespoke package of factors to attract specific companies, from specific sectors with particular attributes. This should support more efficient strategies that support the areas of an economy a country may be trying to grow, diversify or increase in technology intensity.

Attracting the most sophisticated companies, particularly high-tech ones, is indeed shown as being dependent on a company's perception, understanding and confidence in a country's IPR regime. Policymakers wishing to attract this high-quality investment should, therefore, consider enhancing their IPR regime and ensure MNEs understand its strength. They may also look for policy interventions such as soft-landing spaces that support FDI from smaller companies who might be more R&D intensive.

UK MNEs are generally looking to invest in FDI to grow their markets. Policymakers would, therefore, benefit from promoting the market seeking opportunities in their countries to foreign FDI targets. These could include identifying customers for products and services. Policymakers seeking to attract R&D investments might look to promote the opportunities for companies to undertake market specialisation activities as this is a key driver for R&D intensive companies to undertake FDI. Here policymakers could support companies by identifying opportunities for the specialisation of technology and provide subsidies to encourage the R&D required for specialisation.

Cultural closeness is important to service companies and, therefore, supporting these companies to understand the business culture in a country will support more FDI both from service companies and from the companies to whom these companies deliver services. Either better explanation of a business culture or harmonisation of cultures would be a profitable exercise in attracting service-based companies to invest. In China, organisations like the Confucius Institute are charged with this type of activity and policymakers may look to increase support for these types of organisations.

Market size and growth are the main drivers for those companies that deliver services and manufacture products, and IPRs play a particularly important role for these companies in all markets. Macro economic policies that promote growth, linked to improvement in IPRs will support more complex MNEs to consider investing in a market, and with higher quality investments.

Companies have different concerns about IPRs depending on where they are investing. In first world countries, stronger IPRs would be particularly important for service-based companies and those that are highly R&D intensive. Manufacturing will need additional assurances about IPRs in developing countries where the likelihood and capacity to imitate is seen as being greatest.

Companies see IPRs as a cost to their activity and so use these services sparingly. Policymakers should, therefore, consider the costs of maintaining IP and the costs of enforcement in their jurisdiction if they wish to attract IP into their market.

Know-how can add an additional layer of protection to products and services. For many companies protecting the know-how that is held by employees is an important business strategy. Policymakers may consider introducing labour regulations that support companies retaining staff effectively or having robust procedures for protecting the knowledge assets of a company that are held in people.

IPRs will impact on the mode of investment; countries with weaker IPRs attract investments through WFOEs as opposed to JVs. However, if a country is culturally distant from the UK, the company would benefit in participating in a JV. Policymakers may look to establish programs to support the creation of JVs with local companies.

7.3.3 Policy Implications for Businesses

Companies looking to invest in China should take considerable care to understand the market, in particular, the business and legal systems extant in their specific area of operation. Positive engagement with the IPR system will aid understanding and build confidence and potentially open up new areas for FDI activity. Companies may choose to identify a Chinese partner that can help them with this task.

Businesses should ensure that they consider their particular company attributes and proposed investments when making assessments of the IPRs they require to operate effectively and safely in a particular country. They should also consider the type of FDI they are proposing to undertake, the structure of the FDI and internal strategies they could employ to mitigate concerns with IPRs.

IP regimes in China vary dependent on the province/municipality of operation. The most developed provinces/municipalities are Beijing, Shanghai and Guangzhou. Where IPRs are of concern to a company then operating in these provinces/municipalities are likely to provide a more sympathetic IPR environment.

Evidence from the present research is that China's IPR regime is improving through better enforcement of laws and higher penalties for infringements. This may lead UK MNEs to reconsider investing in China or the nature of their investments in China a result of this change.

Businesses must engage in the IPR system when they are considering FDI. Companies that do not leave themselves open to imitation, which could damage their reputation and profits. In many countries familiar UK legal and accounting firms now operate and can offer support to UK MNEs looking to invest in a new market. However, there is evidence of the IPR system being used as an indicator or driver for imitation. Companies may, therefore, look to protect core technologies outside of the country of investment.

Businesses should consider the strategies of verticalisation, partnering, people focus, layering and withholding set out above to support their investments in FDI in countries with weaker IPR regimes. Carrying out R&D and or production in intermediate products with core IP being held outside of the country will add additional IPR protection, with only the intermediate R&D or product being at risk. Partnering gives an MNE access to knowledge of the market and the extant procedures, including how to engage with the IPR system. If a market gives preferential treatment to its indigenous companies, a local partner would enable the extension of this protection to the MNE. IPRs can be lost through people and identifying ways to maintain the loyalty of staff can be an important way companies stop the loss of IP through key staff moving to competitors or setting up competitive activities based on the IP of the MNE. Companies can use a range or all these strategies to protect their IP in jurisdictions with weak laws or enforcement, creating a protective, layered defence of their IP. Where companies are unable to trust the IPR regime with their newest or most valuable IP, they may seek to operate in the jurisdiction using older, less valuable technology.

7.4 Contribution to Knowledge, Theory and Methodology

This research has considered the links between IPRs and FDI using China as its backdrop. It used a mixed methodology that includes a unique survey of UK MNEs about their investment decisions. Aggregate data drawn from the FAME database has been analysed and then explored through an extensive survey and targeted interviews with executives. In this section, the contribution this research makes to knowledge, theory and methodology, and the *significance* of such contributions is explored.

7.4.1 Contribution to Knowledge

As a foreign market entry strategy at the heart of the process of globalisation, international business and economic integration, and a phenomenon widely recognised as a catalyst for economic development and growth, FDI by MNEs remains one of the most widely researched areas in the fields of international business and international economics. Yet, despite several decades of research since the first publication on the possible impact of IPRs on FDI, the relationship between IPR protection and MNEs' propensity to invest, remains unproven and poorly understood (Noon *et al*., 2019). The key findings of this study and attendant implications as highlighted above go a long way in adding to our knowledge on the IPR-FDI nexus, making a significant contribution particularly with respect to providing original, robust evidence on how the perception of IPR protection in China influence the FDI decisions of UK MNEs across business sectors.

Additional, original contributions to knowledge stemming from the present study that is of particular significance are highlighted below.

The relevant literature explained that *R&D intensity* was a key modifier for explaining the link between IPRs and FDI (e.g., Mansfield, 1994; Kumar, 1996; Maskus, 1998b; Javorcik, 2004, Ushijima, 2013). Many studies (e.g., Mansfield, 1994, 1995; Park and Lippoldt, 2003; Javorcik, 2004; Nicolson, 2007) use sector as a proxy to differentiate companies that have high R&D

intensities. This thesis has demonstrated that sector is not a good proxy for R&D intensity with many high-technology companies falling outside the most commonly selected sectors. This finding contributes significantly to studies that have R&D intensity as a core variable. It offers additional avenues to identify proxies around company size and company type to enhance the current proxies used in the absence of robust data on R&D intensity.

The most significant contribution to knowledge of this research lies in a better understanding of *the impact of heterogeneity of companies on their FDI decisions*. Much of the literature on the link between IPRs and FDI, aggregates company data (e.g., Ferrantino, 1993; Mansfield, 1994; Seyoum, 1996; Maskus 1998b; Smith, 2001; Seyoum, 2006). This research has identified that behaviours vary across different types of companies, by sector, R&D intensity, size and experience as predicted by Maskus, 2000. This means that future analyses that only consider one kind of company/sector, for instance, manufacturing, will not provide generalisable results that are applicable across the whole population of MNEs. This contribution the thesis makes is highly significant since the evidence in this thesis demonstrates that company heterogeneity explains much of the ambiguity in both the theoretical and empirical literature about the link between FDI and IPRs. Aggregating company data hides nuances of individual decisions that are driven by very different company profiles dependent on several different variables.

In addition, the current research has confirmed the postulation of Mansfield (1994) that all FDI is not the same and that accounting for *the heterogeneity of FDI* is essential when analysing the impact on FDI of determinant variables such as IPRs. Aggregating FDI into a homogenous whole is, therefore, likely to miss nuances of responses that are dependent on the type of FDI being undertaken. This is highly significant to studies that look at how particular variables impact on FDI. The qualitative nature 'how' not just the quantitative nature of FDI must be considered if researchers are to understand the effects of determinants.

This research has also identified that *R&D intensity is negatively related to company size*. This contradicts much of the literature (e.g., Fishman and Rob, 1999; Park *et al*., 2010; Tsai and Wang, 2004; Lai *et al*., 2015) which by simply assuming that size is positively related to the quantum of R&D and therefore the intensity, cannot be relied upon. Crucially, the present PhD study demonstrates that this assumption is not plausible. It will, therefore, be necessary that future studies find an effective way to measure the R&D intensity of companies since this is a critical variable in the analysis of company behaviours, especially IP-related investment decisions.

The current research has provided empirical evidence for the existence and prominence of vertical R&D for the first time confirming the anecdotal theories proffered by Zhao (2006). This significant contribution evidences a little-understood business strategy developed to counteract weaker IPRs.

7.4.2 Contribution to Theory

This research has shown a clear link between China's IPRs and the quality and quantum of FDI they receive. This supports the findings of Mansfield (1994 and 1995), Javorcik (2004), Hsu and Tiao (2015) and Awokose and Yin (2010b). However, it has additionally shown that these results are not generalisable across all company types or all types of FDI and that the heterogeneity of companies and FDI has a significant impact of the behaviour of UK MNEs. This research would point to the development of theory on the links between IPRs and FDI being disaggregated by both company and FDI type and other variables such as R&D intensity and FDI experience. Companies act differently, sometimes in the opposite direction to what is predicted by existing theory. It will, therefore, be necessary to treat them as different populations when considering their behaviour in response to IPRs.

When identifying variables for the strength of a country's IPRs, this research has shown that proxies such as Park's (2008b) Index of International Patent Protection 2005, are insufficient to understand the impacts of IPRs on the behaviour of MNEs. It is therefore recommended that variables used for the strength of IPRs include *enforcement* (including penalties). Ideally, they would be developed through a survey of perceptions as these are vital to the decision making of companies.

Treating all FDI as a homogenous activity is also a failing of much of the theoretical and empirical literature (except for Mansfield, 1994). This thesis has shown that the type of FDI is either impacted or directed by IPR strength. Future theoretical models and empirical analyses should consider the qualitative nature of FDI undertaken to understand the impacts of IPRs on the decisions businesses make.

7.4.3 Contribution to Methodology

This research has demonstrated the strength of using a mixed methodology to understand the behaviours of UK MNEs. An analysis of the FAME data only would have failed to uncover the nuances between companies or investment types illuminated through the survey of executives. Without the interviews, it would have been difficult to understand the specific drivers and consequences of the decisions of senior executives. This research design - never before employed as a methodological framework for the study of MNEs' FDI country location decisions - provides a useful model or blueprint for future studies into the behaviours of MNEs to follow.

Most of the previous research into the link between IPRs and FDI has concentrated on manufacturing companies. This approach excludes a large portion of the MNE population. To make Mansfield's (1994) qualitative descriptions of FDI relevant to service-based companies and those that both manufacture and deliver services, it was necessary to expand the descriptions drawing on literature from Markusen (2005) and Howells (2000). The significance of this extension cannot be underestimated. This broadening of qualitative descriptions of FDI offers an invaluable taxonomic platform in the FDI research field, new ways to analyse the behaviour of all MNEs and valuable new definitions for further areas of exciting research.

The current literature on survey methodology (e.g., Sheehan and Hoy, 1999; Yun and Trumbo, 2000; Cycota and Harrison, 2006) highlights the problems of small sample sizes and the resultant inability to generalise results and challenges with increasing sampling, non-coverage, non-response and measurement errors. The use of LinkedIn as a research tool to survey executives in MNEs proved successful in the present research. Updating 'attraction and participation' methods used in paper-based surveys to work effectively using this new technology opens up a new approach to attract substantial responses to surveys in international business research.

7.5 Limitations and Directions for Future Research

Despite the robustness of the findings and the worth of their contribution, a few acknowledgements of the main limitations of the present PhD study are in order.

The present research has treated IPRs in aggregate. While it did consider UK MNEs engagement with different facets of China's IPRs (e.g., patents, trademarks and copyrights), it has not differentiated between these facets in terms of the impact they have on business decisions. This research has demonstrated the need to disaggregate the variables relating to companies and FDI. It would, therefore, seem prudent to disaggregate the IPR variables. There is some acknowledgement of the different facets of IPRs impacting FDI decisions in the literature (Maskus 1998b; Park and Lippoldt, 2008; Seyoum, 2006) and, therefore, combined with the findings in the present study around 'heterogeneity', disaggregation of IPRs would be a fruitful avenue to explore in more detail for future research.

This research was inevitably limited by the scope of the research questions and available resources to undertake this thesis. The large amounts of data generated would lend itself to complex econometric analysis that was beyond the scope and reach of this research. Nevertheless, it is worth acknowledging that this analytical pathway could create models to predict behaviour given a specific set of circumstances, including the strength of IPRs. This would enable the development of new theory and empirical studies into this important and interesting subject.

This research only found a moderate correlation between R&D intensity and the confidence a company had to protect its products and services from imitation. If only part of R&D undertaken increases the complexity of a product, it would be an interesting field of research to understand the other variables impacted by R&D and the variables that impact the ease of copying. Given both these variables influence a company's decisions with relation to FDI, a greater understanding of them would be an important addition to the findings of this thesis and knowledge more widely.

This research has demonstrated that the taxonomies used to describe international business do not necessarily relate well or apply to service-based companies (for instance, the concepts of vertical and horizontal FDI). Updating these taxonomies, as was done to the Mansfield's (1994) FDI descriptors in this research, could open new ways to engage with service companies who make up a large portion of the business community. This should help to understand better the challenges and responses to challenges of international business more effectively.

This research has concentrated on the links between IPRs and FDI. Its key findings relate to the heterogeneity of companies and FDI and the company behaviours in response to the strength of IPRs. As set out in Chapter One, this research was bounded in several areas including not considering the role of governance infrastructure (e.g., Globerman and Shapiro, 2002; 2003), political instability, terrorism, regulator freedom and more (e.g., La porta *et al*., 1998a; 1998b). It is likely that heterogeneity of company behaviour and FDI impacts across many areas of the international business field of research. Further exploration of this phenomenon looking at different aspects of international business such as those mentioned above, plus exporting and licensing decisions would be a profitable area of further investigation.

The current research has allowed a deeper understanding of the impacts of IPR strength on the mode of investment (WFOE, JV). However, it has not quantified this effect or the impacts in terms of the value of the investment or proportion of equity taken in a JV. Given the better understanding of the impacts of IPRs on the decisions of MNEs and new tools and methodologies to analyse these decisions, further research into the financial implications of these behaviours under different conditions would be a profitable area of further investigation.

This research chose China as its backdrop for several important reasons including its growth, attraction of FDI and the perception of its IPRs. The current research acknowledges that negative aspects of one variable (IPRs) can be overridden by positive aspects of other variables (e.g., growth and market size) and that this can reduce the impact of the variable under consideration. Studies that focus on other countries that have a different mix of characteristics would enable a complete picture of the effects of specific variables to emerge and be a significant contribution to knowledge in this area.

This research was designed to be a snapshot in time rather than a longitudinal study of how behaviour changes over time. By monitoring IPR perceptions over time, and by comparing it against the benchmark the current research has created, a view on how changes to IPR perceptions impacts FDI behaviour over time could be formed and quantified that would support policy formation and be an extremely valuable contribution to knowledge.

This research has generated empirical evidence of the previously little understood phenomenon of vertical R&D only previously reported as anecdotal evidence by Zhao (2006). A deeper understanding of the strategies around R&D investments and the impact vertical R&D has on spillover benefits, IP loss, profits, etc., would be a fruitful expansion of this research.

7.6 A Final, Personal Reflection

Undertaking a PhD has been a privilege. I have learnt and developed as I progressed through the process, building my knowledge and understanding, developing my academic skills along the way. Achieving a sound set of findings that lead to contributions to knowledge, theory and methodology along with useful policy pointers, has been most fulfilling.

I took on this PhD for many reasons; to stretch myself, to understand my academic colleagues better and to achieve something of which I could be proud. I have met all these objectives and more, including developing a more analytical mindset, new skills and a love of, and for scholarly activity.

I started and finished this PhD in a three-and-a-half-year period while also working full time as Pro-Vice Chancellor Enterprise and Innovation at Coventry University. Juggling time to read, analyse and write between a busy work schedule has been a considerable challenge. Early decisions to stop watching television, and to devote time each evening to study served me well and maintained the necessary momentum which was required to push through the rocky periods when the end seemed a long way away.

I started this PhD with very little knowledge of what skills I would need to complete a doctoral thesis. I had never read an academic paper, written in an academic style, analysed or challenged academic theory. It was a steep learning curve. The extensive reading and analysis required to complete my second and third chapters which reviewed the relevant literature sparked a genuine interest in my subject of choice. I can still picture where I was when I read Edwin Mansfield's (1994) study that crystallised my thinking about how I wanted to approach my research. John Dunning's (1976) paper on the Eclectic Paradigm of International Production was another critical document in my exploration. It provided a matrix within which to set my conceptual framework that underpins this research. The moment when I realised, I could enhance the research of others through my thorough understanding of the theoretical and empirical literature was the moment I first felt like a scholar. The intellectual requirements of searching for then synthesising large amounts of data, thoughts, theory and discussion into a relevant conceptual and methodological framework certainly tested me but has left me with a most valuable set of skills.

Having not been looking forward to developing my methodology, as it was not directly related to the subject I was studying, I was surprised by how, in reality, I enjoyed this challenge. Led by scholars such as Bryman and Bell (2007) and of course my go-to text, Saunders and Lewis (2012), I quickly identified the power of a sound, well-thought-through academic methodology to address questions that had not been discussed in the literature. My mixed methodology approach allowed me to funnel down through aggregate company data into real-life experiences of senior executives bringing a richness of understanding of a decision-making phenomenon.

Having failed miserably in my initial attempt to engage with C-Suite executives with my survey, identifying and then exploiting the use of LinkedIn as a research tool was a crucial moment in this research and led to a very pleasing set of responses from 205 executives. Without this, my research would have been thin, and I would not have achieved the contributions to knowledge, theory and methodology uncovered in this thesis. It took over six months to complete the survey and a similar amount of time to analyse the data. The survey generated by far the most significant tasks of this thesis. However, it was also the facet of the mixed methodology that provided the richness of data that enabled me to draw the conclusions I have made. A strong methodological underpinning was essential to this success.

Analysing the FAME data and the massive amounts of data I derived from the survey of UK MNEs provided perhaps the greatest challenge to the success of this PhD and may have derailed the whole endeavour. I severely lacked the skills I required to carry out even the most basic analysis of the data. I took three months to build the skills I needed, devouring several statistics and econometrics books and hundreds of hours of beneficial YouTube videos to build my skill set. This activity also highlighted that with perhaps another 12 months of this learning, I would have the tools to analyse the data in a way that would be able to model the behaviour of MNEs. This was a distressing finding and made me question my methodology and the conclusions I could draw from my data. It was frustrating and damaging to my confidence. A conversation with my supervisor helped me traverse this issue through understanding the technical skills I needed to answer the research questions I had set for myself and then concentrating on other options for analysis with help from an expert academic once the PhD was completed. This released me to carry on with my work within the parameters I had set.

I enjoyed carrying out the interviews as it brought real insight into the practical implications of my research. The discussions helped put into context my findings and produced interesting up to date insight into the current situation in China. This was valuable information and supported the policy implications of this research.

I have recorded my gratitude to all those who have helped me in the acknowledgements section at the start of this thesis. However, I cant add the final full stop without once again noting the enormous support I received from Dr Appleyard, Professor De Vita, my children Alex and Charlotte and my partner, my love Hannah.

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Appendices

Appendix 1

Selected Empirical Studies and their Findings.

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings
Ferrantino (1993)	Single point in time: year 1982.	Adaptation of the gravity model.	No industry disaggregation.	Stronger IPRs allow a company to sell above marginal cost through a monopolistic position. They may also be incentivised to reduce supply to drive up prices. In this argument the case for increasing IPRs to stimulate trade and investment is ambiguous
Mansfield (1994)	Four periods: 1988; 1989; 1990; and the mean of the three years	Simple OLS.	An aggregate country regression and a regression disaggregated by industry: chemicals (including pharmaceuticals); transportation equipment; electrical equipment; food; metals; and machinery.	No statistically significant relationship' between measures of IPR protection and US MNEs' FDI
Maskus & Eby-Konan (1994)	Single point in time: year 1982.	Tobit estimation.	Data on industry characteristics (proxies for strategic competition, multi-plant economies, and so) are not available.	No statistically significant relationship' between measures of IPR protection and US MNEs' FDI
Mansfield (1994)	Single point in time (1991).	Questionnaire achieving complete or partial returns from 94 firms.	US MNEs' FDI in six different industries: chemicals (including pharmaceuticals); transportation equipment; electrical equipment; machinery; food; and metals.	Importance of IPRs on firms' FDI decisions varied markedly across industries, with it being much greater for firms in the chemical, pharmaceutical, machinery, and electrical equipment industries.

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings

Mansfield (1995)	Single point in time. German & Japanese data relate to 1994, US data to 1991. Model for US manufacturing FDI into 14 countries estimated over 1990-1993.	Questionnaire. The response rate was 71% in Japan and 57% in Germany. The econometric model for the US is estimated using OLS.	For the survey: chemicals, pharmaceuticals, electrical equipment, and machinery, transportation equipment, metals, and food industries. For the econometric model, only aggregate US FDI in manufacturing is considered.	Findings confirm that in relatively high-technology industries a country's system of IPR protection often has a significant effect on the amount and kinds of FDI to that country by Japanese and German as well as US MNEs.
Kondo (1995)	1979-1987.	Survey of 172 firms from a range of sectors. Multiple regression analysis of FDI stock averaged over the sample period. Regression analysis on rate of change of FDI over time and on FDI level before and after patent law changes.	Two digit SIC Chemical and Allied Products (49), Electric and Electronics Equipment (11), Food and Kindred Products (11), Industrial Machinery and Equipment (11), Primary and Fabricated Metals (12), Transportation Equipment (16), Other Manufacturing (43).	US outward FDI is not significantly affected by the patent regimes of destination countries.
Author(s) and year	**Sample period**	**Method**	**Industry/sector disaggregation**	**Findings**

Kumar (1996)	1977 and 1989, using 1982 as a benchmark.	OLS.	Full sample is disaggregated by chemical and food products industries. The full sample is also disaggregated between industrialised and developing economies.	The overall strength of a country's IPR regime favourably affects the probability of attracting R&D investments only in the full and industrialised countries samples. For developing countries, IPR protection does not appear to influence MNEs' R&D investments.
Lee & Mansfield (1996)	1990; 1991; and 1992.	OLS and Tobit estimations.	Disaggregation across six manufacturing industries: Chemicals (including drugs); electrical equipment; machinery: transportation equipment; metals; and food.	If the percentage of firms regarding protection in a particular country as inadequate falls by 10 points, US FDI in that country increases by about $140 million per year.
Seyoum (1996)	Data covering the period from 1975 to 1990 using pooled-time series.	Regression equations for FDI rates for the 27 countries in the sample estimated, cross-sectional (27 countries) analysis.	No industry disaggregation. Regressions disaggregate 'ALL' countries into 'Less Developed Countries' (LDCs), 'Newly Industrialising Countries' (NICs) and 'Developed Countries' (DCs).	Finds no significant relationship between patents and FDI for LDCs. For DCs, there is a significantly negative relationship between patent protection and inward FDI.
Braga & Fink (1998)	Single point in time (1992).	Gravity-type model estimated using OLS.	In estimations of US FDI, data are disaggregated across chemicals & allied products; non-electrical machinery; and electrical & electronic equipment. In estimations of German MNEs' FDI, across chemicals; non-electrical machinery; electrical engineering; and transportation equipment.	At best a weakly negative relationship

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings
Maskus (1998b)	1989-1992.	A set of simultaneous equations in a SUR framework corrected for autocorrelation and heteroskedasticity.	No sectoral or industrial disaggregation. A dummy variable is used to account for the separate effect in developing countries.	The level of average patent strength across countries is strongly associated with patent applications, though the effect is fairly weak in developing countries.
Smith (2001)	1989.	A gravity equation using cross-country data. The SUR approach is also employed.	No industry/sector disaggregation.	This postulation predicts a positive relationship between a country's strength of IPR protection and inward FDI.
Lesser (2002)	Post-TRIPS data for 1998.	Simple cross-section OLS analysis.	No industry/sector disaggregation.	Results suggest that a one-point rise in the IPR score he developed is associated with a US$1.5 billion increase in FDI.
Park & Lippoldt (2003)	1990-2000.	Fixed effects estimations.	Disaggregation by industry	Patent rights are associated positively with FDI and moderately with trade but the strength of these effects varies by level of development and by industry.

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings

Fosfuri (2004)	1981–96, disaggregated in four time periods: 1981–83; 1984–87; 1988–91; 1992–96.	Results are estimated by OLS, Tobit, GLS and by means of SUR techniques.	OLS estimations also disaggregate into chemical industry sub-sectors: Oil refining; Petrochemicals; Plastics and rubber; Gas; and Organic chemicals.	Patent protection does not play a significant role in fostering international activity or in influencing its mode in terms of WFOE, joint-venture, or technology licensing.
Javorcik (2004)	The information collected pertains mostly to the period 1989-1994.	Probit with sample selection equations are estimated simultaneously by ML.	Separate coefficient for high-tech sectors in which IPRs are expected to play a key role by interacting country specific regressors with a dummy for these sectors. These sectors are: drugs, cosmetics & health care products; chemicals; machinery & equipment; and electrical equipment. Disaggregation of 'project function' is also undertaken in terms of the choice of setting up production facilities (manufacturing FDI) or solely on building distribution networks.	In five out of six regressions, IPR protection impacts the probability of investments from high-technology companies, but not other industries. But in four regressions, the impact of stronger IPRs seems relevant to all industries.
Nunnenkamp & Spatz (2003)	Two single points in time: 1995 and 2000.	Gravity-type model and left-censored Tobit models. For the estimation of 'higher-quality FDI' regressions, 2SLS approach.	FDI data are restricted to manufacturing, disaggregated into 7 industries in 1995 and 5 industries in 2000. Food, chemicals, metals, machinery, electronic equipment (the last two subsectors are aggregated in 2000), transport equipment, and other manufacturing (not available in 2000).	Host-country and industry characteristics play a significant role in the relationship between IPR protection and FDI stocks held by US companies in the manufacturing sector of developing and developed countries. Imitative capacity is a key determinant of whether IPRs made a difference to investment decisions.

Author(s) and year	**Sample period**	**Method**	**Industry/sector disaggregation**	**Findings**
You & Katayama (2005)	Japanese MNEs investing in China in the year 2000. Survey answering period set from mid of July to end of Aug. 2001.	Probit estimation of a structural model using survey data from 412 randomly chosen companies. They received 98 responses.	Firm-level data disaggregated by seven manufacturing industries: Glass; Fibre; Vehicles, Food; Chemistry; Machine; and Electronics.	No strong evidence that IPRs are a significant determinant of FDI
Seyoum (2006)	Two time periods: 1990 and 1995.	OLS.	No industry/sector disaggregation.	The impact of IPR protection is positive and significant in both 1990 and 1995
Branstetter *et al*. (2007)	Over the 1980s and 1990s in 16 countries.	Numerical simulations. Plus a difference-in-differences approach to estimate several multivariate models	Specifications that test if affiliates expand their operations at the time of IPR reform are not disaggregated at the industry level. However, most specifications control for "Tech" goods, denoting the set of 10-digit commodity categories associated with innovation-intensive 4-digit ISIC industries, industries in ISIC codes 351, 352, 383, 384, and 385.	Their results indicate that MNEs expand the scale of FDI after IPR reform and that stronger IPRs in the South accelerate the rate at which MNEs' production is transferred there.

Author(s) and year	**Sample period**	**Method**	**Industry/sector disaggregation**	**Findings**

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings
Nicholson (2007)	Cross-sector, cross-country count data for 1995.	A generalised version of the Poisson. Negative binomial model estimated via FEs. When FEs not used robust standard errors are derived by clustering residuals by country.	Industry data disaggregated into three-digit industry sectors, allowing to distinguish between manufacturing and non-manufacturing MNEs.	Companies in industries with high capital costs are more likely to maintain control over production knowledge in countries with weaker IPRs by engaging in FDI. When IPR protection is strong, companies in industries with high investment in R&D are more likely to enter a market by licensing.
Park & Lippoldt (2008)	1990-2005.	Mixed method: (i) FGLS regression analysis; (ii) Case study analysis of the BRIC countries.	Chemicals; Machinery; Electrical appliances & components; Service; Computers & electronics; Information.	Patent rights tend to be positively associated with inward FDI. This relationship holds for all groups of countries, though the statistical association is strongest in developed countries. Copyrights and trademark rights are less strongly associated with technology transfer than patent rights. Stronger patent protection is positively associated with the inflows of high-tech products.

Adams (2010)	Four separate periods: 1985-1989, 1990-1994, 1995-1999, and 2000-2003.	System of four equations estimated using SUR method. To eliminate country-specific effects, data are first-differenced.	No industry/sector disaggregation.	Average IPR for both 1985 and 1990 is considerably lower than that in 1995 and 2000, after the TRIPS agreement.
Awokuse & Yin (2010a)	1992-2005.	Bi-lateral gravity model estimated using FGLS on a random-effects model.	No industry/sector disaggregation but separate estimates for pooled, high- and low-income countries.	Strengthening IPR protection in China has a positive effect on inward FDI
Watkins & Taylor (2010)	2006-2008.	Multivariate models estimated by OLS.	Disaggregation across nine industries	Results fail to support the hypothesis that emerging economy IPRs strongly affect the level or distribution of advanced country FDI

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings
Ushijima (2013)	1985-2004.	a non-standard gravity-type cross-country regression (specified in the negative binominal framework and hence nonlinear) based on aggregated data; and a logistic regression based on firm-level data.	Disaggregated across 15 two-digit industries: Foods; Textile products; Paper and pulp; Chemicals; Petroleum products; Rubber products; Ceramic products; Iron and steel; Non-ferrous metal; Metal products; Machineries; Electric machineries; Transportation equipment; Precision instruments; Other manufacturing.	The positive IPR–FDI link is only present in countries with a high ability to imitate foreign technology. The link with foreign IPR is positive and significant only for FDI in technology-intensive industries. The sensitivity of a firm's FDI to foreign IPRs increases with its patent intensity relative to industry peers. The effect diminishes considerably when a firm has previous investment experience in the same country.
Hsu & Tiao (2015)	1985-2010.	Gravity model estimated using: OLS, fixed and random effects, SYS-GMM.	No industry/sector disaggregation.	Stronger IPR protection increases Asian countries' global FDI inflows.

Author(s) and year	Sample period	Method	Industry/sector disaggregation	Findings
Zhang & Yang (2016)	1985-2012.	A standard gravity model estimated using OLS, FEs and SYS-GMM techniques.	No industry/sector disaggregation.	TRIPS impacted positively on the prevalence of FDI in each of the developing countries except for Indonesia, Philippines, Thailand, Malaysia and Turkey. They argue that these countries' instability, military involvement in politics and ethnic tensions significantly countered the associated increase in FDI they would have expected to see. R&D in Brazil, China, Indonesia and the Philippines was negatively correlated to TRIPS.

Source: Authors Work

Appendix 2

Index of International Patent Protection 2005: Park (2008b)

Index of International Patent Protection 2005. Park, 2008

Broken down into tertiles and depicting the explanatory countries highlighted . Authors own work

Tertile	Country	Park Index	Tertile	Country	Park Index	Tertile	Country	Park Index
First Tertile	United States	4.88	Second Tertile	India	3.76	Third Tertile	Nicaragua	2.97
	Belgium	4.67		Trinidad and Tobago	3.75		Benin	2.93
	Canada	4.67		Taiwan	3.74		Burkina Faso	2.93
	Denmark	4.67		Ecuador	3.73		Central African Republic	2.93
	Finland	4.67		Colombia	3.72		Chad	2.93
	France	4.67		Russian Federation	3.68		Mali	2.93
	Ireland	4.67		Ukraine	3.68		Niger	2.93
	Italy	4.67		Panama	3.64		Senegal	2.93
	Japan	4.67		Brazil	3.59		Togo	2.93
	Netherlands	4.67		Botswana	3.52		Haiti	2.9
	Bulgaria	4.54		Morocco	3.52		Costa Rica	2.89
	Sweden	4.54		Iceland	3.51		Paraguay	2.89
	United Kingdom	4.54		Cyprus	3.48		Dominican Republic	2.82
	Germany	4.5		El Salvador	3.48		Egypt	2.77
	Hungary	4.5		Malaysia	3.48		Indonesia	2.77
	Portugal	4.38		Malta	3.48		Thailand	2.66
	Austria	4.33		Bolivia	3.43		Tanzania	2.64
	Czech Republic	4.33		Jordan	3.43		Sudan	2.61
	Korea (South)	4.33		Uruguay	3.39		Zimbabwe	2.6
	Spain	4.33		Jamaica	3.36		Mauritius	2.57
	Switzerland	4.33		Ghana	3.35		Mozambique	2.52
	Greece	4.3		Peru	3.32		Swaziland	2.43
	Chile	4.28		Venezuela	3.32		Fiji	2.4
	South Africa	4.25		Mauritania	3.27		Pakistan	2.4
	Poland	4.21		Tunisia	3.25		Madagascar	2.31
	Singapore	4.21		Kenya	3.22		Rwanda	2.28
	Slovak Republic	4.21		Nigeria	3.18		Zaire (Dem Rep Congo)	2.23
	Philippines	4.18		Guatemala	3.15		Nepal	2.19
	Australia	4.17		Sri Lanka	3.11		Syria	2.19
	Norway	4.17		Algeria	3.07		Burundi	2.15
	Romania	4.17		Cameroon	3.06		Malawi	2.15
	Luxembourg	4.14		Congo	3.06		Ethiopia	2.13
	Israel	4.13		Gabon	3.06		Somalia	2.13
	China	4.08		Ivory coast	3.06		Liberia	2.11
	New Zealand	4.01		Vietnam	3.03		Zambia	1.94
	Turkey	4.01		Grenada	3.02		Iran	1.91
	Lithuania	4		Honduras	2.98		Bangladesh	1.87
	Argentina	3.98		Saudi Arabia	2.98		Guyana	1.78
	Mexico	3.88		Sierra Leone	2.98		Iraq	1.78
	Hong Kong	3.81		Uganda	2.98		Papua New Guinea	1.6
							Angola	1.2
							Burma (Myanmar)	0.2

Appendix 3

Selected Empirical (Quantitative and Qualitative) Studies

Author(s) and year	Countries considered	Sample period	Method	IPR measure	FDI measure	Industry/sector disaggregation	Other variables considered
Ferrantino (1993)	OECD (Belgium, Canada, Denmark, Finland, France, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, UK, W. Germany); Small Ports (Jamaica, Liberia, Panama, UAE); Southern NICs (Argentina, Australia, New Zealand, Singapore, South Africa); Latin America (Chile, Colombia, Mexico, Philippines (SIC), Peru, Thailand (SIC), Trinidad & Tobago); Euro NICs (Greece, Ireland, Israel, Spain); Africa (Egypt, Indonesia (SIC), Nigeria); Asian NICs (Ecuador (SIC), Malaysia, South Korea); "Empire" (Brazil, Portugal, Turkey); and India. Cluster names for identification only.	Single point in time: year 1982.	Adaptation of the gravity model.	Uses a series of dummy variables to capture whether or not a country belongs to an international patent or copyright convention.	Four dependent variables: Total exports to country; sales of US overseas affiliates in local market (FDI proxy); exports of US firms to their overseas affiliates; and royalties and license fees (payments and receipts of US overseas affiliates to/from affiliated and non-affiliated firms).	No industry disaggregation.	Economic distance variables (geographic distance, persons per telephone, political risk, and dummies for 'colony', 'landlocked' and 'European continent' countries), policy distance variables (tariff, incentives and restrictions regime, FX regime, dummies for Paris and Berne convention membership, number of memberships, duration of patent) and other independent variables (labour costs, population, and GDP).

Mansfield (1993)	15 developing countries: Argentina, Brazil, Chile, Hong Kong, India, Indonesia, Mexico, Nigeria, Philippines, Singapore, Republic of Korea (South Korea), Spain, Taiwan (China), Thailand, and Venezuela.	Four periods: 1988; 1989; 1990; and the mean of the three years.	Simple OLS.	Own IPR strength index, also by industry (and compared to two other measures). Used the average over his six industries of the mean of the three measures of the weakness of the *j* country's IPR protection. Same in regressions disaggregated by industry but in *i* industry in *j* country.	Change in US FDI position in *j* country, and US capital outflow to *j* country. In regressions disaggregated by industry, he uses the change in US FDI position in *i* industry in *j* country in 1990, change in 1989, and sum of the changes in both years.	An aggregate country regression and a regression disaggregated by industry: chemicals (including pharmaceutical s); transportation equipment; electrical equipment; food; metals; and machinery.	Population, GDP, corporate taxation level, exports to imports ratio; urbanisation; percentage of *j* country's GDP attributable to wholesale and retail trade, transport & communications; frequency of change of the national executive of *j* country; six industries' average of the mean of three IPR measures.
Maskus & Eby-Konan (1994)	Relates several measures of US foreign presence in seven broad manufacturing sectors in 44 countries to those countries' national characteristics.	Single point in time: year 1982.	Tobit estimation.	Rapp & Rozek (1990) index.	Foreign presence is measured by the US investment position abroad, net property, plant & equipment of US affiliates, net FDI flows, employment of US affiliates, and net royalties and licence	Data on industry characteristics (proxies for strategic competition, multi-plant economies, and	Change in bilateral exchange rate (1975-1982), change in share of manufacturing in GDP (1965-1985), growth in GNP (1965-1984), debt-service ratio, dummies for the EC and Canada, incentives measure (percentage of affiliates that

					fees associated with FDI.	so) are not available.	received some tax concessions), and disincentives measure (percentage of affiliates subject to a requirement to transfer technology).
Mansfield (1994)	Random selection of 100 US MNEs using a list of major firms listed in Business Week of June 1990; MNEs were asked about 16 countries: Argentina, Brazil, Chile, Hong Kong, India, Indonesia, Japan, Mexico, Nigeria, Philippines, Singapore, Republic of Korea (South Korea), Spain, Taiwan (China), Thailand, and Venezuela.	Single point in time (1991). Regression results reported have a sample period from 1989 to 1992.	Questionnaire achieving complete or partial returns from 94 firms (23.8% response rate); follow-up interviews with a cross-section of firms. Also reports estimation results by Lee's unpublished doctoral thesis.	Own measure of MNEs' perceptions of IPRs in the countries considered by his survey, and then compared against Rapp & Rozek's (1990) index of patent protection; finding a high correlation between the two.	Five different types of investment by US MNEs: sales & distribution outlets, rudimentary production & assembly facilities, facilities to manufacture components, and complete products, and R&D facilities.	US MNEs' FDI in six different industries: chemicals (including pharmaceutical s); transportation equipment; electrical equipment; machinery; food; and metals.	The regression results reported relate to OLS estimation of a basic model of the change in US outward controlling for market size and a dummy for Mexico.
Mansfield (1995)	Survey of a random sample of 45 Japanese MNEs and 35 German MNEs.	Single point in time. German & Japanese data relate to	Questionnaire. The response rate was 71% in Japan and 57%	Two survey-based measures of MNEs' perceptions of IPRs: (i) mean percentage	Survey based information. For the econometric model, the	For the survey: chemicals, pharmaceutical s, electrical	Size of a country's market, the stock of prior FDI, a dummy variable for Mexico.

		1994, US data to 1991. Model for US manufacturing FDI into 14 countries estimated over 1990-1993.	in Germany (hence lower than the 94% figure for the US). The econometric for the US is estimated using OLS.	of US firms regarding IPR protection as too weak to invest in JVs where they contribute advanced technology; (ii) mean percentage of US firms regarding protection as too weak to transfer advanced technology to wholly-owned subsidiaries.	stock of FDI prior to year *t*.	equipment, and machinery, transportation equipment, metals, and food industries. For the econometric model, only aggregate US FDI in manufacturing is considered.	
Kondo (1995)	Country sample: Belgium, Sweden, Hong Kong, UK, Singapore, Japan, Italy, Philippines, Germany, Netherlands, Portugal, France, Australia, Greece, Switzerland, Denmark, Ireland, Malaysia, Taiwan, Austria, Chile, Argentina, Rep of Korea, Brazil, Ecuador, Spain, India, Thailand, Columbia, Venezuela, Mexico, Peru, Indonesia.	1979-1987.	Survey of 172 firms from a range of sectors to gauge the relative importance of each of the 15 scope provisions to the firm's decision to invest in a host country.	Own measure of IPRs based on a numeric representation of 23 patent law features subdivided into three dimensions that are then combined into indicators reflecting the relative strength of a particular patent law. Also used a survey of 172 firms	The stock of FDI, and rate of change of FDI.	Two digit SIC Chemical and Allied Products (49), Electric and Electronics Equipment (11), Food and Kindred Products (11), Industrial Machinery and Equipment (11),	GDP per capita, population, information cost variable (English *vs.* Non English), factor production variable, percentage of school age children enrolled in secondary school, tariff /non-tariff (membership or not of GATT), political risk variable (member or not of ICSID.

			Multiple regression analysis of FDI stock averaged over the sample period. Regression analysis on rate of change of FDI over time. Regressions based on FDI level before and after patent law changes.	with in-house patent counsel to measure the relative weights of patent provisions in particular patent laws.		Primary and Fabricated Metals (12), Transportation Equipment (16), Other Manufacturing (43**).**	
Kumar (1996)	R&D investments by US MNEs in up to 44 industrialised and developing countries on the basis of the Benchmark Survey data on US Direct Investment Abroad in 1977, 1982 and 1989.	Only three years are considered. The effect of the time dimension is detected by including dummy variables for	OLS.	Rapp & Rozek (1990) index.	Expenditure on R&D by majority-owned affiliates of US enterprises in different host countries in the industrialized and developing countries.	Full sample is disaggregated by chemical and food products industries. The full sample is also disaggregated between industrialised	Expenditure on R&D; sales of nonbank US affiliates; GNP of *j* country; FDI royalties and technical fees received by US parents from affiliates divided by affiliate sales; host country sales of majority-owned affiliates; exports by majority-owned affiliates to countries other than the US;

		1977 and 1989, using 1982 as a benchmark.				and developing economies.	exports by majority-owned affiliates to US; total national expenditure on R&D in *j* country; No. of patents granted in *j* country to residents; enrolment ratio for HE in *j* country; average wage in *j* country; expenditure on R&D by majority-owned affiliates in *j* country divided by R&D employment; informational infrastructure in *j* country.
Lee & Mansfield (1996)	US MNEs' perceptions of IPR strength and the volume and composition of US FDI in 14 developing countries: Argentina; Brazil; Chile; Hong Kong; India; Indonesia; Mexico; Nigeria; Philippines; Singapore; South Korea; Taiwan; Thailand; and Venezuela.	Three years only: 1990; 1991; and 1992.	OLS and Tobit estimations.	Mansfield's survey index.	US capital outflows in millions of dollars (source: US Department of Commerce).	Disaggregation across six manufacturing industries: Chemicals (including drugs); electrical equipment; machinery: transportation equipment;	Market size, stock of past investment, measures of industrialisation and trade openness, and a dummy for Mexico. Some regressions also included R&D expenditure, education level and energy usage.

						metals; and food.	
Seyoum (1996)	A sample of 30 countries was randomly selected from five geographic clusters: North America, Latin America, Europe, Africa, the Middle East and Asia. Complete data was collected for 27 countries.	Data covering the period from 1975 to 1990.	Regression equations for FDI rates for the 27 countries in the sample estimated using pooled-time series (1975-90), cross-sectional (27 countries) analysis.	Level of IPR protection data obtained from a questionnaire to IPR experts and practitioners in the 27 countries. Questionnaire mainly based on guidelines for minimum standards of IPR protection and enforcement, developed by the US Chamber of Commerce IP task force in 1987. Questions based on a scale of 0 to 3, with 0 as lowest level.	The dependent variable is FDI inflows, total direct investment flows into 27 countries (1975-1990) computed as a percentage of GDP.	No industry disaggregation. Regressions disaggregate 'ALL' countries into 'Less Developed Countries' (LDCs), 'Newly Industrialising Countries' (NICs) and 'Developed Countries' (DCs).	Eight independent variables are used: four IP variables (patents, trademarks, trade secrets and copyrights) and four economic policy variables (market size, ratio of public investment to GDP, ratio of external debt to exports, and the exchange rate).
Braga & Fink (1998)	Reports evidence of two distinct studies: one to jointly estimate the effects of stronger	Single point in time (1992).	Gravity-type model	Ginarte & Park (1997) index.	Overseas sales by US affiliates; and the stock of German FDI.	In estimations of US FDI, data are	Controls are GNP, GNP per capita, distance, tariffs, border, and language.

	IPR protection on US arms-length exports and overseas sales by US affiliates in 42 countries; and one of the effects of IPRs on German MNEs' exports and FDI decisions in 25 countries.		estimated using OLS.			disaggregated across chemicals & allied products; non-electrical machinery; and electrical & electronic equipment. In estimations of German MNEs' FDI, across chemicals; non-electrical machinery; electrical engineering; and transportation equipment.	Interaction terms of IPRs with industry also included.
Maskus (1998b)	US FDI in a panel of 46 destination countries.	1989-1992.	A set of simultaneous equations in a SUR framework corrected for	Uses the patent strength from Maskus & Penubarti (1995), who adopted an instrumental	Dependent variables capture joint impacts of four MNEs' commercial flows: No. of US patent applications filed in	No sectoral or industrial disaggregation. A dummy variable	Controls for market size, tariff protection, the level of local R&D by affiliates, distance from the US, and investment incentives and disincentives

			autocorrelation and heteroskedasticity.	variable approach to correcting (for endogeneity) the raw Rapp & Rozek (1990) patent index.	host country; total sales of foreign affiliates of US parents; US exports shipped to affiliates; and total assets of foreign affiliates of US parents.	accounts for the separate effect in developing countries.	provided by local governments. An interaction dummy accounts for patent strength in developing countries.
Maskus (2000); Revisits results from Maskus (1998b)	As above	As above	As above	As above	As above	As above	As above
Mayer & Pfister (2001)	The study considers 755 FDI location choices of French MNEs in 36 countries.	Periods considered are: 1981, 1982 and 1988-1992.	A conditional logit model is estimated.	Ginarte & Park (1997) index.	A dummy variable taking value 1 if firm *i* chooses country *j* as an FDI host location at date *k*.	No industry/sector disaggregation. Sample disaggregated by developed and developing countries.	Variables include consumer prices, openness, R&D, education, membership of the EU, corruption, and political freedom.
Smith (2001)	Cross-sections on US outward bilateral exchange, including exports, affiliate sale, and	Year 1989.	A gravity equation using cross-country data. The SUR	Rapp & Rozek (1990) index; Ginarte & Park (1997) index; and No.	Dollar value of sales in manufacturing of (majority-owned	No industry/sector disaggregation.	GDP per capita, population, distance, openness to trade, tax rate. Many interaction

	licenses to unaffiliated foreign firms across 50 countries.		approach is also employed.	of patent lawyers by country.	nonbank) affiliates of US parents.		effects are also considered using dummies.
Lesser (2002)	Analyses the effects of improved IPR protection in a sample of 44 developing countries.	Post-TRIPS data for 1998.	Simple cross-section OLS analysis.	Own IPR strength index to generate an IPR score for each developing country considered.	FDI inflows.	No industry/sector disaggregation.	FDI inward stock; GNP; Risk; Real exchange rate; Degree of industrialisation; Manufacturing tariff; Internal prices.
Park & Lippoldt (2003)	Many developing and least developed countries (further disaggregated by membership of WTO).	1990-2000.	Fixed effects estimations.	Ginarte & Park (1997) index and Park (2001). Data on trademark rights, copyrights, and USTR ratings, are also in Park (2001).	Global inward and outward FDI stocks (source: UNCTAD); US outward FDI by industry (source: US Department of Commerce, BEA).	Disaggregation by industry (Food & kindred products; Transportation equipment; Chemicals & allied products; Petroleum; Primary & fabricated metals; Wholesale trade; Industrial machinery & equipment; Finance, excluding	GDP per capita (which proxies for purchasing power on the demand side and for productivity on the supply side), mean tariff rate, and country risk.

						banks, insurance & real estate; Electronic & other electric equipment; Services) and by sector (Agricultural chemicals; Industrial chemicals; Computer & office equipment).	
Fosfuri (2004)	The chemical industry geographical areas considered are: Africa; Eastern Europe; Far East (including Australia); Japan; Middle East; North America; South America; and Western Europe. A set of up to 75 countries is considered. Countries are also divided in two groups: countries with	1981–96, disaggregated in four time periods: 1981–83; 1984–87; 1988–91; 1992–96.	Results are estimated by OLS, Tobit, GLS and by means of SUR techniques.	Ginarte & Park (1997) index.	All chemical firms from developed countries which had, by 1988, more than $1 billion in sales. Of this set, 153 firms had at least one international plant reported in Chemintell during sample period. Firms cover about 50%	OLS estimations also disaggregate into chemical industry sub-sectors: Oil refining; Petrochemicals; Plastics and rubber; Gas;	Income per capita, population, distance, the country level of education, and the country openness to trade. Experimentation with several other variables (including barriers to trade of capital goods, financial openness, dummies for major oil/non-oil

	strong imitative abilities and countries with weak imitative abilities.				of all FDIs and more than 30% of international technology licensing.	and Organic chemicals.	exporter/producer, capital account restrictions, etc.) did not show statistical significance hence they were dropped and not reported.
Javorcik (2004)	Firm-level data compiled from a worldwide foreign investment survey conducted by the EBRD in 1995 that asked companies about their FDI behavior in 24 countries in Eastern Europe and the former Soviet Union.	The information collected pertains mostly to the period 1989-1994.	Probit with sample selection equations are estimated simultaneously by ML.	Ginarte & Park (1997) index supplemented by Javorick's own enforcement data drawn from the IIPA recommendations for countries to be placed on the US Special 301 Watch List. Countries scored between 1 and 3: '1' indicates inadequate IPR legislation, '2' close to adequate legislation but no enforcement; '3' close to adequate legislation with some enforcement.	FDI is measured by a dummy taking value 1 if firm *i* has invested in country *c*, and zero if a firm has not undertaken FDI in country *c*.	Separate coefficient for high-tech sectors in which IPRs are expected to play a key role by interacting country specific regressors with a dummy for these sectors. These sectors are: drugs, cosmetics & health care products; chemicals; machinery & equipment; and	GDP per capita; Population; Progress in reform; Corporate tax rate; Legal effectiveness; Corruption; Privatization; and Openness. Some estimations also control for firm size, R&D intensity, advertising intensity, production diversi6cation, and regional experience.

						electrical equipment. Disaggregation of ‘project function’ is also undertaken in terms of the choice of setting up production facilities (manufacturing FDI) or solely on building distribution networks.	
McCalman (2004)	The FDI or licensing behaviour of Hollywood studios in both the feature film and video markets in 40 foreign countries.	Single point in time. Most data refer to 1997 (Ginarte & Park index to 1995).	ML estimates of a bivariate probit model, to account for potential correlation between errors of the feature film model and	The IPR index described in Ginarte & Park (1997) extended for the year 1995 (unpublished series made available by Walter Park).	No. of cases of FDI and licensing in both the feature film and video segments in 1997 (source: Screen Digest, 1998).	The exclusive focus is on the film and video distribution segment of the movie industry.	GDP per capita, population, growth rate, regional dummies, language dummy, share of population less than 14 years old, fraction of population that has completed secondary education, distance and domestic film production.

			the video model.				
Nunnenkamp & Spatz (2003)	Sectorally disaggregated FDI data for a large sample of host countries.	Two single points in time: 1995 and 2000.	Gravity-type model, and left-censored tobit models. For the estimation of 'higher-quality FDI' regressions, 2SLS approach.	The degree of IPR protection is measured by the Ginarte & Park (1997) index, and the 2002 WEF survey results.	Current FDI stocks. FDI data restricted to manufacturing. Also considers 3 quality-related dependent variables: US affiliates' local R&D expenditure, US affiliates' value added in host country, US affiliates' exports.	FDI data are restricted to manufacturing, disaggregated into 7 industries in 1995 and 5 industries in 2000. Food, chemicals, metals, machinery, electronic equipment (the last two subsectors are aggregated in 2000), transport equipment, and other manufacturing (not available in 2000).	Host countries' GDP per capita, population, distance between the US and the host country, the cost of investing abroad, and average years of schooling. In some regressions they also interact IPR protection with other regressors using multiplicative interaction terms.

Pfister & Deffains (2005)	The FDI location choices of French MNEs in 17 developing countries. Sample consists of 209 choices of localisation. The countries included and the corresponding No. of localisations are: Brazil (8), Chile (3), Colombia (3), Greece (10), India (9), Indonesia (3), Ireland (18), Malaysia (12), Mexico (17), Nigeria (0), Pakistan (2), Portugal (28), South Africa (3), Spain (45), Thailand (12), Turkey (31) and Venezuela (5).	Only compares locations at a given time point. Data drawn from the DFERFMF dataset 'Subsidiary companies' (1994). From 1959 to 1994, it has collected 2,756 location decisions by French MNEs abroad.	A conditional logit model is estimated.	Ginarte and Park index, constructed in 1995 and going back, in five year periods, until 1960.	The dependent variable takes on the value 1 if country *j* has been chosen as an FDI host location at date *k*.	Uses the industry mean patent propensity and overall median patent propensity (25%) and consider all industries with a patent propensity of more (resp. less) than 25% to be patent sensitive (resp. patent insensitive). Former group: electrical & electronic equipment, cars, cosmetics & drugs, transport	Measures of demand (GDP of each country), production costs (labour costs), trade openness (ratio of the sum of exports and imports over GDP), and agglomeration effects (proxied by the number of French firms of the same sector already located in the host country). They also control for: GDP per capita, the R&D intensity of the host country (RD/GDP), secondary schooling enrolment rates (Education), the level of corruption of the host country, and the extent of political rights granted to its inhabitants.

					equipment, electric & electronic components, household equipment, steel, utilities & oil raffineries. Latter group: mechanical equipment, chemicals & plastics, publishing & printing, wood & paper, textile & leather & clothes. Also, they approximate the host country's ability to imitate through its R&D intensity and

						define two dummies, for high (HRD) and low (LRD) research intensity countries. The interaction variables IPR*HRD and IPR*LRD measure the impact of a change in IPRs for each of the two country groups.	
You & Katayama (2005)	Japanese MNEs that invested in China. From answers to questionnaire they obtained data on 228 of the Japanese firms' Chinese subsidiaries. Data covered 188 subsidiaries of the responding firms which had received Japanese FDI, in	Japanese MNEs investing in China in the year 2000. Survey answering period set	Probit estimation of a structural model using survey data from 412 randomly chosen companies that	Two measures: (i) Constructed own survey-based IPR measure on a 5-point index scale to capture the overall state of IPRs in China; (ii) used a dummy	Investments by Japanese MNEs in China, covering multiple sites and subsidiaries giving a total number of subsidiaries in the data set of 228	Firm-level data disaggregated by seven manufacturing industries: Glass; Fibre; Vehicles, Food; Chemistry;	Responses covered several sectors and investing cities across China. Questions probed on location, sector, partner set-up, level and length of investment, imports that competed with the production in China, from

	13 cities: Peking, Shanghai, Tianjing, Shenyang, Dalian, Qindao, Suzhou, Guangzhou, Shenzhen, Dongguan, Zhuhai, Xiamen, and Fuzhou.	from mid of July to end of Aug. 2001.	invest in China from Toyokeizai Shinposha database. They received 98 responses (23.8% response rate).	variable taking value 1 if the products of the surveyed firm were patented or trademark registered, and value 0 otherwise.		Machine; and Electronics.	Japan or elsewhere. Various trade-related variables, local production and multiple instruments were included as additional controls in probit models. Dummies for city/industry added.
Seyoum (2006)	Random sample of 63 developed/developing countries (3 countries left out of the 1995 dataset).	Two time periods: 1990 and 1995.	OLS.	Ginarte & Park (1997) index.	FDI is the annual inflow of total direct investment flows to a host country.	No industry / sector disaggregation.	Population, exchange rate, corruption, trade/GDP, unemployment, scientific infrastructure, GDP growth.
Zhao (2006)	48 countries (of which 31 countries with weak IPR protection).	1993-2003.	Mixed methods: (i) interviews with managers/researchers in China and qualitative analysis; (ii) within- & cross-firm variances (zero-inflated negative binomial regressions);	Composite index based on Rapp & Rozek (1990), Ginarte & Park (1997), US Trade Representative's Special 301 Watch List (1999), a Rule of Law index, and piracy index from an annual BSA Global Software Piracy Study.	US patents developed in foreign countries.	No industry / sector disaggregation.	Other firm characteristics, including assets, sales and lines of business.

			patent data of 1,567 innovating US MNEs.				
Branstetter *et al*. (2007)	Analyses the effects of discrete changes in patent regimes in 16 countries: Argentina, Brazil, Chile, China, Colombia, Indonesia, Japan, Mexico, Philippines, Portugal, South Korea, Spain, Taiwan, Thailand, Turkey, and Venezuela.	Over the 1980s and 1990s in 16 countries.	Numerical simulations. Plus a difference-in-differences approach to estimate several multivariate models (including Poisson and negative binomial specifications).	Based on timing of major IPR reforms (15 discrete changes) a post-reform dummy is used, also interacted with a Tech variable to reflect the extent to which parents transfer technology to affiliates in countries that do not reform IPRs.	Data on US MNEs from the US BEA annual Survey of US Direct Investments Abroad and the quarterly BoP Survey. To capture evidence of production shifting, uses affiliates' capital stock, employment compensation, use of technology from parent, and R&D expenditures.	Specifications that test if affiliates expand their operations at the time of IPR reform, are not disaggregated at industry level. However, most specifications control for "Tech" goods, denoting the set of 10-digit commodity categories associated with innovation intensive 4-digit ISIC industries,	Controls include time invariant FEs for the affiliate, FEs for the entire sample, and country-specific time trends. Time-varying parent and host country characteristics are also accounted for: total sales of the parent system as well as the level of parent firm R&D spending, per capita GDP, measures of trade and FDI openness, real exchange rates and corporate tax rates.

						industries in ISIC codes 351, 352, 383, 384, and 385.	
Nicholson (2007)	Number of US firms engaged in FDI in 42 countries, also split by OECD membership.	Cross-sector, cross-country count data for 1995.	Generalised version of the Poisson. Negative binomial model estimated via FEs. When FEs not used robust standard errors are derived by clustering residuals by country.	Ginarte & Park (1997) index.	Count data on the number of US companies engaging in FDI and licensing (source: US BEA census).	Industry data disaggregated into three digit industry sectors, allowing to distinguish between manufacturing and non-manufacturing MNEs.	Measures of corruption, the effectiveness of competition policy, industry aggregate costs of property, plant and equipment as a ratio of industry sales, R&D, exports, GDP, population, aggregate R&D, exports, GDP, population, human capital, and distance from US.
Park & Lippoldt (2008)	A data set covering a broad international panel of developed, developing and least developed countries.	1990-2005.	Mixed method: (i) FGLS regression analysis; (ii) Case study analysis of the BRIC countries.	Four IPR measures: index of patent rights; index of copyrights; index of trademark rights; WEF survey.	The stock of inward FDI and US Foreign Direct Investment Assets.	Chemicals; Machinery; Electrical appliances & components; Service; Computers &	General physical property rights, effectiveness of legal regime, quality of governance, cost of doing business, freedom to trade, and per capita GDP.

						electronics; Information.	
Adams (2010)	Panel data for a cross-section of 75 developing countries.	Four separate periods: 1985-1989, 1990-1994, 1995-1999, and 2000-2003.	System of four equations estimated using SUR method. To eliminate country-specific effects, data are first-differenced.	Ginarte & Park (1997) index.	The net FDI inflows share in GDP (source: WDI CD-ROM 2006)	No industry / sector disaggregation.	Real GDP per capita growth rate, inflation, openness, population, infrastructure, return on investment, risk, square of IPR (IPRSQ) to capture nonlinearity, and interaction term (IPR*TRIPS) to investigate a differential effect of IPRs before and after TRIPS.
Awokuse & Yin (2010)	Panel data for 38 countries that include 24 high-income countries and 14 low-income countries.	1992-2005.	Bi-lateral gravity model estimated using FGLS on a random effects model.	Annual foreign patent applications to measure IPR strength in China; and Ginarte & Park (1997).	FDI is measured as the FDI flow from various (38) nations into China.	No industry/sector disaggregation but separate estimates for pooled, high- and low-income countries.	GDP in both source country and China, average trade cost and investment cost in China, distance, and a proxy for China's level of industrialisation.
Watkins & Taylor (2010)	US MNEs' FDI in 22 emerging economies: Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel,	2006-2008.	Multivariate models estimated by OLS.	Ginarte-Park index and the WEF IPR index from Global Competitiveness	Volume of US FDI to the *i* country, measured in millions, US dollars (source: US BEA, years 2006-2008). In the	Disaggregation across nine industries (mining; manufacturing;	Labour costs, corporate tax rates, population, lagged FDI, industrialisation, political instability, education level, and a dummy variable for

	Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, South Korea, Taiwan, Thailand, and Turkey.	Reports 2006 to 2008.	disaggregated models the study also uses the industry composition of FDI based on US stocks in various countries considered (source: US BEA).	wholesale trade; information; depository industries; finance and insurance; professional, scientific and technical services; holding companies except banks; and other industries), and eight sectors within the manufacturing industry (food; chemicals; primary & fabricated metals; machinery;	Mexico. Year dummies are also included for 2007 and 2008.

						computers & electronic products; electrical appliances & components; transportation equipment; other manufacturing).	
Ushijima (2013)	Japanese FDI, measured as the creation of a new subsidiary, with a final sample of 5,378 subsidiaries operating in 58 countries (5,378 FDI events).	1985-2004.	Two alternative methods: (i) a non-standard gravity-type cross-country regression (specified in the negative binominal framework and hence nonlinear) based on aggregated	Ginarte & Park index, and Park (2008).	No. of new subsidiaries in a host country. FDI during the 5-year interval [t, t+4] in which t=1985, 1990, 1995, 2000. In firm-level regressions, dependent variable is a dummy coded 1 if firm *i* invests in country *j* by forming a subsidiary in the 5-year period beginning in t (t=1985, 1990,	Disaggregated across 15 two-digit industries: Foods; Textile products; Paper and pulp; Chemicals; Petroleum products; Rubber products; Ceramic products; Iron and steel; Non-	Control variables include: population, GDP per capita, distance from Japan, the market orientation of government policies and institutions, human capital, and the stock of past Japanese FDI.

			data; and (ii) a logistic regression based on firm-level data.		1995, 2000) and 0 otherwise.	ferrous metal; Metal products; Machineries; Electric machineries; Transportation equipment; Precision instruments; Other manufacturing.	
Hsu & Tiao (2015)	Panel of 11 Asian countries: Taiwan, Japan, Korea, Singapore, Malaysia, India, Indonesia, Thailand, Saudi Arabia, Turkey, and Vietnam.	1985-2010.	Gravity model estimated using: OLS, fixed and random effects, SYS-GMM.	Ginarte & Park (1997) index, and Park (2008).	Global FDI inflows in each country considered (measured in US dollars, taken from UNCTAD).	No industry/sector disaggregation.	Factors such as GDP, trade volume, R&D, openness, but many other factors are omitted, e.g., exchange rates and FTAs.
Zhang & Yang (2016)	Inward FDI in 20 developing countries: Argentina; Brazil; Chile; China; Columbia; Egypt; India; Indonesia; Malaysia; Mexico; Nigeria; Peru; Philippines; Saudi Arabia; Singapore; South Africa; Thailand; Turkey; UAE; and Vietnam.	1985-2012.	A standard gravity model estimated using OLS, FEs and SYS-GMM techniques.	A dummy variable to capture the TRIPS agreement.	FDI flows from home country *i* to host country *j* in year *t* (measured in US dollars, taken from UNCTAD).	No industry / sector disaggregation.	GDP of home and host country, total trade volume of host country, R&D level of home and host country, openness of host country, country risk of host country, investment costs of host country.

Source: Noon *et al.,* 2019

Abbreviations: BRIC (Brazil, Russia, India, and China); Bureau of Economic Analysis (BEA); Direction of Foreign Economic Relations of the French Ministry of Finance (DFERFMF); European Union (EU); Feasible Generalised Least Squares (FGLS); Fixed Effects (FEs); International Centre for the Settlement of Investment Disputes (ICSID); International Intellectual Property Alliance (IIPA); Joint Ventures (JVs); Maximum Likelihood (ML); Ordinary Least Squares (OLS); Seemingly Unrelated Regressions (SUR); System Generalised Methods of Moments (SYS-GMM); Trade Related Aspects of Intellectual Property Rights (TRIPS); United Arab Emirates (UAE); World Economic Forum (WEF); World Trade Organisation (WTO).

Survey of UK Multinational Companies

Welcome

Thank you for agreeing to complete this survey. It should take you no longer than 20 minutes. You can opt to complete the survey at an alternative time by hitting the "**Finish Later**" button at the bottom of each page.

Kind regards

Paul Noon

If you would like to view the whole survey before completion, please click https://static.onlinesurveys.ac.uk/media/account/215/survey/296646/question/pilot_survey.pdf

Participant Information Sheet

How does the perception of Intellectual Property Rights protection in China influence the Foreign Direct Investment decisions of UK Multi-National Enterprises?

Participant Information Statement

The aim of this study is to understand how the perceptions of Chinese intellectual property rights impact the investment decisions of UK companies looking to invest in China. For the purpose of this study, I am surveying a number of business people in companies that have both invested and not invested in China to understand the drivers of their foreign investment decisions, the importance of intellectual property on these decisions and their views on the intellectual property environment in China.

Participation is entirely voluntary, you can opt out at any point by closing and exiting the browser. If you change your mind about participation you may withdraw at any time within 3 months of completion of the survey. If you decide to withdraw your data will be destroyed and not used in any way. There are no consequences for you in either not participating or withdrawing from the study.

You will be asked to take part in an online survey that will take approximately 25 minutes to complete. This data will be anonymised and not attributable to either yourself or your company. Only aggregate data will be reported in the final research outputs. These data will be stored on secure University systems (University of Bristol and Coventry University) and destroyed at the end of the study. You may also be invited to take part in either a telephone or face to face interview.
Again participation in this phase of the study is entirely voluntary and not taking part in the interviews will not impact on your responses to the survey, they will still be valid. All information from the interviews will also be anonymised and be un-attributable to the participant.

The survey and interviews have been designed to reduce the risks of participation by ensuring that all the data is anonymised. The survey and interviews are focussed on business decisions and therefore should not be either intrusive or uncomfortable, but again you will have the option to stop and/or withdraw at any point.

If you take part in this research, you will be enhancing the academic knowledge in this important area of study. It is hoped that this research will produce policy advice for UK companies and the Chinese government. This research has not been carried out in this way before and you will have the opportunity to be involved in the widening and deepening of understanding of the drivers of investment decisions and expanding the scope of the academic literature in this area.

Only I will have access to the raw data from this survey. The data will be coded to ensure it is un-attributable, and the codes will again be kept separately from the raw data. Data from the project will be destroyed by December 31st, 2020. All files with data in them will be password protected and stored on university computer systems that are encoded and secured.

The research results may be presented at academic conferences and be reported in academic journals and other publications. An academic poster will also be completed. All research outputs may be published.

The research has been organised by Paul Noon from the Centre for Business in Society a research centre at Coventry University. This project is not externally funded.

This study has been reviewed by Coventry University's Ethics Approval Committee and has been supervised by Professor Glauco De Vita, Professor of International Business Economics from the Centre for Business in Society.

Contact for further information

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Consent request

I have read and understood the participant information sheet for this study. By completing this questionnaire, I am giving consent for you to use my questionnaire answers in this research study. I understand that I have the right to withdraw my questionnaire within 3 months of completing the survey, by contacting the researcher using the details on the participant information sheet and quoting the participant reference code (contained in the invitation email). I have made a note of my participant reference code. *Required*

More info

- Yes
- No

Confirmatory Data

Your Name:

☐ More info

Position in your Company:

☐ More info

Your Company Name:

☐ More info

Company annual turnover:

☐ More info

- £0 - £2 million
- £2 million to £10 million
- £10 million to £50 million
- £50 million to £500 million
- Above £500 million

Number of company employees:

☐ More info

- 1-9 people
- 10-49 people
- 50-250 people
- more than 250 people

Research and development undertaken as a percentage of annual turnover:

More info

- 0-5 %
- 6-10 %
- 10-25 %
- over 25 %

The following questions relate to your company's general investment decisions and not specifically to China.

Drivers of Foreign Direct Investment

What are the reasons your company takes part in Foreign Direct Investment (please read the descriptions and select all that apply)?

- ☐ To gain access or secure a supply of physical resources of some nature (for instance minerals or agricultural production) or a supply of labour
- ☐ To supply goods and/or services to a country or neighbouring countries or to protect a market that may have been developed through exporting
- ☐ To reduce costs and risks by specialisation of parts of your production
- ☐ To secure cost, knowledge or marketing advantages over your main competitors
- ☐ Other

If you selected 'Other', please specify:

Please detail your company's main products and services:

How easy is it for your products and/or services to be copied?

☐ More info

Please don't select more than 1 answer(s) per row.

	Very Easy	Moderate	Very Difficult

Ease of copying your products and services	☐	☐	☐

What type of investments overseas does your company usually undertake? (Please select the most common types of investment for your company)

☐ More info

- ○ Plants or operations carrying out most or all of production and selling
- ○ Plants or operations carrying out specific parts of the production or sales process Plants
- or operations supplying into a global supply chain
- ○ Other

If you selected 'Other', please specify:

How often does your company make the following types of investments overseas?

	Frequency		
	Never	Sometimes	Regularly
Sales, marketing and distribution of goods and services	○	○	○
Rudimentary production and assembly, services to current clients and intra-firm services	○	○	○
Facilities to manufacture components and or develop services to indigenous companies or clients	○	○	○
Facilities to manufacture complete products and or full-service provision to the indigenous market or neighbouring markets	○		
Research and development facilities and or service development including positioning of some core senior staff	○		

Intellectual Property Rights Considerations

How important is intellectual property rights protection to your business when making choices about the **destination** of your Foreign Direct Investment?

	Importance		
	Not important	Some consideration given	Of major concern
In developed countries (such as USA, Australia and New Zealand)			
In developing countries (such as India, Brazil, Malaysia, Kenya and Saudi Arabia)			
In the least developed countries (such as Angola, Nepal, Tanzania and The Gambia)			

How important is the protection of intellectual property rights dependent on the **types of investment** you make?

	Importance		
	Not important	Some consideration given	Of major concern
Sales, marketing and distribution of goods and services			
Rudimentary production and assembly, services to current clients and intra-firm services			
Facilities to manufacture components and or develop services to indigenous companies or clients			
Facilities to manufacture complete products and or full-service provision to the indigenous market or neighbouring markets			

Research and development facilities and or service development including positioning of some core senior staff			

How important is a country's **intellectual property protection strength** relative to other factors influencing your company's foreign direct investment location decisions?

	Importance			
	Very Important	Equally Important	Less Important	Don't Know
Market Size				
Market Growth				
Financial Incentives				
Access to Infrastructure				
Availability of Human Capital				
Cost of Human Capital				
Corruption/Political Stability				
Cultural Closeness				
Exchange Rate Stability				

The following questions relate to your company's dealings with China.

Your Company's Investments in China

Does your company export to China?

- Yes
- No
- Don't know

Does your company make products or deliver services under licence in China?

- Yes
- No
- Don't know

How would you characterise the social and business culture prevalent in China within your industry?

- Similar to what you might find in the UK
- Different to what you might find in the UK
- Very different to the UK

Does your company have a Chinese Subsidiary?

Does your company have a subsidiary in China (with at least 10% ownership)?

- ○ Yes
- ○ No
- ○ Don't know

More about you company's Investments in China.

What is the structure of your investments in China?

	Yes	No	Don't know
Do you have a subsidiary as a joint venture with a Chinese company?			
Do you have a subsidiary in China that is a Wholly Owned Foreign Entity (WFOE) or a partnership with another foreign company?			

How many subsidiaries do you have in China?

- 1
- 2-5
- 6-10
- 10-49
- 50+

What type of investments do you have in China? (please select all that apply)

- Sales, marketing and distribution of goods and services
- Rudimentary production and assembly, services to current clients and intra-firm services
- Facilities to manufacture components and or develop services to indigenous companies or clients
- Facilities to manufacture complete products and or full-service provision to the indigenous market or neighbouring markets
- Research and development facilities and or service development including positioning of some core senior staff

What type of Research and Development do you undertake in China?

- R&D that is reliant on knowledge held in your home market or other part of the world
- Standalone R&D of products and services
- No R&D in China

Perceptions of Chinese Intellectual Property Rights

How would you describe intellectual property rights protection in China?

- Very Poor
- Acceptable for non-business critical items
- Acceptable for general items
- Good in some areas
- Acceptable for business critical items

How do Chinese intellectual property rights impact the investment decisions made by your company when investing in China?

Has your company filed for the following in China?

	Amount of Filings			
	Never	1-5 times	More than 6 times	I don't know
Patents				
Trademarks				
Copyrights				

Are intellectual property rights in China too weak to set up a joint venture with a Chinese partner?

- Yes
- No
- Don't know

Are intellectual property rights in China too weak to transfer the newest or most effective technology to a wholly owned subsidiary in China?

- Yes
- No
- Don't know

Are Chinese intellectual property rights too weak to license the newest or most effective technology to a company in China?

- Yes
- No
- Don't know

Can China's intellectual property laws protect the technology of your company?

- Yes
- No
- Don't Know

Are there adequate legal structures in China to protect your intellectual property?

- Yes
- No
- Don't Know

Do the relevant agencies in China effectively enforce the intellectual property laws and provide prompt and equitable treatment of foreign firms?

- Yes
- No
- Don't Know

Have your company's products or services been copied or imitated in China? *Optional*

- Yes
- No
- Don't Know

Was this product or service protected in China by

- Patent
- Trademark
- Copyright
- Another form of Intellectual Property protection
- Don't Know

Email for follow-up

A small number of participants may be approached for a subsequent interview as interesting case examples. Please enter an email contact address below:

Please click through to complete the survey

Thank you

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Appendix 5

Ethical Approval

Certificate of Ethical Approval

Applicant

Paul

Project

How does the perception of Intellectual Property Rights protection in China influence the Foreign Direct Investment decisions of UK Multi-National

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Low Risk

Date of 06 July

Project Reference P5333

Appendix 6

Various Tables of Survey Data

Additional Tables 1 Companies Surveyed By Company Type and Sector and Invested in China by Sector

	Shortened SIC																		
	Agriculture, Forestry and Fishing	Mining and Quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Water supply, sewerage, waste management and remediation activities	Construction	Wholesale and retail trade; repair of motor vehicles and motorcycles	Transportation and storage	Accomodation and food service activities	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical services	Administration and support service activities	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities	**Total**
Mainly Manufacturing Products	1	2	27	0	1	0	5	0	0	1	2	0	11	3	0	0	0	2	**55**
Mainly Delivering Services	0	2	1	2	1	1	4	7	1	18	18	2	20	14	1	1	3	2	**98**
Both Manufacturing Products and Delivering Services	2	0	10	0	1	0	7	3	0	8	3	0	7	8	1	0	0	2	**52**
Total	**3**	**4**	**38**	**2**	**3**	**1**	**16**	**10**	**1**	**27**	**23**	**2**	**38**	**25**	**2**	**1**	**3**	**6**	**205**

	Agriculture, Forestry and Fishing	Mining and Quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Water supply, sewerage, waste management and remediation activities	Construction	Wholesale and retail trade; repair of motor vehicles and motorcycles	Transportation and storage	Accomodation and food service activities	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical services	Administration and support service activities	Public administration and defence; compulsory social security	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities
Yes	2	1	21	0	1	0	4	4	0	7	5	0	10	9	0	0	0	0	5
No	1	3	17	2	2	1	9	6	1	20	17	2	26	16	0	2	1	3	1
Don't know	0	0	0	0	0	0	3	0	0	0	1	0	2	0	0	0	0	0	0
Total	**3**	**4**	**38**	**2**	**3**	**1**	**16**	**10**	**1**	**27**	**23**	**2**	**38**	**25**	**0**	**2**	**1**	**3**	**6**

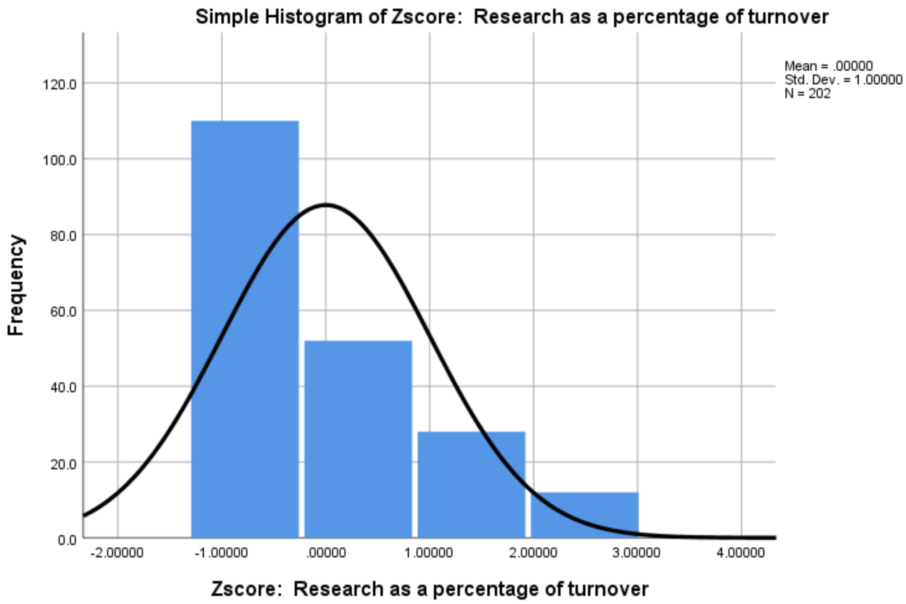
Additional Tables 2 Importance of FDI Drivers by Sector

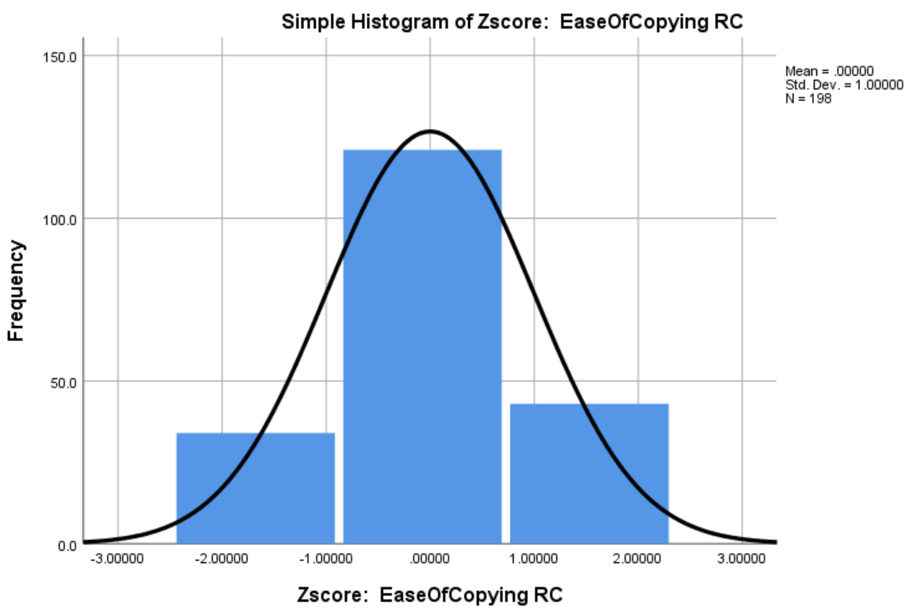
	Agriculture, Forestry and Fishing	Mining and Quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Water supply, sewerage, waste management and remediation activities	Construction	Wholesale and retail trade; repair of motor vehicles and motorcycles	Transportation and storage	Accomodation and food service activities
Zscore: Market Size RC	0.80527	0.29027	0.01380	-0.01873	0.39327	-1.25472	-0.09598	0.25594	-0.01873
Zscore: Market Growth RC	0.85194	0.33143	0.01912	1.26835	0.85194	-1.23011	-0.05896	0.15792	0.01912
Zscore: Financial Incentives RC	0.14492	0.25723	0.34912	0.59417	0.14492	1.94191	-0.12463	-0.30433	0.59417
Zscore: Access to Infrastructues RC	0.38661	-0.27922	0.16467	-0.27922	-0.50117	-0.94506	-0.36245	-0.18410	0.38661
Zscore: Availability of human capital	0.56619	0.15964	0.19352	-1.06001	-0.45018	-1.06001	-0.60264	0.00718	0.15964
Zscore: Cost of human capital RC	1.19031	0.34773	0.17219	-0.91614	-0.28420		-0.57911	-0.12622	0.34773
Zscore: Corruption/Political Stability RC	0.63877	-0.15404	0.07719	-1.34326	0.44057	-1.34326	-0.22837	-0.15404	-0.15404
Zscore: Cultural Closeness/Similarity RC	-0.05460	-0.59205	0.11739	-0.26958	-0.91452	-0.91452	-0.18896	0.37536	0.37536
Zscore: Exchange rate stability RC	0.94527	-0.18178	0.23147	-0.85801	0.49445		-0.31703	0.04363	0.49445

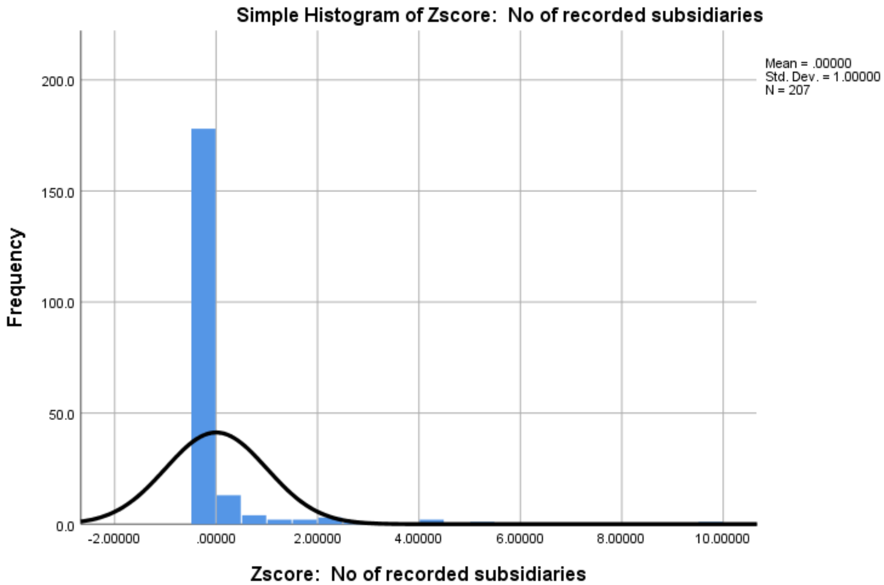
	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical services	Administration and support service activities	Education	Human health and social work activities	Arts, entertainment and recreation	Other service activities
Zscore: Market Size RC	-0.11380	-0.07758	1.21726	-0.19039	0.27791	-0.63672	-1.25472	0.39327	-0.22473
Zscore: Market Growth RC	-0.08082	0.08158	0.64374	-0.15438	-0.03085	-0.60549	-1.23011	0.01912	0.01912
Zscore: Financial Incentives RC	-0.10900	-0.04762	0.59417	-0.11934	-0.13586	-0.75358	-0.75358	0.59417	-0.30433
Zscore: Access to Infrastructues RC	0.08396	-0.24418	-0.27922	0.19078	0.05370	-0.94506	-0.94506	0.38661	0.16467
Zscore: Availability of human capital	0.15964	-0.42114	-1.06001	0.15964	0.15964	-0.45018	-1.06001	0.97274	0.15964
Zscore: Cost of human capital RC	-0.12622	-0.22101	-0.91614	0.20730	0.08443	-0.91614	-0.91614	0.76902	0.13709
Zscore: Corruption/Political Stability RC	-0.10648	-0.21067	1.03518	0.17629	0.09371	-0.15404	-0.15404	0.24236	0.24236
Zscore: Cultural Closeness/Similarity RC	-0.12937	0.25252	-0.26958	-0.14059	0.10664	-0.26958	0.37536	0.80532	-0.05460
Zscore: Exchange rate stability RC	-0.38759	0.22396	0.49445	-0.07932	0.09998	-0.85801	-0.85801	0.94527	-0.40719

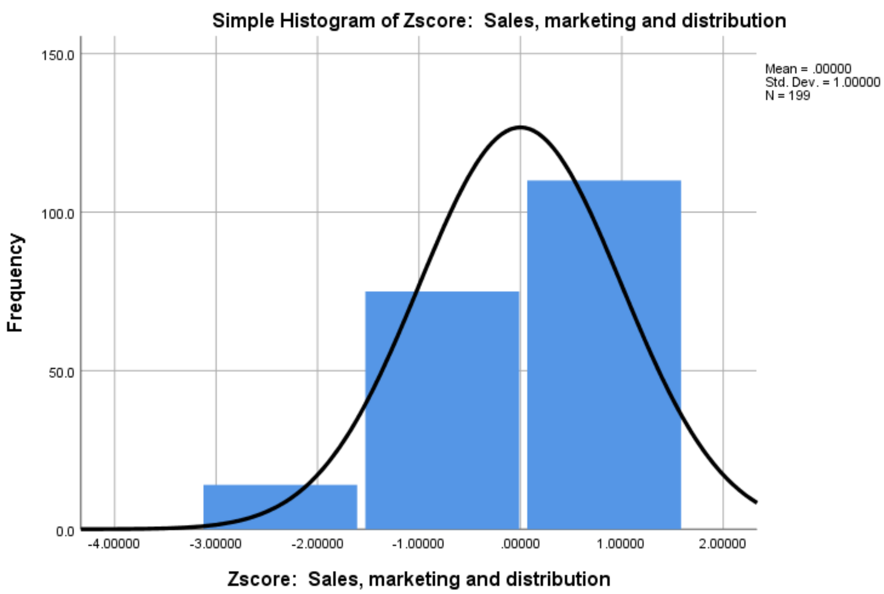
Appendix 7

Various Distributions of Survey Data






Simple Histogram of Zscore: No of recorded subsidiaries
Mean = .00000
Std. Dev. = 1.00000
N = 207
Frequency
200.0
150.0
100.0
50.0
0.0
-2.00000
.00000
2.00000
4.00000
6.00000
8.00000
10.00000
Zscore: No of recorded subsidiaries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Mean = .00000
Std. Dev. = 1.00000
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Frequency
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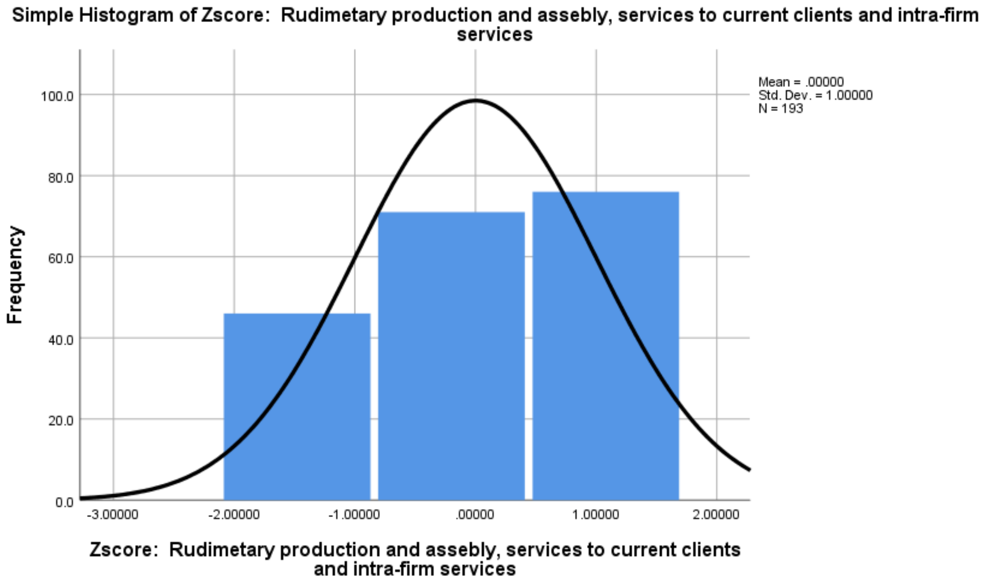
-2.00000
-1.00000
.00000
1.00000
2.00000
Zscore: Sales, marketing and distribution


Simple Histogram of Zscore: Rudimetary production and assebly, services to current clients and intra-firm services
Mean = .00000
Std. Dev. = 1.00000
N = 193
Frequency
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80.0
60.0
40.0
20.0
0.0
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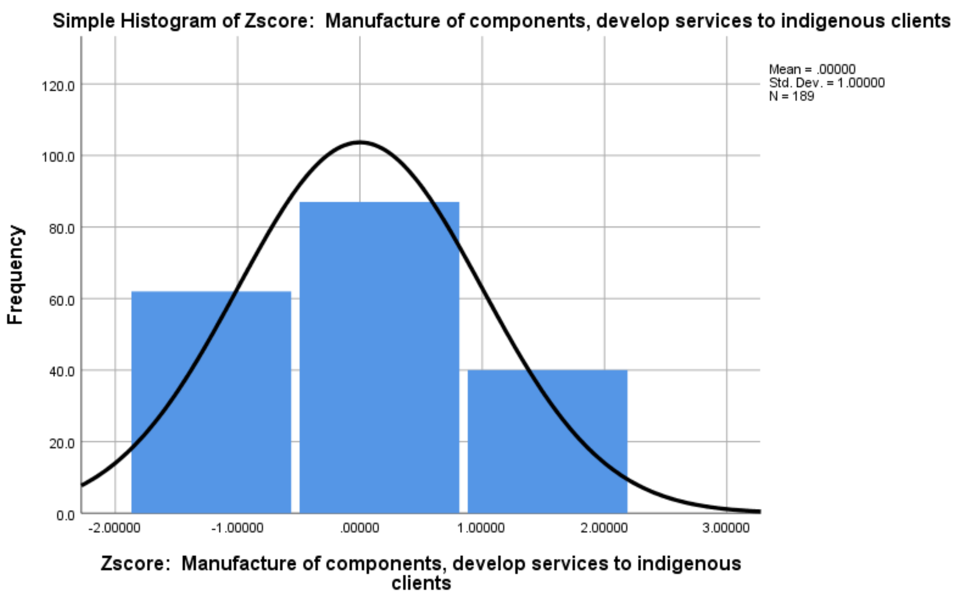
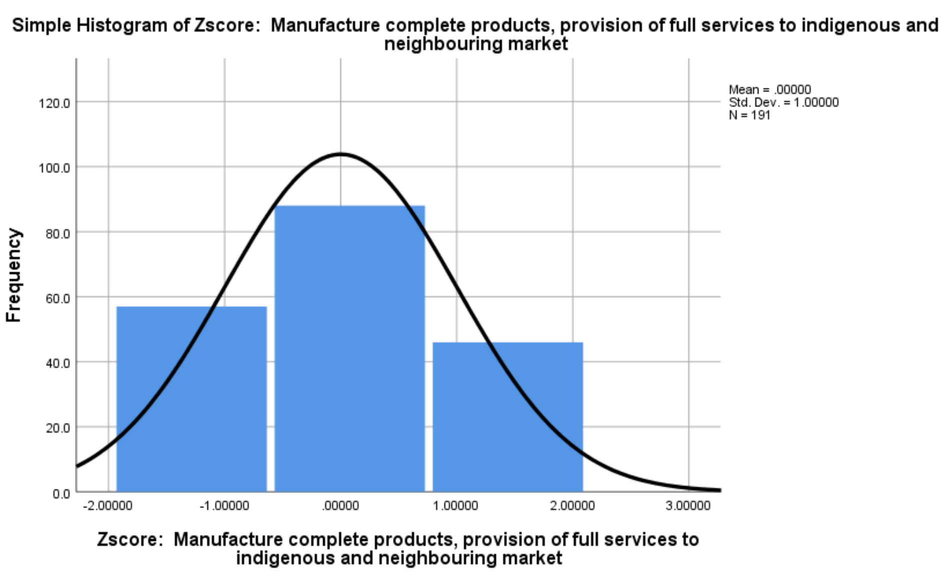
-1.00000
.00000
1.00000
2.00000
Zscore: Rudimetary production and assebly, services to current clients and intra-firm services


Simple Histogram of Zscore: Manufacture of components, develop services to indigenous clients
Mean = .00000
Std. Dev. = 1.00000
N = 189
Frequency
120.0
100.0
80.0
60.0
40.0
20.0
0.0
-2.00000
-1.00000
.00000
1.00000
2.00000
3.00000
Zscore: Manufacture of components, develop services to indigenous clients


Simple Histogram of Zscore: Manufacture complete products, provision of full services to indigenous and neighbouring market
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Std. Dev. = 1.00000
N = 191
Frequency
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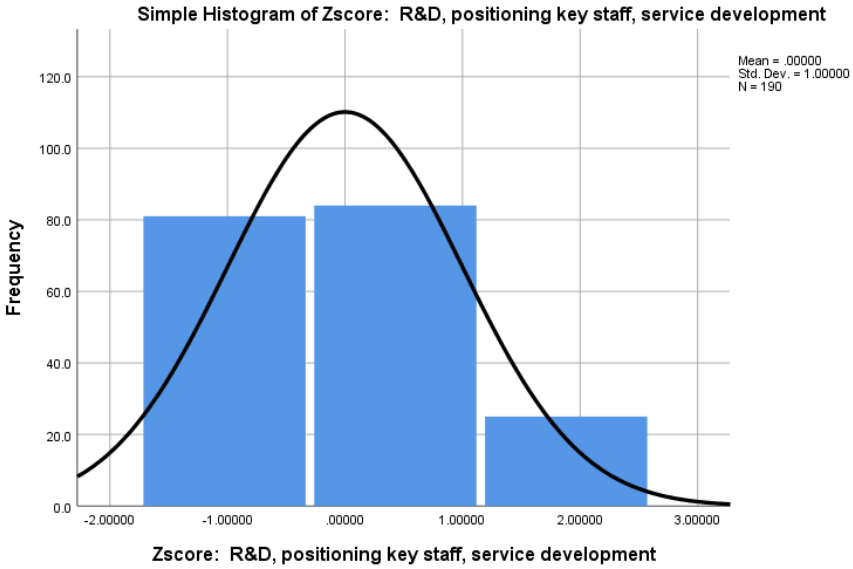
100.0
80.0
60.0
40.0
20.0
0.0
-2.00000
-1.00000
.00000
1.00000
2.00000
3.00000
Zscore: Manufacture complete products, provision of full services to indigenous and neighbouring market


Simple Histogram of Zscore: R&D, positioning key staff, service development
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80.0
60.0
40.0
20.0
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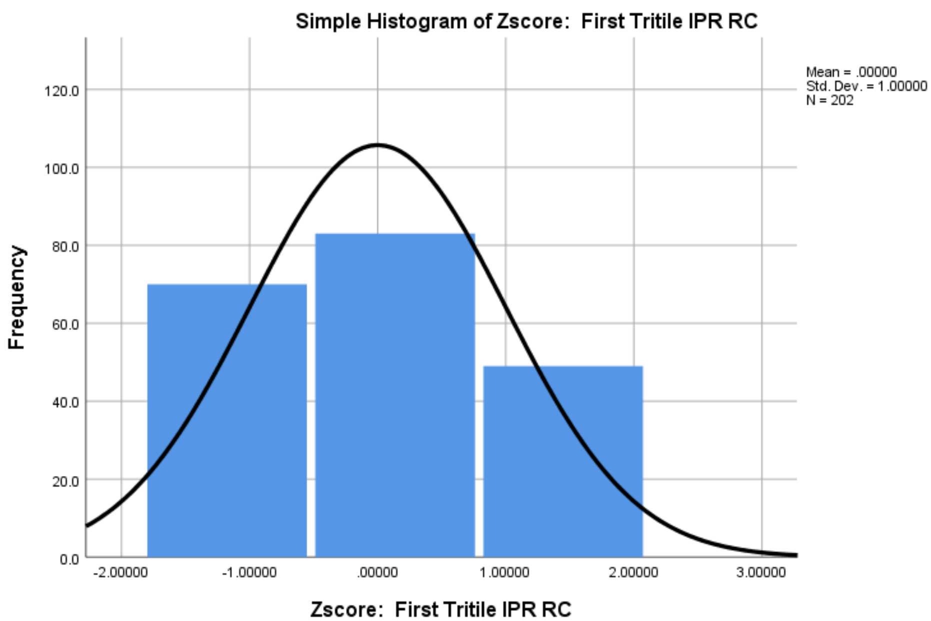
-1.00000
.00000
1.00000
2.00000
3.00000
Zscore: R&D, positioning key staff, service development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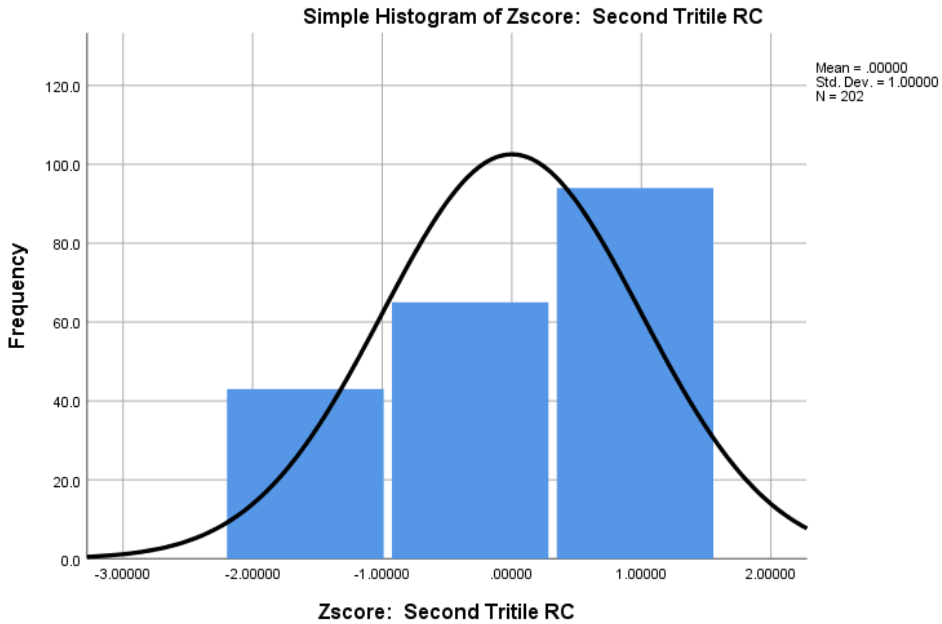
.00000
1.00000
2.00000
3.00000
Zscore: First Tritile IPR RC


Simple Histogram of Zscore: Second Tritile RC
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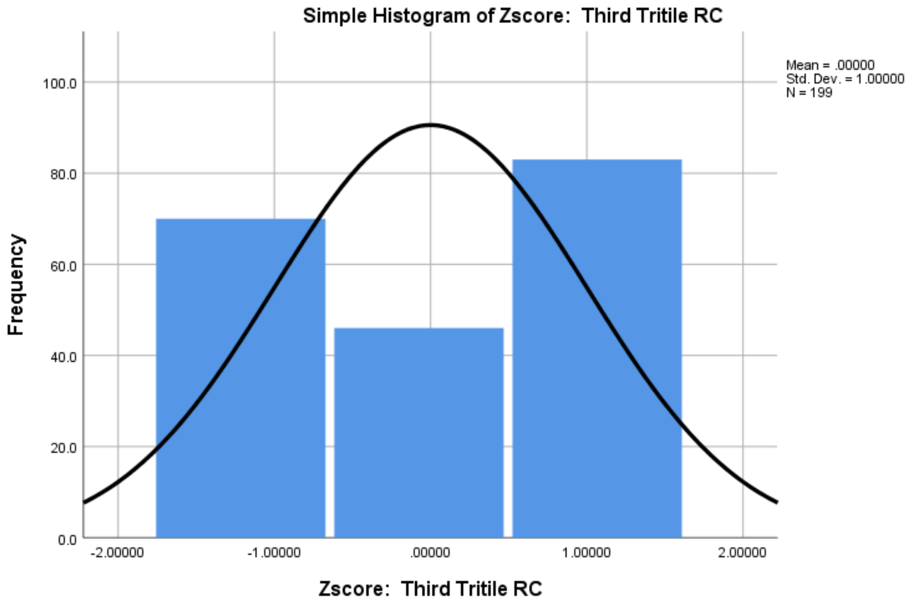
-1.00000
.00000
1.00000
2.00000
Zscore: Second Tritile RC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Frequency
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20.0
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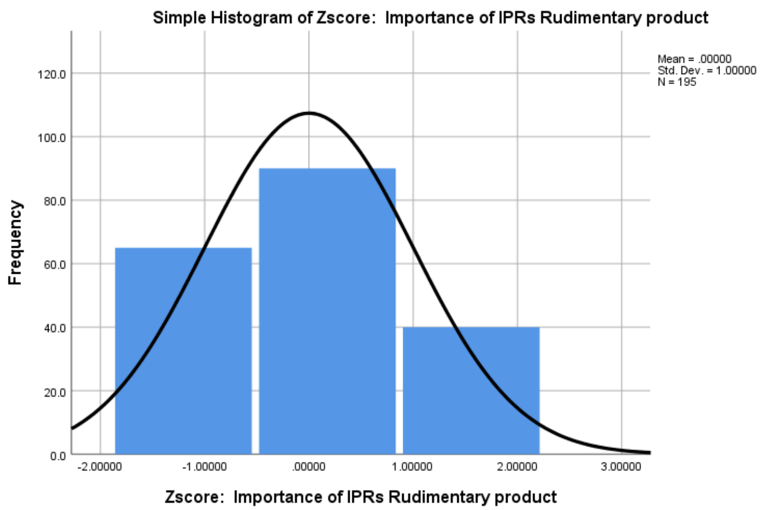
-1.00000
.00000
1.00000
2.00000
Zscore: Third Tritile RC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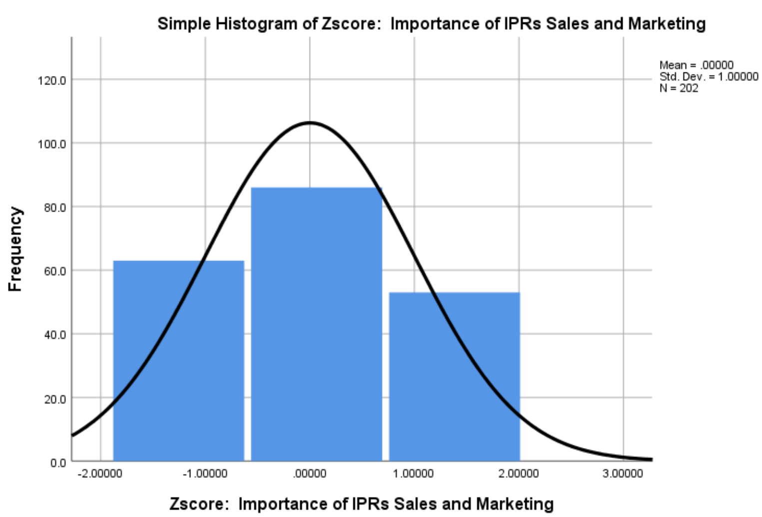
.00000
1.00000
2.00000
3.00000
Zscore: Importance of IPRs Rudimentary product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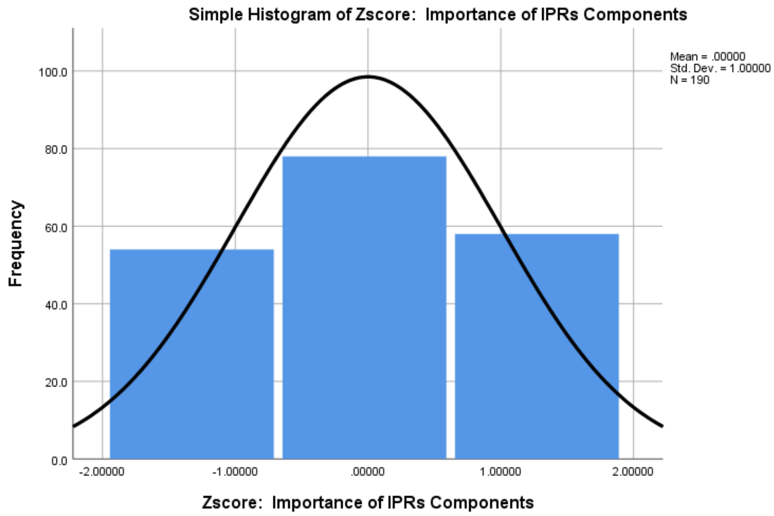
2.00000
3.00000
Zscore: Importance of IPRs Sales and Marketing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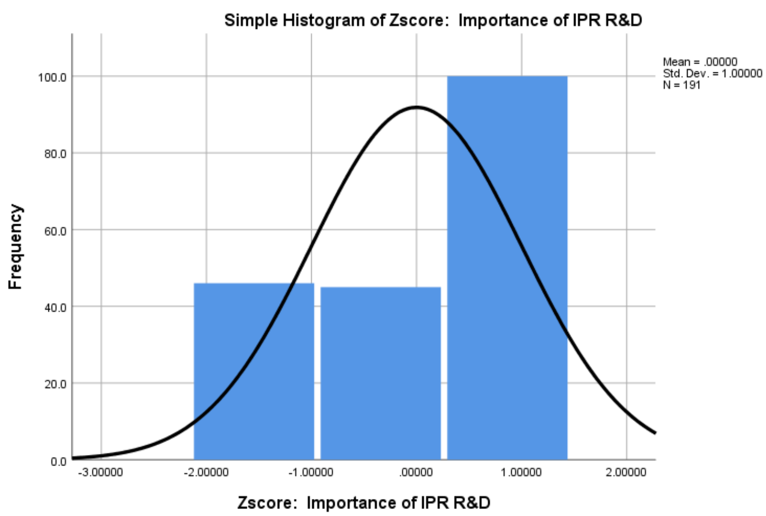
Zscore: Importance of IPRs Components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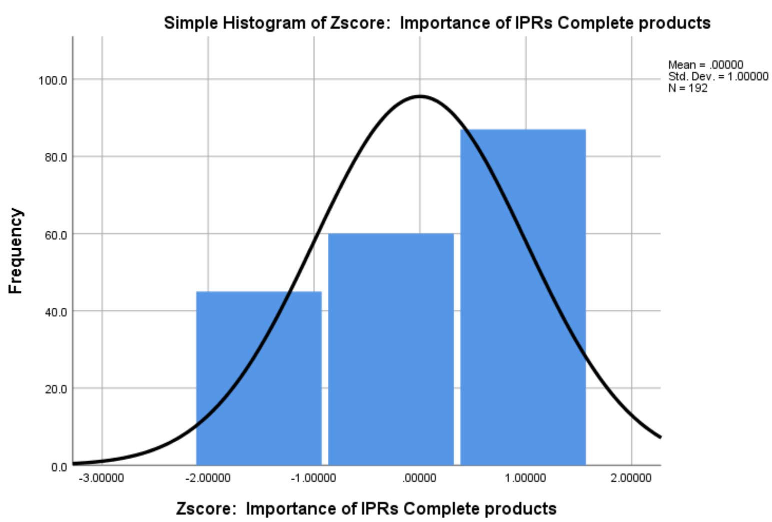
-1.00000
.00000
1.00000
2.00000
Zscore: Importance of IPR R&D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Std. Dev. = 1.00000
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60.0
40.0
20.0
0.0
-3.00000
-2.00000
-1.00000
.00000
1.00000
2.00000
Zscore: Importance of IPRs Complete products

Appendix 8

Interview Consent Form

Consent Statement (Interviews)

How does the perception of Intellectual Property Rights protection in China influence the Foreign Direct Investment (FDI) decisions of UK Multi-National Enterprises?

Participant Reference Code

I have read and understand the attached participant information sheet and by signing below I consent to participate in an interview for this study.

The purpose and nature of the interview has been explained to me and I understand the way in which the research findings for this project will be used.

I am happy for the interview to be digitally recorded and later transcribed.

Any questions about the interview and the wider project have been answered to my satisfaction.

I understand that all confidential and personal details will be recorded and kept separate to the main research findings and that I will remain anonymous in the presentation of research findings.

I understand that I may withdraw my interview up to two weeks after the interview by emailing

Content removed on data protection grounds

Signed:

Print Name:

Researcher's Name:

Researcher's Signature

If you would like a copy of the summary of research findings sent to you, please fill in your email below:

Appendix 9

Qualitative Analysis Procedure

Coding Template and Examples of Participants' Quotes

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Content removed on data protection grounds

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Annexes

Annex 1: Noon, P., De Vita, G., Appleyard, L. (2019) What do we know about the impact of intellectual property rights on the foreign direct investment location (country) choice? A review and research agenda. Journal of Economic Surveys, 33(2), 665-688

Annex 2: The use of new social media tools to survey elite, hard to reach populations: a case study of corporate leaders in UK multinational enterprises.

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WHAT DO WE KNOW ABOUT THE IMPACT OF INTELLECTUAL PROPERTY RIGHTS ON THE FOREIGN DIRECT INVESTMENT LOCATION (COUNTRY) CHOICE? A REVIEW AND RESEARCH AGENDA

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Abstract. Despite a longstanding debate, at both a theoretical and empirical level, research on the relationship between foreign direct investment (FDI) and intellectual property rights (IPRs) remains scant and ambiguous. As a result, the link between IPR strength and multinational enterprises' (MNEs) propensity to invest is unproven and seemingly dependent on a number of factors. We critically review the theory and evidence of the influence of IPRs on FDI and MNEs' investment location (country) decisions both to 'take stock' of existing knowledge of this relationship and, by identifying gaps in, and shortcomings of prior work, develop a fruitful research agenda. We find that existing empirical work on the IPR–FDI nexus, though skewed in favour of a positive relationship between IPR protection and FDI, is fragmented, inconclusive and unable to square the conflicting theoretical predictions on how the strength of IPRs can affect MNEs' FDI location decisions. Several issues and challenges are highlighted to explain the difficulties of the collective body of past empirical work to provide a definite answer to the question of the impact of IPRs on FDI, from which valuable recommendations are proposed to guide future applied research.

Keywords. Critical literature review; Foreign direct investment; Intellectual property rights; Investment location choice; Multinational enterprises

Annex 2

The use of new social media tools to survey elite populations: a case study of corporate leaders in UK multinational enterprises.

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Abstract

Attracting and persuading elite populations to complete survey questionnaires has become increasingly difficult for researchers resulting in concerns with sampling, non-coverage, non-response and measurement errors. Motivational techniques used in mail-surveys have not yet been implemented effectively in web-surveys. However, using new social media tools, such as LinkedIn, coupled with the Tailored Design Methodology to attract and persuade potential respondents may overcome some of these challenges.

Using LinkedIn, we were able to secure 466 participants resulting in a forty-three percent response rate, totalling 207 respondents, of C-Suite executives of UK multinational enterprises. This case study advances the understanding of research design methodology, validating the Tailored Design Methodology within the context of participant attraction and persuasion using social media. It develops a practical model to exploit the benefits of social media and therefore offers new opportunities for researchers to build meaningful populations of survey respondents.

Keywords

LinkedIn, social media, Tailored Design Method, elites, survey

Purpose

This paper reports on the use of LinkedIn to target elite, executives to participate in an online survey. In doing so, it seeks to validate and develop the Tailored (previously Total) Design Method (TDM) created by Don Dillman (1991, 2000) and enhanced in Dillman *et al*. (2016) to increase the response rate of survey participants adapted to the context of new social media tools. The goal is to provide researchers with new techniques to locate elite groups of respondents and to persuade them to participate in surveys, broadening the scope of organisational research and maintaining the validity of the survey instrument.

This paper considers these issues through a brief review of the relevant literature, followed by a discussion of the methodological approach used to attract senior UK executives to undertake a survey related to international business and intellectual property rights. The remainder of the paper describes the results of using this methodology, followed by a discussion of the opportunities this new method of participation attraction offers and of valuable extensions for further research.

The methodological framework and data for this paper are taken from a survey of senior executives of UK multinational companies into the effects of Chinese intellectual property rights on the investment decisions for their companies: carried out between November 2017 and May 2018.

Background

The survey instrument remains an important tool for researchers to gather data from individuals in sufficient quantities to be able to draw generalisable inferences with a level of statistical confidence based on probability theory (Miller, 2017; Stern *et al*., 2014). While there is much academic discussion on designing surveys to increase response rates (e.g. Mellahi and Harris, 2016; Goyder and Leiper, 1985; Groves, 1987), this has yet to be set in the context of using social media as a tool for the identification and attraction of participants directly (Couper, 2000). There is, of course, a body of knowledge emerging about the use of social media to advertise for participants or to gather participants through the use of interest groups, but little evidence of direct targeting of individuals using these new tools (Sikkens *et al*., 2017; Stern *et al*., 2014; Brickman Bhutta, 2012).

Dillman's (1991, 2000) 'Tailored Design Method' crystalises learning from a number of studies into a single model that supports 'best practice' in the field of surveys (Mellahi and Harris, 2016) and remains the basis of many academic survey construction and applications.

The TDM uses social exchange theory[62] to guide the integration of specific methods to increase response rates. Thus in designing and application of a survey instrument, the researcher should seek to reduce the costs of completion (e.g. make the instrument shorter or easier to complete), increase the rewards (e.g. make the instrument interesting or attach other incentives) and increase the trust between the researcher and respondent (e.g. by university sponsorship).

However, as Couper (2000. p. 473) states:

> *tried and tested motivating tools used in mail surveys (e.g., advance letters, personalized signatures, letterhead, incentives, etc.) cannot be implemented in the same way in Web surveys, and functional equivalents are yet to be developed and tested.*

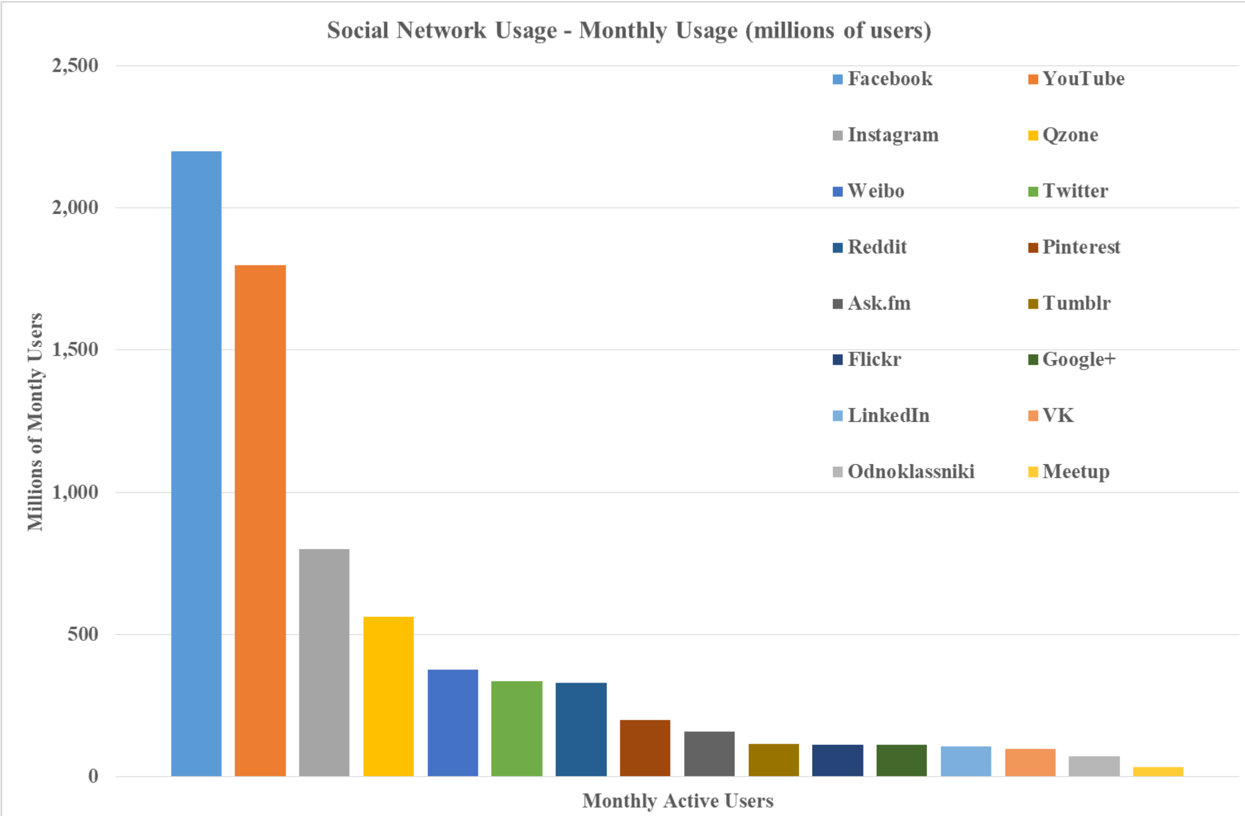
Many of the studies into survey methodologies (e.g. Dillman, 1991; Groves *et al*., 1992; Herelein and Baumgatner, 1978; Fox *et al*., 1988) concentrate on surveys delivered by mail. However, with the introduction of the internet, web-based surveys has become a tool of choice for many researchers (Couper, 2000; Manfreda *et al*., 2008). Much literature concentrates on issues of non-response (e.g. Sheehan and Hoy, 1999; Yun and Trumbo, 2000) as response rates for web-based surveys vary from as high as 70 per cent (Brennan and Hoek, 1992) to as low as 0 per cent (Pradhan, 1999). Falconer and Hodgett, 1999 highlighted the organisational constraints or unwillingness to release data as a significant reason for executives being reluctant to participate in surveys. Cycyota and Harrison, 2006, in an analysis of 231 studies that targeted executives in

[62] Social Exchange Theory suggests that people are most likely to respond to a stimulus if they perceive the benefits to outweigh the perceived costs. Homans, (1958).

top-ranked journals between 1992 and 2003 found an average response rate of 34 percent (SD = 17 percent) with a median of 32 percent and interquartile range of 20-46 percent. They further found that response rates are falling predicting average response rates to fall to 27 percent by 2010 and four percent by 2050. However, they identified that topical salience and consent pre-screening (Dillman, 1978), and engaging in executives' social networks as effective methods to improve response rates. Maintaining an acceptable response rate to survey instruments without impacting on the utility of new modes of surveying or introducing unacceptable bias is a challenge faced by researchers globally. In the following sections, we identify new modalities that can support the attraction and persuasion of executives to participate in research and through a case study develop engagement techniques to be used by researchers.

Social media networks have emerged as one of the most prolifically used services on the internet. According to Perrin (2015), nearly two-thirds of American adults use social networking sites, and use continues to grow. The growth in high-speed internet connections led to the creation of networking sites like Myspace (2003), Facebook (2004) and LinkedIn (2003). Figure 1 shows the monthly usage (March, 2018) of the top 16 global social media platforms demonstrating the enormous reach these services have now achieved.

Figure 1: Social Media by monthly usage (March 2018)



Source: https://www.dreamgrow.com/top-15-most-popular-social-networking-sites/

Social networking sites allow users to connect by creating profiles and inviting colleagues and friends to have access to this information. Messages, articles, pictures and other media can be shared across these sites with individuals or groups of participants. Brand communities and communities of interest are also created within these networks (Muniz and O'Guinn, 2001; Wellman and Haythornthwaite, 2008). Given that survey research is a social interaction between the researcher and the respondent (Murphy and Salomone, 2013) and supporting the findings of Cycyota and Harrison, 2006 that accessing executives through social networks supports participation attraction, one would expect social media networks to provide a substantive conduit for researchers.

Case Study: Survey of UK Multinational Companies

In November 2017, the author initiated a survey of senior, board level, representatives of UK Multinational Enterprises (MNEs) on the impact of intellectual property on the investment decisions of their companies. A sample frame of participant companies was drawn from the FAME[63] database, which included company information and some (not complete) contact details. These data were segmented into 19 two-digit SIC[64] code sectors, and a stratified random sample of companies was taken to ensure coverage across all the sectors. Targets for the number of respondents from each sector were set as a ratio to the sector's weight within the total population. Using the contact details retrieved from FAME a total of 2650 emails were sent from a university email address, set out the nature of the research, length of the survey and assurances around the anonymity of the respondent and the company. Twenty-two percent of these emails were rejected immediately by either spam filters or because the address was incorrect. Rejections were also received stating that the person had moved, or that the company no-longer-used this type of communication. Twenty-five companies had become insolvent or closed. In total, only five respondents agreed to participate in the survey as a result of this initial communication.

A further round of communications to 654 companies through online contact forms on the company's website was undertaken; this resulted in an additional three respondents agreeing to participate in the survey.

Both emailing companies directly and communicating through online web forms required someone within the company to represent the researcher, reading the communication then

[63] FAME (**F**inancial **A**nalysis **M**ade **E**asy) is a financial database of public and private global companies. Each record contains the profit and loss account, balance sheet, financial and profitability ratios and financial and profitability trends. It is possible to carry out searches using criteria such as company name or registration number, trade description or SIC codes, number of employees, geographical area (postcode, post town or country) or accounting or financial data such as turnover.

[64] The Standard Industrial Classification (SIC), created by the Office for National Statistics, is used in classifying business establishments and other statistical units by the type of economic activity in which they are engaged..

identifying and pursuing a suitable executive respondent. Elite populations include those with relatively low numbers in the sample frame, groups who are hard to identify, people who do not want to disclose they are members of the population and where the behaviour of the population is difficult to determine (Marpsat and Razafindratsima, 2010). Populations will also be hard to reach if the subject of the survey is obscure or not thought to be salient to the respondent (Bean and Roszkowski, 1995). Furthermore, external distraction, for instance, how busy the potential participant is, will decrease the recipient's ability to interact with the research (Dillman, 2011; Vercruyssen *et al*., 2014). The researcher considered C-Suite executives as being an elite population (Zuckerman, 1972) given they are limited in numbers, hard to approach (having gatekeepers), a high social position (Stephens, 2007) and, have broad job roles so are unlikely to find research of this nature salient. They are also busy, distracted people.

While sending out emails is a relatively convenient, cost-effective (Simsek and Veiga, 2000) and not particularly time-consuming activity; it proved to be ineffective in engaging with respondents (Im and Chee, 2004). This finding confirms research from Sappleton and Laurenço, (2016) who found that in five email surveys carried out in 2014 an average response rate of only 0.24 per cent was achieved.

Faced with the failure of these initial methods to engage with participants, the researcher sought alternative methods to communicate with and attract respondents. Making use of Dillman's (1978; 1991; 2000; 2011) Tailored Design Methodology, insight from Groves *et al*., (1992) and the experience of Gerard (2012), Dusek *et al*., (2015), Miller (2015) and others the researcher chose to explore the use of LinkedIn as a conduit to connect with potential survey participants hoping that a more targeted sampling technique could provide a more feasible approach to identifying and persuading an elite population of C-Suite executives (Watters and Biernacki, 1989; Schmidt, 1997).

The researcher carried out a pilot review of LinkedIn to identify if the sample frame of companies and key respondents at a senior enough level were represented on LinkedIn (Messer and Dillman, 2011; Horrigan, 2009). The researcher assumed that C-Suite executives would have a high level of internet literacy (Converse *et al*., 2008; Shih and Fan, 2008). This review included a search of companies covering each sector accompanied by searches of senior executives using keywords such as "Chief Executive", "Director", "Managing Director", "Vice President", "Founder", "Owner", "Partner", "Counsel" and "International". This activity demonstrated a wide and comprehensive coverage of the sample frame, validating the work of Chiang *et al*., (2013) who found that LinkedIn was 277 percent more effective at generating professional leads than Facebook and Twitter.

LinkedIn builds on the idea postulated by Frigyes Karinthy's (1929) proposition of six degrees of separation; that we are only six steps/people away from any other person via our mutual contacts (Parez, 2013). LinkedIn operates on a system of three degrees of separation/connections. First-degree connections are those people to whom you are already connected. Second-degree connections are those connected to your first-degree connections. LinkedIn allows its users to send connection requests directly to second-degree connections. Third-degree connections are those connected to your second-degree connections and, dependant on the set-up of their accounts, you can either send them invitations to connect, send them an InMail, or you are unable to connect with them until they become a second-degree connection. Those people who fall outside of these three degrees of separation are considered 'Out of Network' and can only be approached through 'InMail' or if you send them a personalised invitation to connect which requires their personal email address.

LinkedIn is a business-focused social network, and user's link their profiles to their company and in many cases include their employment history. This enables the researcher to understand the position of potential respondents and their knowledge and experience on a particular subject.

This supports the selection of potential participants with the relevant experience and expertise to answer research questions (Malhotra and Grover, 1998).

Dillman, (2000) discusses the need to develop trust (de Leeuw, 2005; Claybaugh and Haseman, 2013) with the respondent to encourage participation. The use of the LinkedIn profile offers the researcher an opportunity to communicate information (Hirsch, 1995) about the researcher, the researchers' organisation and the nature of the research, enabling trust development activity. Herbelien and Baumgartner, (1978) detail the need to establish the legitimacy (Bickman, 1974) and authority (Bushman, 1984) of the organisation undertaking the survey and therefore as an initial activity the researcher's LinkedIn profile was reviewed and enhanced. Improving the profile included ensuring the personal elements of the profile were up to date, and the relationship with the university, including a background image of the university, was highlighted (Dillman, 1978). Academic awards and honours were updated, and a new, more professional profile picture selected to enhance the online personal brand (Arruda, 2009) and increase the likelihood of the profile being viewed (Shontell, 2012). An additional comment was added to the profile summary detailing the research being undertaken. Superfluous information was removed from the profile. The improvement of the researcher's LinkedIn profile proved important to the success of the research as there was a marked increase in views of the profile during the research period, reaching over 600 per week at one point compared to a steady-state of less than 30 per week outside of the research period.

Using LinkedIn's search function, target companies taken from the stratified random sample of companies derived from the FAME database were identified. Filters for location (UK) were used to remove employees of the company's foreign subsidiaries (although there were some cases where the decision maker for the UK MNE was resident outside the UK – where this was found to be the case the specific person was contacted directly). Some companies had a different registered company name (as found on the FAME database) to the one used in their public profile on LinkedIn. Crosschecking the website address from FAME enabled the researcher to identify the public profile of the company and to search LinkedIn accordingly.

Once the correct company was identified, a search was undertaken on the keywords refined in the pilot study to identify potential participants. In many cases, multiple potential participants were identified (such as CEO, International Director, General Counsel). Screening based on the potential participant's experience and time in the organisation was used to identify the correct participant (Yun and Trumbo, 2000). Some potential participants were already within two degrees of separation and therefore contactable directly, others were more distant. LinkedIn offers a service called InMail that is available through a paid-for Premium Service or purchased directly from LinkedIn. The InMail service allows a user to send messages to contacts outside of their two or three degrees of separation. The Premium Service also gives the user additional search capabilities including unlimited browsing of people, the ability to have an 'Open Profile' and to see greater details of who has viewed your profile. The researcher, through subscription to a Premium Service, made limited use of InMails, to make contacts but found that this was not successful in making the necessary connections. InMails are identified as such in the user's inbox and may appear to be advertising or give the impression of cold calling. This method of messaging also bypasses the value of a person viewing the LinkedIn profile before connecting and therefore, the user making an active choice to allow the researcher into their network. Despite InMails achieving a zero-response rate in this research, LinkedIn maintains it is a more successful way of making connections than simple connection requests. The additional search services and access to additional information from the Premium Service were, however, valuable tools enabling the researcher to understand the breadth of contact within a sector and the interest shown in connection requests. The ability to thoroughly search a company for the participant and to see greater detail on potential participants was a useful addition to the researcher's effectiveness. The researcher was also able to select an 'Open Profile' which enabled others to view their profile fully and to connect.

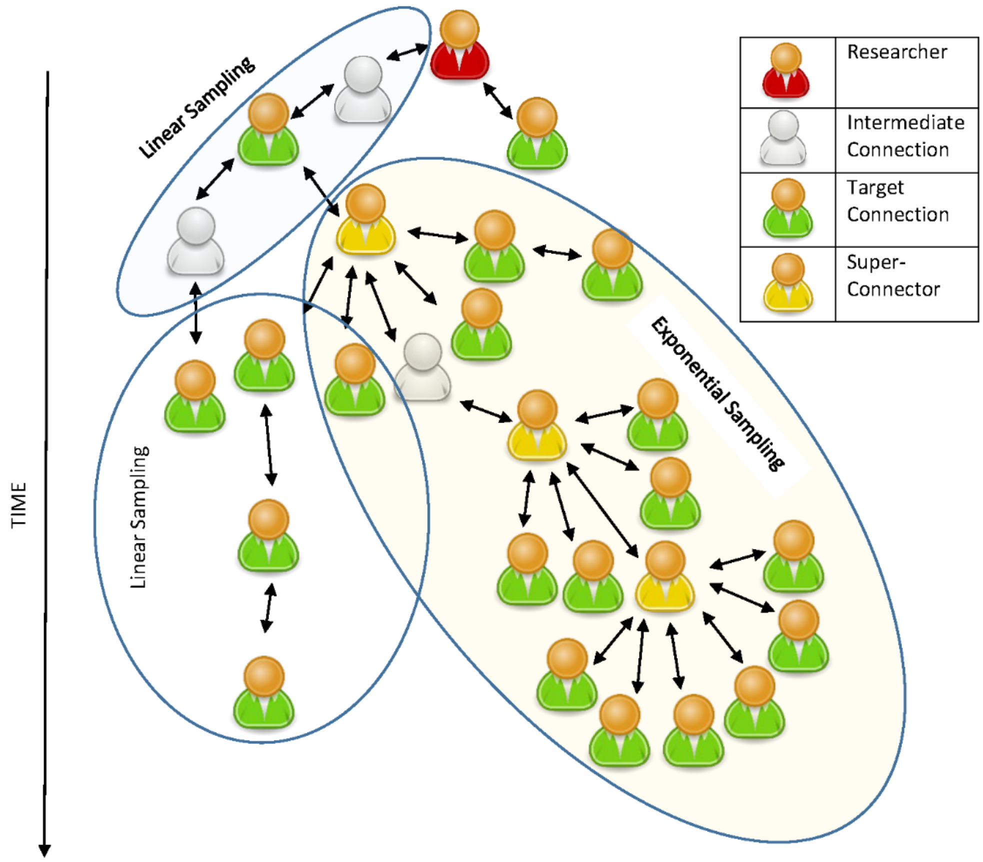
Once the correct company was identified, and the target participant selected an initial invitation to connect was sent through LinkedIn. The initial searches often identified that the target respondents were not within the appropriate degree of separation or had a secured account. In some cases, intermediate connections (McCurdy *et al*., 2004) were identified (senior staff with 'Open Profiles' or within the necessary degree of separation). This population was also sent requests to connect through LinkedIn, and either provided the required connection to the target participant or were able to refer the researcher to a suitable alternative respondent.

Out of those approached, a proportion did connect to the researcher following the request. As these acceptances built over time, degrees of separation within the sector reduced increasing the opportunities to connect within that sector. By going back to those companies where a connection had not been possible additional contacts to potential respondents became available.

The researcher also discovered that within each sector some people had large numbers of connections within the target group. These people could be identified through industry groups, searches for senior experienced practitioners and those making a significant contribution to discussions within the sector. These 'Super-Connectors' were valuable connections as they were able to reduce the researcher's degrees of separation quickly and efficiently. Super-Connectors add significant utility of using social media to connect to potential respondents, opening-up unfamiliar populations. Super-Connectors are the hub-airports of social media.

Through building connections, repeated searches and super-connectors it was possible to connect to suitable respondents across all sectors. Approximately 20 percent of all connection requests were accepted[65]. By the end of this process of connecting, the researcher had added 3252 new 'C' level connections to his LinkedIn profile not only enhancing opportunities to invite contacts to participate in research but creating an audience for the results of the research and useful connections for future business engagements see Figure 2.

Figure 2: Participant attraction using LinkedIn

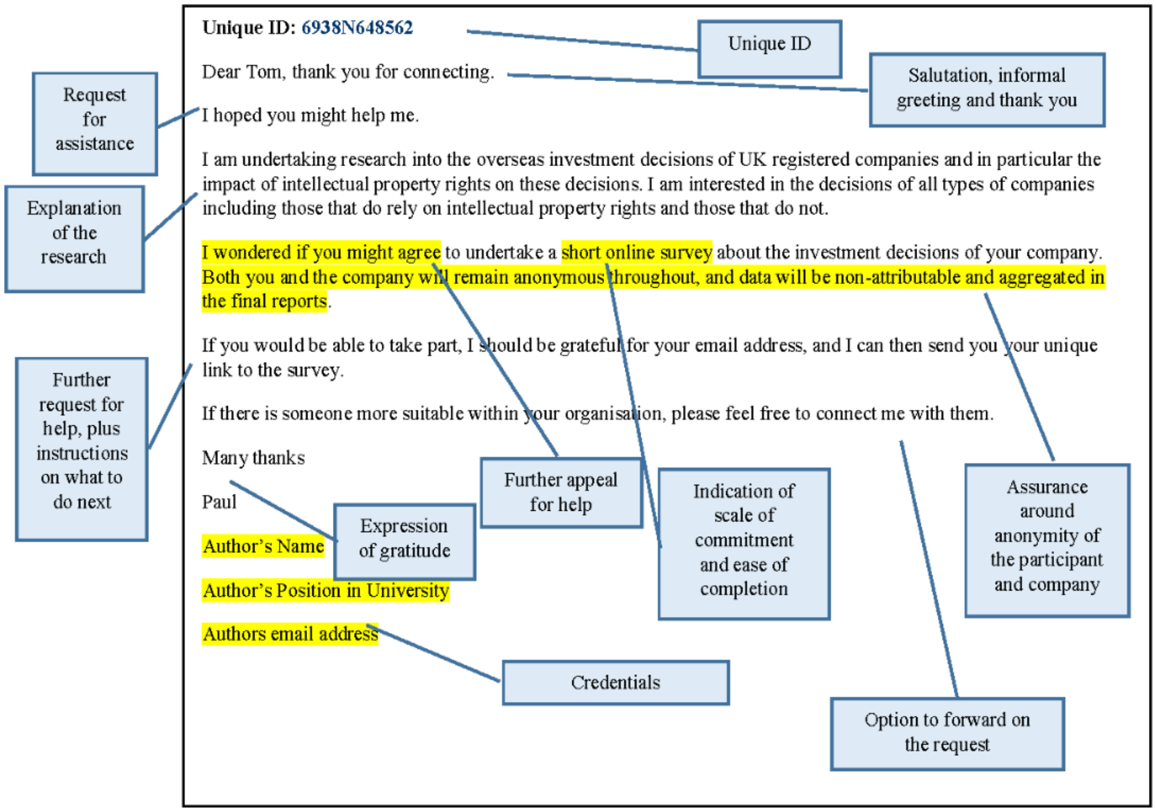


Source: Authors own work.

Once the target respondent connected they were approached through the LinkedIn message service with a request to participate in the survey which served as a pre-notice of the research (Mehta and Sivadas, 1995; Fox *et al*., 1988) (see Figure 3).

[65] LinkedIn cap the number of extant requests to connect to 3000 and if the user wishes to continue inviting they are required to withdraw some of the extant requests. This is a relatively easy process and can be carried out in date order allowing the user to remove the oldest extant requests first.

Figure 3: LinkedIn initial engagement message



Source: Authors own work

The initial engagement message drew heavily on the advice of Dillman's (1991; 2000; 2011) Tailored Design Methodology as the academic authority on participant engagement. However, the researcher was cognisant of the risks that this pre-contact screening agreement (Weiss and Kurland, 1997) could introduce bias into the research through creating a negotiated sample (Dillman, 2000). To reduce the potential bias, the researcher was opaque about the details of the survey (not mentioning China) and asked for participants where the impacts of intellectual property were salient and where they were not. To aid in searching and identification of the company, and to be sure that responses could be linked to the participant, each company was given a unique identifier (*Figure 53*), linked to the participant. This also had the effect of indicating a level validity and professionalism of the approach supporting the authenticity of the request (Heberlein and Baumgartner, 1978).

The message was personalised using the connections' first name (Schaefer and Dillman, 1998) which is available on the person's LinkedIn profile, but drafted to be respectful yet informal acknowledging the status of the potential respondent, their knowledge and expertise and the value placed on their time (Thibaut and Kelley, 1986; Groves *et al*., 1992; Heerwegh *et al*., 2005). A clean, easy to read font was chosen to not deter the potential respondent (Mahon-Haft and Dillman, 2010). The message gave three opportunities to thank the potential participant, demonstrating appreciation for time and effort and showing respect for their position (Blau, 1994; Dillman *et al*., 1974; Emery, 1997). This also demonstrated positive behaviour given it is postulated that people feel obligated to reciprocate (Cialdini *et al*., 1975; Regan, 1971). The message included two direct appeals for help from the potential participant (Homans, 1961; Dovidio, 1984; Mowen and Cialdini, 1980; Yu and Cooper, 1983) thought to be a key driver in achieving engagement. Through explaining the nature of the research, and explaining the type of participant required, the potential participant is encouraged to feel part of a wider group (Slocum *et al.,* 1956; Festinger, 1954) and the salience of the issue is described (Sheehan and McMillan, 1999). Explaining the need for a wide range of participants, including those to whom intellectual property rights are a significant concern and those where this is not the case, the researcher supported an understanding of the research topic and made the research sound interesting and important and reduced the risk of selection bias (Cialdini, 1984; Dillman, 1991, 2000). This also supported social validation of the research and that it was targeted at senior business people (Cialdini, 1984; Groves *et al*., 1992), that their participation was important (Yu and Cooper, 1983) and that opportunities to participate in the research may be limited.

Through the use of clear language and by explaining the survey process the researcher sought to put the potential respondent at ease ensuring they did not feel the survey could cause them embarrassment (Dillman *et al*., 2016). By stating that the survey was short, the letter sought to minimise the perceived burden of participation in the survey (Heberlein and Baumgartner, 1978).

Given the expected concerns around privacy (Manfred *et al*., 2008; Kantor, 1991) of the respondent and the company's confidential information, the message included information regarding the researchers' promises around confidentiality (Johnson and Owens, 2003)[66]. Finally, the university sign off was included to establish trust and the authority of the survey (Cialdini, 1984; Heberlein and Baumgartner, 1978; Emery, 1997)

Following the initial message, sent via LinkedIn, the author received either no response, a rejection of the request, a request for more details on the survey, a referral to a more appropriate respondent or an acceptance to participate in the survey. Given that multiple contacts improve response rates (Smith and Leigh, 1997; Van Mol, 2017), by up to 25 percent (Sheehan and Hoy, 1999), where no response was received a short reminder message was again sent through LinkedIn between two weeks and one month of the original message.

Again the follow-up message drew on the TDM (Dillman, 1991; 2000). However, the researcher was also cognisant of the need to ensure that potential participants targeted through LinkedIn did not feel harassed or pressured. If three LinkedIn members complain about unsolicited invitations from the same

[66] This position was also confirmed in the survey informed consent form, and at each point where potentially confidential business information was requested in the survey (Childers and Skinner, 1996).

person, that person may be placed on probation (Dusek *et al*., 2015). Therefore only one follow-up message was sent to each potential participant.

The follow-up message was short and informal and appealed to the respondent to participate and gave instructions on how to do this. It also served as a prompt of urgency to the potential respondent. The follow-up message was successful in prompting non-respondents with an approximate 20 percent connection rate following this message.

Rejections came in many forms from 'Not Interested, 'Haven't got time' to 'Not relevant to me' or 'my company'. Several respondents said that their organisations did not participate in surveys. Six respondents requested more information about the survey, particularly about how it would be used and confidentiality. These requests were answered promptly and in some cases involved sending a PDF of the survey for their consideration. Three of these potential respondents agreed to participate three did not. Where the initial respondent suggested someone else as a more suitable respondent, a new initial engagement message was sent to the new respondent but with the addition of a line explaining the referral from their colleague. Where an intermediary had referred a colleague, approximately 80 percent of the referred connections agreed to connect to the researcher and 40 percent of these agreed to participate in the survey.

Those who accepted participation were sent an email link to a personalised, multi-platform, version of the survey to complete. The survey was delivered through the Bristol Online Surveys[67] (now Online Surveys), consisted of 16 questions and took around 30 minutes to complete. In total 466 C-suite respondents from 465 companies agreed to undertake the survey. Each participant was sent up to five reminders, through the survey tool, to complete the survey at two-week intervals resulting in 207 responses of which 205, covering 18 of the 19 sectors, were usable (two respondents did not give consent to the survey). A total response rate of 44 percent was achieved see Table 1 for details of the final disposition codes and formula used (AAPOR, 2016). Six respondents asked for reports from the research once it was concluded and three respondents asked for meetings to discuss collaboration outside of the research.

Table 1: Final Disposition Distributions

Final Disposition Code	Description	Outcome
RR	Response Rate	44%
I	Complete Interviews	207
P	Partial Interviews	0
R	Refusal break-off	2
NC	Non-Contact	257

[67] https://www.onlinesurveys.ac.uk/

O	Other	0
UH	Unknown if household /occupied	0
UO	Unknown other	0

Using outcome rates from final disposition distributions using RR1 (the minimum response rate):

$$\mathbf{RR1=}\ \frac{\mathbf{I}}{\mathbf{(I+P) + (R+NC+O) + (UH+UO)}}$$

Source: AAPOR, 2016

See supplementary material for a diagrammatical view of the participant attraction and persuasion process.

Limitations

The use of LinkedIn to approach and persuade participants for this survey was not carried out as an 'experiment' but a practical and pragmatic (Feilzer, 2010) attempt to solve the participation problem. Work to identify and make connections was carried out throughout the survey period; messages were sent as connections were made and follow up messages sent at varying intervals. It was therefore not possible to disaggregate particular actions from others and understand clear cause and effect. Thus full analysis of each action and its impact was not possible.

Conclusion

The use of LinkedIn was central to the success of this research. It proved an effective conduit to target potential participants directly supporting the view of Duffy, (2013) of LinkedIn's utility. It identified a new way to reach top executives and encourage participation, identified as a requirement for further research by Cycyota and Harrison (2006). The work of Dillman, (1991, 2000), Groves, (1987) and others continues to provide a sound practical basis for the creation and administration of surveys, and, importantly still relevant advice for engaging with potential participants. Dovetailing the TDM with new ways of connecting with people through social media directly, therefore provides a new and effective method to attract and persuade executive participants for survey research.

LinkedIn offered many opportunities to enact advice from the literature on participant attraction including making multiple contacts, prior-notifications, building personal and institutional legitimacy, and also addressing social exchange theory practicalities such as reducing costs, increasing rewards and supporting trust with participants. LinkedIn also offered many useful additional tools for the researcher to find (through advanced search functions), contact through linking, screening participants, messaging and InMails. This research identified that companies had online profiles that differed from their registered company names and that it is necessary for the researcher to validate LinkedIn profiles using other sources of information such as websites. The Premium Service provided by LinkedIn provided the researcher with useful tools and, while this is a paid service, was considered valuable in terms of this research. However, InMails did not prove to be an effective way of building a network of participants. The identification of the super-connector was a significant result of this research and supported the success of the participant attraction. These super-connectors enable rapid and efficient entry into an unfamiliar population for the researcher, turbo-charging the ability to connect and influence a group of individuals.

By bringing accepted best practice techniques into the sphere of social media, the researcher was able to attract a significant population of elite, executive respondents, and develop a new method of participant attraction and persuasion to future researchers.

Future extensions of this research that would be valuable in this field would include undertaking experiments with LinkedIn and other social media tools, to understand the key drivers for people connecting, the value of reminder messages, and the importance of the user profile. Understanding why InMails proved to be unsuccessful in attracting participants would be an interesting area for further discovery and if a different approach or methodology is required to make use of this mode of connections. The identification of the super-connector would warrant more in-depth research to understand who these people are and how best a researcher might use this valuable resource. Questions considering their existence in other hard to reach groups or on other social media platforms could open up new opportunities for researchers. Exploring the use of LinkedIn and other social media platforms to survey groups of people such as HR, financial and logistics professionals by refining the keyword search would give significant opportunities for wider research. Finally, while this method of attracting participants was deemed successful by the researcher, an understanding of the scale of the opportunity, this raises would be a fruitful topic of further study along with the population's resilience to further, more constant requests to participate in research, an important variable to quantify.

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