



UHASSELT

KNOWLEDGE IN ACTION

Faculty of Business Economics

Master of Management

Master's thesis

Innovating in countries with weak intellectual property rights

Laura Bourdakis Roldan

Thesis presented in fulfillment of the requirements for the degree of Master of Management, specialization Strategy and Innovation Management

SUPERVISOR :

Prof. dr. Bart LETEN



UHASSELT

KNOWLEDGE IN ACTION

www.uhasselt.be
Universiteit Hasselt
Campus Hasselt:
Martelarenlaan 42 | 3500 Hasselt
Campus Diepenbeek:
Agoralaan Gebouw D | 3590 Diepenbeek

2020
2021



Faculty of Business Economics

Master of Management

Master's thesis

Innovating in countries with weak intellectual property rights

Laura Bourdakis Roldan

Thesis presented in fulfillment of the requirements for the degree of Master of Management, specialization Strategy and Innovation Management

SUPERVISOR :

Prof. dr. Bart LETEN

This master thesis was written during the COVID-19 crisis in 2020-2021. This global health crisis might have had an impact on the (writing) process, the research activities and the research results that are at the basis of this thesis.

Acknowledgement

This master thesis is the final part of my study in Strategy and Innovation management at the university of Hasselt before entering the professional world.

I want to dedicate this thesis to my father Giorgio, for inspiring me to become the person that I am today, and to my mom Sandra for her unconditional love and endless care during my studies.

I want to thank my boyfriend Mikhail for always believing in my capabilities when I was in doubt.

Thank you to my supervisor Prof. Bart Leten for his encouragement and guidance throughout this process.

I also want to thank interviewees for their time and valuable insights.

Executive summary

Emerging countries have become attractive destinations for Multinational Enterprises (MNEs) to internationalize. By locating manufacturing and innovation activities such as research and development (R&D), MNEs can take advantage of opportunities like lower cost for human capital, local expertise, fast-growing markets, and a highly innovative environment. For the MNEs conducting innovative activities, a solid intellectual property (IP) strategy is decisive for the firm's competitiveness as it offers protection for the innovations against competitors in highly innovative markets. A reliable legal system and favorable IP environment is the most essential requirement to protect intellectual property rights (IPRs). However, managers of MNEs that are considering moving innovative activities to offshore locations in emerging markets, seem to have to make a tradeoff between the enjoying the benefits the country had to offer, and not exposing themselves to higher risks for IP leakage and infringement. Prior literature on this topic is rather general, therefore the scope of this research will be narrowed down to China, one of the emerging countries where IPRs are considered relatively weak and the main driver of global growth in IP filings. MNEs' concern for being exposed to higher risks when conducting innovative offshore derives from the fact that the legislative framework for intellectual property rights (IPRs) in China is a relatively young system, and therefore still requires improvements to match the standards of IP protection in developed.

However, MNEs do not have to rely solely on external institutions such as laws and enforcements in courts to protect their IP. Appropriability is endogenous and lays partly in the hands of the internal organization. By implementing alternative strategies other than formal IP protection mechanisms like patents, MNEs can exercise control over the knowledge that is transferred. The strategies identified from prior literature are:

1. Internal linkages.

Splitting R&D activities/projects across locations & high interdependence between each unit. Often combined with international teams to coordinate all the projects.

2. Company policies and employee awareness.

Include non-disclosure agreements and non-compete clauses to limit damage from knowledge leakage due to employee mobility.

3. Involving head quarter personnel.

Assigning head quarter personnel to monitor projects in offshore locations and help identify potential threats of IP leakage earlier and more efficient.

4. Hierarchical segmentation

Splitting knowledge across employees according to their position/role in the project. The purpose is that the valuable knowledge is only held by a small number of employees or fragmented in a way that the damage from leaking one part is limited.

5. Internal controls and knowledge access

Implement access controls for important locations where R&D is conducted, sometimes according to the position or role in the project.

6. Lobbying governmental instances

Actively voice concerns towards the local/national government and other stakeholders to improve IPRs in the host country.

Consequently, the purpose of this thesis is to explore how MNEs implement the above strategies in practice to deal with risks when innovating in countries with weaker IPRs.

Prior research on this topic is scarce, therefore it was decided to conduct exploratory research to confirm and extend the existing literature. To link the secondary data gathered in the literature research to the current IP protection methods that are being implemented in practice by MNEs in China, a qualitative approach with the method of semi structured in-depth interviews was adopted. The interviewees belong to two categories: experts on the topic of IP protection and managers working for MNEs that conduct innovative activities in China.

As this research is exploratory, the most significant findings that emerged from this study are not conclusive results. The collected data allows to structure and test the heretofore known results of previous research in practice. And contributes to the existing literature by revealing new insights that may have been overseen.

First, not all respondents agree with the assumption that China is labelled as a country with weaker IPRs due to the legislative framework and the execution in courts. It was suggested to place the identified risks in a historical context. Similarly, the existing literature does not provide enough recent sources to confirm or deny this assumption. Additionally, the interview insights underwrite the assumption that MNEs innovating in China are exposed to higher risks, partly due to the unusual size of the country and the speed in which innovation happens. This results in bigger changes of getting imitated and a more complex environment where spotting knowledge leakages becomes harder.

Overall, this study underlines that informal strategies to protect IP, are widely used by MNEs. Internal linkages are a strategy implemented by almost all the MNEs that were represented in this research, often in combination with cross-cluster, which is in line with the results from prior research. Involving cross-cluster teams and head quarter personnel in particular seem very favorable strategy among managers as the local teams will therefore be assisted with different expertise and absorb new perspectives on the project.

In practice, both non-compete clauses as non-disclosure agreements are a standard practice. During the interview however a few flaws were pointed out by the managers. First, non-disclosure agreements are as important to be signed by the employees as by clients when in negotiation. Non-compete clauses on the other hand need to be adjusted according to the situation of the employee, considering its position in the company and how industry specific the employee's skills are.

Moreover, interview data proves that having a corporate reputation of being though in IP enforcement is an informal practice that has barely been mentioned in the literature. In practice this manifest in continuous monitoring to detect IP leakages.

Hierarchical segmentation is overall a less favorable strategy as some managers noted that it may isolate employees and harm innovation and efficiency.

The external oriented strategy of lobbying government instances is not a practice that is frequently implemented in practice by the managers interviewed. Interviewees do not seem to be aware that this strategy can be a more effective way to improve the protection of IP in the long run. However, one respondent suggested to also look into a more novel but very important stakeholder: e-commerce giants in China. These platforms can become government like, and it could be beneficial for MNEs selling consumer products to lobby these platforms to improve the rules and online enforcement.

Lastly another strategy was unveiled that helps MNEs protect their IP: lead time/speed to market. This strategy was mentioned very briefly in the literature. The reasoning behind lead time /speed to market is that the IP becomes irrelevant faster, thus not giving imitators or infringers the change to catch up and take advantage of knowledge leakages. For further research purposes the implementation of this informal strategy to protect IP can be explored.

Like all research, this study has some limitations. First, qualitative research relies on the interpretation and judgement of the researcher, and thus is sensitive to bias. Moreover, as the interviewees were not selected according to the years of involvement in the offshore location in China, therefore it was noticed that some managers had limited experience which made it difficult to assess the implementation of some of the strategies in practice. The scope of respondents was limited, and as this research was conducted through semi-structured interviews, and there was only limited interview time per respondent, a larger scope of interviewees would have provided more reliable insights to draw conclusions.

To summarize the finding of this study there are a few suggestions for future research purposes. First, there is not enough supportive recent literature confirming that enforcement of IPRs in China should be a concern for foreign MNEs. Therefore, further investigation is needed to identify if this is still a recent challenge MNEs come across.

Additional research is needed to test if the strategy of lead time contributes to protections mechanisms MNEs implement.

Additionally, the limited prior literature around using external oriented strategies as lobbying of governmental instances can be more substantiated in future research. Accordingly, the possibility of impacting the IPRs environment in China by lobbying other external stakeholders such as e-commerce giants is a possible future research topic.

Contents

- 1. Introduction.....10**
- 2. Theoretical background14**
 - 2.1. *Intellectual Property14*
 - 2.2. *The evolution of Intellectual Property.....16*
 - 2.3. *The Chinese patent system.....17*
 - 2.4. *IPRs concerns for foreign firms in China20*
 - 2.5. *Strategies to protect intellectual property26*
 - 2.5.1 Company policies and employee awareness.....27
 - 2.5.2 Internal linkages28
 - 2.5.3 Involve headquarter personnel32
 - 2.5.4 Hierarchical segmentation33
 - 2.5.5 Internal controls and knowledge access35
 - 2.5.6 Lobbying governmental instances.....36
 - 1.5.8. Configurations to protect IP37
- 3. Research methodology.....40**
 - 3.1. *Introduction.....40*
 - 3.2. *Qualitative approach and data collection.....41*
 - 3.3. *Interview guide.....44*
 - 3.4. *Qualitative data analysis45*
- 4. Results46**
 - 4.1. *The Chinese IP and business environment46*
 - 4.2. *Positioning the MNEs.....48*
 - 4.3. *Risks of innovating in China as a foreign company.....51*
 - 4.4. *Strategies to protect IP55*

4.4.1. Internal linkages	55
4.4.2. Company policies and employee awareness	57
4.4.3. Involve head quarter personnel	60
4.4.4. Hierarchical segmentation	62
4.4.5. Internal controls and knowledge access	64
4.4.6. Lobbying governmental instances.....	65
4.4.7. Other strategies	66
4.4.8. Combination of strategies.....	67
5. Discussion	70
6. Conclusion	74
7. Limitations and future research	76
8. List of tables	78
9. List of figures	78
10. References	80
11. Appendices	84
<i>10.1 Interview guide</i>	<i>84</i>

1. Introduction

Business economic motivation

Emerging countries have become attractive destinations for Multinational Enterprises (MNEs) to internationalize. By locating manufacturing and innovation activities such as research and development (R&D), MNEs can take advantage of opportunities like the lower cost for human capital and local expertise (Zhao, 2006). China, being one of these countries, is full of potential for MNEs to gain additional market share or new rents from their technologies due to being characterized by a large, fast-growing market, investor-friendly policies in special economic and high-tech development zones and an improving quality of human resources and infrastructure (Froese et al., 2019). By looking at the registered patents as an indicator for innovation there is a clear indication that China lives up to this expectation of being a highly innovative country accounting for almost half of the patent filings worldwide (WIPO, 2019). MNEs nowadays know that the intellectual property (IP) strategy is decisive for a firms' competitiveness as it offers protection for the innovations against competitors, especially when carrying out activities in these highly innovative markets (Holgersson, Granstrand, & Bogers, 2018). A solid patent system and favorable IP environment is the most essential requirement to protect intellectual property rights (IPR) (Xie & Zhang, 2015). However, managers of MNEs that are considering moving innovative activities to offshore locations like China, seem to have to make a tradeoff between the benefits of enjoying low-cost labor and local expertise, and not exposing themselves to higher risks for IP leakage and infringement. The concern for being exposed to higher risks when conducting innovative activities in emerging countries like China derives from the fact that the legislative framework for intellectual property rights (IPRs) is a relatively young system, and therefore still requires improvements to match the standards of IP protection in developed countries (Huang et al., 2013). However, as MNEs are a geographically distributed network (Zhao, 2006) they have the ability to organize large-scale R&D projects in different locations (Zhao, 2004), they have the opportunity to influence the exposure to risks as IP leakages by adapting their internal structures and strategies. Therefore MNEs do not have to rely solely on external institutions such as laws and enforcements in courts (Quan & Chesbrough, 2010). The purpose of this thesis is to explore the possible strategies MNEs can implement internally to deal with risks when innovating in countries with weaker IPRs. Subsequently helping MNEs to facilitate the tradeoff that needs to be made when they consider exploiting the opportunities these countries have to offer.

Academic motivation

There is not a lot of literature available specifically studying the alternative protection mechanisms that can be implemented to protect IP in countries with weaker IPRs. Nevertheless, few studies were identified that point out the most common practices implemented by MNEs innovating in countries with weak IPRs. The study from Srikanth et al. (2020) is used as a guideline, because their research resembles this research the most as a similar approach for data collection is implemented. Srikanth et al. (2020) notes that prior work on this topic has mainly focused on how to influence employee's motivation to responsibly handle valuable knowledge, often neglecting the organizational practices that can be implemented to influence the nature of the knowledge itself to make it less leaky and thus increase protection. Additionally, the available literature implements mainly the analysis of patent data, which may leave certain practices that cannot be picked up by this data collection approach, unnoticed. Nearly all the studies focus on one or two particular strategies, as to this research, which is inspired by Srikanth et al. (2020), will give a recapitulation of the heretofore known practices identified in priori research.

Problem statement

Even though many Western companies are estimating to launch part of their R&D activities offshore to enjoy the benefits of local talents and low-cost R&D, they hold back as they are aware of the poor institutional environment in emerging countries regarding IP protection (Zhao, 2006). China is labeled an emerging country with weak IPRs (Huang et al., 2013). And according to Zhao (2006) this means that localizing innovative activities is accompanied by more significant risks compared to countries with developed IP systems. It is not uncommon that MNEs experience unwanted spillovers to local competitors when active in these offshore locations. For example, local competitors may imitate products and processes introduced by foreign firms (Berry, 2017; Zhao, 2006). For MNEs to be able to exploit these opportunities, it is almost inevitable to not transfer knowledge to these offshore projects in the process (Berry, 2017; Zhao, 2006). In some industries and environments, simply using formal IP protection mechanisms such as patenting does not provide enough protection against knowledge leakage and misappropriation (Srikanth et al., 2020). Ideally the advantages derived from setting up part of the innovation process in these countries with weak IPRs weigh out the risks. This can be done if the standard IP protection procedures, like filing patents, are combined with alternative protection mechanisms (Zhao, 2006). Mapping the potential strategies MNEs can implement to protect their IP against risks from the external environment, is crucial for firms innovating in countries where formal IP protection mechanisms do not provide enough protection (Srikanth et al., 2020; Zhao, 2006). This problem has been studied by only a handful of researchers who identified the most common used strategies MNEs can implement. Therefore, the aim of this thesis is to explore and bring structure to the already identified strategies. To narrow down the scope of the research the focus will lay solely on the Chinese business environment because it is the main driver of global growth in IP filings.

Main research questions

- What challenges do Multinational Enterprises (MNEs) encounter when setting up (part) of their processes in China?
- Which IP protection strategies are MNEs implementing to protect their IP China?

Sub research questions

The sub question is developed to understand which configurations of strategies are made by MNEs innovating in China, more specifically if they are rather a modular strategy, or focused on high interdependence between locations and broad information transfer (Srikanth et al.,2020).

- Are IP protection strategies combined? If so, what combinations are made?

Contribution

This thesis seeks to contribute to the field of international business management and innovation management. It can serve as guidance for managers in MNEs already innovating or planning on starting innovative activities in countries that may be considered high risks for IP leakage. The research is focused on giving more structure to the strategies that are already identified in the literature. Additionally, this thesis aims to explore how these strategies are applied in practice.

Approach

This thesis consists of 7 chapters including this introduction. Chapter two, the theoretical background, describes the notion and evolution of IP followed by an outline of the Chinese IP environment. Furthermore, the literature research points out the challenges foreign MNEs encounter when innovating in China and proceeds to explore the heretofore known strategies to avoid or limit these risks. Chapter three describes the research methodology and introduces the interview guide and respondents. Chapter 4 presents the results according to each strategy that was identified in the literature review. Chapter 5, the discussion, elaborates on the results and links them to the literature to draw conclusions, again it will be analyzed per strategy. Chapter 6 concludes the findings of this study and emphasizes the contribution of this research. Chapter 7 will present what the limitations for this research and suggestions for future research directions.

2. Theoretical background

2.1. Intellectual Property

Innovation can be described as a process that transforms new ideas and knowledge into new products and services and is one of the most characteristic features of the economy we know today (Baran & Zhumabaeva, 2018). As Baran and Zhumabaeva (2018) and Rogers (1998) mentioned in their research, Schumpeter classified innovation in 5 categories: the application of a new method of production or sales, opening a new market, acquiring new sources of supply or developing a new industry structure. The term innovation is equal to change and is present in new products, technologies, services or unconventional management methods (Baran & Zhumabaeva, 2018). What distinguishes innovation from invention is that innovation refers to the practice of creating a new or building upon an existing product, service, or process to make a significant improvement. Very specifically aiming towards a solution that has market potential and therefore creates added value for the firm or its customers (Rogers, 1998).

According to Granstrand and Holgersson (2015) and Bogers, Bekkers, and Granstrand (2012) one of the central parts of this innovation process is Intellectual property (IP), IP is the outcome of innovations in the industrial, scientific, literary and artistic field. IP can be considered as a form of business asset or property such as machinery or real estate. IP shares characteristics of a business's tangible properties such as the ability of being sold, bought, and exchanged. What mainly distinguishes IP from other assets is its intangibility (Bogers et al., 2012; Granstrand & Holgersson, 2015). To give recognition and protect the creators of IP they can be granted certain rights to control the usage of their knowledge and creation: intellectual property rights (IPRs) (Bogers et al., 2012). IPRs assign ownership to intellectual assets such as knowledge of an innovative process, technological innovations and a brand (Granstrand & Holgersson, 2015). In essence, IP defines boundaries around access to innovations and determines when and how an innovation becomes available for others (Gollin, 2008). The restricted access applies to activities as making, selling, and the usage of products and services protected by IPRs without the owners' permission (Granstrand & Holgersson, 2015).

IPRs incorporate various forms of IP including patent rights, copyrights, design or trade mark rights and trade secret rights (Granstrand & Holgersson, 2015; Xie & Zhang, 2015). As Granstrand and Holgersson (2015) states, copyrights aim to protect creations in the art field such as books, songs and software and are valid for the lifetime of the creator and up to 50 to 100 years after the creator's death. Design rights protect the visual features of a product that can be defined as a shape, configuration, pattern, and ornamentation. Design rights are granted for up to 25 years in Europe (Granstrand & Holgersson, 2015; Walker & Lunn, 2012). Trademark rights protect the identity marks, signs and designs that identify a brand. Because trademark rights are associated to brand values they can be renewed indefinitely (Granstrand & Holgersson, 2015; Walker & Lunn, 2012).

A trade secret is often used to protect knowledge that gives the owner competitive advantage such as customer lists, business plans and formulae (Walker & Lunn, 2012). Although trade secrets are also protected by trade secret rights, these rights remain unregistered and therefore can be kept indefinitely (Granstrand & Holgersson, 2015; Walker & Lunn, 2012). Lastly, patent rights are obtained to protect technical inventions and are generally granted for 20 years starting from the filing date of the application. A patent gives protection to a product itself, the functionality or the operating manner of that product (Walker & Lunn, 2012). Before granting a patent, the invention needs to meet certain requirements. The patentable invention should be new, non-obvious, applicable and useful (Granstrand & Holgersson, 2015). All these different rights are applied and enforced by different institutions such as the patent, trademark, and copyright office as well as the adequate courts. The concept of IPRs can be seen as the creators' right not to be harmed or interfered with by others in their creative work (Merges, 2011).

There are various reasonings behind the use of IPRs. First, there is a right for the inventors of an innovation to be recognized for their creation (Granstrand & Holgersson, 2015; Merges, 2011). This right goes beyond any other economic interest or other rights to the creation (Merges, 2011). Although in many cases the employing firm decides to include IP ownership clauses in employment agreements to ensure IP ownership stays within the firm (Walker & Lunn, 2012). In some countries for example, an IPRs legislation is in place that gives the inventor the right to be rewarded if the invention is highly profitable, even if the inventor is employed by a big company and had signed away the invention rights. Rewarding acknowledgement to the inventor fosters an ecosystem that is encouraging for both the individual as well as the team dynamics throughout the whole organization. It signals an environment in which creativity is supported and nurtured (Merges, 2011). A second moral ground justifying IPRs is protecting and assuring consumers about the origin and quality of a product or service using trademarks (Granstrand & Holgersson, 2015).

Additionally, a firm's IP is often considered one of their greatest assets, especially when playing in a high-technology industry. Therefore, owning IPRs signals competitiveness and often defends the firm's competitive position in the market. This goes hand in hand with creating revenue from owning tactical IP (Blomqvist, Hara, Koivuniemi, & Äijö, 2004). Apart from excluding other parties from the usage of owned IP, a patent owner can also monetize their invention in the form of royalty payments by licensing out the owned IP to external parties. Patent portfolios are therefore an attractive asset for investors (Walker & Lunn, 2012). Another motive that emphasizes the importance of IPRs is the role it plays in stimulating investments in research and development (R&D) in order to create and commercialize innovations, and encourage disclosure of information that are beneficial for consumers and society in general (Granstrand & Holgersson, 2015). Throughout this research basic and applied research, as well as product development are defined as R&D. R&D can cover various activities ranging from minor adaptations to an existing product or service to developing new products (within existing architectures) or even product systems (new architectures) (Quan & Chesbrough, 2010).

Although it is argued by Moser (2013) and Merges (2011) that inventors may be willing to disclose valuable technical information to their competitors when protected by IPRs, IP is sometimes considered to be a mechanism to block rather than encourage idea diffusion. A big concern associated with patent rights is the strong competitive advantage it grants the owner, that might lead to monopolistic behavior that would manifest in for example, high market prices. Which causes a contradictory effect in which there is a significant disadvantage for both the consumers and society when ownership of IP is not being used fairly (Granstrand & Holgersson, 2015).

2.2. The evolution of Intellectual Property

“Different legal frameworks apply to different IPRs, and these to some extent vary over time and across countries, for example in terms of legal strength and enforceability against infringers and counterfeiters” (Granstrand & Holgersson, 2015, p. 2)

The roots of IP are presumably found in the difficult ability to keep secret in ancient times, thus the decision of purposely not disclosing certain information. According to the translation of a 4.000-year-old employee confidentiality agreement with a Pharaoh set in stone, ancient Egyptians were clearly aware of trade secrets at least since 2000 BCE. Early trademark concepts also date back to the same time period, proven by Chinese porcelain marked by potters, and logos and brand names used for Roman stores. In Roman times supporters of the emperors were rewarded with the right to sell specific products. Similarly Renaissance rulers granted supporters public documents as evidence of exclusive rights, giving monopolies over land, goods, or services. The Venetian patent decree is considered the first formal intellectual property law and dates back to the year 1474. The decree recognized inventions made by Venetians and visitors and offered protection from imitators as copying these inventions without license was forbidden. The Venetian patent decree showed striking similarities to the modern patent laws, one of them is the concept of treating foreigners and residents equally, when filing a patent. Ever since the implementation of the Venetian patent decree, systems to protect IP spread throughout Europe (Gollin, 2008).

Up until the year 1820 the world only knew moderated progress in per capita income. Yet ever since the first industrial revolution 200 years ago, followed by several other significant industrial revolutions there has been a turning point. With major technological shocks being at the base of these disruptions the last two hundred years, we have witnessed the biggest increase in both human population and economic welfare ever recorded. Technological innovation is considered to make the most important contribution to this growth (Crescenz, Iammarino , Ioramashvili , Rodríguez-Pose , & Storper, 2019).

Subsequently this led to the further expansion of IP laws (Gollin, 2008). An US-sponsored process of international harmonization of IPRs emerged in the mid-1990s: Agreement on Trade-Related Aspects of IPRs (TRIPS). TRIPS, which is considered a global benchmark for spreading, strengthening and harmonizing IPRs regimes worldwide, increased the numbers of filed and granted IPRs (Granstrand & Holgersson, 2015; Merges, 2011).

One of the tools used to measure the innovation of a giving economy in the present day IPRs are patents. More particular the number of submitted, registered and quoted patents are clear indicators of the awareness and need to protect IPR and the actual quality of the proposed solutions (Baran & Zhumabaeva, 2018; Rogers, 1998). The growth of global IP can be derived from the patent filing activity. This activity is increasing globally setting new records each year. In 2018 3.3 million patents and 14.3 million trademarks were filed worldwide (WIPO, 2019).

A remarkable trend in this growth is China, which is considered the main driver of global growth in IP filings. China's share of the world total patent application increased with 31.5% over a period of 10 years. According to the statistics provided by (WIPO, 2019) China accounted for 46.4% of patent filings and 51.4% of the global trademark filings in 2018. For comparative purposes, simultaneously, The United States of America saw the first decline in patent filings in since 2009, but in contrast registered a growth of 4.3% in trademark filling activity. In 2018 1.5 million patent applications were filed at the China National Intellectual Property Administration (CNIPA), the amount is equal to the combined total of 8 of the international IP offices that were ranked in the global top 11 (WIPO, 2019).

2.3. The Chinese patent system

Northeast Asia today is identified as the third great pole of the world economy and a highly innovative part of the world (Crescenz, Iammarino , Ioramashvili , Rodríguez-Pose , & Storper, 2019). By looking at the registered patents as an indicator for innovation there is a clear indication that China lives up to this expectation of being a highly innovative country accounting for almost half of the patent fillings worldwide (WIPO, 2019). Firms nowadays know that IP strategy is decisive for a firms' competitiveness (Holgersson, Granstrand, & Bogers, 2018) and a patent system is the most important institution to protect IPR and encourage innovation (Xie & Zhang, 2015). Of the total of applications filed worldwide 28.5% of the applicants were non-residents of the country where the patent was filed. These numbers show the awareness in protecting IP across regions and that having a high-quality IP portfolio is considered equal to staying competitive worldwide (WIPO, 2019).

In May 1944, the first patent law in Chinese history was announced, this was a result of revisions of the previous legislation around IP. One of the revisions included no longer forbidding foreign inventors to apply for patents.

The period hereafter, up until 1957, IP activities were encouraged using a reward system in which inventors got granted bonuses, medals, certificates and honorary degrees for both patent rights and copyrights (D. Yang, 2003).

From 1958 to 1978 the reward system got substituted by a single bonus inventors got granted for their innovations. As in that period China was highly controlled by the government, who was steering the country towards a system of socialist public ownership. Therefore, inventors could not apply for the rights to their invention anymore.

All inventions were in fact considered national assets and could be used freely across the country. Consequently, discouraging innovative activities and discouraging respect towards for knowledge and IP. For a while, development towards an IP system was put on hold until 1979 when China opened to the outside world and trade (D. Yang, 2003). Since then, the approach of China towards IPRs has changed drastically in a period of 40 years. Going from a country without IPRs protection, to a broad and systematic framework (Baran & Zhumabaeva, 2018; D. Yang, 2003). After getting engaged as a member of the World Intellectual Property Organization (WIPO), China has been very active in improving its IPRs system. China's membership also indicated that they abide by international rules and regulations relating to trade and IPRs (D. Yang, 2003).

Since March 1985, the Chinese Patent Law has been passed on setting clear rules for patent applications, examinations, approvals, protection scopes and patent prosecution. Simultaneously the Chinese state passed the Implementing Regulations of the patent Law of the People's Republic of China. CNIPA has since then had the sole authority to process patent applications in China (Xie & Zhang, 2015). When the TRIPS agreement, which served as a model law, was introduced, China decided to improve its IPRs system even further by implementing its first amendment, and therefore have better alignment with international IPR regulations (D. Yang, 2003). In an article from W.-N. Yang and Yen (2009) an overview of the different amendments made in the Chinese patent system until 2009 was described. The first amendment in 1992 expanded the patentable scope including chemical inventions, such as pharmaceuticals, and made situations in which compulsory licenses must be granted more exceptional. Additionally, the first amendment extended the lifetime of the invention patent from 15 to 20 years, and the utility and design patent from 5 to 10 years (W.-N. Yang & Yen, 2009).

The second amendment, as stated in the article, was announced in 2000 and became effective in 2001 is the closest to the current patent law in China. The amendment increased protection for inventors that were victims of unauthorized use of patented products and products deriving directly from patented processes. However, the improvement only applied to invention and utility patents, excluding design patents. Specifically, a standard for compensating damages in the case of patent infringement was set. This standard was based on the lost profit to the patentee, the illegal profit obtained by the infringer, or an appropriate multiplication of the amount of the exploitation fee of that patent under contractual licenses W.-N. Yang and Yen (2009).

Furthermore, similar to the previous amendment, the conditions for granting compulsory licenses are further limited. According to the article from W.-N. Yang and Yen (2009), the second amendment aimed to facilitate the application process for foreign applicants. By, for example not requiring prior approval from administrative authorities before the patent application. Foreign applicants were also no longer required to submit records of prior patent applications of the same patent in other countries (W.-N. Yang & Yen, 2009).

Eight years later, in 2008 the third amendment of the Chinese patent law was announced (W.-N. Yang & Yen, 2009). This amendment mainly reflected China's own ambitions to improve their IPRs system rather than aligning with international standards as was the case for the previous amendments according to the article by W.-N. Yang and Yen (2009). To promote patent application it is no longer required to appoint a patent agency designated by the Patent Administration Department to be represented, instead it is allowed to appoint any legally established patent agency to act as a mediator making the application process more accessible for foreign firms (Wu, 2011; W.-N. Yang & Yen, 2009). To encourage Chinese entities and inventors to apply for foreign patents, the third amendment now allowed applications for a foreign before applying for a Chinese patent first, which was not the case prior to 2008. However, prior to filing a foreign patent a security examination is required to identify if the application contains state secrets, regardless of if the inventor is Chinese or a foreigner. If the applicant fails to request a security examination before filing for a patent, they will not be granted a Chinese patent for that same invention in the future (W.-N. Yang & Yen, 2009).

Furthermore the third amendment prohibits not only patent infringement but also the "passing off" of patents, the act of deceiving others by incorrectly presenting an unpatented product as patented or presenting itself as the owner of a patent owned by someone else (Wu, 2011). The Patent Administrative Department also received more resources to investigate potential cases of "passing off" patents and patent infringement. Moreover, paragraphs were added to the Chinese patent law to clarify the distinction between invention patents and design patents and raised the standard for the requirement of novelty to meet international standards (Wu, 2011; W.-N. Yang & Yen, 2009). Lastly, the third amendment also stipulates that in the case of co-ownership without a prior set agreement regarding the exploitation of the co-owned patent, both owner's consent is not needed when exploiting the patent, unless granting an exclusive license which needs the consent of all the co-owners. Although all royalties deriving from that exploitation must be distributed among the co-owners of the patent. If an agreement was set regarding the exploitation of the co-owned patent, the guidelines of that agreement must be followed (Wu, 2011).

The current IP system in China is a system with three main inter-related powers: legislative guidance, administrative control, and judicial enforcement, called a triple system. The legislative guidance is the system and legal mechanisms in charge of guiding patenting activities as well as patent protection. Examples of the legislative guidance legal mechanism are the patent law, copyright law, trademark law and the anti-unfair competition law.

The second power, administrative control, includes the administrative offices and their responsibility in patent applications, examinations, approval, and protection. The court system in charge of dealing with patent disputes and enforcement is referred to as the judicial enforcement, referring more specifically to the People's Courts (D. Yang, 2003).

The current Chinese patent system and regulations protect 3 rights: inventions, utility models and industrial designs. Accordingly the CNIPA issues three kinds of patents that are available for Western and Chinese firms who seek to protect their IP while operating in China: invention patents, utility model patents and design patents (Huang, Geng, & Wang, 2013; Xie & Zhang, 2015).

The strongest form of IP protection in China is filing an invention patent which is awarded for 20 years and has the clearest property rights (Huang et al., 2013). The purpose of invention patents is to protect new technical solutions related to a product, process, or improvement in particular. Whereas utility model patents protect minor technical solutions of a product or service (Huang et al., 2013; Xie & Zhang, 2015; D. Yang, 2003). The design patents enclose new designs related to shapes, patterns, colors, and their combination of a product. Design patents create the aesthetic around a product and are primarily for industrial applications and mass production (Xie & Zhang, 2015; D. Yang, 2003).

Both the utility model and design patents are awarded for 10 years starting from the application date (Huang et al., 2013; Prud'homme, 2017; Xie & Zhang, 2015). Utility patents can be considered a "second-tier" type of patent and are mainly beneficial for smaller companies and individual inventors, due to it being an easier, cheaper, and faster alternative to invention patents. The fast application and granting process allows for fast commercialization of technologies, which is essential in fields where the lifecycle of technologies is rather short. Additionally, utility patents are an adequate protection model for big or small players in market segments mainly dominated by inventions with lower levels of inventiveness. To ensure this faster and therefore less costly application process, there are lower requirements and no substantive examination before application needed (Prud'homme, 2017). However, the utility model patent is more likely to be filed by multiple entities which makes infringement more likely to occur and thus it can only guarantee a more limited scope of IP protection compared to invention patents (Huang et al., 2013).

2.4. IPRs concerns for foreign firms in China

Since 1985 China's IP regulations are heading more and more towards a similar treatment of foreign and local firms (Huang et al., 2013). However still less than one-tenth of all applications filed in China are non-resident applicants (WIPO, 2019). This can be due to China's IPR legislation being a rather young regulation system and therefore still requires improvements to match the standards of IP protection in Western countries (Huang et al., 2013).

Transferring knowledge assets to foreign operations can gain firms competitive advantage over both local and foreign rivals but Teece's studies as cited in Berry (2017) have shown that knowledge transfer does not always take place efficiently or effectively even within firms. For example, China's open-door policy attracted foreign and investment technologies and Chinese firms saw the opportunity to quickly absorb, imitate and modify the existing foreign technologies, allowing them to catch up with the global technologies frontiers (Xie & Zhang, 2015). It shows there is a realistic risk of spillovers to local competitors when active in a foreign market. Local competitors may imitate products and processes introduced by foreign firms (Berry, 2017; Zhao, 2006). Consequently China is commonly considered an emerging country with weak IPR (Huang et al., 2013). Countries with weak IPRs entail various risks as weak patent and trade secret laws, and thus few legal remedies against IP infringement, and poor enforceability in court (Nandkumar & Srikanth, 2016)

To measure and mitigate the risks of imitation when innovating in an emerging country with weak IPR like China, Zhao (2004) developed a theoretical model of three criteria that need to be assessed to predict if imitation can take place: the motivation to imitate, the ability to imitate and the possibility of getting around legal restrictions against imitation. The first criteria examine the motivation to imitate. According to Zhao (2006) there is a positive correlation between the value of the IP and the motivation to imitate, the higher the value of the IP the higher the motivation to imitate. Imitators will only steal technologies if they expect profit from it. Furthermore the value of the IP decreases when the IP is highly dependent on complementary internal resources or assets (Srikanth, Nandkumar, Mani, & Kale, 2020; Zhao, 2006). Imitators get discouraged to imitate technologies that are not readily available and will not be valuable without the complementary knowledge. Lack of specialized resources and knowledge to imitate product limits the ability to imitate (Zhao, 2006). The last criteria assess the opportunity and ability to avoid legal restrictions against imitation. As frequently discussed in literature, IP protection in China takes place in a young and complex institutional environment and it is considered that formal practices are not always effectively enforced because still further improvement of the IPRs system is needed (Huang et al., 2013; Xie & Zhang, 2015; Zhao, 2006). A recent report from European Commission (2020) addressed the European Commission's concerns around shortcomings in the Chinese IPRs enforcement system. The report mentions the complex legislation process for foreigners, the low amount of damage fines for infringements and discrimination of foreign right holders in court (European Commission, 2020).

However, some studies were conducted to identify the fairness of the IPRs in China regarding enforcement of patents when done by foreign right holders. For example, a study conducted by Zhang and Cao (2020) analyzed data from all the patent infringement disputes at the Beijing First Intermediate People's Court in the period between 2004 and 2011. Based on the results of this study, it is show that foreign right holders have no noticeable disadvantage compared to domestic right holders when it comes to win disputes and damage claims. Moreover, foreign patent holders seem to have an advantage (Zhang & Cao, 2020). In a similar study from Bian (2017) shows that approximately 80% of the patent infringement cases in 2014 was won by the suers. This is specifically remarkable as major Western countries show much lower rates, for example Germany (66%) and the United States (60%) (Bian, 2017).

According to the report of the European Commission (2020) this discrepancy can be explained by the fact that there are significant differences between cities across China, the Courts in bigger cities such as Beijing and Shanghai have higher standards of administration and therefore more satisfactory in following the IPRs system compared to less developed cities in China, where a clear lack of expertise can be seen (European Commission, 2020).

Besides the risk of imitation and the questionable enforcement of patent infringement, China has generally less transparent government procedures compared to Western countries. Obtaining permits, product approvals and other considered everyday task can therefore be a more cumbersome process (Froese, Sutherland, Lee, Liu, & Pan, 2019).

Applying for patents in general is a process that involves heavy professional work and distinct knowledge, for that reason patent applicants hire specialized agents to apply on behalf of them (Xie & Zhang, 2015). According to Xie and Zhang (2015) there is a noticeable distinction in number of patent applications between the three types of patents, invention patents being the type of patent that is dominantly filed by foreign applicators in China. However, as mentioned earlier the percentage of total patents applied for by foreigners in China is lower than the world average, which also indicates an improvement of domestic innovation capacity in Chinese firms (WIPO, 2019). The increased innovation capacity and the mindset of facilitating catch-up for their domestic players may cause China to favor and support domestic firms(Froese et al., 2019).

Another risk for companies looking for business opportunities abroad is cultural differences and China is no exception to that. In the Chinese culture the "rule of man" is embedded in not only the social but also the business environment, this rule can be recognized in modern day "guanxi", informal connections and relationships of influence. Huang et al. (2013) studied the institutional inadequacies China suffers from compared to Western countries, which often have established strong IPR protection laws. In this research the concept of seeking alternative protection against IP misappropriation through "guanxi" is confirmed. It is mostly Chinese firms that are familiar with these practices of resorting to informal institutional norms to solve conflicts. Western firms on the other hand are more accustomed to relying on formal rules and regulations rather than the informal institutional environment. Many Western early entrants have undergone a transition from "foreign investors" to "strategic insiders" in order to take advantage of these informal institutions. Huang et al. (2013) concluded that these practices are a result of the inefficiency in formal institutions and the cultural norm of avoiding conflict in Chinese society.

According to Zhao (2010) who studied the Chinese intellectual property environment, the Chinese legal system is not errorless. The unusual size of the country leads to an uneven dispersion of the quality of lower-level courts among regions. More so, local governments' protectionist influences still exist to some degrees (Zhao, 2010). A report of European Commission (2020) also raised concerns around so called "induced" or "forced technology transfers", a practice in which foreign firms are required to transfer their technology to China. For example, foreign firms may be required to license out their technology in exchange for access to the market, investments or administrative approvals (European Commission, 2020).

Prud'homme and von Zedtwitz (2019) and Prud'homme, von Zedtwitz, Thraen, and Bader (2018) discussed forced technology transfers in emerging markets and focused on the requirements the Chinese government imposes on foreign companies in order to receive their transferred technology. According to the companies interviewed in Prud'homme and von Zedtwitz (2019) the most well-known requirement from the Chinese government is providing market access in the form of a business license and state support in the form of financial resources in exchange for transferring their technology into a foreign-Chinese joint venture.

In the pharmaceutical and chemicals industry for example, there have been experiences in which foreign firms had to disclose trade secrets to the Chinese state in order to receive regulatory approvals (Prud'homme & von Zedtwitz, 2019; Prud'homme et al., 2018). Combined with the habit of local firms to resort to "guanxi" to enjoy benefits when resolving conflicts (Zhao, 2010), this results in a complex business environment, especially as an outsider. Nevertheless, if foreign firms innovating in China have a thought through IP strategy, it is quite feasible to defend their IP through the Chinese court or administrative systems. The main difficulties remain, but MNEs have shown to be able to successfully pursue legal cases against patent infringement (Zhao, 2010). MNEs are mainly a geographically distributed network and have therefore been a particular interest for research on how to protect IP in emerging countries (Zhao, 2006). It is clear MNEs have gained more experience over time in organizing large-scale R&D projects and navigating through the complex institutional environment in China, often learning it the hard way (Zhao, 2004).

In addition, a main challenge for foreign companies in China is attracting and more importantly retaining the correct qualified human resources. Due to the scarce availability of qualified personnel for higher managerial positions there is an increasing demand for a higher pay in that target group (Froese et al., 2019). Berry (2017) notes that evidently, competitors seeking to compete will target the employees in the key positions. Additionally, Chinese firms gain more attractiveness as employers targeting the same qualified personnel, this results in increasing employee turnover rates for Western firms when it comes to local employees (Froese et al., 2019; Srikanth et al., 2020). To emphasize the seriousness of this threat of increasing employee mobility, the framework of Nandkumar and Srikanth (2016) explains how employing locals of a country with weak IPRs for R&D project increases the threat of IP leakage. This due to employee mobility being a source of knowledge transfer between firms.

According to (Srikanth et al., 2020) the main reasons IP is at risks can be derived from the nature of the R&D projects itself. A couple of characteristics (4) to look out for to determine how big the risk for leakage is are:

1. *Generality of the project, how useful is the project for the competitors?*
 The more knowledge depends on the firm specific assets or complementary IP, the less useful it is for competitors to appropriate the IP. This strategy will be discussed further in the chapter about internal linkages.

2. *How much of the firm's prior knowledge is used in the R&D project?*
 Projects using a firm's prior knowledge are usually a higher risk for leakage. Mainly because this knowledge may not be available to the local competitors in the country with weak IPRs yet and therefore imitators are more attracted to unveil this knowledge.

3. *To which extend is the knowledge of this project codifiable?*
 A common assumption is that codified knowledge is leakier compared to knowledge that is not codifiable and thus tacit.

4. *How radical is the innovation?*
 Projects that include innovations that are expected to generate big technical advance are considered more valuable and therefore more attractive to competitors.

These characteristics can partly be linked to the study of Quan and Chesbrough (2010).

The study presents 4 natures of R&D, these are based on MNEs' R&D laboratory's market orientations and product development strategies. In figure 1, "local market" means the market in the offshore location.

		PRODUCT	
		New	Old
MARKET	Global	Position 3	Position 4
	Local	Position 2	Position 1

Figure 1. Positioning MNEs' R&D in a spatial innovation strategy. Source: (Quan & Chesbrough, 2010)

1. MNEs at *position 1* have R&D in laboratories in offshore locations that is mainly focused on low-innovative activity. A few examples: local adaptation of imported products, Production, or technical support for local sales. MNEs in this position are not focusing nor doing effort to develop new products for this offshore market.

MNEs in this position are therefore considered to conduct fewer radical innovations in the local R&D projects. However there is more prior knowledge involved (Quan & Chesbrough, 2010; Srikanth et al., 2020).

2. MNEs active in *position 2* have started to identify and maybe adapt to local needs of the offshore location. In this position new products for these new emerging markets are developed.

If we follow the framework mentioned by Srikanth et al. (2020) MNEs in this position are working with knowledge that is more useful for local competitors compared to knowledge in position 1.

3. MNEs in *position 3* are also focused on developing products for the local market needs. Moreover, they are also focusing on developing products in this offshore location to integrate in products for other markets. For example, developing adaptation for other offshore locations or the home country. These are mainly R&D laboratories for research as they are conducting rather long-term research objectives. The result from such research is often applied to a global market product development in a later stage.

Projects in this position are increasingly useful for local competitors, use the firm's prior knowledge to some extent and may possibly include more radical innovations (Quan & Chesbrough, 2010; Srikanth et al., 2020).

4. *Position 4* is not extensively discussed by Quan and Chesbrough (2010). This position mainly covers the traditional practice of MNEs developing old products in offshore locations like China to target a global market, for example using China as a manufacturing location to import products from for the home market.

According to the findings of Quan and Chesbrough (2010) MNEs at the beginning stage upon entering offshore markets traditionally start at position 1 and gradually move to 3 when they gain more confidence and experience in the new market. It is not unusual to see MNEs conduct research in all three strategic positions.

2.5. Strategies to protect intellectual property

As cited in Zhao (2006) emerging countries like China are providing top-notch scientist at a high speed for a fraction of the cost of their counterparts in developed countries. The lower cost for human capital and sometimes specialized expertise can help MNE's gain additional market share or new rents from their inventions as well as exploit knowledge assets available in these countries that can be used for both the home market as well as the host market (Berry, 2017; Nandkumar & Srikanth, 2016; Quan & Chesbrough, 2010; Srikanth et al., 2020). China belongs to one of the countries that has a lot of opportunities to offer to foreign companies such as a large, fast-growing market, investor-friendly policies in special economic and high-tech development zones and an improving quality of human resources and infrastructure (Froese et al., 2019). It is clear why many Western companies estimate going off shore, but to be able to exploit these opportunities it is inevitable to not transfer knowledge to these offshore projects in the process (Berry, 2017; Zhao, 2006). Therefore a lot of these MNE's are holding back as they are aware of the poor institutional environment in emerging countries regarding IP protection (Zhao, 2006).

In some industries and environments, simply patenting does not provide enough protection against knowledge leakage and misappropriation because patents are often a temporary barrier and do not protect tacit knowledge (Srikanth et al., 2020). Ideally the advantages derived from setting up part of the innovation process in these countries with weak IPRs weigh out the risks if the standard IP protection procedures, like filing patents, are combined with alternative protection mechanisms (Zhao, 2006).

There is not a lot of literature available specifically researching these alternative protection mechanisms that can be implemented to protect IP in countries with weaker IPRs. Nevertheless, few studies were identified that point out the most common practices implemented by MNEs when innovating in these regions. To discuss these strategies in this section, the study from Srikanth et al. (2020) will be used as a guideline, because their research resembles this study the most out of all the available literature. The study uncovered 5 alternative organizational practices that firms use to protect their knowledge from leaking by first interviewing managers of MNEs innovating in countries with weak IPRs. Additionally, they held a broader survey and analyzed patent data to subsequently determine if each strategy limits knowledge leakage itself and/or limits knowledge leakage damage. Lastly, they decide if these strategies are complements or substitutes for one another.

As mentioned previously most firms usually have two options when they want to protect their IP against leakage: filing for patent protection or use trade secrets to safeguard the knowledge (Srikanth et al., 2020). With their research Srikanth et al. (2020) want to unveil the organizational strategies that manipulate the nature of the knowledge with the objective to improve trade secret protection. According to Srikanth et al. (2020) prior studies have only focused on how to manipulate human capital to not leak valuable knowledge by for example, educating employees on the importance of secrecy, which will be discussed later in this section.

But Srikanth et al. (2020) want to emphasize that not only the intentions and motivation of its' employees can have an influence on the amount of knowledge leakage but also firms' internal processes. Therefore Srikanth et al. (2020) investigated alternatives other than motivation based strategies for employees to protect knowledge from leaking. Trade secrets for example, are an organizational mechanism that is designed and implemented by firms to protect their valuable knowledge, according to Srikanth et al. (2020), due to the confidential nature, there is not a lot of information available about the strategies surrounding trade secrets.

Yet these strategies are crucial for firms innovating worldwide because trade secrets are often used as a solution when patenting does not provide enough protection (Srikanth et al., 2020; Zhao, 2006). Trade secrets can be seen as an informal way of protecting IP, especially when companies are not able to or do not want to protect their IP with formal measures such as patents, because patents require disclosure of the technology (Srikanth et al., 2020). However, using trade secrets is not a bullet proof strategy either. Often is it hard to enforce non-disclosure agreements in the case of wrongful disclosure of information. Srikanth et al. (2020) follows a simple logic: by making knowledge harder to transfer the risk of knowledge leakage will decrease. Srikanth et al. (2020) suggests that unwanted knowledge transfer to external parties can be hindered by, as previously mentioned, creating less willingness among employees to share valuable knowledge. But also by increasing the tacitness or social complexity of the knowledge (Srikanth et al., 2020).

2.5.1 Company policies and employee awareness

As mentioned in Srikanth et al. (2020), previous studies have focused on company policies and employee awareness as a strategy to protect knowledge from leaking. This strategy is mainly used for knowledge that is not yet patented and therefore subjected to secrecy (Srikanth et al., 2020). Alcácer and Zhao (2012) talk about reducing incentives for imitation by implementing organizational designs for secrecy like company policies. Company policies can take various forms like non-disclosure and non-compete agreements. Non-disclosure agreements are mainly used to protect knowledge from being leaked when employees are dealing with external parties. As previously discussed increasing employee turnover rates for Western firms in emerging countries is a frequent concern, especially because it is one of the main sources of knowledge transfer between firms (Froese et al., 2019; Nandkumar & Srikanth, 2016; Srikanth et al., 2020). A company policy like non-compete agreements can legally restrict an employee from working for a competitor, often for a certain amount of time after leaving the company. Thus avoiding that the knowledge employees obtain during their employment is transferred to competitors, which could result in serious loss of competitive advantage (Srikanth et al., 2020; Zhao, 2006).

Besides company policies, firms can additionally educate employees on the importance of confidentiality (Srikanth et al., 2020), by for example setting up monitoring systems like email controls, marking confidential documents,... So that employees are aware they are handling proprietary information (Srikanth et al., 2020). These strategies tackle the problem of knowledge leakage by manipulating the intrinsic motivation of employees, a subject that has been researched prior according to Srikanth et al. (2020). Additionally Alcácer and Zhao (2012) suggests that having a corporate reputation of being though in patent enforcement when needed increases employee awareness around the seriousness. Subsequently reducing knowledge outflows associated with employee mobility.

However, the strategy of using company policies and creating employee awareness may decrease knowledge leakage, but this strategy alone is not enough to ensure hard protection. Intrinsic employee motivation is something that firms' have little control over and non-disclosure and non-compete agreements are often hard to enforce (Berry, 2017). Therefore Srikanth et al. (2020) proposed the following strategies that will be discussed in this chapter to make the knowledge itself less leaky rather than manipulating the motivation of employees.

2.5.2 Internal linkages

Several studies like Alcácer and Zhao (2012) and Srikanth et al. (2020) are partly based on early research from Zhao (2006) which builds upon a previously discussed framework from Zhao (2004). This framework is built around the 3 preconditions for imitation: motivation to imitate, ability to imitate and the possibility to work around legal restrictions (Zhao, 2004, 2006). The framework mainly suggests that the imitating a technology is less attractive when a technology is less valuable or more dependent on the firms' internal resources (Alcácer & Zhao, 2012; Zhao, 2004, 2006).

According to Zhao (2006) these internal resources or complementary knowledge can take on various forms such as market power, manufacturing capability, unique organizational culture, technologies,...

Especially technologies that require complementary IP in order to be valuable enough to gain significant profits are unattractive for imitators. Partly because of the high costs that comes with obtaining the complementary knowledge (Zhao, 2004, 2006). In other words, developing technologies that are dependent makes knowledge leakages less threatening as the loses from leaking one part of the knowledge is not as big as for knowledge that is widely applicable (Zhao, 2004, 2006). Considering the framework against imitation developed by Zhao (2004) and the fact that MNEs are a distributed network, it is clear MNEs can exploit the opportunity to safely develop technologies off shore and use these technologies later in other large R&D projects by choosing strategically to keep IP dependent on internal resources and complementary knowledge (Alcácer & Zhao, 2012; Srikanth et al., 2020; Zhao, 2006).

Zhao (2006) built further upon this assumption by analyzing patent activities of MNE's originating from the United States. Zhao (2006) observed that patent data of MNEs innovating in countries with weaker IPRs show more inventor collaborations as well as more self-citations. In other words, the patent data indicates that the technologies developed in these MNEs are widely shared across the organization and integrated in other R&D projects, for example self-cited by R&D teams located elsewhere in the same company. Additionally cross-border collaborations are more likely to happen when firms innovate in countries with weaker IPRs. According to Zhao (2006) this is proof of close knit internal innovation structures and MNEs' superior ability to carefully coordinate R&D projects on different locations. If a firm has this capability it allows them to keep the more valuable complementary IP protected under home country IP law labels while less valuable IP is developed elsewhere (Zhao, 2006). Additional technologies that are more dependent on internal resources are more likely to be further developed by the same firm, allowing the original inventors to capture more benefits from the innovation (Zhao, 2006). Zhao (2006) considers this power as the main reason MNE's are able to use complementary knowledge and internal resources as an immune system against weak IPRs and imitation.

Zhao (2006) and Alcácer and Zhao (2012) label this strategy as "strong internal linkages", Srikanth et al. (2020) call it "fine slicing", a strategy often used by firms innovating in countries with weak IPRs to substitute for the weak external environment. It is the practice of distributing the knowledge of an innovation across locations, usually the head quarter and the captive centers, and then integrating the results by involving an international head quarter team (Alcácer & Zhao, 2012; Srikanth et al., 2020). This results in IP that is intertwined in the firm's internal knowledge to that extend that it is as they were developed right at the headquarters without actually having to transfer the all valuable complementary knowledge to these offshore locations (Zhao, 2006).

In their study Alcácer and Zhao (2012) identified the following benefits of using internal linkages as a substitute for the weak protection by the external environment:

1. Strong internal linkages improve the absorption and integration of knowledge across the firm.
2. Strong internal linkages increase the absorption of external knowledge especially when R&D locations are scattered.
3. Strong internal linkages facilitate the transfer of local knowledge of the offshore location back to the headquarters.
4. Strong internal linkages are proven to improve the overall quality of innovation throughout the firm.

Therefore Zhao (2006) acknowledges that the ability to efficiently transfer, integrate and further developing of technologies on a global basis by using close knit internal structures is a big advantage to protect IP in countries with weaker IPRs. MNEs often have the capital, experience and the strong internal linkages to divide their R&D in specific types of applications, specific stages or even locations Zhao (2004, 2006).

This practice of segmenting according to projects and stages of R&D could be crucial in the protection of IP China. As the R&D of MNEs conducted in China are often part of the firms' global research agendas the value of the IP is also limited Alcácer and Zhao, 2012; Zhao, 2004). MNEs are clearly in a unique position where their internal processes are that thought through that they compensate for the weaker IPR legislation (Zhao, 2004).

According to Alcácer and Zhao (2012) and Srikanth et al. (2020) internal linkages or fine slicing in a firm can be implemented in two ways. One way is to split R&D tasks across different locations with minimal interaction between the R&D teams (Srikanth et al., 2020). Alcácer and Zhao (2012) suggest to then monitor R&D activities closely across the different firm locations. This can be done by head quarter personnel that takes care of the organizational aspect and is less involved in the actual R&D tasks at the location (Srikanth et al., 2020). MNEs can go even further by putting constraints on cross-border knowledge flows to keep valuable IP protected under IPRs of the home country, although this may stand in the way of innovation (Zhao, 2006).

Secondly, firms can increase the interdependence between locations to protect themselves against weak IPRs (Alcácer & Zhao, 2012; Srikanth et al., 2020). This can be done by frequent interactions between R&D employees across locations, which is an approach that is often used by MNEs in countries with weaker IPRs (Srikanth et al., 2020).

Relying on these close interactions increases the social complexity of the technology because knowledge will be dependent on relationships, company culture,... Making it harder for competitors to replicate as they not only need to imitate the technology itself, but also the pattern of interactions between employees (Srikanth et al., 2020; Zhao, 2006). Therefore Srikanth et al. (2020) suggests that projects with high levels of interdependence or strong internal linkages as Zhao (2006) would say, are more likely to protect their IP in countries with weaker IPRs.

Another strategy related strong internal innovation structures is coupling employee knowledge tightly to the firms' internal assets to limit leakage from employee mobility Alcácer and Zhao, 2012; Srikanth et al., 2020). The valuable knowledge an employee possesses will be so firm specific that once the firms' assets are not available, the value of the employee's knowledge will decrease significantly Alcácer and Zhao, 2012; Srikanth et al., 2020). For example, one of the managers interviewed by Srikanth et al. (2020) said the following:

"We spend significant effort training our employees to get them up to speed in using these protocols. An employee who leaves us it not able to utilize much of our knowledge in drug design since the competitor will not have the same equipment and protocols." (p. 102)

Therefore Srikanth et al. (2020) concludes that R&D projects offshore can implement highly firm specific assets in the R&D activities to protect knowledge from leaking to competitor in the case of employee mobility.

Alcácer and Zhao (2012) go further into the concept of using cross-cluster teams. A practice which allows having better firm-level monitoring from teams active in different clusters and therefore locations. We could translate this into the use of international team for coordinating projects in different locations.

Alcácer and Zhao (2012) stated that nowadays leading companies in high-tech industries tend to be pulled towards clusters, high geographic concentrations of related innovative firms and (governmental) instances. Often these firms can enjoy big competitive advantages and reduced costs due to the rapid innovation and productivity in these areas, as well as the access to local skilled labor, specialized suppliers, and knowledge spillovers (Alcácer & Zhao, 2012). Alcácer and Zhao (2012) mention that one of the strategies for protecting knowledge is raising barriers to imitation by locating R&D facilities distanced from the location's potential imitators. As these firms engage in innovative activities in close proximity, Alcácer and Zhao (2012) notes that clusters also attract competition for the available resources and knowledge, especially among locally based rivals. Knowledge leakage is more likely to happen when geographic space is shared, although it may be an advantage to be able to take advantage of spillovers from other companies, firms try to protect their own knowledge getting out (Alcácer & Zhao, 2012).

With their study Alcácer and Zhao (2012) want to find out how firms can benefit from clusters without losing their valuable knowledge and how to strengthen the internal linkages across clusters. The hypothesis of the study is that strong internal linkages across clusters help firms internalize knowledge and therefore decreases the risks of knowledge leakage and thus benefitting competitors. Alcácer and Zhao (2012) tackled this by analyzing patent data of firms in the semiconductor industry to identify the number of cross-cluster self-citations, the number of citations by local competitors and the presence of cross-cluster teams.

One form of internal linkages Alcácer and Zhao (2012) suggests is the implementation of cross-cluster teams, these are teams spanning over multiple clusters working on different locations and projects. Cross-cluster teams can be set in motion when knowledge internalization is at risk. Such teams can enhance the knowledge flows cross locations thus increase knowledge transfers, thus increase social complexity. The value of the knowledge a competitor can obtain due to knowledge leakage is therefore limited (Alcácer & Zhao, 2012). Firms with strong internal linkages can closely monitor the progress of R&D activities across various locations and make sure the activities align with firm priorities by for example, invite researchers or managers from other locations to participate in local R&D projects (Alcácer & Zhao, 2012). Rotation of R&D teams or managers allow MNEs to get more comprehensive knowledge and draw boundaries for the IP. Additionally, it helps avoiding the formation of only local capabilities, for example employee spin-offs. Cross-cluster teams can easily identify valuable information and transfer it to other locations quickly when needed (Alcácer & Zhao, 2012).

The result of the research from Alcácer and Zhao (2012) show patents in companies that implement cross-cluster teams are less cited by external parties. Additionally, it showed that firms often strengthen their internal linkages when they are in close proximity to competitors. Cross-cluster teams are a tool to increase of knowledge flows across clusters as well as increased barriers for competitors to overcome when trying to misappropriate knowledge (Alcácer & Zhao, 2012).

2.5.3 Involve headquarter personnel

Because MNEs practicing fine slicing or a strong internal linkages strategy usually conduct a part of their segmented R&D activities at the headquarter, there is usually a significant level of information transfer (Srikanth et al., 2020). It often gives head quarter personnel an overview of the know-how that gets developed in the offshore locations. Which is needed as literature already confirmed that employee mobility is an present concern for MNEs and contract enforcement may be harder in countries with weak IPRs (Berry, 2017). Head quarter personnel is therefore frequently involved in R&D projects offshore (Srikanth et al., 2020) to carry out a form of social control, and guide the local employees to work more aligned with the head quarter rather than outsiders (Berry, 2017). Additionally, head quarter personnel can interfere when a risky situation takes place faster when they are on location (Berry, 2017). According to insights from managers interviewed by Srikanth et al. (2020) offshore R&D projects that have high involvement of head quarter personnel are more likely to protect their knowledge.

As mentioned previously, retaining qualified employees in China is increasingly challenging. Nandkumar and Srikanth (2016) conducted a study focusing on a strategy based on the allocation of human resourced in R&D projects. Nandkumar and Srikanth (2016) implemented a similar approach as Zhao (2006) by analyzing a sample of patents deriving from MNEs with headquarters in the Unites States of America (USA), the main question: does the number of local and head quarter inventors depend on the strength of the IPRs in the R&D location?

Nandkumar and Srikanth (2016) argues that if R&D managers from the home country of the MNE are allocated to local R&D teams for coordination and supervision of the projects in countries with weaker IPRs, it will decrease the likelihood of knowledge leakage to local competitors. This logic derives from the assumption that the weaker the IPRs environment of the country in which the R&D projects are conducted, the more likely local employees will leak out knowledge to competitors. The risk increases even more if the number of local inventors working on the project increases, or if the technology being developed is designed for the host market (Nandkumar and Srikanth, 2016). Similarly, Berry (2017) suggests that headquarter personnel can be used as a buffer, substituting for a risky external environment, at the same time head quarter personnel increases knowledge flows and limits spillovers protecting valuable IP.

Therefore, one of the main tasks of these home country R&D managers is to assess the need of employing the right combination of home country employees and local employees for the R&D projects and therefore making a trade-off between reducing cost for human capital and reducing risk of IP leakage (Nandkumar and Srikanth, 2016). When the risks are high, Nandkumar and Srikanth (2016) suggest assigning more head quarter personnel to the offshore locations to ensure more protection. (Berry, 2017) analyzed patent data from MNEs in the US and mainly searched for the answer to 2 questions: "Was there knowledge transferred?" And "What was the value of the knowledge transferred?". The results clearly showed headquarter personnel can substitute for a weak IPRs environment. The condition to this is that the firm has enough manufacturing and knowledge capability to transfer valuable patent firm capabilities.

According to interviews conducted by Srikanth et al. (2020) it is important to balance out this strategy when possible. For example, by carrying out projects in the offshore location only, without any involvement of head quarter teams. This is beneficial for retaining and motivating local personnel. When carrying out such projects will weaker internal linkages to the home country location, other strategies can be implemented to protect IP from leaking (Srikanth et al., 2020).

Even if head quarter teams are not deeply involved in some projects, a high level of information transfer between the offshore location and the head quarter can still be maintained according to Srikanth et al. (2020). It will not only strengthen the internal linkages but the head quarter will be able to respond more quickly to limit the risks of leakage of new innovations (Srikanth et al., 2020). For some firms, the head quarter is involved in decisions regarding the design, building of the components in the offshore location. Headquarters take the final decision on how to proceed in the innovation process. Often having to decide between further developing the R&D in the offshore R&D centers or transferring the project to another location if it is labelled as too risky (Zhao, 2006). For other firms that take other measures to protect their IP, the head quarter barely has an influence on the offshore R&D activities (Srikanth et al., 2020).

2.5.4 Hierarchical segmentation

Quan and Chesbrough (2010) investigated the nature of MNEs' R&D through small-scale surveys on MNEs in the IT industry investing in R&D in China. Subsequently they discuss three case studies based on experiences from firm executives, government officials and industry experts. The study mainly focused on the innovation activities in and around Beijing and Shanghai due to it is global in R&D. The objective of their research is to investigate how IPRs concerns are addressed by the R&D laboratories in China when it comes to high-IP content R&D. Quan and Chesbrough (2010) intends to complement the research developed by Zhao (2006) by analyzing the exact nature of the R&D organization of MNEs in-depth.

The main assumption throughout this study is that the architecture companies use to limit the level of knowledge it transfers to offshore locations like fragmenting their R&D (internal linkages/fine slicing (Srikanth et al., 2020; Zhao, 2006)) combined with traditional measures like company policies and physically restricting access to knowledge (internal controls and knowledge access (Srikanth et al., 2020)), is a strategy to protect MNEs active in country with weak IPRs. Quan and Chesbrough (2010) uncovered a new strategy that had not been discussed in prior literature: protecting IP by implementing hierarchical segmentation. Similar to the argumentation of Srikanth et al. (2020) the base of this strategy is the assumption that R&D laboratories can manage the risks of IP leakage in countries with weak IPRs internally. Therefore there is no need to rely on external national institutions like laws and enforcements in courts (Quan & Chesbrough, 2010). In the case of this strategy MNEs can internally control and manage the types of knowhows that is shared among locations, lowering the leakage risks. More specifically by using the principle of modularity. Modularity is the ability to fragment complex systems into smaller parts (modules) and clearly defined standards or design rules that enable the modules to operate together. An example is car manufacturing, where different components can be developed in different locations to be assembled into one product at a later stage (Quan & Chesbrough, 2010). The benefit of segmenting the product into modules according to Quan and Chesbrough (2010) is that it limits complexity and therefore provides for future flexibility as modules can be easily assembled into new products.

Quan and Chesbrough (2010) divides knowledge into the following 3 categories:

1. *Architecture level / system level knowledge*

Architectural level has the highest technological value because it determines how the system will look like. If knowledge from this level is lost the damage of leakage is high. Therefore, it belongs in the head quarter R&D laboratory.

2. *Interface level*

The interface level knowledge is according to Quan and Chesbrough (2010) usually located close to the headquarters as well. Interface knowledge is needed to embody the systems architecture and decides how the different modules will interact with each other / what service each module provides.

3. *Module protocols*

Module protocols contain information about the modules itself but rely on interface levels to connect back to the whole system or technology. The local R&D center managing one module knows what they are expected to develop, but not necessarily why (Quan & Chesbrough, 2010).

Ideally when working with modularity, the head quarter holds the architectural design, while the offshore locations host independent modules called the peripheral R&D (Quan & Chesbrough, 2010). The independent modules are divided over locations according to the value of the IP and the protectability of the technology.

If a technology had a high value, for example core R&D, combined with low protectability, the project will be assigned to offshore locations with string IPRs. In the case that the protectability of the core R&D is high it could also be carried out in locations with weaker IPRs. If the value of the IP is low, peripheral R&D, and the protectability is high it can be assigned to offshore R&D locations with weak IPRs (Quan & Chesbrough, 2010).

The reasoning behind hierarchical segmentation and working with modules is that local R&D staff in offshore locations will only have access to the part of the information that is needed to carry out their tasks (Quan & Chesbrough, 2010). Even though R&D staff receive interface parameters they don't have access to the architectural level knowledge and therefore MNEs carrying out this strategy are ensuring minimal knowledge transfer subsequently decreasing the leakage damage (Quan & Chesbrough, 2010). In other words, hierarchical segmentation or modularity mainly make technologies less attractive to imitate as even if imitators get a hold of one module, the functions of the whole system remain unclear to them. At the same time, if knowledge is leaked the damage will be limited (Quan & Chesbrough, 2010).

2.5.5 Internal controls and knowledge access

To protect proprietary knowledge, MNEs innovating in different locations including countries with weak IPRs, can rely on internal controls (Srikanth et al., 2020). As mentioned in the study of Srikanth et al. (2020) internal controls help firms to manage employee's access and therefore also access from external parties to confidential information by restricting physical access to some knowledge across employee positions in the company. The objective of these internal controls is that the knowledge is not easily physically available for multiple individuals, all having a different accessibility to the knowledge that is being protected (Srikanth et al., 2020). This makes it harder to replicate the total innovation even if one part of the knowledge is leaked, similarly to the suggestion of Zhao (2006) to split knowledge into complementary parts. This strategy mainly limits damage from leakage that is caused by employee mobility (Srikanth et al., 2020). Srikanth et al. (2020) found a couple ways to implement internal control in their research. Moreover, Srikanth et al. (2020) and Quan and Chesbrough (2010) mention that some firms appear to have designed their physical layout with the objective to minimize interactions between R&D teams.

First, the use of multiple databases to store valuable information, each database having its own access protocols (Srikanth et al., 2020; Quan and Chesbrough,2010).

Second, the servers these important data is stored in can be located outside of the offshore location where (part of) the innovation is taking place, for example in the home country. Reinforced with controls for accessing this information (Srikanth et al., 2020; Quan and Chesbrough,2010).

Third, physically dividing teams according to what project they are working on, additionally have restriction on access to the different R&D work areas. Last, restricting employees from reading, downloading or printing documents according to their role in a R&D project (Srikanth et al., 2020).

2.5.6 Lobbying governmental instances

Prud'homme and von Zedtwitz (2019) chose a different approach on how firms innovating in China can protect their IP. Their focus lays on what strategies MNEs in China implement to respond to the risks of so-called Forced Technology Transfer policies (FTT policies) we mentioned in a previous chapter. These policies were led by the Chinese government to increase foreign domestic technology transfer and to weaken the appropriability of foreign innovations in China (Prud'homme & von Zedtwitz, 2019). Although FTT policies have resulted in complaints from the European Union, the World Trade Organization and triggered the US-China trade war, these controversial policies have not yet been mentioned in prior literature that was covered in the research of Prud'homme and von Zedtwitz (2019).

Prud'homme and von Zedtwitz (2019) notice that most literature focusses on how firms can implement strategies that are internally oriented as the ones we mentioned earlier in this literature review. These strategies focus mainly on activities that are within the firm boundary. Nevertheless Prud'homme and von Zedtwitz (2019) consider external oriented strategies at least as important as internally oriented strategies for protecting IP in countries like China. Externally oriented or non-market strategies are based on the MNEs engagement with external parties, for example the local government. Based on surveys and semi-structured interviews conducted on MNEs active in China Prud'homme and von Zedtwitz (2019) identified strategies that can be labelled as externally oriented and had not been covered by previous studies yet. Up until now, externally oriented strategies were not the first ones to resort to for MNEs as these are considered too risky and costly. One of the strategies that is related to this research is engaging with government and other stakeholders to improve IPRs in the host country. This can be implemented by for example lobbying the Chinese government either directly or indirectly through lobbying organizations like the chambers of commerce. These chambers of commerce can collect opinions of various MNEs and propose them to the state officials. This has multiple benefits, MNEs will be able to channel and enhance the message, they will reduce the costs that come with this external oriented strategy and reduce the risk that the state will retaliate for criticizing their policies.

MNEs could also voice their concerns through state officials in their home country to even reduce these risks and costs further. Prud'homme and von Zedtwitz (2019) are convinced these strategies are more efficient in some cases and offer a solution on the long term. The recent changes that were made to adjust these FTT policies and this shift was led by MNEs and other instances implementing these externally oriented strategies on the Chinese government (Prud'homme & von Zedtwitz, 2019).

1.5.8. Configurations to protect IP

To sum up the literature study identified 6 common strategies that MNEs implement to protect UP in countries with weak IPRs: Company policies and employee awareness (1), internal linkages (2), involve headquarter personnel (3), internal controls and knowledge access (4), hierarchical segmentation (5), lobbying governmental instances (6).

The extended research from Srikanth et al. (2020) labels the strategies into 2 objectives: preventive strategies to limit knowledge leakage and remedial strategies limiting damage from knowledge leakage. According to Srikanth et al. (2020) practices as linking knowledge to firm specific assets (internal linkages (2)) are labelled as preventive strategies against knowledge leakage. Involving head quarter personnel (3) and transferring information to the head quarter, implementing internal controls on access to knowledge (4) are labelled as remedial strategies to limit the damage of knowledge leakage when it occurs. Srikanth et al. (2020) also unveiled those strategies that limit knowledge leakage are complementary to strategies that limit damage.

More important, Srikanth et al. (2020) identified possible configurations of strategies to optimize the protection and limit damage. First, using internal linkages (2) along with internal controls (4) so that valuable knowledge is fragmented across employees but also across locations. Second, internal linkages (2) mixed with high interdependence between locations and broad information transfer (Srikanth et al., 2020). The difference between these two configurations is the extent to which R&D teams will be interacting with each other. According to Srikanth et al. (2020) this means that IP protection can be obtained by implementing:

1. A modular strategy where each team has only limited access to the knowledge and no overview of the other teams or whole R&D project.
- 2.
3. An interdependent strategy where teams will be able to create protection by increasing the social complexity of the technology by interacting with each other.

Prud'homme and von Zedtwitz (2019) on the other hand, segment strategies into internal and external oriented. Company policies and employee awareness (1), internal linkages (2), involve headquarter personnel (3), internal controls and knowledge access (4), hierarchical segmentation (5) are internal oriented strategies. As lobbying governmental instances (6) is labelled as external oriented.

According to Prud'homme and von Zedtwitz (2019) risks in emerging countries are dynamic and therefore it is suggested to use a more dynamic combination of externally and internally oriented strategies, especially when the risks derives from local policies or legal systems.

3. Research methodology

To explain the setting and methodology of this research this chapter will be presented in four parts. First, the aim of thesis and the research objective will be discussed. Second, the qualitative approach and the data collection will be elaborated. And the third section introduces the research design including the interview guide. Finally, a short introduction into the data analysis will be given.

3.1. Introduction

As already discussed in the previous chapter, MNEs are encountering problems when setting up part of business in offshore locations, more specifically countries where IPRs are considered weaker compared to developed countries. This topic has not been researched extensively yet, therefore this thesis conducts exploratory research to confirm and extend the existing literature. The limited literature on this topic identifies seven strategies for MNEs to protect their IP in countries with weak IPRs. But as most of the prior research done on this topic is very broad, the scope of this research was narrowed down to solely the Chinese business environment.

Therefore, the aim of this research is to extend prior research by pointing out which strategies are used effectively in practice. More specifically, which strategies are implemented by MNEs that are active in China.

Main research questions

- What challenges do MNEs encounter when setting up (part) of their processes in China?
- Which IP protection strategies are MNEs implementing to protect their IP China?

Sub question

- Are IP protection strategies combined? If so, what combinations are made?

3.2. Qualitative approach and data collection

The problems as well as the solutions MNEs encounter when innovating in offshore locations are not clearly defined and confirmed yet. Therefore, this research will follow an exploratory and a qualitative approach. To link the secondary data gathered in the literature research to the current IP protection methods that are being implemented in practice by MNEs in China, the method of in-depth interviews was adopted. Interviews are especially suitable for research topics that are rather understudied or to discuss sensitive topics. In this case the way the interview was structured invited the interviewees to share their insights on a topic widely considered as confidential. The interviews were formatted in a semi-structured manner to be able to ensure flexibility of the questions and go into detail when necessarily. Semi-structured interview also gives the opportunity to elaborate on new insights provided by the interviewees for example strategies that were not identified in prior research rather than focusing on the 6 common strategies exclusively.

The interviews took place in the period of February to April 2021 interviewees were divided into two categories: experts and managers.

A list of potential companies and experts was collected based on the requirement that the MNE needs to be innovating in China. Innovating thus being defined according to Schumpeter's classification: the application of a new method of production or sales, opening a new market, acquiring new sources of supply or developing a new industry structure. Baran and Zhumabaeva (2018) and Rogers (1998). The interviewees in this list were approach through a semi-formal email and introduced to the interview guide (see appendix 1) when the date for the interview was set. The managers and experts were interviewed for a duration of 45 to 60 minutes and the interviews were recorded when given permission by the interviewee for analysis purposes. Subsequently the interviews were transcribed in a verbatim format and carefully analyzed. Due to the topic being rather confidential and upon request, all the interviewees will remain anonymous and thus only be referred to as either Ex1, 2, 3 (experts) or M1,2,3,4,5,6 (managers).

Experts

First, to gain more general insights on the topic of IP protection and the Chinese IPRs environment three experts on the topic were invited to participate in the research (see table 1). The aim was to collect additional information about the most recent state of the IPRs environment in

	Industry focus	Interviewee position	Experience
Ex1	Chemicals	European patent attorney	5 years
Ex2	SME advisory	IP business advisor	3 years
Ex3	Artificial Intelligence, digital marketing	Sinologist /consultant	20 years

Table 1. Experts

China and the concerns surrounding IP protection. Additionally, these experts were briefly introduced to each strategy to receive a general overview of the prevalence of each IP protection strategy.

Ex1 is a European patent attorney for a leading company in the chemical industry. Ex1 is a prior engineer in the same industry retrained to patent attorney. Additionally, Ex1 has experience in both European as well as global legislation around IP. Furthermore, Ex1 has hands on experience in IP advisory in China.

Ex2 is an IP business advisor for a chamber of commerce and has helped hundreds of small and medium-sized enterprises (SMEs) adapt their IP strategy to succeed worldwide, and in China specifically. Even though Ex2 has a little over three years of experience, as an advisor in a big chamber of commerce the bird's-eye view over the overall IP environment and favored strategies ensures valuable insights for this research.

Ex3 is an established sinologist, speaker, writer, and more important consultant in the European /Chinese business scenery. Ex3 has established various business in China and has hosted various seminars in several countries, including Belgium on how to do business in China. Ex3 is specialized in artificial intelligence and digital marketing which are booming industries in terms of innovation in China.

Managers

Second, after gaining more in-dept insights about the general IP landscape in China interviews with managers of MNEs that are active in China were organized. The aim was to get a more individualistic and precise answer to the research questions. Table 2 exhibits the managers and CEO interviewed in the context of this research.

	Type of business	Head quarter	Interviewee position
M1	Healthcare & lighting	Netherlands	Senior IP Counsel & Head of trademarks and designs
M2	Food industry	Belgium	Sales manager North Asia
M3	Chemicals	Switzerland	IP counsel
M4	Software	Belgium	CEO
M5	Brewery	Belgium	VP Procurement sustainability
M6	Packaging	Belgium	Business development Asia

Table 2. Managers

M1 includes 2 respondents of a global leading company in healthcare and lighting devices with headquarters in The Netherlands. The respondents are the Senior IP Counsel and Head of trademarks and designs both mainly based in different locations, thus Europe and China. The MNE these manager work for has an impressive presence of R&D worldwide, managing research centers in among others France, Germany, India, USA, and China.

M2 is a sales manager responsible for the region North Asia representing the bakery products of a leading Belgian food company founded more than 120 years ago. Right now, they are expanding their already global presence to North Asia focusing first on conquering the Chinese market with their innovative recipes.

M3 is an IP counsel advising a global leading company in specialized chemicals for among others the cosmetics industry. Headquarters are based in Switzerland, but the MNE conducts research 10 R&D centers worldwide including an R&D center in China.

M4 is the CEO of a spin-off of IMEC, an international research center based in Belgium. The spin-off is specialized in software for advanced technology. Additionally, the MNE is launching several R&D collaborations with R&D centers in China, as well as establishing a presence in the Chinese market by opening a local facility.

M5 is the Vice president (VP) of procurement and sustainability for a leading brewing company based in Belgium. This brand is active in 150 countries and currently hosts several production and R&D units in China. The MNE has a strong and already established presence in China in both technology transfer as manufacturing and sales.

M6 is the responsible for the business developing in Asia of a Belgium based family-owned leading business in industrial packaging solutions. The company exports to 65 countries worldwide, China being one of the main sales markets. As their solutions are increasingly innovative M6 has learned valuable lessons in how to protect IP in China.

3.3. Interview guide

The interview guide (see appendix 1) consists of 4 parts and was designed to fit the literature perfectly for analyses purposes, which will be further discussed in the following chapter. The interview guide differed according to whether the interviewee was a manager or an expert on the topic. The interviews held with the experts were more open-ended and general as they are speaking from "second-hand" experience in different cases.

Part one of the interview consist of general introductory questions to get a clear understanding of the interviewee's role, the company processes, and the geographic regions the company is active in. Additionally, the importance and the comprehension of the notion of IP within the company will be captured. For the expert interviews, the experts were questioned about their role and experience in advisory and their clients' profiles.

In the second part of the interview the questions go deeper into the interviewee and the company's experience in the Chinese business and IP environment, the local competition and the risks and problems they may have encountered since their entrance in China. For the expert interview, the experts were requested to explain the general IP environment in China, as well as the general incentives for companies that decide to enter China.

The third part of the interview guide includes close-ended questions about each strategy identified in the literature that need to be elaborated with an example. Each strategy (6) is represented by a common practice. Subsequently the interviewee is asked if they have used this strategy and ground their answer with an example. In this part of the interview the interview format allows to ask more profound questions according to the interviewee's answer. Additionally, an open-ended question was added to investigate whether there are other strategies the MNEs were implemented that are not identified yet.

Some of the interviews conducted are part of an overarching research on the internal linkages strategy by Zhao (2004, 2006) conducted by professor Bart Leten, the promotor for this thesis. Therefore, the last part of the interview guide includes questions about the nature of the technologies being developed by the MNEs and the effect on the implementation and need of IP protection strategies. This part of the interview was led by Professor Bart Leten. Nevertheless, as both researchers have overlapping objectives the answers to these questions are partly included in this thesis.

3.4. Qualitative data analysis

After the data from the interviews was collected, all the recorded interviews were transcribed verbatim, simultaneously the recordings were attentively listened to in order to understand the core of the answers the interviewees have given. The collected data was labelled according to the 4 different parts of the interview guide to identify structure The general introduction (1) which allows to position the MNEs in the special innovation strategy matrix by Quan and Chesbrough (2010) (see figure 1). The Chinese IP and business environment (2), mainly identifying risks/challenges and advantages of conducting part of the processes in a country with weaker IPRs. And strategies to protect IP (3) which is divided into 6 subparts according to each strategy identified. The last part of the interviews covering the nature of the technologies will be discussed briefly as it belongs to an overarching ongoing research conducted by Professor Bart Leten.

4. Results

In this chapter, the primary data collected through interviews will be introduced. The data divided in to 4 different segments following the interview guide: The general introduction (1) and the nature of the technologies (2) which is part of an overarching research and will only be discussed briefly, the Chinese IP and business environment (3), and lastly strategies to protect IP (4). To interpret the data derived from the interviews the third segment, strategies to protect IP will be divided into 4 subsegments according to the strategies identified in the literature. Throughout the presentation of the results the following research questions will be kept in mind:

Main research questions

- What challenges do MNEs encounter when setting up (part) of their processes in China?
- Which IP protection strategies are MNEs implementing to protect their IP China?

Sub question

- Are IP protection strategies combined? If so, what combinations are made?

4.1. The Chinese IP and business environment

The first aim is to focus on finding an answer to the following **research question**: "What challenges do MNEs encounter when setting up (part) of their processes in China?". This section in the interview guide included questions about the managers experience in operating in China, regarding the advantages and disadvantages of setting up a unit in China, how close the local competitors are located to the MNEs, and which challenges the MNEs encountered when trying to protect their IP in China. Before going into the risks of innovating in China and the managers experience, the experts on this topic were questioned on the overall IP landscape and structure in China. Getting the expert' insights help having a more recent view on the IPRs environment in China.

First the experts were asked to outline the current situation in the Chinese IPRs system and their perception on the risks that come with transferring valuable knowledge to China.

Ex 3: *"We need to be very careful when talking about "risks" or "problems" regarding IP protection in China and place these experiences in the historic context. You know, China entered the IP protection scene relatively recent. Every company that entered China before this period was doing business in a whole other scene, where the government and local players were barely aware of the existence of IP protection. In 20 years', time they have built a legal framework that in my opinion, and in the opinion of many IP experts, is very similar to the framework we use in Western countries. The problems lay more in other aspects of the IP protection."*¹

Ex 1: *There is a general idea that the relationship between companies in China are managed by the guanxi. But in fact, if something goes wrong, the guanxi will not work. Especially between Western companies and Chinese companies you need to set up solid contracts. The fact is that there is this fear from companies that the guanxi favors local companies when disputes need to be addressed in court. The fact is that in my opinion the IP system works fairly well if you have set up the things correctly. If you have filed a patent and set up contracts there should be no problem in enforcing your rights. I have seen many brands win cases in China against infringers. Additionally, there are a lot of Chinese companies innovating nowadays. Those companies want to have a robust system of protection, so the system must be fair enough. And from what I hear in general the system right now is fair enough. If you have done the things right, there shouldn't be an issue."*

The experts proceeded to elaborate on one of the biggest concern for MNEs considering innovating in countries with weak IPRs: the weak enforcement of IP in Chinese courts (Huang et al., 2013; Xie & Zhang, 2015; Zhao, 2006). According to the Sinologist and consultant with more than 20 years' experience in doing business in China this concern should not be significant anymore.

Ex 3: *I know one of the bigger problems I have come across until 5 years ago is that despite having a legislative framework, the changes of getting your rights enforced and be compensated for the infringement is low. This had partly to do with the fact that there was not a broad legislative framework around IP protection that was widely used across the country yet. It resulted in cases where if a company has an infringement case in a more rural area, for example the western China, the chances a foreign company will win the case from the local counterpart were low."*

¹ Translated quote (Dutch to English) from transcribed interview of interviewee Ex1.

When asking to go more in-dept about other potential disadvantages of trying to enforce IP in China than the enforceability of patents, the experts had the following to say:

Ex3: *I think the biggest 'problem' right now is that even though the legislative framework and the execution of this framework are okay. There are much more chances of getting imitated, this has mainly to do with the large population compared to Western companies. But also, with the speed of innovation and the risks these imitators take is so large that companies do not get the change to enforce their rights against that many infringers. Companies often thought the efforts were just too complex and therefore lot of infringers get away with imitating."*

Ex1: *"A more complex thing is to identify that your product has been counterfeited."*

4.2. Positioning the MNEs

In this part a general idea of the company processes as well as the extent of the R&D activities conducted in China will be formed. This is particularly important to point out according to Quan and Chesbrough (2010), as the framework they developed (see figure 1) helps recognize the 4 natures of R&D and indicate how susceptible an MNE is for imitation or misappropriation of their IP. This approach is focusing working towards an answer to the first main **research question**: "What challenges do MNEs encounter when setting up (part) of their processes in China? "

Interview question: Which countries are you operating in, which activities do you perform in those countries (e.g., research, development, manufacturing, sales) and why? Please elaborate on the activities in China.

M2: *"We have our home market in Europe, we set up a local entity there. So that's Belgium, Netherlands, France, Germany, Spain, and Italy. Besides [having an entity to distribute directly without agents in] these countries, we have also export Europe. So that's [export to] eastern Europe, southern Europe. And then you have central Europe. And then we moved to the Middle East, and we also have Asia, South America, central America, Africa, so everywhere in the [world]. So, in the USA at the beginning, it was also by export. So, the business model was export via agents, but then we also set up our own local entity and then we do a combination of export from Europe. For China it is a combination, we selectively bring our standard products to China. In the meantime, we also do adapted innovation. Why do we do that? Because we have most of the time done business in China via the distributor. So, we are very far away from the customer. "*

M2: "So, we must start now from scratch, understand the market and from top down and bottom line, that is the first. And second, you must test what you have in the market to say how much you are accepted and how much you are advised to change. So that is why I see first we go with our standard product already selected to the legislation of the local food laws and really can feel the taste needs of the people and for the aroma and then the look of the products. And in the meanwhile, we also collect immediate feedback from the customer. "

M6: "Our headquarter is based in Europe but we provide our sales and services in among others Australia, the U.S.A, and Asia. We have been selling our solutions in Asia, and China for over 10 years now. Recently we opened a unit in Kuala Lumpur to be closer to our clients in Asia. At this moment we only sell and license out our products. Though we have many innovative solutions, I notice that in markets like China we often limit our product offerings to our "older" technologies and solutions. This to preserve our most innovative IP from the risks of imitation in such countries. The newest solutions are reserved for markets where we can ensure our IP will be protected." ²

M4: "All our core R&D activities take place in Belgium, but we have had more and more partnerships with local R&D labs in China, therefore since recently we establish our own office in China. Up until now, the nature of these partnerships is mainly offering support to work with our software in the form of trainings. Some R&D labs have manufacturing units, and we help them align our software, that we out license to them, to their manufacturing processes. As our software is very "open", that means that licensees can built further upon our software. Additionally, we also sell to the local market. " ³

M2, M4 and M6 are currently focusing on low-innovative activities in China, namely local adaptation of imported products and technical support for local sales. Therefore, all three MNEs can be positioned in a low-risk position in the matrix, position 1 (see figure 2): old products for the local market. According to both Srikanth et al. (2020) and Quan and Chesbrough (2010) recognize that even though there is prior knowledge involved which sparks imitator's interest, the radicalness of the innovation is very low which makes these kinds of projects attract less risks. It is important to note that M4 is also leaning towards position 2 (developing new products for the local market) as they are improving their current product by hosting partnerships with local R&D labs.

² Translated quote (Dutch to English) from transcribed interview of interviewee M6.

³ Translated quote (Dutch to English) from transcribed interview of interviewee M4.

		PRODUCT	
		New	Old
MARKET	Global	M1	
	Local	M1 M3 M4 M5	M1 M2 M3 M4 M5 M6

Figure 2. Positioning MNEs' R&D in a spatial innovation strategy. Adapted from (Quan & Chesbrough, 2010)

M1: "Right now I think all our R&D activities are concentrated in [one city in China]. Although if you talk about a little bit broader product development, we also do a little bit in Hong Kong for our domestic appliance's businesses. And, yeah of course we have offices in other Chinese cities as well. To give an impression, basically we have currently four major R&D hubs in the world, next to China, also India, The Netherlands, and the U.S.A. So that means that it is quite an important location. It is not just one out of 25. We have established the R&D and the manufacturer site in a [couple of cities] in China. At the beginning it was decided not to take certain activities to China. Partly because like you already indicated in the beginning the Chinese IP system is of course relatively young, especially compared to the Western European IP systems which are around for 150 years. So, there was a kind of cold-water fear, and we thought let us make sure that we understand how the situation works first. And then we took further steps to move further activities to China."

M1 follows the assumptions of Quan and Chesbrough (2010) precisely by admitting in the early stages of their entrance in China it was opted to keep the product development in other locations and therefore find themselves in position 1 (see figure 4): old products for the local market. Gradually as the MNE started to establish a presence in the market and gained experience it started organizing R&D projects to develop new products for the local market (position 2) and integrate these projects to develop products for other markets (position 3). Considering the framework of Quan and Chesbrough (2010) this makes the MNE a big target for imitators as the innovations are increasingly radical and the knowledge the location is working with is more valuable.

M5: *"At this moment we manage more or less 30 breweries in China. From a consumer perspective not, everyone accepts that a beer is brewed locally [in the host country], luckily in China this is a less sensitive subject. It is more efficient for supply but also for the quality, costs and even sustainability. We build upon our existing brand by using "brand extensions", which are different depending on location because each country has different preferences for flavors. Additionally, we have some local brands either regional or national in China. There the extensions are made locally based upon the very local needs."*⁴

M3: *"The HQ is in Switzerland, but we are active in 53 countries worldwide. Right now, we do sales, R&D in our new innovation center in China, product development and manufacturing. Some products we import from other countries we are active in and further configure them for the Chinese market. Others, we make almost from the basis here in our Chinese facilities. The benefits of having our operations in China are, I mean the local researchers can address the issues with the local customers more quickly. The local sales and marketing people know the local needs more deeply. So, they can work with local researchers more closely to develop new products for, you know, the local customers."*

M3 and M5 are located in both position 1 (see figure 2): bringing old products to the local market, as well as position 2: developing new products for the local market by developing new local brands as well as brand extensions and brand adaptations to the local needs, a position which is accompanied by reasonable risks of imitation.

All the participating MNEs are now divided into the according strategic positions and most of them should be encountering fair risks owing to the activities they conduct in China.

4.3. Risks of innovating in China as a foreign company

After getting familiar with the current situation of the IPRs landscape in China and assessing the level of risks the represented MNEs they are exposed to by positioning the nature of their R&D activities in the matrix by Quan and Chesbrough (2010). The risks MNEs face when conducting innovative activities, and thus transferring knowledge to China will be discussed. The data collected from this part of the interview gives us a direct answer to one of the main research questions.

⁴ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

Main research question: What challenges do MNEs encounter when setting up (part) of their processes in China regarding the protection of their IP?

Interview question: How would you describe your experience in operating in China? What do you consider the advantages and disadvantages/risks of operating in China?

Most interviewees agreed that the main motivation behind setting up R&D activities in China has to do with taking advantage of the local knowledge and gaining front-row insights on the local market.

M1: *"The availability of experts and understanding local requirements made it that we set up R&D centers."*

This is exactly in line with the testimonials of the research identified in the literature review. When asked about the disadvantages and thus risks that come with the opportunity to exploit local human resources and markets, the managers stated that imitation is of frequent occurrence.

M1: *"China is a huge market with a lot of creative people. So, they [imitators] quickly learned what they could, or they could not do in terms of, being caught by us in terms of infringement. They realized they need to change the strategy because they all otherwise would be too easily caught. So, what they did first is moving from a one-to-one copy to kind of small change in our brand name, in a little bit different writing, often in Chinese characters, but then a little bit different from the characters we used."*

M5: *"One of the two big problems we have is the sales of fake beers. Our beers sold in China have a Chinese brand name, imitators tend to change the characters on the brand name slightly. The biggest issue with that is that imitators take time to reproduce the brand, but do not try to reproduce the quality of the beer itself. This results in very poor-quality beverages, that are associated with our brand and therefore hurt our brand image."⁵*

Beside imitation, the risk of reverse engineering and designing around patents is also a clear threat for the MNEs represented in the interviews. Thus, for some MNEs the risks lay more in copying the technology itself rather than the brand image.

M1: *"They [competitors] also have their own R&D people. And they do also study our IPs and try to do design around. So where legally it is allowed."*

M6: *"In the past there have been problems with infringers copying our packaging solution, thus the technology behind the packaging machines. These were mainly local players that managed to reverse engineer our packaging lines and offered our existing clients a similar solution for a fraction of the price."⁶*

⁵ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

⁶ Translated quote (Dutch to English) from transcribed interview of interviewee M6.

To go even more in depth about the root cause of these risks, a senior IP counsel for a lighting and healthcare who observed the following:

M1: *"The IP system, the protection system, also their IP awareness among the Chinese people is maybe not as high as the rest of the Western world. And sometimes for patents our R&D colleagues, they are not very aware of IP protection systems. The questions about IP are quite different from what I received from [employees in] China. So, they are less educated in that topic compared to the rest of the world."*

The lack of awareness for local employees is an observation that was briefly discussed in the literature. From the data collected it was clear that this concern forms a basis for other forms of IP leakage like knowledge transfer due to employee mobility. The first risk that came into mind for an IP counsel in the chemicals industry.

M3: *"The risks that come with it, is that people will leave the company and may be hired by our competitors. They may even sometimes disclose information about our company to the competitor when they get hired. Maybe this could also happen in other countries. But you know, in the US and in Japan for example, this kind of trade secret misappropriation happens less than in China. Because the legal system is different and in China the IP law is more recent and not very very powerful yet. Also, the local employees are not informed enough. Relatively speaking we are still on the way to get better IP awareness here."*

Similarly, the experts were asked to not only set out the risks MNEs encounter from the external environment but also to elaborate on the root causes of these risks. Additionally, the experts were asked to describe the most common mistakes MNEs make that make them more susceptible to IP leakage, imitation, ... The result collected in this part helps built an answer to the **main research question:** What challenges do MNEs encounter when setting up (part) of their processes in China? And set up the basis for the following **research question:** Which IP protection strategies are MNEs implementing to protect their IP China?

The first mistake foreign MNEs make when entering the Chinese market is forgetting or simply not protecting IP with the formal IP protection mechanisms like patents, trademarks... (Srikanth et al., 2020). Surprisingly, this was a statement that came back in all three of the interviews with the experts and is considered the main cause of bad experiences of MNEs innovating in China. A consultant and sinologist with more than 20 years' experience in doing business in China had the following statement:

Ex3: "A big mistake that really happens a lot is that foreign companies forget to patent their IP in China. Simply if it is not patented you cannot protect it. As for most MNEs China is not the first country they are coming in to they have their patents registered in for example Europe first. But by the time these MNEs reach the Chinese market their technology is already imitated and patented by local competitors."⁷

Similarly, an IP business advisor for a Chamber of Commerce gave the following answer:

Ex2: "I have seen cases where the IP was protected in the home country and therefore also made public. Then the company wants to enter a new market, for example China. Of course, they want to test their product first, but unfortunately by the time they decide they are proceeding with this market and want to appropriate their knowledge they find out that the IP has already been claimed by local competitors."

Ex1: "I think the most common mistakes I saw happening up until ten years ago was not filing patents in China. Because of the cliché that it is not enforceable anyway, that in China you can do whatever you want. Obviously if you file a patent correctly, they [imitators] cannot do whatever they want."

Ex2: "The main risk companies take is not being prepared properly. If you do not have your IP protected by patents or trade secrets, in this market you will for sure find a competitor."

One of the respondents revealed that some companies make the mistake of not coming to China directly but first assign a local partner that sets the initial offshore location up for them.

Ex2: "We have seen cases where the Chinese brand started developing the business, when the Western company wants to interfere, they realize they have no power or ownership, and out of the blue they have a competitor using their brand."

This opened a conversation about the status of Forced Technology Transfer policies (FTT policies) earlier mentioned in the literature review, and the way they affect foreign MNEs wanting to set up an entity (to innovate) in China. The expert, who is an IP advisor for SMEs stated that in theory local instances are not allowed to force companies to transfer their knowledge in any way. However, in practice this still happens in some industries.

Ex2: "The forced technology is being under control. Technically speaking there is no way to force companies to transfer their technologies from the legal point of view. But if you look at the foreign investment law there is a negative list. It states some industries that are prohibited or restricted to enter as a foreign company, meaning they are not allowed to have technology in this industry. "

⁷ Translated quote (Dutch to English) from transcribed interview of interviewee Ex3.

Ex2: *"In general, the prohibited industries do not affect most of the MNEs coming to China as its mainly technologies related to the national security like military applications and weapons. The restricted sectors which are more however, you need to have a Chinese partner as a specific requirement to participate in these restricted sectors. It goes like this: an MNE opens a joint venture, with a Chinese partner and ask the government for full permission to be a part of this company. The technology transfer is somehow forced, but you need to proactively ask for this permission so again not fully forced."*

A Sinologist and consultant with 20 years of experience in doing business in China added:

Ex1: *"Officially it is not allowed, in December 2020 the Chinese government made alterations to these policies. However, Chinese players in the market are very brainy, they suggest foreign MNEs to partner up with them and helping them gain a part of the market share in return for having insights on their technologies. This has to do with the fact that before IP protection was considered in China, many locals believed in sharing information in a sort of "open innovation" context. They would imitate or infringe technologies but at the same time share it openly so that everyone can enjoy the benefits."*

4.4. Strategies to protect IP

In this chapter the results are analyzed to find an answer to the following **research question:** "Which IP protection strategies are MNEs implementing to protect their IP China?". For each strategy (6) identified in the literature the common practices were carefully selected. During the interviews with the managers from MNEs, one semi-open question for each strategy was asked. Additionally, the manager was asked to support their answer with an example. The aim was to test if these strategies, that were identified by prior research are used in the sample of MNEs represented in this research, moreover how practical these solutions are in their day-to-day activities. This resulted in comprehensive opinions and anecdotes.

4.4.1. Internal linkages

Internal linkages is a strategy that was persistent in the literature and seems to be the basis for other alternative strategies that are used by MNEs to protect IP. Zhao (2006) suggested that MNEs protect their knowledge from leaking by splitting up their projects over locations, thus deciding to sometimes locate less valuable IP in these countries with weak IPRs.

Specifically, this would mean that the IP used in R&D projects in for example China, is not valuable enough on its own because it is complementary to other IP located elsewhere. The other IP is held in locations that are considered strong IPRs environments. With this strategy MNEs try to use this complementary IP as a buffer, in the case of IP leakage in the country with weak IPRs the losses will be limited as the IP is not valuable enough unless combined with the complementary IP in the other locations. It is obvious that this strategy of internal linkages is only possible because MNEs have the capacity to assimilate, generate and integrate knowledge on a worldwide basis due to their international presence but also their excellent internal innovation structure (Zhao, 2006).

Interview question: Do you rely on a segmentation strategy whereby R&D projects are split up over different locations (China and another country) whereby each location is responsible for part of the project and coordination happens via an international team? If this is the case, please provide an example. Is this a standard practice for all businesses/technologies?

Some managers claimed that the MNE they are representing uses the strategy of strong internal linkages frequently. For example, a sales manager responsible for the region North Asia for a big player in the food industry explained their internal processes.

M2: *“For our research and innovation projects, we have a metric system. So, some of the projects even when they are done locally, they can be rolled out internationally. We have the international panel, international category manager, international innovation manager. We have a screening system of projects which is really centralized. Every week, every Friday we collect the whole week of projects application that is coming from all over the world. And then these projects will be finally filtered to be assigned to different project teams. So, some of them will be centralized, some of them will be localized.”*

A respondent from another MNE, a brewing company with multiple R&D locations worldwide gave the following insights.

M5: *“It is a conscious choice to implement this strategy. It is a global strategy for us to split up some projects, just in case of. To preserve the projects from bad intentions, that happens.”⁸*

An IP counsel for an MNEs in the chemical industry argues that the strategy of splitting up R&D projects is only in place for the most sensitive or valuable projects.

M3: *“For some very sensitive projects, for example where we produce very valuable materials in China. We need to work closely with team members to protect the valuable IP. In that case the projects that are mainly divided in sections, for example: product control,*

⁸ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

product design, ... may be done outside of China. It's not the case for most of the projects, only for sensitive ones, and it is coordinated by an international team."

Other respondents explained that the use of international teams is a common practice, however deliberating splitting up projects to protect IP is not included in their strategy.

M1: *"We have our different research labs all over the world, but our research is not organized like geography-based. The same research projects can have the teams from all the labs, China, U.S.A, European labs, are all mixed together. Our company wants to hear our combined knowledge and skills from all over the world so we can come up with good solutions. That is how we are organized in an international way."*

Another point of view was given by the CEO of a MNE in the software industry.

M4: *"For us it is more for efficiency related reasons, because for quality control and management reasons it is easier to concentrate your activities in one location. However now we have established a lab in China, and the IP developed in that lab will be transferred back to the head quarter in Belgium to ensure that we have control and ownership of the developed IP at all times."*⁹

4.4.2. Company policies and employee awareness

As priorly pointed out in the data collected from the first introductory question, lack of employee awareness could be at the base for some cases of IP leakage. For example, unwanted knowledge transfers due to employee mobility. Therefore Alcácer and Zhao (2012) suggest to bring awareness to employees and employ company policies. Evidently, it all starts with internal communication towards the employees to create awareness about the seriousness of protecting IP.

M2: *"Many of the companies don't have this kind of sense [of awareness]. Our company is very aware of different issues. We organize workshops for different levels of employee. Now it is a must that we attend, and that you understand the importance for your level. For the onboard training for example. I had a meeting with my legal colleagues, and then they gave me the information, what I need to be aware of, what is important. So, for me, I immediately got that message. Okay. IP is important."*

⁹ Translated quote (Dutch to English) from transcribed interview of interviewee M4.

When discussing the topic of implementing internal controls, which will be discussed further in chapter 4.4.5 the IP counsel for a company offering lighting and healthcare products stated the following:

M1: *"We constantly monitor to see if leakage is happening to raise the awareness of the people that they are actually dealing with confidential information. Because when you are working at a company like ours over time, if you are not in IP, then it is difficult to forget about the value of that information. And you might not even consider it a breach sharing something with someone from outside the company. So, it's a kind of awareness."*

Creating awareness also means having a corporate reputation of being though in patent enforcement towards both employees and the external environment according to Alcácer and Zhao (2012). Some MNEs try to create this reputation by having a preventive team in place to identify potential threats in advance.

M5: *"To be fair, it is often very hard to realize that our knowledge has leaked in such a big market. And infringement cases can only be filed when we can catch infringers in the act of imitating. Therefore, we have a permanent team in audit compliance identifying potential knowledge leakages."*

M1: *"The imitators are conscious of the fact that we are aware that they are imitating our products. It is a kind of battle, we hit them, they try something different, we hit them again. If we lose, that is okay. At least they know we are precautious."*

This strategy also includes two main practices: putting in place company policies describing how to deal with external parties, and contractual measures to limit employee mobility to competitors. A contractual measure like non-compete clauses can legally restrict an employee from working for a competitor, often for a certain amount of time after leaving the company. Thus, avoiding that the knowledge employees obtain during their employment is transferred to competitors, which could result in serious loss of competitive advantage (Srikanth et al., 2020; Zhao, 2006).

Interview question: Do you have a company policy (e.g., use of non-disclosure agreements) on how to deal with external parties in protecting your intellectual property? If this is the case, please elaborate how on the most important elements of your company policy.

Overall, the respondents seem to agree that signing non-disclosure agreements are a standard practice in their company. One respondent state that after signing non-disclosure practices, it is still important to take the responsibility to keep reminding and educate the employees on the importance. Because even though employees have the best interest in mind, confidential information can easily be shared unconsciously.

M2: *"We implement non-disclosure approaches to have the law and regulation. So, in fact, we know from ourselves, we should not ask for example the specific information from our, we should not violate the intellectual property of others and so on. But it is needed for our company to remind us how are you using this kind of information? How many mistakes have you already made? What can be the mistakes that we are making?"*

Additionally, these on-disclosure agreements seem to be particularly important to address to not only employees, but external parties as well. For example, a manager for a global brewing company claimed:

M1: *"Sometime when we are in negotiations with suppliers, we provide samples or designs of what we want to develop before signing an official agreement for partnership. It is than a standard practice to sign a non-disclosure agreement before the negotiation process starts."¹⁰*

Similarly, an IP counsel for a company in the chemical industry substantiated this approach.

M3: *"We have an IP policy that everyone has to keep confidential information secret, unless there is a business discussion. And also, for example, salespeople when they give out samples to potential clients, they need to make sure that the non-disclosure agreement is put in place and approved by the legal IP department."*

As for the contractual measures to prevent leakage from employee mobility the following insights were collected.

Interview question: Do you rely on anti-compete clauses or other (contractual) measures (e.g., stock options) to prevent local employees from leaving and leaking valuable company knowledge to competitors? If this is the case, please elaborate on these measures.

It was a recurring answer that non-compete clauses are used but depend on the employees' position in terms of how stringent these measures are applied.

M2: *"For some critical positions, senior technical managers or scientists, when they join the company, they need to sign a contract with a non-compete clause. It states that the employee will not work for the competitors in the next 2 years."*

¹⁰ Translated quote (Dutch to English) from transcribed interview of interviewee M1.

M1: "At the end of an employee's career this is certainly a topic that needs to be addressed. It actually depends on the position of the employee that is leaving the company. For example, an employee working in the commercial department it is realistic that we explicitly put an agreement in place that they are not allowed to work for a competitor. But for example, if someone in my position wants to leave the company [Vice President], there need to be negotiations to see what is possible."¹¹

According to a CEO of a company in the software industry the reason for these unequal clauses is the fact that some employees have no choice when switching employers as their position and skills are quite industry specific. Therefore, it would be unfair for companies to interdict these employees to continue practicing their profession.

M4: *"Non-disclosure agreements are written down in the contract as a standard practice. However, we do not include non-compete clauses, in my opinion I cannot prohibit someone to carry out their job. A professor in photonics for example, what other company needs such a researcher that is not our competitor? An alternative would be to prohibit such workforces to be employed by a competitor within a time period but offer to compensate the loss of the income in that period. Although this may not be viable in all cases."*

The CEO suggest a revision of such clauses to fit the professional but also personal situation of the employee by not allowing the employee to transfer to a competitor within a time period but acknowledge the viability by paying the employee a bonus that equal a salary for that period. Needless to say, this strategy has limitations as a company therefore should make a tradeoff between the value lost from possible knowledge leakage and the cost for paying out the compensation.

4.4.3. Involve head quarter personnel

In the literature a strategy was discussed by Berry (2017), Nandkumar and Srikanth (2016) and Srikanth et al. (2020) which involved the positioning of head quarter personnel in local R&D teams in the offshore locations to carry out a form of social control and guide the local employees to work more aligned with the head quarter rather than outsiders. This headquarter personnel is assumed to take care of the organizational aspect and is less involved in the actual R&D tasks at the location (Srikanth et al., 2020).

¹¹ Translated quote (Dutch to English) from transcribed interview of interviewee M1.

Interview question: Do you assign employees from the company's home country to supervise the operations of local teams with the objective to guard your intellectual property? If this is the case, please provide an example. Is this a standard practice for all businesses/technologies?

Overall, this seemed like a more sensitive topic as some respondents did not want to openly disclose, they administer a sort of control over the local employees and the valuable knowledge using head quarter staff in crucial positions.

M5: *"That is a delicate question, it is like stating that we are superior to our colleagues that work on the same project."*

M3: *"I would say, in many foreign companies in China including ours, there are some foreign researchers and leaders here to supervise and manage the R&D activities. They supervise and manage the activities but also bring their expertise to the local teams, although I think their task is mainly to supervise."*

Many respondents proceeded to explain that in fact there are head quarter employees assigned to positions in offshore countries with sometimes weaker IPRs, but often also for other reasons such as optimizing knowledge transfer across employees with different experiences originating from other locations.

M1: *"I think that is something we did in the past. I think like 20 years ago, we brought senior managers to come to China to establish the research center. Although now a lot of local Chinese colleagues are taking more and more senior positions and they still have the supervision, or they must report to the global. Most recently we had people with a strong Chinese affinity employed. So, they had experience from both working outside China and of course, understanding the Chinese way of working, the Chinese language, Chinese culture. So, I think the mix of employees is very important in this decision as well."*

M5: *"There are some foreign employees situated in key positions, but it is not necessarily to supervise the local researchers but for various other reasons. First, it is beneficial for individuals to visit different R&D locations, but also beneficial for the company to get different points of view on some projects. And to be clear, when I come to our Chinese establishments my biggest task is compliance. And compliance includes much more than IP, for example the legal rights of the employees. These kind of missions for head quarter personnel are needed to keep things running smoothly and detect obstacles early."*¹²

This is in line with the results in the study of Srikanth et al. (2020), where head quarter personnel was not only used for social control but also for foreseeing potential risks early. Having regular activities between head quarter personnel and offshore locations not only strengthen the

¹² Translated quote (Dutch to English) from transcribed interview of interviewee M5.

internal linkages but the head quarter will be able to respond more quickly to limit the risks of leakage of new innovations (Srikanth et al., 2020).

For some firms, the head quarter is involved in decisions regarding the design, building of the components in the offshore location. Headquarters take the final decision on how to proceed in the innovation process (Zhao, 2006).

M5: *"We often need to ask head quarter for permission for certain brand extensions [local adaptations to product]. Every brand has an owner that needs to give their consent and asses if the extensions is conform with the overall brand image."¹³*

4.4.4. Hierarchical segmentation

MNEs can internally control and manage the types of knowhows that is shared among locations, lowering the leakage risks. More specifically by using the principle of modularity, the ability to fragment complex systems into smaller parts (modules) and clearly defined standards or design rules that enable the modules to operate together (Quan & Chesbrough, 2010). Local R&D staff in offshore locations will only have access to the part of the information that is needed to carry out their tasks (Quan & Chesbrough, 2010). Even though R&D staff receive the parameters of a big part of the project they do not have access to the whole picture. Hierarchical segmentation ensures minimal knowledge transfer subsequently decreasing the leakage damage (Quan & Chesbrough, 2010). The usage of hierarchical strategy at the represented MNEs is measured using the following interview question.

Interview question: Do you fragment access to knowledge across employees in the Chinese affiliate so that only a small number of people have access to important intellectual property? If this is the case, please elaborate how you organize the fragmentation of knowledge access.

One respondent was persistent on the fact that the company the respondent is employed in has a very open culture in term of knowledge transfer.

M2: "In our company I have the feeling everyone is very honest and transparent. If we ask for additional information, like a specific recipe I am allowed to, it is not as if this information can only be known by certain positions in the R&D team. We have the non-disclosure agreements in place. So, we know what needs to stay within the company. I feel like our colleagues have the awareness and responsibility to takt the right decisions. "

¹³ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

However other respondents gave insights to how they implement this strategy to segment knowledge across employees in various ways. The CEO of a highly technological company offering software primarily uses the strategy of hierarchical segmentation for efficiency purposes.

M4: *"We do use such as strategy, not according to the individual but according to the task divisions. The employees in sales have access to other data as for example the R&D staff, it happens that this information overlays. For us it is just to work more efficiently and make sure no one interferes in the tasks that are given to certain divisions."*

M5: *"For the very confidential projects we indeed try to limit the group that has access to that information, sometimes only one or two people that are allowed to be aware of that information. Some people for the marketing department, some from the supply chain department and so on. Eventually the rest also gets access to the information, but just in a much later stage."*¹⁴

M1: *"For very key trade secrets, and IP, we don't exclude the segment strategies. For example, for manufacturers we have some trade secrets in the manufacturing process, only those who are actually doing that process, they have access to their trade secret. That is on an all I need to know basis. It's not significant for China or other countries, but it applies to all locations."*

Remarkably, **M1** made the following remark:

M1: *"But on the other hand, we try not to control everything. Because then people stop talking with each other. Then we won't have new innovations if people are too isolated."*

M4 followed the same logic.

M4:" It is certainly not the purpose to deprive the employees of knowledge, that is not efficient."¹⁵

It confirms MNEs can go even further by putting constraints on cross-border knowledge flows to keep valuable IP protected under IPRs of the home country, although this may stand in the way of innovation (Zhao, 2006).

¹⁴ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

¹⁵ Translated quote (Dutch to English) from transcribed interview of interviewee M4.

4.4.5. Internal controls and knowledge access

Internal controls help firms to manage employee's access and therefore also access from external parties to confidential information by restricting physical access. The objective of these internal controls is that the knowledge is not easily physically available for multiple individuals, all having a different accessibility to the knowledge that is being protected (Srikanth et al., 2020). There are various implementations to ensure a solid physical security around valuable IP. First, the use of multiple databases to store valuable information, each database having its own access protocols innovations (Quan & Chesbrough, 2010; Srikanth et al., 2020). Second, the servers these important data is stored in can be located outside of the offshore location where (part of) the innovation is taking place, for example in the home country. Reinforced with controls for accessing this information innovations (Quan & Chesbrough, 2010; Srikanth et al., 2020). Third, physically dividing teams according to what project they are working on, additionally have restriction on access to the different R&D work areas. Last, restricting employees from reading, downloading or printing documents according to their role in a R&D project (Srikanth et al., 2020).

Interview question: Do you rely on security measures (e.g., IT security or security of access to your facilities) to protect your intellectual property from leaking out to external parties? If this is the case, please explain the most important security measures.

All respondents agree on this strategy and implement it in their activities as a standard practice.

M1: *"Yes, I think they generally, we employ these measures worldwide. Of course, our premises are secured with digital access only to the people who need to be there. But next to that, we also have in place security measures on our tools and our systems. To give an example, the moment someone indicates that he or she wants to leave our company, we critically assess the access of data of that person to make sure that that person will not take, with him or her, confidential information."*

Additionally, **M1** stated that besides detecting leakage faster, internal controls also help with keeping the employees alert, and aware that they are dealing with confidential information.

From the collected data it is clear that also having restriction on access to the different R&D work areas is a very common implementation restricted knowledge access.

M5: *"Security is priority number one, we have IT-security access controls you name it. For example, we have some breweries that are used for testing products, there are a few physic barriers implemented to deny access to external parties that do not need to be there. On my laptop, there is for sure a lot of valuable information my competitors would love to get in their hands."*

M4: *"For one Chinese unit in an incubator center we are applying additional strict measures for access to our workspace. In such a center the knowledge is transferred too quickly."*¹⁶

4.4.6. Lobbying governmental instances

According to Prud'homme and von Zedtwitz (2019) engaging with government instances to improve IPRs in the host country can be a more effective way, in the long run to protect IP in countries with weak IPRs. This can be implemented by for example lobbying the Chinese government either directly or indirectly through organizations like the chambers of commerce. MNEs could also voice their concerns through state officials in their home country to bring the issues around IP protection to the table.

Interview question: Do you interact with local and national governments to improve the protection of your intellectual property? If this is the case, please elaborate on this strategy.

The opinions on this strategy show that it has not been considered by a lot of MNEs yet.

M2: *"At this moment, we do not, but certainly it will be my purpose also to get into contact with the local authorities, the government. And also, to benchmark with the peers on IP protection and not only in our industry."*

M3: *"Actually new do not use this strategy, we need to take our own measures to protect the IP. But when there is a case, we work with the local court and police stations and marketing supervision bureau to protect the IP."*

However, one MNE believe in the effectiveness and importance of opening up the discussion with local or national governments around IP protection concerns.

M1: *"We are members of these kind of IP associations and organizations. We also have opportunities to talk with the China associates and we also regularly kind of keep in touch with the authorities either directly or via our agents."*

The IP Counsel and Head of trademarks and design elaborate this statement even further, by affirming that they preferably use these lobbying organizations as identified in the literature to address the IP protection concerns.

¹⁶ Translated quote (Dutch to English) from transcribed interview of interviewee M4.

M1: *"We have different channels to really talk or express our opinions and our thoughts about their IP protections We typically do that via more like, cross-company associations of interest holders. We work with the international chambers of commerce to make sure that our company's interests are properly recognized. There are organizations which bring together, non-Chinese companies, but also manufacturing companies. We have ways to contact people in the government, individually, but we prefer to do that as a stakeholder in a larger group of companies. For example, if we see that, in the customs regulations, there are some clauses which hinder us and hamper us in taking proper enforcement. We try to explain why certain rules might need to be updated and improved through an association which is very involved in these export regulations, of which we are a member of."*

Additionally, the respondents went into a topic that was theretofore unknown in this research. According to both the IP Counsel and the Head of trademarks and design the Chinese e-commerce platforms can be seen as an external party that should be targeted by these external oriented practices. As online marketing and sales are of big importance in China. These platforms can become government like, and it is in the benefit of MNEs selling consumer products to work together with e-commerce giants to improve the rules on these platforms and online enforcement of IP.

4.4.7. Other strategies

After going through all the strategies on the interview guide, respondents were asked if they could come up with other strategies, they implement to protect their IP in China, that had not been mentioned yet. Most MNEs agreed on that the strategies mentioned covered all their current practices. However, some MNEs revealed a new strategy: speed to market/lead time.

In a scene where competitors, customers and the market evolve rapidly, MNEs need to adjust their internal processes to keep up. In many cases the innovative landscape in China is so exceptionally rapid that it designs a strategy for MNEs to protect their IP.

M1: *"The Chinese economy and the people are evolving rapidly in the past years. But I think this also kind of also drives us to keep innovating and always move ahead of it."*

M5: *"We're used to a consumer market that is changing swiftly, but in China it is even more accelerated, especially digitalization. For us, staying ahead of the curve is more important than protecting the technology behind it with formal IPRs." ¹⁷*

¹⁷ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

M6: *"We mainly count on our rapid innovation processes to protect our IP instead of for example waiting for formal methods as IP enforcement in courts."*¹⁸

The idea behind speed to market or taking advantage of lead time is that the IP becomes irrelevant faster, thus not giving imitators or infringers the change to catch up and take advantage of knowledge leakages. For the Vice President of procurement and sustainability for a leading brewing company the priorities lay in responding to the customer needs in a certain moment in time.

M5: *"With our speed to market we make more impact on IP protection than when we try to protect all the new IP formally. Summertime and holidays like Chinese New Year happen only once a year. By the time competitors try to imitate the beverages we brought out during a holiday, the moment has already passed and we're working on something new."*¹⁹

After further discussion about using speed to market as a strategy for IP protection the Vice President of procurement and sustainability proceeded to label the nature of the technology they develop as one of the influencing factors to be able to profit from a rapid innovation structure.

M5: *"The fact that the nature of the technology we develop is rather simple allows us to modify the product at a faster pace. Opposite to complex, discreet technologies are outdated faster, which is no problem for us as we want to proceed developing the next new technology in the blink of an eye."*²⁰

4.4.8. Combination of strategies

To address the sub question "**Are IP protection strategies combined? If so, what combinations are made?**", the collected data from the previous questions regarding the use of certain IP protection strategies is illustrated in Table 3. The table presents each strategy and indicate if the manager and thus the MNE carries out this strategy in their processes. To answer the first part of the sub research question, by looking at the table and available data it is positive that strategies are combined.

Srikanth et al. (2020) identified possible configurations of strategies to optimize the protection and limit damage from IP leakage. First, using internal linkages and internal controls. Second, internal linkages, high interdependence between locations and broad information transfer (for example using head quarter personnel for knowledge flows from the offshore location and the head quarter) (Srikanth et al., 2020). The difference between these two configurations is the extent

¹⁸ Translated quote (Dutch to English) from transcribed interview of interviewee M6.

¹⁹ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

²⁰ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

to which R&D teams will be interacting with each other. Analyzing the collected data some MNEs clearly lean towards one of the two combinations presented by Srikanth et al. (2020).

1. An interdependent strategy where teams will be able to create protection by increasing the social complexity of the technology by interacting with each other.

M2 and M4 lean towards a more interdependent combination of strategies. M2 argued specified whole the interview that the MNE represented carries out a very transparent strategy, employee awareness and responsibility is encouraged rather than splitting knowledge across employees and involving head quarter personnel for monitoring IP leakages. Similarly, **M4** favors a strategy where there is mutual trust to be able to be transparent enough across locations and teams. However, **M4** implements Hierarchical segmentation, but with the objective to make the task divisions more efficient not necessarily restricting access to fight knowledge leakage.

M4: *"I try to shape teams that are built on trust. I believe in trusting to all of the local employees as well in all locations. Ideally we provide all of the knowledge that the employees feel they need to carry out their job correctly."*²¹

2. A modular strategy where each team has only limited access to the knowledge and less overview of the other teams or whole R&D project.

M1 and M5 have been very vocal about the strategy of internal linkages in combination with hierarchical segmentation of knowledge across employees. Both are in favor of strict internal controls and knowledge access.

M5: *"Security is priority number one, we have IT-security access controls you name it. For example, we have some breweries that are used for testing products, there are a few physic barriers implemented to deny access to external parties that don't need to be there." On my laptop, there is for sure a lot of valuable information my competitors would love to get in their hands."*²²

Additionally, M1 and M5 tend to use the strategy of hierarchical segmentation frequently.

M1: *"For very key trade secrets, and IP, we don't exclude the segment strategies. For example, for manufacturers we have some trade secrets in the manufacturing process, only those who are actually doing that process, they have access to their trade secret. That's on an all I need to know basis."*

²¹ Translated quote (Dutch to English) from transcribed interview of interviewee M4.

²² Translated quote (Dutch to English) from transcribed interview of interviewee M5.

M5: "For the very confidential projects we indeed try to limit the group that has access to that information, sometimes only one or two people that are allowed to be aware of that information. Some people for the marketing department, some from the supply chain department and so on. Eventually the rest also gets access to the information, but just in a much later stage."²³

For the remaining 2 respondents there was insufficient data collected to analyze the combination of strategies they are rolling out.

	M1	M2	M3	M4	M5	M6
Internal linkages	X	X	X	X	X	
Policies & awareness	X	X	X	X	X	X
Involving head quarter personnel	X		X			
Hierarchical segmentation	X		X	X	X	
Internal controls & knowledge access	X	X		X	X	
Lobbying government		X				

Table 3. Strategies implemented by respondents.

²³ Translated quote (Dutch to English) from transcribed interview of interviewee M5.

5. Discussion

In this chapter, the data collected through interviews will be linked to the literature, gaps will be assessed, and conclusions will be drawn accordingly.

The Chinese IP and business environment

The assumptions made in the literature about the strength of the IPRs in China and the risks of innovating locally are not completely in line with the perception of the experts interviewed. Both Huang et al. (2013) and the experts interviewed for this research agree on the fact that the legislative framework in China is relatively young and therefore still requires improvements to match the standard of IP protection in Western countries. Huang et al. (2013) and Zhao (2010) suggest that due to the novel nature of the IP protection system, the Chinese IPRs environment is rather weak. Experts' insights, however, argue that the judgment the Chinese IP protection environment would be weak due to the legislative framework and the execution in courts needs to be put in historic context. Moreover, some managers interviewed substantiated this opinion. Poor execution of enforcement in court (Nandkumar & Srikanth, 2016) cannot be assumed with the literature and the data revealed in this research. Both literature (Zhao, 2010) and experts agree that the unusual size of the country and market contribute to the risks as there are more chances of getting imitated which makes it more complex to notice IP infringement and imitation, but also money and time consuming to enforce the MNEs rights.

Risks of innovating in China as a foreign company

The collected data confirmed the results of previous research stating the driver for setting up R&D activities in offshore locations is profiting from local talents and expertise, as well as being closer to a (potential) market Zhao (2006). As for the risks that MNEs are exposed to, risk for imitation (Berry, 2017; Zhao, 2006) design around and reverse engineering, employee mobility (Froese et al., 2019; Srikanth et al., 2020), lack of awareness of importance of IP due to historical grounds (D. Yang, 2003) are confirmed by the results of the interviews conducted. The risks deriving from Forced technology transfers (FTT), a practice where foreign companies are required to transfer (part of) their technology to local entities in exchange for access to the market, investments and administrative approvals Prud'homme and von Zedtwitz (2019) and Prud'homme, von Zedtwitz, Thraen, and Bader (2018), was discussed more thoroughly in the interviews with experts. First it can be argued that due to the cumbersome process for foreign firms to obtain permits, product approvals,... (Froese et al., 2019), foreign firms turn to local partners often to help them set up an entity in China. In the case of deliberately starting a partnership with a local agent, the most common mistake according to data collected from expert interviews is assigning a local partner without being closely involved in the process. This sometimes leads to situations in which the local agent takes

advantage of the freedom and trust and becomes a competitor for the MNE robbing the MNE of the ownership of the established brand in the offshore location. Forcing firms to transfer technology by implementing barriers has recently (December 2020) been prohibited in any form. However, experts notice that in practice, firms still are offered market share or access by local competitors in return for a piece of their technology. Additionally, there are still some restricted sectors for which foreign companies need a joint venture with a local partner to be approved access to selling in these sectors.

Internal linkages

MNEs have the ability to distribute the innovation process across locations, usually the head quarter and the captive centers, and then integrating the results by involving an international team (Alcácer & Zhao, 2012; Srikanth et al., 2020). The respondents admitted to implementing such segmentation strategy by for example assigning all projects globally over different locations. Internal linkages allows to keep the more valuable complementary IP protected under home country IP law labels while less valuable IP is developed elsewhere (Zhao, 2006). Which according to the managers limits damage in case of IP leakage. For most respondents, such projects are then coordinated by an international team, and the developments are closely reported back to headquarters. Which results in IP that is intertwined in the firm's internal knowledge to that extend that it is as they were developed right at the headquarters without actually having to transfer the all valuable complementary knowledge to these offshore locations (Zhao, 2006). These international teams substantiate the notion of cross-cluster teams discussed in the literature. Rotation of R&D teams or managers allow MNEs to get more comprehensive knowledge and draw boundaries for the IP. Additionally, it helps avoiding the formation of only local capabilities, for example employee spin-offs. Cross-cluster teams can easily identify valuable information and transfer it to other locations quickly when needed (Alcácer & Zhao, 2012). Managers agree with this assumption as they have used international teams to share knowledge and pick up different points of view on a certain project.

Company policies and employee awareness

To avoid unwanted knowledge transfers, for example from employees leaving with information obtained during their employment and transferring it to competitors, which could result in serious loss of competitive advantage (Srikanth et al., 2020; Zhao, 2006). Alcácer and Zhao (2012) suggest reducing incentives for imitation by implementing organizational designs for secrecy like company policies: non-disclosure and non-compete agreements. Non-disclosure agreements are mainly used to protect knowledge from being leaked when employees are dealing with external parties. Non-compete agreements can legally restrict an employee from working for a competitor. According to the respondents, non-disclosure agreements are indeed a standard practice to protect valuable knowledge. In practice however, these are used between the company and the employees, but also frequently between the company and clients or suppliers when negotiations take place. Furthermore,

when non-compete clauses are considered, managers consider the position of the employee, as it is not always viable to restrict employees from being employed within the same industry and thus by competitors, especially when the employees' skills are very industry specific. A costly alternative in those cases would be to pay out an equal to a salary for the period the employee is restricted from working for the competition.

As for employee awareness, all respondents agreed that monitoring daily activities in various ways such as email controls, marking confidential documents,... (Srikanth et al., 2020), reminds employees that they are working with sensitive information and thus creates awareness, which is completely in line with what Srikanth et al. (2020) suggested.

Lastly, Alcácer and Zhao (2012) briefly suggested that having a corporate reputation of being though in patent enforcement when needed increases employee and external parties' awareness around the seriousness of the IP. This is a strategy that seems to be quite a standard practice for some MNEs.

Involve headquarter personnel

For some MNEs interviewed in this research, the head quarter is involved in decisions regarding the design, building of the components in the offshore location. Headquarters take the final decision on how to proceed in the innovation process. This supports the finding from Zhao (2006). Berry (2017) and Srikanth et al. (2020) claim the strategy of using head quarter personnel in offshore locations can go even further. Head quarter personnel can be involved in R&D projects offshore to carry out a form of social control, and guide the local employees to work more aligned with the head quarter rather than outsiders (Berry, 2017). Additionally, head quarter personnel can interfere more rapidly when a risky situation takes place when they are on location (Berry, 2017). From the interviews it was clear that head quarter personnel are frequently involved in such offshore R&D projects, but this is rather a sensitive topic. This results in not being able to collect enough data to confirm the use of this strategy with the objective to monitor and protect IP from leaking. However, managers did argue that head quarter personnel are often assigned to offshore R&D projects to bring their expertise and carry out compliance.

Hierarchical segmentation

MNEs can internally control the diffusion of knowledge across locations, lowering the leakage risks. By using the principle of modularity local R&D staff in offshore locations will only have access to the part of the information that is needed to carry out their tasks (Quan & Chesbrough, 2010). Even though R&D staff receive the parameters of a big part of the project they do not have access to the whole picture. Most of the managers interviewed execute a strategy where they divide knowledge according to an employee's position, distributing knowledge on a "all I need to know" basis. For some managers, this practice happens only in the early stages of sensitive projects.

At a later stage, this information is diffused more widely. Hierarchical segmentation ensures minimal knowledge transfer subsequently decreasing the leakage damage (Quan & Chesbrough, 2010). Therefore, some managers made the remark that they tend not to use this strategy too excessively, as they do not want to deprive employees from knowledge to a point, they become isolated and harm innovation and efficiency.

Internal controls and knowledge access

The finding from previous research regarding internal controls and managing access to knowledge are in accordance with the finding from this study. Interviews revealed almost all the MNEs represented secure their workspaces and IT by using internal controls. It helps manage employee's access and therefore also access from external parties to confidential information by restricting physical access (Srikanth et al., 2020).

Lobbying governmental instances

According to Prud'homme and von Zedtwitz (2019) engaging with government instances to improve IPRs in the host country can be a more effective way in the long run to protect IP in countries with weak IPRs. This can be implemented by for example lobbying the Chinese government either directly or indirectly through organizations like the chambers of commerce. MNEs could also voice their concerns through state officials in their home country to bring the issues around IP protection to the table. This strategy does not seem of frequent occurrence compared to the other strategies; therefore, it was not possible to elaborate on how viable this strategy is for MNEs. However, during the data collection it was clear that there is an additional external stakeholder MNEs innovating in China need to consider: e-commerce giants. These platforms can become government like, and it is beneficial for MNEs selling consumer products if they work together with e-commerce platforms to improve the rules and online enforcement of IP on these platforms.

Other strategies

The managers interviewed unveiled another strategy that helps them protect their IP: lead time/speed to market. This strategy was mentioned very briefly in the literature: "Complementary capabilities and lead time advantages are also important mechanisms for knowledge appropriation." (Alcácer & Zhao, 2012, p.4). According to the data collected, the reasoning behind lead time /speed to market is that the IP becomes irrelevant faster, thus not giving imitators or infringers the change to catch up and take advantage of knowledge leakages.

Respondents suggest that the nature of the technology they develop can be linked to the ability to use the strategy of speed to market. For example, a technology that is discrete rather than complex will be easier to change rapidly to create new innovations.

Combination of strategies

The collected data is not extensive enough to confirm the theory of Srikanth et al. (2020). In previous research, 2 configurations of strategies to optimize the protection and limit damage from IP leakage were identified. First, using internal linkages and internal controls, fostering a modular strategy where each team has only limited access to the knowledge and less overview of the other teams or whole R&D project. Second, internal linkages, high interdependence between locations and broad information transfer, a more interdependent strategy where teams create IP protection in the form of social complexity and thus interacting among each other (Srikanth et al.,2020).

However it appeared that based on the information we received regarding the use of IP strategies at least 4 of the managers seemed to lean towards one of the two configurations according to the research of Srikanth et al. (2020)

6. Conclusion

The main goal of this study was to explore the informal strategies that are implemented to protect IP in countries with weak IPRs, unveil how these strategies are used in practice, and extend the literature by confirming the challenges for IP protection that MNEs face in these offshore locations. This thesis seeks to contribute to the field of international business management and innovation management. It can serve as guidance for managers in MNEs already innovating or planning on starting innovative activities in countries that may be considered high risks for IP leakage. First, an overall picture of the IP environment in China was drawn, the legislative framework, latest amendments made to the system and the challenges these MNEs encounter. Second, previous research was summarized which resulted in a structured overview of 7 most common used strategies: Internal linkages (2), Company policies and employee awareness (2), involve headquarter personnel (3), internal controls and knowledge access (4), hierarchical segmentation (5), lobbying governmental instances (6). Thirdly the research inspected the point of view of MNEs innovating in China. First questioning the managers how they perceive the challenges and risks of innovating in an offshore location considered high risk for IP leakage. Second, how these strategies were used in practice and what combinations were made keeping in mind the theoretical background.

As this is an exploratory research, the aim is to investigate a topic that is understudied and therefore not entirely defined yet. This research is conducted to have a better understanding of this topic. Therefore, the most significant findings that emerged from this study are not conclusive results. The collected data allows to structure and test the heretofore known results of previous research in practice. And contributes to the existing literature by revealing new insights that may have been overseen.

First, some respondents did not agree with the assumption that China is labelled as a country with weaker IPRs due to the legislative framework and the execution in courts (Huang et al.,2013; Zhao ,2010). It was suggested to place the identified risks in a historical context. Similarly, the existing literature does not provide enough recent sources to confirm or deny this assumption. Additionally, the interview insights underwrite the assumption that MNEs innovating in China are exposed to higher risks, partly due to the unusual size of the country (Zhao, 2010) and the speed in which innovation happens. This results in bigger changes of getting imitated and a more complex environment where spotting knowledge leakages becomes harder.

Overall, this study underlines that informal strategies to protect IP are widely used by MNEs. Internal linkages is a strategy implemented by almost all the MNEs that were represented in this research, often in combination with cross-cluster teams and thus an international team that coordinates these projects, which is in line with the results from prior research conducted by Alcacér & Zhao (2012) and Srikanth et al. (2020). Involving cross-cluster teams and head quarter personnel in particular seem very favorable strategy among managers as the local teams will therefore be assisted with different expertise and absorb new perspectives on the project. In practice, both non-compete clauses as non-disclosure agreements are a standard practice. During the interview however a few flaws were pointed out by the managers. First, non-disclosure agreements are as important to be signed by the employees as by clients when in negotiation. Non-compete clauses on the other hand need to be adjusted according to the situation of the employee, considering its position in the company and how industry specific the employee's skills are. Moreover, interview data proves that having a corporate reputation of being tough in IP enforcement is an informal practice that has barely been mentioned in the literature. In practice this manifest in continuous monitoring to detect IP leakages. Hierarchical segmentation is overall a less favorable strategy as some managers noted that it may isolate employees and harm innovation and efficiency. The external oriented strategy of lobbying government instances is not a practice that is frequently implemented in practice by the managers interviewed. Interviewees do not seem to be aware that this strategy, according to Prud'homme and von Zedtwitz (2019), can be a more effective way to improve the protection of IP in the long run. However, one respondent who does use lobbying organizations to raise awareness for IP protection concerns in China, suggested to also look into a more novel but very important stakeholder: e-commerce giants in China. These platforms can become government like, and it could be beneficial for MNEs selling consumer products to lobby these platforms to improve the rules and online enforcement.

Lastly another strategy was unveiled that helps them protect their IP: lead time/speed to market. This strategy was mentioned very briefly in the literature: "Complementary capabilities and lead time advantages are also important mechanisms for knowledge appropriation." (Alcácer & Zhao, 2012, p.4). According to the data collected, the reasoning behind lead time /speed to market is that the IP becomes irrelevant faster, thus not giving imitators or infringers the change to catch up and take advantage of knowledge leakages. For further research purposes the implementation of this informal strategy to protect IP can be explored.

7. Limitations and future research

Like all research, this study has some limitations that were not able to be addressed during the research. First, qualitative research relies on the interpretation and judgement of the researcher, and thus is sensitive to bias. Moreover, as the interviewees were not selected according to the years of involvement in the offshore location in China, therefore it was noticed that some managers had limited experience which made it difficult to assess the implementation of some of the strategies in practice. The scope of respondents was limited, and as this research was conducted through semi-structured interviews, and there was only limited interview time per respondent, a larger scope of interviewees would have provided more insights and thus more material to analyze and draw conclusions. As this is an exploratory research and the topic of alternative strategies to protect IP in countries with weaker IPRs is rather understudied there are a few suggestions for future research purposes. First, there is not enough supportive recent literature confirming that enforcement of IPRs in China should be a concern for foreign MNEs. Therefore, further investigation is needed to identify if this is still a recent challenge MNEs come across. Additional research is needed to test if the strategy of lead time contributes to protections mechanisms MNEs implement. Additionally, the limited prior literature around using external oriented strategies as lobbying of governmental instances can be more substantiated in future research. Accordingly, the possibility of impacting the IPRs environment in China by lobbying other external stakeholders such as e-commerce giants is a possible future research topic.

8. List of tables

Table 1. Experts.....42

Table 2. Managers.....43

Table 3. Strategies implemented by respondents.....69

9. List of figures

Figure 1. Positioning MNEs' R&D in a spatial innovation strategy. Source: (Quan & Chesbrough, 2010)24

Figure 2. Positioning MNEs' R&D in a spatial innovation strategy. Adapted from (Quan & Chesbrough, 2010)50

10. References

- Alcácer, J., & Zhao, M. (2012). Local R&D Strategies and Multilocation Firms: The Role of Internal Linkages. *Management science*, 58(4), 734-753. doi:10.1287/mnsc.1110.1451
- Baran, A., & Zhumabaeva, A. (2018). Intellectual property management in startups — problematic issues. *Engineering management in production and services*, 10(2), 66-74. doi:10.2478/emj-2018-0012
- Berry, H. (2017). Managing valuable knowledge in weak IP protection countries. *Journal of International Business Studies*, 48(7), 787-807. doi:10.1057/s41267-017-0072-1
- Bian, R. (2017). Many things you know about patent infringement litigation in China are wrong. SSRN. doi:<http://dx.doi.org/10.2139/ssrn.3063566>
- Blomqvist, K., Hara, V., Koivuniemi, J., & Äijö, T. (2004). Towards networked R&D management: the R&D approach of Sonera Corporation as an example. *R & D management*, 34(5), 591-603. doi:10.1111/j.1467-9310.2004.00365.x
- Bogers, M., Bekkers, R., & Granstrand, O. (2012). Intellectual Property and Licensing Strategies in Open Collaborative Innovation. *Open Innovation in Firms and Public Administrations*, 37-58. doi:10.4018/978-1-61350-341-6.ch003
- Crescenz, R., Iammarino, S., Ioramashvili, C., Rodríguez-Pose, A., & Storper, M. (2019). The Geography of Innovation: Local Hotspots and Global Innovation Networks. *Economic Research Working Paper*(No. 57). Retrieved from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_econstat_wp_57.pdf
- European Commission. (2020). *Report on the protection and enforcement of intellectual property rights in third countries*. Retrieved from European Commission: https://trade.ec.europa.eu/doclib/docs/2020/january/tradoc_158561.pdf
- Froese, F. J., Sutherland, D., Lee, J. Y., Liu, Y., & Pan, Y. (2019). Challenges for foreign companies in China: implications for research and practice. *Asian business & management*, 18(4), 249-262. doi:10.1057/s41291-019-00084-0
- Gollin, M. A. (2008). *Driving Innovation: Intellectual Property Strategies for a Dynamic World*. Cambridge: Cambridge University Press.
- Granstrand, O., & Holgersson, M. (2015). Intellectual Property. In *The Wiley Blackwell Encyclopedia of Consumption and Consumer Studies* (pp. 1-3).

- Holgersson, M., Granstrand, O., & Bogers, M. (2018). The evolution of intellectual property strategy in innovation ecosystems: Uncovering complementary and substitute appropriability regimes. *Long range planning*, 51(2), 303-319. doi:10.1016/j.lrp.2017.08.007
- Huang, K. G., Geng, X., & Wang, H. (2013). Institutional Regime Shift in Intellectual Property Rights and Firms' Patenting Strategies in China. *Institute for Operations Research and the Management Sciences (INFORMS)*, 2013(1), 14851. doi:10.5465/ambpp.2013.14851abstract
- Merges, R. P. (2011). *Justifying Intellectual Property*. Cambridge: Harvard University Press.
- Nandkumar, A., & Srikanth, K. (2016). Right person in the right place: How the host country IPR influences the distribution of inventors in offshore R&D projects of multinational enterprises: Right Person in the Right Place. *Strategic management journal*, 37(8), 1715-1733. doi:10.1002/smj.2418
- Prud'homme, D. (2017). Utility model patent regime "strength" and technological development: Experiences of China and other East Asian latecomers. *China Economic Review*, 42, 50-73. doi:10.1016/j.chieco.2016.11.007
- Prud'homme, D., & von Zedtwitz, M. (2019). Managing "forced" technology transfer in emerging markets: The case of China. *Journal of international management*, 25(3), 100670. doi:10.1016/j.intman.2019.04.003
- Prud'homme, D., von Zedtwitz, M., Thraen, J. J., & Bader, M. (2018). "Forced technology transfer" policies: Workings in China and strategic implications. *Technological forecasting & social change*, 134, 150-168. doi:10.1016/j.techfore.2018.05.022
- Quan, X., & Chesbrough, H. (2010). Hierarchical Segmentation of R&D Process and Intellectual Property Protection: Evidence From Multinational R&D Laboratories in China. *IEEE transactions on engineering management*, 57(1), 9-21. doi:10.1109/TEM.2009.2033043
- Rogers, M. (1998). *The Definition and Measurement of Innovation*: Melbourne Institute of Applied Economic and Social Research.
- Srikanth, K., Nandkumar, A., Mani, D., & Kale, P. (2020). How Firms Build Isolating Mechanisms for Knowledge: A Study in Offshore Research and Development Captives. *Strategy Science*, 5(2), 98-116. doi:10.1287/stsc.2020.0101
- Walker, J., & Lunn, B. (2012). Intellectual property Risk management aspects. *Keeping good companies*, 64(11), 655-661. Retrieved from <https://tinyurl.com/ygw5sgvc>
- WIPO. (2019). *World Intellectual Property Indicators 2019*. Retrieved from Geneva: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2019.pdf

- Wu, R. T. (2011). Awaking the sleeping dragon: the evolving Chinese patent law and its implications for pharmaceutical patents. *Fordham international law journal*, 34(3), 549. Retrieved from <https://tinyurl.com/yf635wey>
- Xie, Z., & Zhang, X. (2015). The patterns of patents in China. *China economic journal*, 8(2), 122-142. doi:10.1080/17538963.2015.1046219
- Yang, D. (2003). The development of intellectual property in China. *World patent information*, 25(2), 131-142. doi:10.1016/S0172-2190(03)00026-7
- Yang, W.-N., & Yen, A. Y. (2009). The dragon gets new IP claws: the latest amendments to the Chinese Patent Law. *Intellectual property & technology law journal*, 21(5), 18. Retrieved from <https://tinyurl.com/yzdr46nh>
- Zhang, C., & Cao, J. (2020). How Fair is Patent Litigation in China? Evidence from the Beijing Courts. *The China quarterly (London)*, 241, 247-261. doi:10.1017/S0305741019000754
- Zhao, M. (2004). *Essays on multinational R&D, intellectual property rights, and knowledge spillover*. ProQuest Dissertations Publishing, Retrieved from <https://tinyurl.com/yd3lhr9u> (Dissertation/Thesis)
- Zhao, M. (2006). Conducting R&D in Countries with Weak Intellectual Property Rights Protection. *Management science*, 52(8), 1185-1199. doi:10.1287/mnsc.1060.0516
- Zhao, M. (2010). *Policy Complements to the Strengthening of IPRS in Developing Countries - China's Intellectual Property Environment: A Firm-Level Perspective*. Retrieved from <https://doi.org/10.1787/5km7fmtw4qmv-en>

11. Appendices

10.1 Interview guide

Interview on IP Protection Strategies in China

General introduction

- Please introduce your company briefly, what product/service do you offer and what is your market segment and market position? How many people do you employ?
- Which countries are you operating in, which activities do you perform in those countries (e.g., research, development, manufacturing, sales) and why? Focus mainly on China.
- Since when are you active in these countries/China?
- How important is innovation in your company? Which technologies are you developing?
- Describe what intellectual property implies for your innovations? Do you protect your innovations with formal IPRs (e.g., patents, copyrights) or do you rely on trade secrets?

Operating in China

- How would you describe your experience in operating in China? What do you consider the advantages and disadvantages/risks of operating in China?
- Who are your local competitors in China? Are they located close to your facilities?
- Have you experienced problems regarding the protection and leakage of intellectual property since you are operating in China? Please elaborate with an example.
- What was the root cause of these problems?
- Do these problems differ from problems you would encounter when active in another country?
- How did you solve the problem or tried to prevent this from happening in the future?
- Has this solution become a standard practice embedded in your strategy/processes?

IP protection strategies in China

- Which strategies do you adopt to protect your technologies in China (against imitation)?
- Do you rely on one general IP protection strategy, or do you adopt different strategies for different products/businesses or different types of innovation/technologies?

Based on prior research different strategies to protect intellectual property in countries with weak IP have been identified. I will go through the main practices for each strategy to see if they are applicable to your business and to which extent these strategies have been used.

- Do you assign employees from the company's home country to supervise the operations of local teams with the objective to guard your intellectual property? If this is the case, please provide an example. Is this a standard practice for all businesses/technologies?
- Do you rely on a segmentation strategy whereby R&D projects are split up over different locations (China and another country) whereby each location is responsible for part of the project and coordination happens via an international team? If this is the case, please provide an example. Is this a standard practice for all businesses/technologies?
- Do you fragment access to knowledge across employees in the Chinese affiliate so that only a small number of people have access to important intellectual property? If this is the case, please elaborate how you organize the fragmentation of knowledge access.
- Do you rely on security measures (e.g., IT security or security of access to your facilities) to protect your intellectual property from leaking out to external parties? If this is the case, please explain the most important security measures.
- Do you have a company policy (e.g., use of non-disclosure agreements) on how to deal with external parties in protecting your intellectual property? If this is the case, please elaborate how on the most important elements of your company policy.
- Do you rely on anti-compete clauses or other (contractual) measures (e.g., stock options) to prevent local employees from leaving and leaking valuable company knowledge to competitors? If this is the case, please elaborate on these measures.
- Do you interact with local and national governments to improve the protection of your intellectual property? If this is the case, please elaborate on this strategy.

Nature of technologies and IP protection

In ongoing research, we are examining whether IP risks in weak IPR environments, and therefore the need for IP protection strategies, depend on the nature of technologies of firms. Here we make a distinction between i) discrete and complex technologies and ii) tacit and codified technologies. Discrete technologies are technologies that consist of a small number of components/patentable elements (e.g., chemicals), whereas complex technologies consist of many components/patentable elements (e.g., electronic devices). Codified technologies can be written down or expressed in words or carved in a design (e.g., chemicals, electronic circuits). Tacit technologies are difficult to articulate or written down (e.g., process technologies).

- How would you classify the nature of the technologies of your firm, and specifically those technologies that your firm is working on in China? Would you classify your technologies as discrete or complex? Would you classify your technologies as codified or tacit?
- Does the nature of your technologies in China influences the IP risks that you face in China (risk for local imitation)? If yes, please explain why you think that this is the case.
- Does the need to implement IP protection strategies (e.g., segmentation and international collaboration) depends on the nature of your technologies in China?
- We claim in our study that firms that have mainly complex technologies in their technology portfolio face fewer IP risks (imitation) in China. Do you agree with this statement?
- We claim in our study that firms that have mainly tacit technologies in their technology portfolio face fewer IP risks (imitation) in China. Do you agree with this statement?