INSTITUTO
UNIVERSITÁRIO
DE LISBOA

Challenges and Strategies of Intellectual Property for Cross-Border E-Commerce Enterprises in Shenzhen

SUN Tianlu

Doctor of Management

Supervisors:
PhD Leandro Luis Ferreira Pereira, Associate Professor (with Habilitation),
ISCTE University Institute of Lisbon
PhD Xiao Yangao, Professor,
University of Electronic Science and Technology of China

July, 2024

BUSINESS
SCHOOL

Challenges and Strategies of Intellectual Property for Cross-Border E-Commerce Enterprises in Shenzhen

SUN Tianlu

Doctor of Management

Supervisors:
PhD Leandro Luis Ferreira Pereira, Associate Professor (with Habilitation),
ISCTE University Institute of Lisbon
PhD Xiao Yangao, Professor,
University of Electronic Science and Technology of China

July, 2024

BUSINESS
SCHOOL

Marketing, Operations and General Management Department

Challenges and Strategies of Intellectual Property for Cross-Border E-Commerce Enterprises in Shenzhen

SUN Tianlu

Doctor of Management

Jury:

PhD Graça Silva, Associate Professor with Agregation,
ISEG - Lisbon School of Economics & Management
PhD Wang Bingjie, Associate Professor,
UESTC - University of Electronic Science and Technology of China
PhD Carlos Jerónimo, Visiting Assistant Professor,
ISCTE University Institute of Lisbon
PhD Leandro Pereira, Associate Professor with Habilitation,
ISCTE University Institute of Lisbon
PhD Sandra Loureiro, Full Professor,
ISCTE University Institute of Lisbon

July, 2024

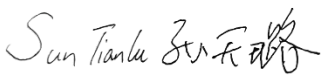
INSTITUTO UNIVERSITÁRIO DE LISBOA

Challenges and Strategies of Intellectual Property for Cross-Border E-Commerce Enterprises in Shenzhen

SUN Tianlu

Declaration

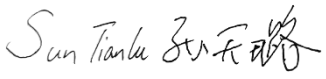
I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed:  Date: 2024.12.1

Name: SUN Tianlu

作者申明

本人郑重申明：除了论文致谢中明确说明并致以谢意的部分外，所呈交的论文不包含任何他人或作者本人已用于获得任何教育机构的学位和证书而使用过的材料。同时尽我所知，除了文中特别加以标注引用的内容外，本论文不包含任何其他个人或集体已经发表或撰写的成果作品。

作者签名：  日期：2024.12.1

姓名(拼音)：SUN Tianlu

[This page is deliberately left blank]

Abstract

This research systematically analyzes the intellectual property (IP) challenges faced by Shenzhen-based cross-border e-commerce enterprises in the overseas market, focusing on how these challenges impact their international competitiveness. Initially, through a comprehensive literature review, the study synthesizes existing research on IP management, platform business ecosystems, and theories of competitive advantage in the cross-border e-commerce sector, thereby establishing a theoretical foundation for the research framework. Furthermore, detailed case studies of Shenzhen Hello Tech Energy Co., Ltd. ("Hello Tech") and TOMTOP Technology Limited ("TOMTOP") are conducted to explore these companies' specific strategies in overcoming technical barriers and addressing IP litigation during their international expansion. These cases illustrate how precise patent positioning, proactive global trademark registration, and strategic brand transformation can enhance their competitive advantage in the international market. Based on the above analysis, the study identifies common challenges faced by Chinese cross-border e-commerce enterprises, such as inadequate IP positioning, low technological barriers, frequent IP lawsuits, and delayed brand development, and provides practical recommendations to improve their global competitiveness. The findings underscore the importance of integrating IP management into the core of global strategies, emphasizing the need for balancing technological innovation with brand development and the significance of international cooperation and policy support in navigating complex legal environments.

Keywords: Cross-border e-commerce, Intellectual property management, International competitiveness

JEL: F23; L25; O34

[This page is deliberately left blank.]

Resumo

Este estudo analisa sistematicamente os desafios relacionados à propriedade intelectual (PI) enfrentados pelas empresas de comércio eletrônico transfronteiriço de Shenzhen no mercado externo, com ênfase em como esses desafios afetam a competitividade internacional das empresas. Em primeiro lugar, por meio de uma revisão abrangente da literatura, este estudo examina a gestão de propriedade intelectual no setor de comércio eletrônico transfronteiriço, o ecossistema de negócios das plataformas digitais e as teorias de vantagem competitiva, estabelecendo assim uma base teórica para o arcabouço de pesquisa. Além disso, com base em estudos de caso da Shenzhen Hello Tech Energy Co., Ltd. ("Hello Tech") e da TOMTOP Technology Limited ("TOMTOP"), são analisadas detalhadamente as estratégias adotadas por essas empresas para superar barreiras tecnológicas e lidar com litígios de propriedade intelectual durante sua expansão internacional. Esses casos demonstram como a implementação de uma estratégia precisa de posicionamento de patentes, o registro proativo de marcas globais e a transição estratégica de marcas podem aumentar significativamente a competitividade no mercado internacional. Com base nessas análises, o estudo identifica os desafios comuns enfrentados pelas empresas chinesas de comércio eletrônico transfronteiriço, como a falta de um posicionamento adequado de propriedade intelectual, barreiras tecnológicas fracas, litígios frequentes de PI e o atraso na construção de marcas, e oferece sugestões práticas para melhorar a competitividade global das empresas. Os resultados enfatizam a importância de integrar a gestão de PI como parte central da estratégia global da empresa, destacando a necessidade de equilibrar inovação tecnológica com desenvolvimento de marca, e o papel da cooperação internacional e apoio político para enfrentar ambientes legais complexos.

Palavras-Chave: Comércio eletrônico transfronteiriço, Gestão de propriedade intelectual, Competitividade internacional

JEL: F23; L25; O34

[This page is deliberately left blank]

摘要

本研究系统分析了深圳跨境电商企业在欧洲市场中所面临的知识产权（IP）挑战，重点探讨了这些挑战对企业国际竞争力的影响。首先，通过全面的文献综述，本研究梳理了跨境电商领域的知识产权管理、平台商业生态系统及竞争优势理论等现有研究，为研究框架奠定了理论基础。首先，通过全面的文献综述，本研究梳理了跨境电商领域的知识产权管理、平台商业生态系统及竞争优势理论等现有研究，为研究框架奠定了理论基础。此外，本文通过对深圳市华宝新能源股份有限公司和通拓科技有限公司的案例研究，详细分析了两家企业在国际扩展过程中克服技术壁垒和应对知识产权诉讼的具体策略。这些案例展示了企业如何通过精准的专利布局、主动的全球商标注册及战略性品牌转型，提升其国际市场竞争力。基于以上分析，本研究总结了中国跨境电商企业普遍面临的挑战，如知识产权布局不足、技术壁垒较低、频繁的知识产权诉讼以及品牌建设滞后等问题，并针对性地提出了提升企业全球竞争力的实际建议。研究结果强调了将知识产权管理纳入企业全球战略核心的重要性，指出企业应当在技术创新与品牌发展之间保持平衡，并通过国际合作与政策支持有效应对复杂的法律环境。

关□□□跨境电商，知识产权管理，国际竞争力

JEL: F23; L25; O34

[This page is deliberately left blank]

Acknowledgements

First and foremost, I would like to express my deepest gratitude to my supervisors, Professor Leandro Luis Ferreira Pereira and Professor Yan Gao Xiao, for their patience, invaluable guidance, and unwavering support throughout my entire research process. Their profound expertise and meticulous mentorship have not only enabled me to make significant academic progress but have also imparted to me the true essence of the scientific spirit.

Secondly, I want to convey my deepest appreciation to my family, especially my parents. The process of writing my doctoral thesis was greatly challenged by the pandemic. I had to juggle academic pressures while leading my team through the difficulties encountered by our company's international business due to the pandemic's impact. During this period of immense stress and uncertainty, my family's unconditional support, particularly the care and encouragement from my parents, became my greatest source of motivation. It was your love and trust that empowered me to keep moving forward under tremendous pressure, ultimately enabling me to successfully complete this formidable task.

I am equally grateful to my colleagues. During this time, not only did you provide tremendous support in the workplace, but you also helped me maintain progress in both my academic and professional endeavors through your supervision and encouragement. Your dedication and support allowed me to remain confident and motivated in the face of adversity.

Additionally, I would like to thank my friends. You have not only supported and accompanied me in my personal life but also motivated me to persist in completing my thesis through your supervision and encouragement. Your support and motivation enabled me to overcome numerous challenges and ultimately achieve this goal.

Lastly, I extend my gratitude to all the participants and data providers involved in this research. Your cooperation and support were crucial in ensuring the smooth progress of this study and have been integral to the successful completion of this thesis.

Once again, I sincerely thank everyone who has assisted me throughout my academic journey! This research would not have been possible without your support.

[This page is deliberately left blank]

致谢

首先，我要向我的导师 Leandro Luis Ferreira Pereira 教授和肖延高教授致以最诚挚的感谢。感谢您们在我整个研究过程中给予的耐心指导、宝贵意见和无私支持。导师们深厚的专业知识和悉心的指导，不仅帮助我在学术上取得了显著的进步，更让我深刻领会到科研精神的真谛。

其次，我要向我的家人，特别是我的父母，表达最深的感激之情。在撰写博士论文的过程中，疫情带来了巨大的挑战。我不仅要面对学业的重压，还要带领团队克服公司在国际化业务上因疫情冲击而遇到的难关。在这段充满压力和不确定性的时期，家人的无条件支持，尤其是父母的关怀和鼓励，成为我坚持下去的最大动力。正是您们的爱和信任，让我能够在重重压力下继续前行，顺利完成这项艰巨的任务。

我同样要感谢我的同事们。在这段时期，您们不仅在工作中给予了我极大的支持，还通过监督和鼓励帮助我在学术和事业上并肩前行。您们的敬业精神和支持让我能够在面对困境时保持信心和动力。

此外，我还要感谢我的朋友们。您们不仅在生活中给予了我关心和陪伴，还通过监督和鼓励，督促我坚持完成论文。您们的支持和激励让我能够克服种种困难，最终达成这一目标。

最后，感谢所有参与本研究的受访者和数据提供者。您们的合作与支持使本研究得以顺利进行，成为本论文成功完成的重要保障。

再次衷心感谢所有在我学习和研究过程中帮助过我的人！没有您们的支持，这项研究成果不可能得以完成。

[This page is deliberately left blank]

Contents

[This page is deliberately left blank]

List of Tables

[This page is deliberately left blank.]

List of Figures

[This page is deliberately left blank.]

Chapter 1: Introduction

Intellectual property, also known as "intellectual property rights," refers to the property rights enjoyed by the rights holder over the achievements created through their intellectual labor. These rights are usually valid for a limited period and cover various intellectual creations, such as inventions, designs, literary and artistic works, as well as marks, names, and images used in commerce. Intellectual property is an intangible property right that arises from creative achievements and business marks in accordance with the law, protected by national laws, and cannot be infringed by anyone.

Enterprise intellectual property refers to the intellectual achievements created by enterprises in their production and business activities, which are protected by law to prevent infringement by others. Specifically, enterprise intellectual property mainly includes: (1) Copyright: Enterprises enjoy copyright over various works they create, such as software, articles, and design drawings. The copyright protection period is at least fifty years, ensuring enterprises' exclusive right to use and obtain remuneration for their creative works. (2) Trademark rights: Enterprises' trademarks, logos, and other marks used to distinguish the source of goods or services enjoy trademark rights. Trademark rights can protect the brand image of enterprises and prevent imitation or infringement by others. (3) Patent rights: Enterprises can apply for patents and obtain patent rights for various new technologies and products they invent if they meet the conditions stipulated in the patent law. The patent protection period is twenty years, ensuring that enterprises can exclusively use their inventions for a certain period of time.

The protection of enterprise intellectual property is of great significance to the long-term development of enterprises. Firstly, it can maintain the competitive advantage of enterprises and prevent competitors from copying or imitating their unique technologies and innovations. Secondly, it can enhance the brand value of enterprises, protect their trademarks and logos, and enhance their market position and reputation. In addition, enterprise intellectual property can also encourage enterprises to conduct more innovation and research and development, promoting technological progress and economic development.

With the acceleration of globalization, enterprises are increasingly participating in international competition, and the expansion of overseas markets has become an important direction for enterprise development (Han & Kim, 2019). However, as an important competitive

resource, the protection of intellectual property in overseas markets is particularly important (Maskus & Reichman, 2005).. Only by having solid overseas intellectual property protection can enterprises effectively safeguard their own interests, avoid infringement disputes, and ensure the smooth promotion and sales of their products in the international market.

Furthermore, the protection of overseas intellectual property is also significant for the long-term development of enterprises. By protecting their innovative achievements and technological advantages, overseas intellectual property can bring sustained market competitive advantages and profit sources to enterprises. At the same time, it can also encourage enterprises to conduct more innovation and research and development activities, promoting technological progress and industrial upgrading.

In addition, studying enterprise overseas intellectual property also helps enterprises better understand the rules and standards of international intellectual property protection, improving their international competitiveness. Through exchanges and cooperation with internationally advanced enterprises, enterprises can learn from their successful experiences and practices in overseas intellectual property protection, continuously improving their own intellectual property management systems and strategies.

Finally, from a national perspective, strengthening the protection of enterprises' overseas intellectual property is also an important means to promote national economic development. By protecting enterprises' intellectual property overseas, it can encourage enterprises to increase their foreign investment, promote the development of international trade and cooperation, and promote the prosperity and progress of the national economy. Therefore, studying enterprise overseas intellectual property has important practical significance and strategic value.

1.1 Research background

Cross-border e-commerce enterprises face a series of unique difficulties and challenges in managing intellectual property in overseas markets. These challenges include the relatively small size of enterprises, limited overseas intellectual property holdings, incomplete intellectual property teams, lack of experience, and insufficient understanding of the target countries' and regions' markets and relevant intellectual property systems. These issues may expose enterprises to unnecessary risks and disputes overseas.

Shenzhen is a significant hub for cross-border e-commerce in China, housing numerous well-known cross-border e-commerce enterprises. These enterprises hold a considerable market share and influence in the overseas market, making the study of their intellectual property

dilemmas invaluable for the entire cross-border e-commerce industry.

Overseas markets, especially in Europe and USA is a region that highly values intellectual property, possessing a relatively robust intellectual property protection system. However, this also poses greater challenges for Shenzhen's cross-border e-commerce enterprises. In the overseas market, enterprises need to handle intellectual property issues with greater caution to avoid losses due to infringement.

The impact of intellectual property dilemmas on Shenzhen's cross-border e-commerce enterprises is profound. On one hand, it may expose enterprises to legal litigation and fines; on the other hand, it may also damage their reputation and brand image, further affecting their competitiveness in the European and American market.

By studying the intellectual property dilemmas encountered by Shenzhen's cross-border e-commerce enterprises in Europe and the USA, effective solutions and strategies can be explored. These may include strengthening intellectual property team building, increasing research and development investment to establish patent barriers, and enhancing cooperation with international intellectual property organizations. These measures can help enterprises better address intellectual property challenges and enhance their competitiveness in the international market.

In summary, studying the intellectual property dilemmas encountered by Shenzhen's cross-border e-commerce enterprises holds significant practical and theoretical value. It not only provides valuable reference and guidance for Shenzhen's cross-border e-commerce enterprises, but also offers beneficial insights and inspiration for intellectual property management in the entire cross-border e-commerce industry.

This chapter will first discuss the background of the topic selection, and on this basis, propose research problems, questions and research significance, and then introduce the research content and research methods, and finally give a detailed explanation of the research route and chapter structure.

1.1.1 Realistic background

The rapid development of cross-border e-commerce has not only met the domestic consumers' demand for diversified and personalized products, but also helped Chinese products go global, becoming an important force driving the development of foreign trade (Giuffrida et al., 2017). The growth of cross-border e-commerce is attributed to its flexible, efficient, and resilient supply chain, providing cost-effective products to global consumers and injecting new momentum into global trade growth (Tu & Shangguan, 2018).

In 2023, China's cross-border e-commerce import and export data showed significant growth. According to the information released by the General Administration of Customs, China's total cross-border e-commerce import and export reached 2.38 trillion yuan in 2023, representing a year-on-year increase of 15.6%. Among this total, exports reached 1.83 trillion yuan, up 19.6%, while imports were 548.3 billion yuan, an increase of 3.9%. These figures reflect the strong growth momentum of China's cross-border e-commerce in 2023 and its increasingly important role in global trade. China's cross-border e-commerce has become a new driving force for foreign trade development, a new channel for transformation and upgrading, and a new grasp for high-quality development, playing an important role in the economic recovery of China and the world in the post-pandemic era. The government is also actively promoting relevant policies to support the sustained and healthy development of cross-border e-commerce.

Shenzhen is a typical gathering area for Chinese cross-border e-commerce enterprises, mainly engaged in wholesale and retail e-commerce. Currently, it is developing vigorously and has achieved remarkable results in terms of industrial scale, market entities, overseas warehouse construction, innovative measures, and supply chain system, becoming a "ballast stone" for stabilizing foreign trade scale and optimizing structure. The construction of China (Shenzhen) Cross-border E-commerce Comprehensive Pilot Zone has been recognized by the government, with assessment evaluations ranking in the first tier of "notable achievements" for two consecutive years, firmly standing in the "first echelon" nationwide.

According to statistics, the number of cross-border e-commerce export enterprises in Shenzhen exceeds 150,000, accounting for almost half of Chinese sellers on platforms such as Alibaba.com, AliExpress, Lazada, and eBay. Currently, one-third of Amazon's Chinese sellers come from Shenzhen. Shenzhen currently boasts six national-level e-commerce demonstration enterprises, five national-level e-commerce demonstration bases, and seven provincial-level cross-border e-commerce enterprises. Shenzhen has cultivated 10 listed cross-border e-commerce companies, ranking first in the country. Shenzhen cross-border e-commerce enterprises have built and operated over 100 branded independent websites. Up to now, Shenzhen enterprises have built and operated over 350 overseas warehouses globally, covering an area of over 3.8 million square meters, ranking second in the country. Among the 21 provincial-level public overseas warehouses in Guangdong Province, 17 are built and operated by Shenzhen enterprises. In addition to focusing on developed countries and regions such as North America, Europe, and Australia, Shenzhen enterprises have also built and operated overseas warehouses covering an area of over 630,000 square meters in countries participating

in the Belt and Road Initiative, with rapid growth in Southeast Asia, the Middle East, and other regions.

Cross-border e-commerce enterprises in Shenzhen are mainly involved in industries such as wholesale and retail, logistics and transportation, software information services, leasing, and business services. Among them, e-commerce enterprises engaged in wholesale and retail are the main type, accounting for 53% of the total, as shown in Figure 1.1.

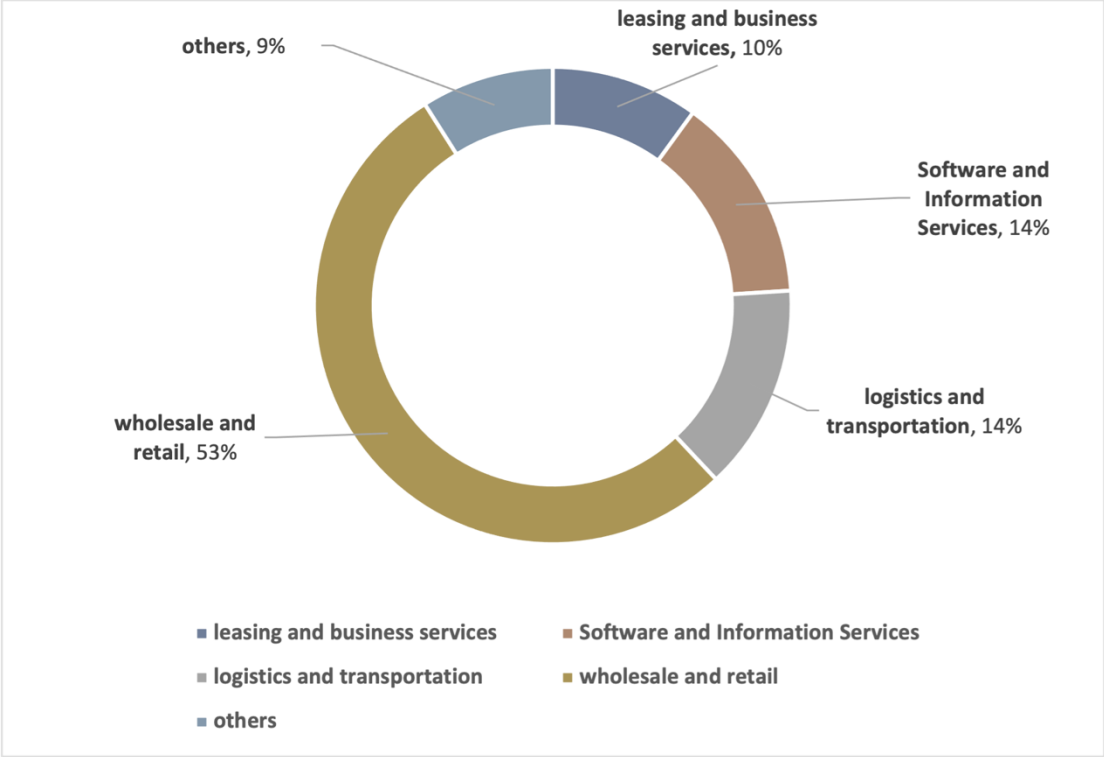


Figure 1.1 The industry distribution of cross-border e-commerce enterprises in Shenzhen

Source: Commerce Bureau of Shenzhen Municipality, 2023

Many of the cross-border e-commerce enterprises in Shenzhen are small and medium-sized. Among them, 30% of the enterprises have a registered capital of 0 to 1 million, 22% have a registered capital of 1 to 2 million, 16% have a registered capital of 2 to 5 million, 17% have a registered capital of 5 to 10 million, and 10% have a registered capital of over 10 million, as shown in Figure 1.2.

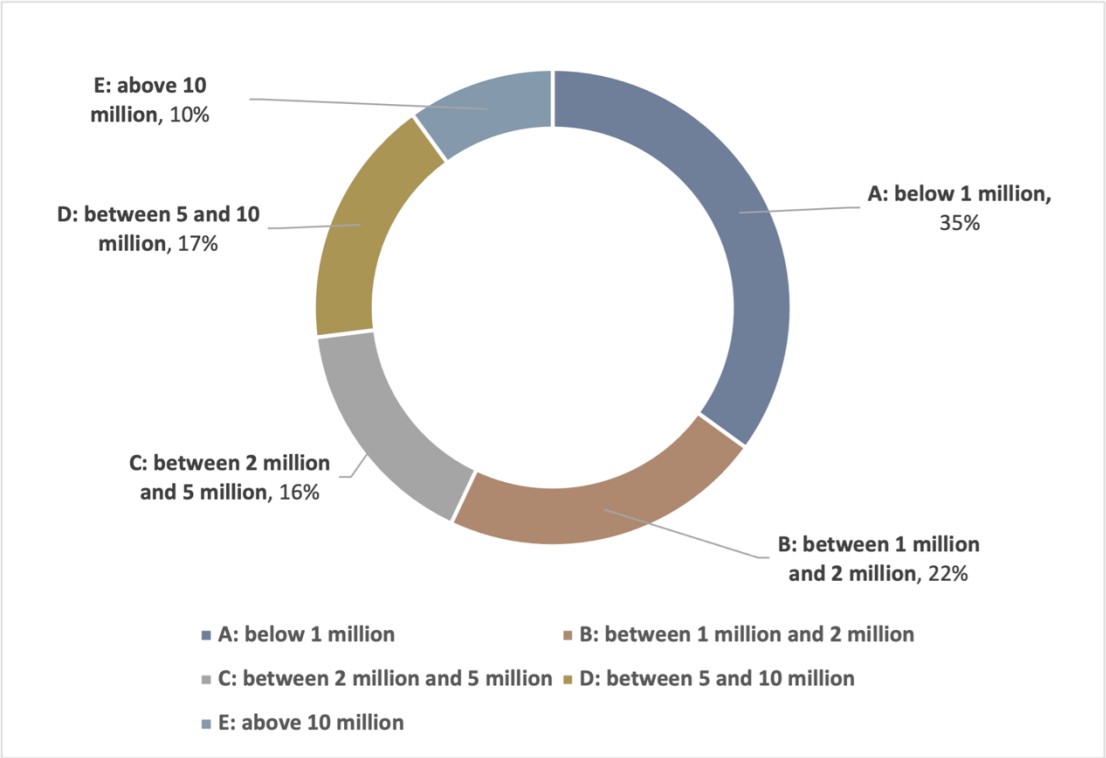


Figure 1.2 The size of cross-border e-commerce enterprises in Shenzhen

Source: Commerce Bureau of Shenzhen Municipality, 2023

Cross-border e-commerce enterprises in Shenzhen are mainly distributed in Longgang, Bao'an, Longhua, Futian, and Nanshan districts, while there are fewer enterprises (9%) in Luohu, Yantian, Guangming, and Pingshan districts, as shown in Figure 1.3.

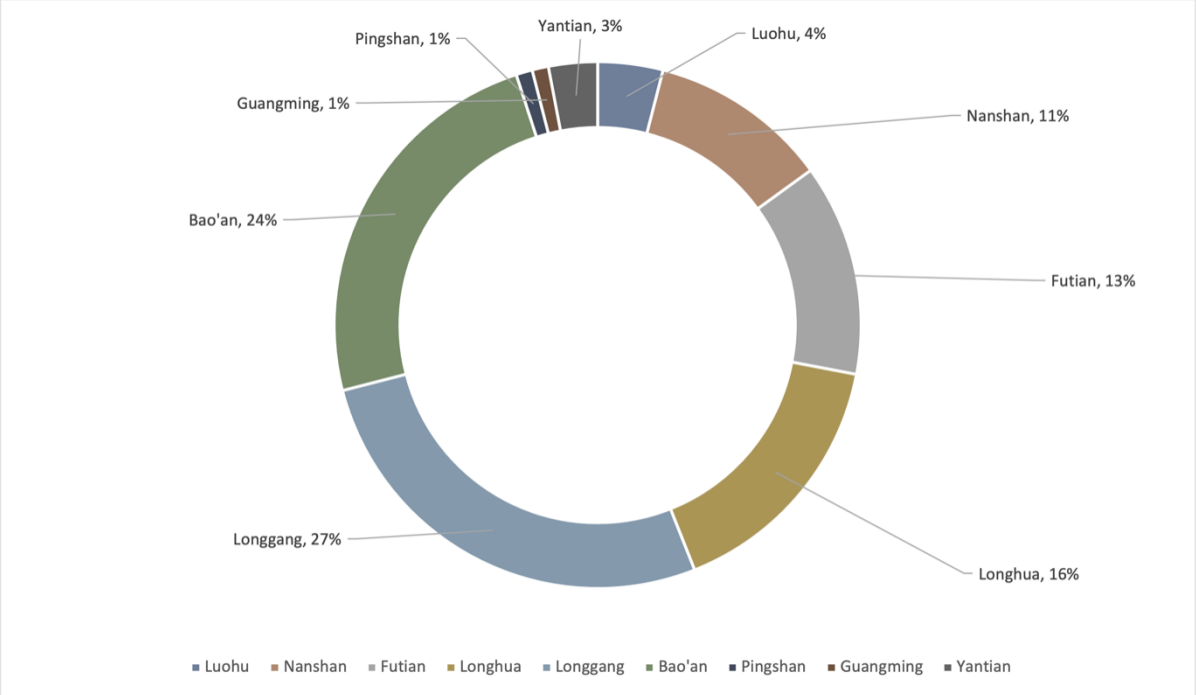


Figure 1.3 The regional distribution of cross-border e-commerce enterprises in Shenzhen

Source: Commerce Bureau of Shenzhen Municipality, 2023

Shenzhen's cross-border e-commerce enterprises are developing well, with more than half

of them established in the past five years. Among them, 29% of the enterprises have been established for less than one year, 44% for 1-5 years, 22% for 5-10 years, 3% for 10-15 years, and 2% for more than 15 years, as shown in Figure 1.4.

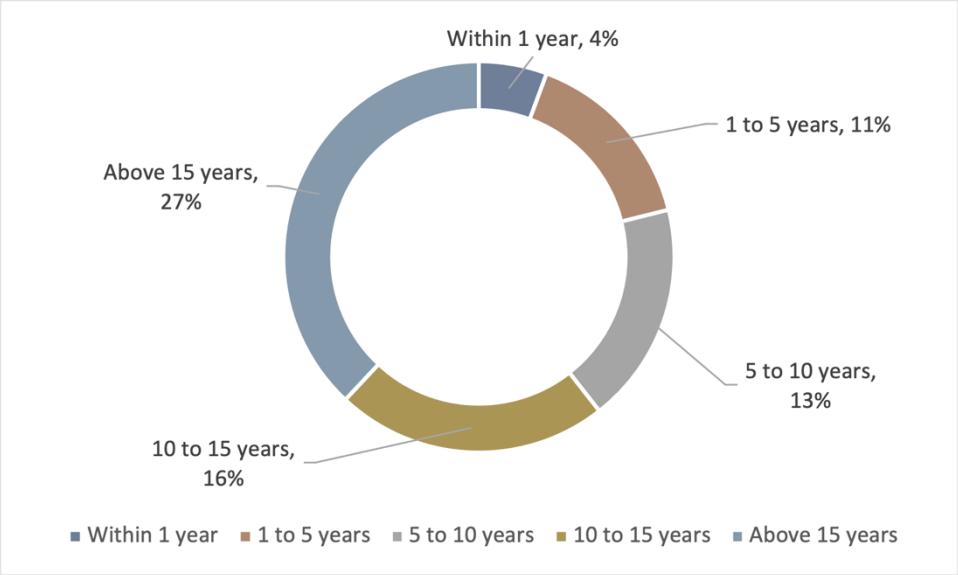


Figure 1.4 The distribution of establishment years of cross-border e-commerce enterprises in Shenzhen

Source: Commerce Bureau of Shenzhen Municipality, 2023

Cross-border e-commerce enterprises in Shenzhen play a pivotal role in the foreign trade industry. However, with the influx of overseas intellectual property infringement cases, cross-border e-commerce enterprises encounter numerous obstacles in exploring overseas markets. Most of these enterprises have not been established for a long time, with limited registered capital and talent pool. They face multiple issues such as weak awareness of intellectual property protection, imperfect intellectual property management, lack of intellectual property management institutions or personnel, and unfamiliarity with the intellectual property rules of e-commerce platforms and the legal environment of the target market countries. When encountering foreign-related intellectual property disputes, due to the long duration, high cost, and complicated procedures, these enterprises often find it difficult to support in terms of manpower and financial resources, and they usually adopt a passive response while withdrawing from sales channels. The consequence of such handling is often that the right holders no longer pursue the infringement liability, but it also restricts the healthy development of cross-border e-commerce enterprises.

1.1.2 Theoretical background

E-Commerce denotes the virtual trade of goods and services utilizing state-of-the-art technological innovations such as Mobile Commerce (M-Commerce), Digital Marketing,

Electronic Supply Chain Management (E-SCM), Electronic Data Interchange (EDI), and Electronic Funds Transfer (EFT), all enhancing online commerce efficiencies (Schafer et al., 1999). This evolution has notably reshaped consumer shopping practices, transitioning from the customary brick-and-mortar store visits to engaging online portals, thus boosting customer gratification through enhanced delivery services, electronic payments options, and broader product/service accessibility. Additionally, the incorporation of advanced technologies like chatbots further elevates the shopping experience on e-commerce websites, providing superior customer support(Cui et al., 2017). E-commerce simplifies a broad spectrum of commercial transactions between enterprises and customers via the internet, minimizing costs while enhancing process efficiency and transaction times. The utilization of e-commerce platforms has noticeably escalated over recent years due to their efficacy in managing operations and data. As technology continues to progress, e-commerce evolves, integrating diverse technological tools. For instance, the integration of social media features, including product reviews and ratings, referrals, and recommendations, on e-commerce sites has remarkably boosted user engagement, promoting both consumer purchases and digital marketing through word-of-mouth promotion.

The relentless progression of e-commerce has birthed S-Commerce. S-Commerce represents a comprehensive platform that amalgamates social media components with e-commerce technologies, features, and functionalities. It capitalizes on social media's potential to stimulate user interaction and information dissemination, thereby influencing purchasing choices. Hence, S-Commerce is recognized as a novel communication conduit for interaction on social media-enabled platforms, fostering value generation for both consumers and businesses (S. Kim & Park, 2013). Unlike traditional e-commerce platforms, S-Commerce emphasizes on content, community, context, connection, and conversation (Hopkins, October 11, 2022). On S-Commerce platforms, content signifies the accessible information, inclusive of consumer-generated reviews and product ratings, adding value and augmenting user engagement. Similarly, the establishment of community networks serves as a crucial feature of S-Commerce, facilitating productive interactions among users and nurturing robust relationships (Hopkins, October 11, 2022). The context pertains to the circumstances surrounding a transaction or communication, such as expressing interest in a product, enabling companies to tailor their offerings to meet consumer requirements. User connections fortify decision-making processes, as individuals can glean insights about products or services through peer reviews. Furthermore, dialogues between consumers and businesses enhance interaction quality, contributing to superior customer relations (Lal, 2017).

ARPANET's advent in the nineteen seventies signified the onset of scientific exploration into online transaction methodologies. In 1976, Atalla Technovation surfaced as a trailblazing entity offering security-centric online transaction solutions, principally targeting banking and finance establishments (Mero, 2022). This advancement facilitated Michael Aldrich's inauguration of the inaugural online shopping system in 1979 (Tkacz & Kapczynski, 2009), followed by Thomson Holidays (UK)'s launch of the inaugural B2B online shopping platform in3 1981 (Palmer, 1988), and Tesco, a retail colossus, initiating the initial B2C online shopping system in 1984 (Winterman & Kelly, 2013). The advent of the World Wide Web in 1990 catalyzed the proliferation of E-Commerce, consequently enabling the emergence of innovative commercial enterprises such as S-Commerce and sharing commerce over ensuing years.

During the late nineties to early aughts, the ascendance of social networking platforms such as Facebook and Google's social applications heralded the dawn of S-Commerce. Since its inception, S-Commerce has metamorphosed from being solely a social networking platform to a comprehensive framework integrating social psychology, social heuristics, information sharing and management, communication tactics, and information communication technologies within the realm of e-commerce (C. Wang & Zhang, 2012).

In 2000, concurrent with the advent of e-commerce, research predominantly focused on its platform architecture, emphasizing trustworthiness, usability, and customer satisfaction. Bansal and Chen (2011) postulated that consumers harbored higher trust in e-commerce than in S-commerce due to issues such as unauthorized access, unreliability, and recurrent errors. G. Cecere et al. (2020) underscored that technological and managerial strategies pose substantial obstacles for e-commerce, advocating novel strategies to augment commercial worth and impact. M. Hajli (2012) discerned that social interactions on e-commerce platforms engender value and deemed trust as a pivotal determinant influencing consumer conduct. Research conducted during 2010-2012 primarily concentrated on value generation, consumer behavior, anticipations, and motivations (Kwahk & Ge, 2012; Noor et al., 2014) within S-Commerce platforms.

From 2013 to 2015, considerable research centered on trust and technology within S-Commerce. (M. Hajli, 2012) proposed an adoption model for S-Commerce, while Noor et al. (2014) pinpointed six domains—utility, user-friendliness, security, privacy, website aesthetics, and electronic word of mouth (e-WOM)—as vital in shaping trust towards S-Commerce platforms. These domains primarily concentrate on technical facets. N. Hajli (2015) article underlined elements such as ratings, customer reviews, endorsements, and communal dialogues as pivotal in cultivating trust, emphasizing the significance of social media platforms and

networks. Concurrently, H. Zhang et al. (2014) scrutinized the impact of technological milieu on user interaction within S-Commerce, ascertaining that virtual components such as social assistance, visibility, and information dissemination significantly influence user engagement. N. Hajli (2015) delineated essential attributes of S-Commerce such as ratings, reviews, and endorsements. Moreover, N. Hajli et al. (2017) study revealed that privacy apprehensions impede the symbiotic relationship between S-Commerce and co-branding initiatives. Consequently, as S-Commerce witnessed escalating adoption between 2013 and 2015, concerns pertaining to technology and societal facets, including privacy, security, and reliability, surfaced as vital to its progression.

1.2 Research problem and question

1.2.1 Research problems

(1) Lack of systematic understanding of overseas intellectual property management

Shenzhen's cross-border e-commerce companies generally face a lack of systematic understanding of overseas intellectual property (IP) management, leading to frequent IP disputes and growth constraints (BeijingMunicipalIntellectualPropertyOffice, November 5, 2021). Some cross-border e-commerce companies lack sufficient knowledge or awareness of IP, resulting in poorly regulated management; others may have some understanding of IP protection but lack clear recognition of whether the products they sell infringe on IP rights. Some companies are aware that their products might have IP risks but do not take them seriously. Due to the territorial nature of IP, rights held domestically may infringe on IP rights abroad. Companies attempting to scale up their overseas market often do not realize the importance of IP layout overseas (A. Liu et al., 2021). Thus, the lack of systematic understanding of overseas IP management results in a common issue where cross-border e-commerce companies lose their competitive edge abroad (Johnson Intellectual Property Agency, 2023).

(2) Lack of effective response strategies to overseas IP challenges

Shenzhen's cross-border e-commerce companies lack effective strategies to address overseas IP challenges. Some companies, when sued overseas, believe that judicial decisions from afar are unenforceable due to the geographical distance and thus respond passively to litigation. The differences in judicial procedures between domestic and international courts lead these companies to ignore notifications from e-commerce platforms, payment platforms, or law firms, missing the opportunity to respond in time. While some companies try to respond actively

to litigation, they are often disadvantaged by language barriers, geographical distance, financial constraints, limited legal knowledge, and inadequate IP awareness, resulting in an asymmetry of information during litigation. From the beginning of their overseas market expansion, these companies have either neglected the importance of overseas IP layout and management or adopted ineffective strategies. These issues have hindered Shenzhen's cross-border e-commerce companies from developing adequate IP capabilities to cope with these challenges (China (Shenzhen) Intellectual Property Protection Center, 2022).

1.2.2 Research questions

To address the above problems, this research proposes the following research questions:

(1) What are the current overseas intellectual property (IP) challenges faced by Shenzhen's cross-border e-commerce companies?

These mainly include:

1) What kinds of IP infringement issues are prevalent, and can you provide specific examples of such cases?

2) What economic losses and reputational damage have companies faced due to IP disputes?

3) What are the blind spots and weak links in the IP protection strategies of these companies?

4) How does the IP legal environment in overseas markets specifically affect Shenzhen's cross-border e-commerce companies?

(2) How can Shenzhen's cross-border e-commerce companies bulid intellectual property capability and adopt effective strategies to address overseas IP challenges?

This mainly includes:

1) How do IP issues influence Shenzhen's cross-border e-commerce strategies for expanding into the overseas market?

2) How do IP challenges affect the long-term development and international competitiveness of these companies?

3) What IP management measures have companies currently adopted, and how effective are they?

4) What are some successful and unsuccessful cases of IP protection, and what lessons can be learned from them?

1.2.3 Research significance

1.2.3.1 Theoretical significance

(1) Realization and Contribution of Knowledge Value

This research aims to conduct comprehensive and in-depth analysis on intellectual property rights (IPR) issues in the cross-border e-commerce sector, striving to fill the gaps in the existing literature in this crucial field. Specifically, by thoroughly examining the intricate IPR challenges faced by Shenzhen cross-border e-commerce enterprises, this research can not only fully reveal the specific challenges encountered by these enterprises during their global expansion, but also analyze the underlying reasons behind these challenges. I believe that the conclusions drawn from this research will provide effective coping strategies for Shenzhen cross-border e-commerce enterprises to address their IPR concerns, and also provide strong theoretical support for policymakers to formulate more scientific and reasonable policies accordingly. In addition, my research will make substantial contributions to the international comparative study of IPR protection, providing a new perspective for understanding IPR protection under different legal systems by comparing the differences in IPR legal systems between China and major market countries.

(2) Establishment and Improvement of Theoretical Framework

The goal of this research is to construct a comprehensive and integrated theoretical framework to analyze and interpret how Shenzhen cross-border e-commerce enterprises can further enhance their competitiveness in the international market by improving their IPR capabilities. This theoretical framework will integrate theories of enterprise capabilities, business ecology, and competitive advantage to reveal the critical role of IPR capabilities in enterprises' participation in international competition and their internal mechanisms. With this theoretical framework, I will delve into the strategic choices of Shenzhen cross-border e-commerce enterprises in various aspects of IPR management, protection, and utilization, as well as how these strategies profoundly impact their market performance and long-term development. Furthermore, this theoretical framework will provide a novel analytical tool for future research, assisting researchers in gaining a deeper understanding and interpretation of Shenzhen cross-border e-commerce enterprises' behavioral patterns and performance under various market environments.

(3) Promotion and Deepening of Interdisciplinary Research

This research will adopt an interdisciplinary approach, extensively borrowing theoretical achievements and empirical research data from multiple disciplines such as law, management,

and international trade, aiming to gain a comprehensive and profound understanding of the IPR challenges in cross-border e-commerce. Through this interdisciplinary research perspective, I hope to promote knowledge exchange and integration between different disciplines, driving the pace of theoretical innovation. For instance, I will delve into how laws and regulations affect enterprises' commercial strategic decisions and how enterprises should adapt to changing legal environments through management innovations. Additionally, I will analyze IPR issues in international trade and how these issues profoundly impact the patterns and trends of international trade. Through these interdisciplinary research contents, I expect to provide richer and deeper theoretical explanations for IPR protection in cross-border e-commerce, opening up new avenues for academic research and practical applications in related fields.

1.3 Practical significance

(1) Practical Value and Significance of the Research

1) Policy-making Suggestions

This research will provide solid theoretical foundations and detailed data support for government departments in formulating policies on IPR protection in the emerging field of cross-border e-commerce. Specifically, we will comprehensively analyze the IPR dilemmas faced by Shenzhen cross-border e-commerce enterprises, identify the shortcomings of the existing policy system, and accordingly propose practical reform suggestions. In addition, we will deeply analyze the important role played by international cooperation in IPR protection, providing targeted strategic guidance for government departments in carrying out international exchanges and cooperation.

2) Guidelines for Enterprise Operation

For Shenzhen's cross-border e-commerce enterprises, this research will provide a set of targeted IPR protection strategies and practical advice. Our research results will help enterprises accurately identify and assess various IPR risks that may arise during their operations and accordingly develop corresponding risk prevention and response plans. At the same time, we will delve into how to further enhance enterprises' competitiveness in international competition by continuously improving their IPR protection capabilities, providing strategic guidance for their long-term development.

3 ）Promotion and Improvement of Industry Norms

This research aims to promote the development of the cross-border e-commerce industry

towards a more standardized and professional direction, aiming to improve the overall level of IPR protection in the industry. We will conduct an in-depth analysis of the status of IPR protection within the industry, identify existing problems, and accordingly put forward constructive opinions on building an industry self-regulatory mechanism. Additionally, we will actively promote the popularization and enhancement of IPR protection awareness within the industry, encourage cooperation and exchange between enterprises, and jointly address various challenges in IPR protection.

(2) Social Value and Significance of the Research

1) Driving Force for Economic Development

Strengthening IPR protection is undoubtedly the key to promoting the high-quality development of foreign trade and economy in Shenzhen and even the whole country. This research will focus on exploring the driving role of IPR protection in economic development, especially in the emerging field of cross-border e-commerce. Our research results will provide strategies and approaches for the government and enterprises to promote economic development through strengthening IPR protection, contributing to the sustainable prosperity of China's economy.

2) Enhancement of International Image

This research aims to enhance the IPR protection image of Chinese enterprises in the international market, thereby increasing the international community's recognition and trust in Chinese enterprises. We will deeply analyze the IPR dilemmas faced by Shenzhen cross-border e-commerce enterprises and propose strategies and suggestions to enhance the international image of Chinese enterprises. This will help improve the reputation of Chinese enterprises in the international community, further enhancing the competitiveness of Chinese brands worldwide.

(3) Educational Value and Significance of the Research

1) Development and Application of Teaching Cases

This research will provide teachers with a wide range of teaching cases to enhance the practicality and relevance of related subject teaching. Our research results will be widely integrated into the teaching curriculum of universities and research institutions, providing students with a valuable platform to gain in-depth understanding and learning of IPR protection issues in cross-border e-commerce. With these well-designed teaching cases, students can gain a deeper understanding of the core position of IPR protection in international trade, thereby effectively improving their practical operation and problem-solving abilities.

2) Innovation and Exploration of Talent Training Models

This research will provide new models and ideas for talent cultivation in cross-border e-commerce and IPR protection fields in universities and research institutions. We will delve into how to enhance students' IPR protection awareness and capabilities through systematic education and training, cultivating more talents with international vision and professional literacy for society. In addition, we will actively promote close cooperation between universities and research institutions and enterprises, further enhancing students' practical experience and comprehensive quality through organizing practical projects and providing internship opportunities.

1.4 Research methods and routes

1.4.1 Research methods

Qualitative comparative analysis (QCA) is an asymmetric data analysis technique that combines the contextual richness of qualitative methods with the logical and empirical rigor of quantitative methods capable of handling large numbers of cases and being more generalizable than symmetric theories and tools (Charles, 1987). This integration of qualitative and quantitative analytical techniques differs significantly from traditional quantitative analysis methods based on variance and null hypothesis significance testing (NHST).

QCA can identify logically simplified statements that describe different combinations of conditions (or configurations) leading to a given outcome (Ragin, 2009). A configuration is a set of causally related variables that map onto the observed outcome or outcome of interest. There are three main types of QCA: crisp-set QCA (csQCA), multi-value QCA (mvQCA), and fuzzy-set QCA (fsQCA).

In the configurational approach, conditions indicating outcomes are viewed as configurations of related constructs rather than entities examined independently. By analyzing different configurations, one can gain a systematic and comprehensive understanding of information systems and market environments. QCA can be used for inductive, deductive, and abductive reasoning (Park et al., 2020; Saridakis et al., 2020) and also for theory building, theory elaboration, or theory testing (Greckhamer et al., 2013; Misangyi et al., 2017).

QCA has gained increasing popularity in many research areas, including e-business (Pappas et al., 2016), social media (Pappas et al., 2020), information systems (Y. Liu et al., 2017; Park & Mithas, 2020), education (Nistor et al., 2019; Pappas et al., 2017), and learning analytics and multimodal data (Papamitsiou et al., 2018; Papamitsiou et al., 2020).

In this research, fuzzy set QCA will be employed to analyze the intellectual property challenges and development strategies faced by Shenzhen cross-border e-commerce enterprises. Here are the application steps of QCA in this research:

(1) Sample Selection:

According to the research objectives, representative Shenzhen cross-border e-commerce enterprises are selected as case study subjects. The selection of cases will be based on multiple dimensions such as enterprise size, product type, market performance, and the current status of intellectual property protection.

(2) Data Collection:

Data is collected through various channels including interviews, questionnaires, corporate reports, and legal documents. This ensures the comprehensiveness and diversity of the data, facilitating in-depth analysis.

(3) Definition of Conditions and Outcomes:

The "outcome" variable of the study is clearly defined, which refers to the specific manifestations of intellectual property challenges encountered by Shenzhen cross-border e-commerce enterprises in the overseas market. At the same time, the "conditional" variables that may affect this outcome are identified, such as enterprise size, market strategy, and intellectual property protection measures.

(4) Data Analysis:

Collected data is analyzed by using fuzzy set QCA analysis. The research will also employs Necessity Condition Analysis (NCA) to complement the QCA findings. Through logical minimization and truth table analysis, necessary and sufficient conditions that lead to intellectual property challenges are identified.

(5) Model Construction:

Based on the results of data analysis, a logical model is constructed between conditions and outcomes. The model demonstrates the impact paths of different combinations of conditions on intellectual property challenges.

(6) Strategy Generation:

According to the QCA analysis results, targeted development strategies are proposed. These strategies aim to help Shenzhen cross-border e-commerce enterprises overcome intellectual property challenges and enhance their international competitiveness.

(7) Robustness Check:

A robustness check is conducted on the QCA model to ensure the reliability of the research results. Possible methods include cross-validation and case comparisons.

(8) Case Study:

In Chapter Five, an in-depth analysis of the selected cases will be conducted to validate the applicability of the QCA model and the effectiveness of the proposed strategies. This research selects Shenzhen hello Tech Energy Co. Ltd and Shenzhen TOMTOP Technology limited as case study subjects for in-depth analysis.

1.4.2 Thesis structure

The research route of this research is detailed in Figure 1.5.

(1) Literature Review:

In Chapter Two, a theoretical foundation for the study is established through a literature review. This review examines relevant theories and research progress in the areas of platform business ecosystems, cross-border e-commerce, and intellectual property capabilities.

(2) Theoretical Framework Construction:

In Chapter Three, a theoretical model is constructed to clarify the logical framework and analytical path of the study.

(3) Data Collection and Analysis:

Data collection and fuzzy set QCA analysis are conducted according to the steps described in 1.3.1.

(4) Model Validation and Strategy Proposal:

In Chapter Four, the QCA model undergoes robustness checks, and targeted development strategies are proposed.

(5) Cases Analysis:

In Chapter Five, cases analysis are conducted to further validate the effectiveness of the QCA model and the proposed strategies.

(6) Discussion and findings:

The main findings of the study are summarized and discussed, theoretical and practical contribution are proposed.

(7) Conclusions:

Summarize the research content, propose management and policy recommendations, and research limitations and future directions are proposed.

Through the above research methods and technical routes, this research aims to provide in-depth theoretical analysis and practical guidance for Shenzhen cross-border e-commerce enterprises facing intellectual property challenges in the overseas market.

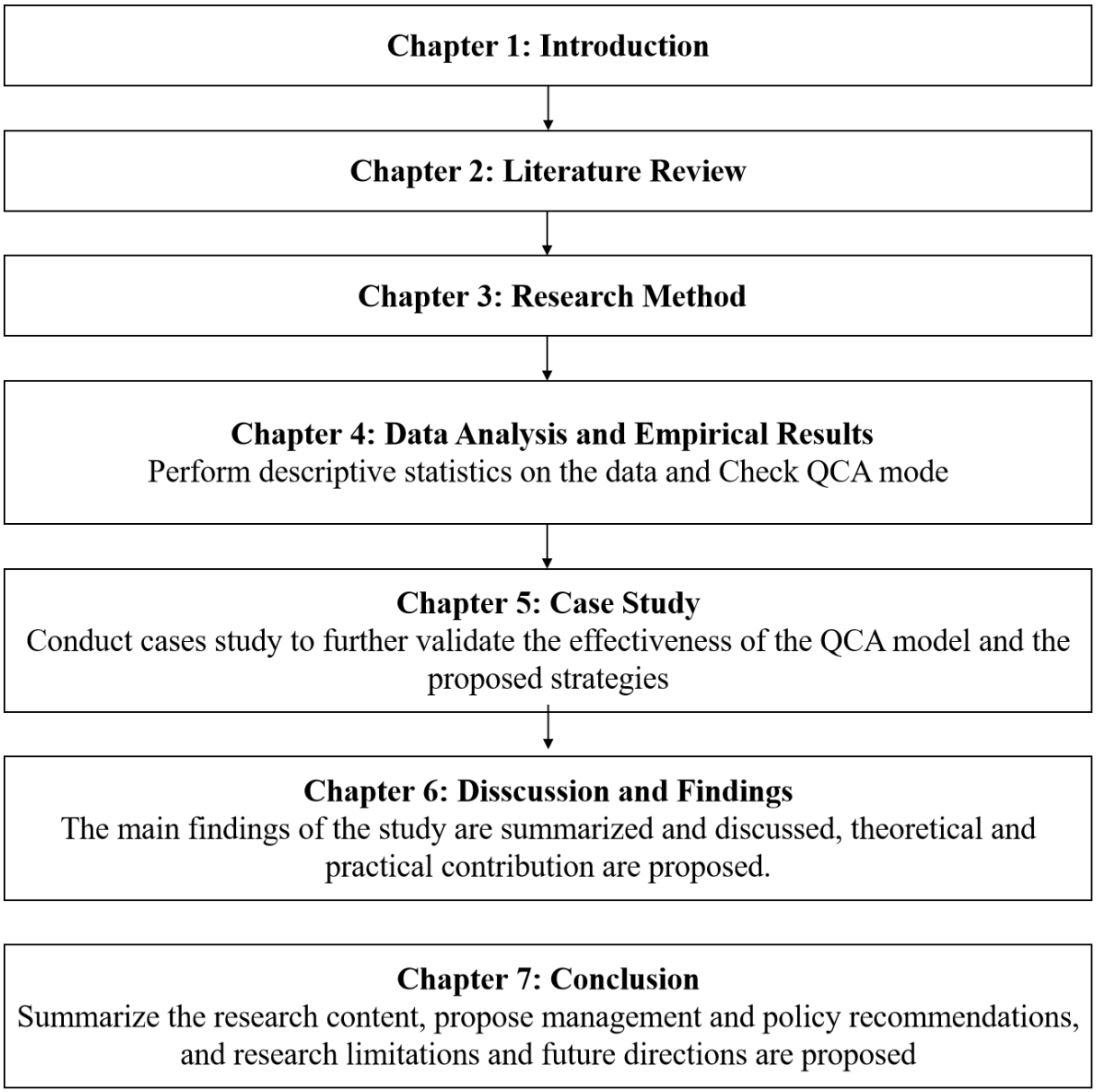


Figure 1.5 Chapter structure

Chapter 2: Literature Review

2.1 Platform business ecosystem

2.1.1 Business ecosystem and its evolution

2.1.1.1 Definition of business ecosystem

An ecosystem, defined as a community of living organisms that interact with each other through cooperation and competition in the common resource environment(Moore, 1996), is a useful ecological metaphor to explain the evolution of the business world.

Business ecosystems have become a novel type of value system in all economic sectors. Moore (1996) refers to a business ecosystem as "an economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world". The birth, expansion, leadership, or self-renewal of a business ecosystem results from complex interdependence among the co-evolving member organisms (e.g., suppliers, partners, competitors, innovators, and customers). A company cannot achieve business success without simultaneously considering both cooperative and competitive strategies at different stages of ecosystem evolution. This theory plays a key role in understanding and analysing complex business environments and market dynamics.

In business ecosystems, firms compete and cooperate at the same time, or engage in co-opetition, as they have a mutual interest in defending, developing, and growing the ecosystem (Moore, 1996). He mentioned that companies should be viewed not as members of a single industry but as part of a business ecosystem that crossed a variety of industries. The concepts of co-creation, co-evolution and continuous innovation also brought a dynamic perspective to the ecosystem model which was absent from conventional economic models such as Porter (2008). Additionally, Adner (2017) posited the notion of ecosystem synergies and their impact on enterprise success, particularly highlighting the complex interplay not only with direct competitors but also with other ecosystem participants, such as suppliers, customers, and partners. Consequently, the success of enterprises is contingent not solely on their own strategies and capabilities but is also influenced by the behaviours and relationships of other enterprises within the ecosystem. Their theory suggests that understanding and managing these synergistic relationships within the ecosystem is pivotal, enabling enterprises to navigate the

complex market environment more effectively and thus secure a competitive edge.

2.1.1.2 Components of a business ecosystem.

The health of a business ecosystem is not solely dependent on the success of individual companies but also on the healthy interactions between all companies within the system (Iansiti & Levien, 2004). The ecosystem's resilience lies in its ability to adapt to external changes, such as technological innovations and market demand shifts.

Ensuring the collective well-being and balance of various organizational types within an ecosystem is crucial for attaining sustainable competitive advantages. Similar to a biological ecosystem, business ecosystems exhibit three key behaviours— "keystone players", "dominators", and "niche players"—which are instrumental in understanding participant strategies and positioning.

Among them, keystone players are active leaders in the ecosystem and tend to actively improve the overall health of the ecosystem. They maintain a low physical presence and are generally more effective at both creating and sharing value across the system through platforms. Keystones tend to assume roles of hubs in the network; they are the "most richly connected" and often lie at the network's core.

The keystone organization is also challenged by the members of the ecosystem, referred to as "dominators", which are direct rivals of the platform leader for the governance of the ecosystem. Dominators are firms that have strong physical presence and control a large part of their networks. They take most of the value for themselves and leave little for other companies in the ecosystem. In mature industries, where little innovation takes places and change is slow, dominators can have a beneficial effect. In emerging industries, this behaviour can be highly destructive as it limits innovation.

Niche players constitute the largest group in any ecosystem. They are non-dominant, large, and small, companies that specialize in specific capabilities to differentiate themselves from others in the ecosystem. Niche players collectively create much of the value in a niche and generally capture the value they create. Their growth depends on their ability to leverage keystone platforms and to maintain a level of differentiation.

2.1.1.3 The operating mechanisms of business ecosystems.

Ecosystems operate and evolve subsequent to endogenous and exogenous forces.

A fundamental force internal to the ecosystem is the "co-evolutionary processes" among members of the ecosystem, as interdependent organizations evolve reciprocally with one another. These processes include firms feeding-off, supporting, and interacting with one another

in exchanging knowledge and resources, and manufacturing products and services. The relationship between firms may be cooperative as well as competitive, resulting in co-opetition among ecosystems. Coevolution is more readily observed in ecosystems where complementors and component makers produce distinct technological sub-systems, and when there is a clear platform architecture that connects all sub-systems in a stable fashion. As a consequence, the platform leader plays a central role in this change dynamics because its technology connects the technologies of other organizations of the ecosystem(Iansiti & Levien, 2004; Iyer & Davenport, 2008). Furthermore, A further endogenous factor that influences the evolution of the ecosystem is platform "governance". The central theme in platform governance is the amount of decision making and control (or coordination) that platform owners should relinquish to other members of the same ecosystem. The set of decisions that platform owners and module producers must consider include the functions of each sub-system and the member who should control the interfaces between sub-systems (Tiwana, 2010).

By contrast, external factors that influence the evolution of business ecosystems are generically sourced from the ecosystem's "environment". These include, firstly, changes in the social and economic environments, which have a bearing on the rate and direction of ecosystem development (Habbershon, 2006; Nehf, 2007). Other exogenous factors are the technological changes - such as radical, discontinuous, and disruptive changes - in the ecosystem's environment. When these technological changes are convergent (i.e. through the integration and bundling of different technologies into a single product), and take place in application domains outside of the focal ecosystem, they can provide an opportunity for external platform makers to penetrate into the focal domain, and at the same time allow the focal platform owners to seek applications in the external domain where convergence has formed. The process of penetrating another application domain as a result of technological convergence is referred to as "envelopment". The outcome of envelopment is to broaden a given ecosystem's scope while engaging in competition and potentially shrinking that of another.

2.1.1.4 The evolution of business ecosystems.

In the modern Information and Communication Technology (ICT) sector, an ecosystem will inevitably be anchored by a platform and platforms are now pervasive in high-technology industries (Downes & Nunes, 2013). A platform as being a building block which could be a product, service or technology that acted as a foundation upon which other organisations could develop complementary products, services or technologies (Gawer, 2009).

Technological platforms have become increasingly pervasive as new computing

technologies have become embedded within industrial ecosystems transforming the industrial and competitive landscapes and disrupting the balance of power between firms. This trend has been referred as “The Age of the Platform” (Downes & Nunes, 2013). The first widespread use of platforms occurred in the early 1990s within the context of product development, otherwise known as “product platforms” (Gawer, 2009).

Meyer (1997) first defined product platforms as a set of sub-systems and interfaces that formed a common structure from within a stream of derivative products that were efficiently developed and produced. The benefits of designing and using product platforms were to reduce fixed costs, gain efficiency in product development (through the re-use of common parts), the ability to produce a large number of derivative products as well as gaining flexibility in product design and mass customisation.

Gawer (2009) second platform typology was the supply chain platform. According to Gawer, the supply chain platform extended the product platform concept to firms within the context of a supply chain. The main difference between the two platforms was that product design, development and manufacture happened externally and not internally, involving different suppliers and final assemblers. The objectives of the supply chain platforms were similar to the internal platforms in that they sought to improve efficiency, reduce costs, reduce the variety of parts and increase product variety (involving the systematic re-use of modular components).

2.1.2 Business ecosystem and its evolution

2.1.2.1 The concept of the platform business ecosystem

The recent emergence of business ecosystems Moore (1996) and platforms (Choudary, 2015; Parker, 2016; Tiwana, 2013) represents a very important development that is having a highly disruptive impact on traditional industries and product/service markets(Downes & Nunes, 2013). The speed and exponential rate of growth of this phenomenon has largely been the result of new technologies in the Information and Communication Technology (ICT) sector including the Internet (Web 1.0 and Web 2.0), the increasing digitisation and dematerialisation of products, the rapid diffusion of mobile communications as well as big data and cloud computing (Simon, 2013). This trend is set to continue with the development of “deep” technologies such as the industrial Internet (Internet-of-Things), artificial intelligence (AI) and the increasing connectedness that will result from this(Manyika, 2011).

Scholars from various disciplines take different perspectives on how digital platforms

orchestrate an ecosystem of actors to co-create value (Lusch & Nambisan, 2015). These disciplines include economics with a market-based perspective (McIntyre & Srinivasan, 2017; Parker et al., 2017), technology management with a technical perspective(Tilson et al., 2010; Tiwana, 2010), and information systems with a socio-technical perspective (Constantinides et al., 2018; De Reuver et al., 2018).

In the course of Digital Technologies (DT) , through the holistic confluence comprising material, organizational and further environmental dimensions(Bharadwaj et al., 2013), so-called digital business ecosystems, which in the past were only a topic of interest for IT and software industries, are becoming more and more inseparable from regular business ecosystems and increasingly relevant across sectors as digital technologies diffuse through industries and society. Digital business ecosystems define business environments “shaped by a network of interdependencies specifically generated through digital technologies”(Kopalle et al., 2020).

Gawer (2009) third typology was the industry platform. A key distinction between supply chain platforms and industry platforms is that within industry platforms the firms developing complements don’t necessarily buy or sell from each other, they are also not part of the same supply chain nor is there any need for cross-ownership. These platforms consist of a large number of firms that Gawer referred to as industrial ecosystems which develop complementary technologies, products and services. Examples include the Microsoft Windows, Apple iOS and Android operating systems, the Linux operating system, Intel and Qualcomm microprocessors, the Google Internet search engine, social networking sites such as Facebook, video game consoles (Sony, Microsoft and Nintendo) and more recently payment platforms. This range of platforms is increasing all the time as the cost of computing power, storage and bandwidth declines i.e. new financial technology (Fintech) and health platforms are also emerging.

The fourth and final typology that Gawer (2009) considered was the double-sided (or multi-sided) market. The term, double-sided markets was coined by two French economists Rochet and Rochet and Tirole (2003) following earlier research by William Baxter in 1983 (P. Lin et al., 2000). Double-sided markets (also known as two-sided markets, multi-sided markets or multi-sided platforms) are technologies, products or services that create value primarily by enabling direct interaction between two or more customers or participant groups.

However, as the diffusion of smartphones, apps and cloud computing have increased exponentially since the publication of Gawer (2009), the number of multi-sided platforms has proliferated (Evans & Gawer, 2016). A key driver of this proliferation has been the business model innovation.

2.1.2.2 The structure of the platform business ecosystem (entities, elements, relationships)

The structural components in a platform ecosystem describe how actors (Platform, customer, service provider) interact with value proposition and value creation. Actors link to each other through cooperation and competition.

Platform-customer interactions. Platforms can work to develop interpersonal trust with their customers through direct or indirect interactions with them. By indirect we mean interactions in an environment that might, for example, protect personal information, such as an Airbnb host communicating with a guest through the Airbnb website, as opposed to texting each other directly. They earn the customers" loyalty by creating superior user experiences through better data and algorithms so that customers will go to them first. An important example outside of hospitality is Google search, where so many consumers start their searches for many products and services. Google thereby mediates the relationship between customers and providers (Malthouse et al., 2013). Platforms such as eBay have consumer trust that anonymous vendors would not have. Platform businesses, such as Airbnb and Uber, also foster interactions between customers that take place on their own platform. To build a credible trust mechanism that customers can reply on, platform businesses led the way by institutionalizing online review systems as central practices of interacting with their network, while financial services and other utilitarian service settings have lagged behind when it comes to sharing customer feedback or reviews in public(Fehrer et al., 2018). Such cooperation between customers and the platform helps the ecosystem build an online review system that offers a strategic advantage to multiple participating species. There has also been research on how user interfaces and recommender systems (RS) affect user trust(Jones & Pu, 2007) and how to design RS to be robust to attacks that may reduce trust(Mobasher et al., 2007).

Customer-service provider interactions. The core of the platform ecosystem is customer-service provider interactions. The possibility of interpersonal contact distinguishes between the major accommodation types (shared room vs. entire home) on Airbnb (Lutz & Newlands, 2018). To increase matching efficiency, hosts of shared rooms tend to strategically signal a preference for guests who are open to social interaction. By contrast, "entire home" listings appeal to guests who expect a minimal element of sociality(Lutz & Newlands, 2018). Additionally, prior research has identified the level of a service provider's interpersonal skills during the post-purchase stage as an antecedent of customer loyalty in the sharing economy(Akhmedova et al., 2020). As an asymmetric form of communication, parasocial interaction also significantly drives consumer decision making. Specifically, the degree of perceived trustworthiness inferred

from an Airbnb host's personal photo is positively related to both listing price and purchase probability (Ert et al., 2016).

Incumbent-platform interactions. Incumbents (e.g., taxis) are traditional businesses that offer products and services that are increasingly in competition with platform businesses (e.g., Airbnb, Uber, and BlaBlaCar). The entry of platform businesses to the market has posed significant threats to the survival of incumbents(Abrate & Viglia, 2019). In response to competitive interactions with the new entrants, incumbents have implemented a variety of strategies including "modifying their business models to focus on segments platforms cannot serve well (e.g., business travelers who need a range of value-add services) and adopting features of platforms (e.g., launching a booking app), to launching competing platforms (often one-sided platforms), and acquiring and integrating peer-to-peer platforms (e.g., AccorHotels" acquisition of onefinestay)" (Wirtz et al., 2019). Over time, incumbent-platform interactions have resulted in both niche separation in the service market and the diffusion of one-sided and/or peer-to-peer platforms among incumbents. The institutionalization of digital platforms does not necessarily mean that incumbents utilize the new organizational form in the same ways as platform businesses do.

Platform-service provider interactions. The relationship between a platform and a service provider on a sharing platform is different from the one between an incumbent and its employees. Platforms need to educate and train service providers to ensure consistent customer experiences and standards of service quality. Although platforms can motivate service providers to improve their skills and expertise, it is still difficult to navigate due to the nature of informal employment relationships. Service providers such as Uber drivers have expressed dissatisfaction because of inadequate compensation and the lack of non-wage benefits. Researchers have argued that platforms should address the dissatisfaction by offering a performance-based compensation system, a direct communication channel, and an insurance package(Kumar et al., 2018). For a long time, Uber drivers have not been entitled to regular employee benefits. This has resulted in ongoing court battles and prompted government actions to further regulate economic activities born in this business model. In March 2021, the company announced that it would reclassify its U.K. drivers as "workers" and grant them a minimum wage, vacation pay, and pension contributions based on the decision of the U.K. Supreme Court.

2.1.2.3 The governance of the platform business ecosystem

Tiwana (2010) describes platform governance as "who makes what decisions about a platform". The primary challenge in platform governance lies in balancing the need for platform owners

to maintain enough control to uphold the platform's integrity while allowing sufficient autonomy for module developers, users, or participants to foster innovation. Therefore, platform governance can be analyzed from three distinct angles.

(1) "**Decision-rights partitioning**" involves the allocation of decision-making powers between platform owners and the participants. This includes three main areas of decision rights: (i) the features and functionality of a subsystem (like add-on software) on the platform; (ii) the manner of its operation, centering on its design, concept implementation and interface; and (iii) the governance of the platform ecosystem's internal interfaces.

(2) "**Control**" pertains to the mechanisms, both formal and informal, used by platform owners to promote desired actions among users. Formal control divides into: (i) output control, where the platform owner sets predefined standards to assess, reward, or penalize users" outputs; and (ii) process control, where the platform owner prescribes the procedures and methods for module developers. Informal control relies on cultivating shared values, beliefs, and norms, known as clan control, to influence the behavior of platform participants.

(3) "**Proprietary**" vs. "**Shared ownership**" addresses the ownership structure of a platform, distinguishing between single-owner platforms and those with multiple stakeholders.

Building on previous research, Tiwana (2013) further categorises platform governance according to three dimensions. The first revisits the distribution of decision-making between app developers and platform owners (similar to the decision rights in Tiwana (2010)). The second dimension outlines four strategies—gatekeeping, metrics, process control, and relational control—that platform owners can combine in various ways to align and coordinate with app developers (similar to control in Tiwana (2010)). The third dimension, as outlined by Tiwana, concerns platform pricing strategies, including five key choices: (ⅰ) determining whether pricing for the platform's two sides should be symmetric or asymmetric; (ⅱ) if asymmetric, identifying which side to subsidize and the duration of this subsidy; (ⅲ) deciding if pricing should be done for access and/or usage; (ⅳ) choosing between fixed or a sliding scale; (ⅴ) making decisions on app pricing. Tiwana also suggests that these dimensions are interconnected, with decisions in one area impacting the others. Moreover, he argues that the most effective governance structure minimizes costs while fulfilling the platform's objectives for both app developers and the platform owner.

Building on the work of Tiwana (2010) and Tiwana (2013), Schreieck et al. (2016) explore various elements concerning the design and governance of platform ecosystems. They distinguish platforms as either technology-based or market-oriented and assert that governance

spans both perspectives because it addresses technological aspects, such as the provision of APIs, and market considerations, such as price determination. **Eight** principal concepts have been identified, targeting the governance of platform ecosystems.

-"**Roles**" within a platform ecosystem is an important factor in its governance, covering aspects such as the number of sides they connect, their ownership regimes (Bakos & Katsamakas, 2008), the distribution of power, which can be centralized or decentralized, and their relationships with stakeholders of the ecosystem (Bullinger et al., 2012). For instance, a mobile payment platform ecosystem needs to manage the balance of power and ownership among banks, dealers, and customers, while fostering ties with business partners to enhance its appeal.

-"**Pricing and revenue sharing**" serve as a governance mechanism within platform ecosystems, denoting the distribution of payments across the ecosystem's stakeholders. These mechanisms are instrumental in fostering network effects and addressing the initial chicken-and-egg challenge faced by platform ecosystems (Suarez, 2009). For example, Microsoft incentivized software developers with payments to produce initial applications for the Windows phone platform, aiming to draw in more users. Subsequently, developers had to sell their apps through sales to consumers or by displaying ads.

-"**Boundary resources**" refer to the instruments, norms, or resources employed to regulate value co-creation within platform ecosystems (Eaton et al., 2015). The majority of studies on boundary resources emphasize APIs or software development kits (SDKs) as key facilitators of value co-creation. However, boundary resources can sometimes hinder co-creation of value. For instance, stringent rules for approving complementary goods or services on a platform might dampen the incentive for complementors (Eaton et al., 2015). User-provided data is increasingly recognized as a critical boundary resource in platform ecosystems, facilitating access for complementors (Gawer, 2014).

-"**Openness**" in the context of platform ecosystems signifies the relaxation of constraints on utilizing, developing, and commercializing technology (Boudreau, 2010). This can be achieved by providing access to the platform or relinquishing some degree of control over it. For instance, Microsoft allows application developers to access the Windows platform while maintaining control, contrasting with Linux, where the technology is fully accessible to all stakeholders (Ondrus et al., 2015). Selecting an appropriate level of openness forms a part of the governance strategy for platform ecosystems and can be dynamically modified, as demonstrated by Android and iOS case studies.

-"**Control**" typically means to guide attention, inspire, and ensure that organizational

members act in alignment with the organization's goals and objectives (Wiesche et al., 2011). Within platform ecosystems, control describes the manner in which the platform owner manages the ecosystem's processes, categorizing into formal (e.g., output control) and informal (e.g., clan control) mechanisms (Tiwana & Bush, 2014).

-"**Technical design**" involves the platform's modular structure (Tiwana, 2010), interface definition, and system compatibility. "Competitive strategy" describes the optimal approach—competition, collaboration, or co-opetition—to position a platform ecosystem competitively (Mantena & Saha, 2012).

-"**Trust**", serving as the counterbalance to power, is fundamental for the success of a platform ecosystem (Hurni & Huber, 2014). This trust is crucial in the interactions between the platform owner and the complementors, and between the customers and the platform ecosystem at large.

However, as digital platforms increasingly shape the economy, their owners amass greater power and often control the ecosystem's value creation, sometimes prioritizing their own benefits over others. A centralized governance structure allows the platform owner to define clear governance procedures and results, but it might also marginalize other participants (Boudreau, 2010). Conversely, in a decentralized governance model, participants have more influence and can advocate for their interests, yet this may lead to a dispersed power structure, slower decision-making, and potential overall platform inefficiencies. Y. Chen et al. (2021) contribute significantly by analysing the balance between **centralized and decentralized governance** in digital platforms through **Mechanism Design Theory**. They advocate for semi-decentralization as the optimal governance model, citing its potential for aligning incentives, enhancing informational efficiency, and achieving favourable governance results. Their empirical analysis, based on blockchain industry data, indicates that decentralization's effect on market capitalization follows an inverted U-shape, suggesting that a moderate level of decentralization tends to correlate with improved market performance. Moreover, platform performance aspects like developer attention, development activities, and social media following exhibit an inverted U-shaped relationship with centralization levels. This leads to the conclusion that platform owners can enhance performance by moderately relinquishing control to participants, thereby finding an ideal equilibrium, which is a significant challenge. It is suggested that the governance structure of platforms can be shaped by a mix of design constraints and strategic leadership, with experienced leaders playing a crucial role in steering digital platforms towards effective governance models.

2.1.2.4 The effects of the platform business ecosystem

Network effect: Network effects occur when a product becomes more valuable to a user as more people use it. Katz and Shapiro (1985) divide network effects into two types based on their origin. The first type is the direct network effect, arising from the increased participation of similar users, such as more Xbox One players enhancing the experience for each other. The second type is the indirect network effect, stemming from different user groups, like mobile device users benefiting from a broader range of apps developed by more third-party developers.

Network effects alter the product diffusion process, crucial for a company's success, showing distinct patterns compared to traditional sectors. Studies on product diffusion under network effects reveal more complex behaviors than the standard S-curve, including double-peaked and saddle-type patterns (Goldenberg et al., 2002). Additionally, the diffusion process is influenced by the competitive landscape, where the proliferation of rival products can modify consumer interactions (Peres et al., 2010).

Under network effects, consumer benefits correlate with the user base of the product, yet individual consumers only interact within their specific social networks or local circles, which frame the network effects. According to complex network theory, the social structure of economic agents is neither uniformly structured nor entirely random, often exhibiting complex network characteristics like "small world effects" (Shang et al., 2021). Consequently, the characteristics of these interaction networks significantly impact the diffusion of products under network externalities.

2.2 Cross-border e-commerce

2.2.1 The origins and development of e-commerce theory

2.2.1.1 Definition and characteristics of e-commerce

E-Commerce encompasses the digital trading of goods and services. It uses various technological solutions such as Mobile Commerce (M-Commerce), Digital Marketing, Electronic Supply Chain Management (E-SCM), Electronic Data Interchange (EDI), and Electronic Funds Transfer (EFT). These technologies enhance the efficiency of buying and selling online (Schafer et al., 1999). The evolution of e-commerce has significantly altered consumer purchasing habits, transitioning from conventional shopping (in brick-and-mortar stores) to online platforms, which has improved customer satisfaction by offering superior services in delivery, electronic payment methods, and the overall accessibility of products and

services. Furthermore, the adoption of cutting-edge technologies like chatbots enhances the shopping experience on e-commerce websites by offering superior customer service (Cui et al., 2017). E-commerce streamlines a wide range of commercial activities between enterprises and consumers via the internet, reducing expenses and improving the process efficiency and time of business dealings. The use of e-commerce platforms has significantly increased over the past years due to their effectiveness in managing operations and information. With ongoing technological advancements, e-commerce continues to evolve, incorporating various technological means. For example, the integration of social media functionalities, including product reviews and ratings, referrals, and recommendations, on e-commerce sites has notably improved user engagement, facilitating both consumer purchases and digital marketing through word-of-mouth.

The continuous evolution of e-commerce has led to the emergence of S-Commerce. S-Commerce embodies a comprehensive platform that integrates social media elements with e-commerce technologies, features, and functionalities. It leverages the capabilities of social media to encourage user interaction and information sharing, thereby influencing purchasing decisions. Consequently, S-Commerce is defined as a novel communication channel for interaction on platforms enabled by social media, facilitating value creation for both consumers and business (Bianchi et al., 2017). Distinct from traditional e-commerce platforms, S-Commerce is characterized by **its emphasis on content, community, context, connection, and conversation**. On S-Commerce platforms, content refers to the information made available, including consumer-generated reviews and product ratings, which add value and enhance user engagement. Similarly, the formation of community networks stands as an important feature of S-Commerce, facilitating effective interaction among users and fostering strong relationships (Hopkins, October 11, 2022). The context is the instance surrounding a transaction or communication, such as showing interest in a product, which enables companies to align their offerings with consumer needs. Connections among users bolster decision-making processes, as individuals can gather insights about products or services through other users" feedback. Moreover, conversations between consumers and businesses enhances interaction quality, contributing to superior customer relationships (Lal, 2017).

Sharing commerce (or called sharing economy) is a novel business concept, arising from the evolution of the sharing economy. It denotes the exchange of resources among individuals, either freely or at a certain cost, primarily via online platforms. This model integrates e-commerce, s-commerce, and social networking technologies to facilitate the online buying and selling of goods and services. Collaborative commerce and participatory commerce

represent distinct types within sharing commerce, characterized by the extent of consumer and provider engagement. For instance, group buying allows consumers to aggregate orders via a third-party platform for discounts, with another company handling delivery. Similarly, participatory commerce involves consumers directly in the creation, purchase, and sale of products and services. Thus, sharing commerce can be described as a model where the functions of online commerce, such as production, distribution, and buying and selling, are collaboratively undertaken by various stakeholders, including both consumers and companies, across different levels.

Currently, the trend in the online commerce sector is the increasingly widespread adoption of S-Commerce with E-Commerce. This trend is driven by the distinct advantages S-Commerce offers, such as integrating consumers into business operations like advertising and marketing and engaging them in processes like reviewing and rating products. These activities aid potential buyers in their decision-making processes. Concurrently, sharing commerce is experiencing a surge in popularity due to its varied participatory approaches. These methods not only grant consumers greater autonomy in the buying and selling process but also assist them in finding the appropriate product at the correct price.

2.2.1.2 Theoretical issues in e-commerce and research progress.

The inception of ARPANET in the 1970s marked the beginning of research into online transaction methods. In 1976, Atalla Technovation emerged as a pioneering company to offer solutions for secure online transactions, catering primarily to the banking and finance institutions. This innovation provided the opportunity for Michael Aldrich's establishment of the inaugural **online shopping system** in 1979 (Tkacz & Kapczynski, 2009), succeeded by Thomson Holidays (UK) launching the first **B2B online shopping** platform in 1981, and Tesco, a retail behemoth, introducing the initial **B2C online shopping** system in 1984 (Winterman & Kelly, 2013). The development of the **World Wide Web** in 1990 propelled the expansion of **E-Commerce**, subsequently facilitating the emergence of novel commercial ventures such as **S-Commerce** and **sharing commerce** in the following years.

In the late 1990s to early 2000s, the rise of social networking platforms such as Facebook and Google's social apps marked the beginning of S-Commerce. Since its development, S-Commerce has evolved from merely a platform for social networking to a comprehensive framework that integrates social psychology, social heuristics, the sharing and management of information, communication strategies, and information communication technologies within the sphere of e-commerce (C. Wang & Zhang, 2012).

In 2000, as e-commerce emerged, research predominantly explored its platform architecture, emphasizing trust, usability, and satisfaction. Bansal and Chen (2011) observed that consumers exhibited greater trust in e-commerce compared to s-commerce due to issues such as improper access, unreliability, and frequent errors. L. Cecere et al. (2010) highlighted that technological and management strategies represent significant hurdles for e-commerce, proposing new strategies to enhance commercial value and impact. M. Hajli (2012) identified that social relationships on e-commerce platforms generate value and considered trust as a critical factor influencing consumer behavior. Research during 2010-2012 primarily concentrated on value creation, consumer behavior, expectations, and motivations (Kwahk & Ge, 2012; Noor et al., 2014) within S-Commerce platforms.

Between 2013 and 2015, significant research concentrated on the trust and technology within S-Commerce. M. Hajli (2012) proposed an adoption model for S-Commerce, while Noor et al. (2014) pinpointed six domains—usefulness, user-friendliness, security, privacy, website aesthetics, and electronic word of mouth (e-WOM)—as pivotal in shaping trust towards S-Commerce platforms. These domains primarily focusing on technical aspects. N. Hajli et al. (2014) highlighted elements like ratings and reviews, recommendations and referrals, as well as forums and communities as instrumental in fostering trust, underscoring the role of social media and networking. Similarly, H. Zhang et al. (2014) examined how technological environments influence user engagement in S-Commerce, discovering that virtual elements like social support, presence, and the flow of information have significant effects. N. Hajli (2015) defined key features of S-Commerce such as ratings, reviews, and referrals. Further, Y. Wang and Hajli (2014) identified that concerns about privacy affect the relationship between S-Commerce and co-branding efforts. Consequently, as S-Commerce saw greater adoption between 2013 and 2015, issues surrounding technology and social factors, including privacy, security, and dependability, emerged as crucial to its development.

After 2015, trust has remained an important factor influencing S-Commerce evolution, with research focusing on trust-building mechanisms and their effects on purchase intentions. Shanmugam et al. (2016) explored how social elements (like reviews, ratings, and referrals) and support (informational and emotional) contribute to trust development. Their findings indicated that these social constructs effectively enhance consumer trust through emotional and informational support. Similarly, N. Hajli (2015) highlighted social constructs, complemented by Web 2.0 technologies, can amplify social presence, thereby increasing trust and purchase intentions. Furthermore, Yahia et al. (2018) identified platform reputation and pricing advantages as key drivers of trust. Gibreel et al. (2018) emphasized that for S-Commerce to

thrive in emerging markets, both social and technical aspects should be considered. Their research identified a positive association between word of mouth (WoM) and the enhancement of trust and purchasing intentions. Similarly, Y. Wang and Yu (2017) discovered that purchase intentions are significantly influenced by WoM, alongside observations and learnings from other platform users. Culture on S-Commerce has also been a significant area of research. Studies by Bianchi et al. (2017) and J. Lin et al. (2019) investigated S-Commerce adoption across various cultural settings, revealing that certain culture factors uniquely affect trust formation and purchase intentions.

Research on sharing commerce is still in the early stages. Similar as S-Commerce evolved from the advancements in social media and networking, the rise of sharing commerce is tied to the growth of the sharing economy, which has been increasingly adopted since the early 2010s (Hamari et al., 2016). Some studies exploring the diverse forms of sharing, their constructs, and their effects on various commercial companies. Pei and Yan (2019) discovered that cooperative behavior and the exchange of information could minimize information distortion and improve decision-making processes. Rong et al. (2018) identified that sharing commerce contributes to the development of sustainable value chains, which has become a key business goal in recent years. Z. W. Lee et al. (2018) noted that the perceived advantages and trust play crucial roles in motivating participation in the sharing economy. Despite its potential benefits, sharing commerce presents challenges that necessitate attention. Ganapati and Reddick (2018) pointed out that regulatory issues, particularly in the areas of mobility services, accommodation sharing, and gig economy, pose significant concerns for sharing commerce. In a similar way, Lutz et al. (2018) emphasized the importance of addressing privacy, financial motives, and trust as critical issues in sharing commerce.

2.2.2 The impact of e-commerce on international trade

Traditional business models are increasingly falling short of fulfilling consumer needs worldwide. Since the global financial crisis in 2008, there has been a rise in cross-border e-commerce, marking a new way for broadening international trade (Tu & Shangguan, 2018). Cross-border e-commerce is characterized by transactions involving consumers and sellers across different countries through digital trading platforms, using cross-border logistics for the delivery of goods (T. Y. Kim et al., 2017). This development in cross-border e-commerce can significantly improve shopping convenience, satisfy consumer demands, and optimize the overall shopping experience. This model plays an important role in redefining international trade, manifesting through changes in how transactional security and trust are established

between nations, the expansion of trade dimensions from B2B to direct engagements with global consumers, and the shift from traditional offline to modern online operational models (Han & Kim, 2019).

2.2.2.1 Risk reduction: delivery of goods and payment transactions.

Electronic commerce has substantially enhanced the transparency of transactions to a certain degree by furnishing exhaustive product descriptions, consumer evaluations, and seller rating mechanisms (Benlian et al., 2012). It can not only aids buyers in making smarter purchasing decisions but also stimulates salutary competition among sellers, thus ameliorating the caliber of service and product dependability. Furthermore, with the ongoing advancements in e-commerce risk management technologies (de Gusmão et al., 2018), particularly in the realms of transaction fraud prevention and cyber-attack defense, the employment of third-party payment platforms such as Alipay and PayPal has significantly bolstered payment security. Business organizations have invested in intensive research to develop various models for identifying and managing potential threats to successful online transactions. Technology supports such as the Privacy-Enhancing Technologies, Digital Signatures, Encryption Technology, Digital Envelopes, effectively diminishing the risks associated with information security, cyber fraud, and payment modalities (Jarvis, 2020). Concurrently, the collaboration between e-commerce firms and third-party logistics providers, coupled with the utilization of cutting-edge logistics tracking technologies, has refined the goods distribution and delivery processes. Such initiatives have markedly reduced losses and delays in goods transportation, efficaciously reducing delivery risk (Manners-Bell & Lyon, 2019).

2.2.2.2 Expanding scope: from b2b to b2c.

E-commerce encompasses two principal models: Business to Business (B2B) and Business to Consumer (B2C) (Kumar & Raheja, 2012). The B2B model facilitates transactions between businesses, such as those between manufacturers and wholesalers or between wholesalers and retailers (Medjahed et al., 2003). Conversely, the B2C model equips organizations with a framework that enables them to connect buyers with sellers, thereby earning commissions provided by the sellers. Recent discussions on e-commerce have predominantly centered on the business-to-consumer (B2C) domain, attributed to the existence of over 100 million consumer households that render the market highly appealing (Hutt & Speh, 2021).

B2C platforms have catalyzed changes in market structures by lowering barriers to entry: lower risk, transaction costs, and more inconvenience.

Contemporary research in information systems on B2B platforms predominantly focuses

on sectors related to manufacturing, where firms provide products and services that are highly specialized and customized to meet the distinct needs of clients. Such specialization results in considerable diversity in product offerings and leads to the segmentation of markets (Schermuly et al., 2019). The development of a digital platform within this context requires a more intricate approach and tailored solutions, often necessitating strategies that are specific to the industry (Joglekar et al., 2022). Consequently, the market structure remains fragmented, with the platform catering to a relatively small target segment (Ritala & Jovanovic, 2024).

Conversely, B2C platforms have significantly altered market structures and introduced novel modes of interaction (J. He & Zhang, 2022). Illustrations such as Airbnb, Uber, and the app stores of Google and Apple demonstrate the transformative impact these platforms have on their respective sectors (Parker, 2016). Airbnb, for example, has broadened the private accommodation market by developing the technical framework and fostering trust among users, thus allowing property owners to securely and profitably lease their spaces to strangers. Consequently, this innovative accommodation model has been embraced by travelers, leading to adjustments in travel habits. The platform has facilitated this by lowering the barriers to entry, such as risk, transaction costs, and inconvenience, while enhancing value for newcomers through more competitive pricing, unique lodging options, prime locations, and interactions with owners.

B2C platforms offer simplified modes of participation, predominantly accessible via smartphones or web browsers.

B2B platforms serve an essential function in connecting disparate market segments by providing technical solutions designed to enhance collaboration among potential market participants dealing with significant heterogeneity across markets (Heimburg & Wiesche, 2022). Within the domain of information systems, the concept of “boundary resources” has been developed to facilitate the integration of actors, incorporating resources such as software development kits (SDKs) or application programming interfaces (APIs), which are offered by the platform (Ghazawneh & Henfridsson, 2010). Boundary resources integrate complementary assets and integrate the platform within existing IT frameworks, which may require professional technical solutions.

B2C platforms have revolutionized user connectivity by establishing a “plug-and-play” framework (Anderson et al., 2022), facilitating easy and seamless user integration without any supplementary technical interventions. These platforms are predominantly accessible via smartphones or web interfaces, offering the convenience of immediate access, in some instances even bypassing the need for account creation by allowing logins. While initial B2C platforms

encountered infrastructural challenges and needed to devise technical solutions, they primarily served a relatively homogenous segment of business users with minimal pre-existing IT infrastructure such as Android or iOS applications. For example, OpenTable developed a software-as-a-service solution for restaurant reservation management before making the platform accessible to its restaurant customers (Evans, 2016). In contrast, B2B platforms are necessitated to extend beyond basic platform services to accommodate the needs of both market sides (Shree et al., 2021). This entails achieving integration across varied IT frameworks on both ends, thus the technical challenges are, therefore, potentially significantly higher than in B2C markets.

B2C platforms benefit from strong competition, leading to lower prices, more choices for consumers, and improvements in product and service quality.

The impact of on-platform competition varies significantly between B2C and B2B platforms. B2C platforms experience positive outcomes from intense on-platform competition, which results in decreased prices, a broader range of choices for consumers, and the possibility of enhanced quality of products and services (Wan & Chen, 2019). Additionally, suppliers gain indirectly from such competition as the combination of lower prices and expanded choices tends to draw a larger consumer base, illustrating the benefits of indirect network effects. Upon achieving critical mass, B2C platforms can depend on a decentralized network of suppliers and developers (Alt & Zimmermann, 2019).

B2C platforms perform better at data sharing.

Within the B2B and B2C platforms, data sharing is regarded as beneficial for all parties involved. B2C platforms are known for their data-driven approach, using a data-centric strategy, employing data gathering methods to cultivate insights and introduce new products and services (Troisi et al., 2020). Similarly, B2B platforms value the access to consistent and high-quality data as a considerable asset (Chakravarty et al., 2014). Data sharing enhances dependence and loyalty among users, thereby solidifying the relationships between buyers and suppliers. However, it's crucial to recognize that, although individual users on B2C platforms may be inclined to share their data in return for free services or convenience, businesses participating on B2B platforms typically expect some form of compensation for their data contributions.

Clearly, acquiring user data on B2C platforms is more straightforward, as it better aligns with the requirements of both supply and demand sides (Peltier et al., 2020). Additionally, B2C platforms frequently strive to leverage their expertise from their main market into new areas, integrating data from these expansions with their existing data. Beyond the assessment and collection of data, the capability to generate novel ideas from data is vital for the success of

B2C platforms as well. Therefore, the ease of data acquisition significantly improves the rapid growth of B2C platforms (He & Zhang, 2022).

2.2.2.3 Optimization method: from offline to online.

In Cross-border e-commerce (CBEC), both suppliers and consumers can engage in buying and selling goods internationally over the Internet, leading to significant reductions in transaction costs, including communication, market research, and administrative expenses (Qi et al., 2020). Developing and developed economies are increasingly adopting CBEC as it allows exporters to bypass challenges such as limited information access, market isolation, and the high costs associated with entering new markets.

2.2.2.4 Comparative analysis of traditional and online business models.

Comparison of operational processes Traditional business frameworks usually involve tangible production facilities, necessitating considerable infrastructure, machinery, and labor (Christopher, 2016). They typically distribute products through physical retail or warehouse networks, which require complex transportation and inventory systems. Online business models, however, depend on digital production and distribution channels, sourcing products for centralized storage and utilizing efficient logistics for delivery, leading to optimized operations, lower storage expenses, and quicker deliveries. Despite these advantages, online models can encounter difficulties in managing inventory and shipping, especially for entities offering diverse products or operating across multiple regions.

Analysis of market reach and customer base Traditional business models often face geographical constraints, usually serving local or regional markets and relying on brick-and-mortar stores, which restricts their customer reach (Laudon & Traver, 2020). Conversely, online business models break these geographical barriers, offering access to a global clientele. Through e-commerce platforms and targeted digital marketing, these businesses can reach diverse customer segments and widen their market presence. Such expansion enhances growth and revenue opportunities. However, online businesses encounter challenges like cultural, linguistic, and regulatory variances across international markets, necessitating strategies for adaptation and localization to successfully enter these markets.

Evaluation of cost structures and profitability Traditional business models often necessitate significant initial investments in physical assets, inventory systems, and labor, incurring costs for rent, utilities, upkeep, and distribution. Online business models, however, enjoy reduced overhead by foregoing physical stores, which diminishes rent, utility, and personnel expenses. Furthermore, they utilize automation and digital marketing to lower

marketing and operational costs. The scalability of online models facilitates economies of scale. Dubosson‐Torbay et al. (2002) discusses the impact of cost structures on profitability, highlighting the importance of pricing strategies, customer acquisition costs, and customer lifetime value in influencing profit margins. Both business types must address these elements to maintain long-term profitability.

Examination of regulatory and legal considerations Traditional business models are subject to regulations concerning physical premises, licensing, labor, and taxes, necessitating adherence to the specific legal frameworks of each operational market. Online businesses, while also bound by these rules, encounter additional regulatory dimensions like data privacy, cybersecurity, intellectual property, international trade laws, and e-commerce legislation. To maintain compliance, foster customer trust, and reduce risk, online entities must navigate these complex and dynamic legal landscapes, which demands continuous vigilance and adaptability in their regulatory strategies (Shaw et al., 2010).

2.2.2.5 Impact of e-commerce on international business.

E-commerce significantly influences international business by enabling market expansion and access to global customers. Dan Ikenson in his work “E-commerce is Transforming Global Trade and Benefiting US Economy” highlights that e-commerce overcomes geographical limitations, allowing businesses to reach an international clientele (Tripathi, 2023). The advantages of e-commerce, such as market diversification, increased revenues, and innovation, contribute to the global trade landscape. While it facilitates international connectivity and economic enhancement, businesses face hurdles like cultural variances and logistical complexities. E-commerce reshapes international business by eliminating geographical constraints, granting businesses access to a worldwide customer pool. It revolutionizes traditional commerce, allowing firms to operate beyond local and regional confines to a global audience, thus facilitating growth and revenue diversification (Suominen, 2019). Businesses leveraging e-commerce can extend their reach, utilizing online platforms like Amazon, eBay, and Alibaba to present and distribute products globally. Through targeted digital marketing, companies can attract specific demographic segments across various regions, adapting their products to align with local tastes and needs. Such market penetration not only boosts sales but also helps in building an international brand identity. E-commerce enables real-time access to a global customer base, with advanced analytics and insights into customer behavior, preferences, and purchasing trends (Akter & Wamba, 2016). This information allows businesses to tailor their marketing strategies, offering personalized promotions, recommendations, and

experiences. By deeply understanding the global market's needs and preferences, companies can improve customer satisfaction, foster loyalty, and cultivate enduring relationships, thereby enhancing growth and profitability (Kumar et al., 2013).

Enhanced customer experience and personalized marketing E-commerce revolutionizes customer experiences by offering personalized marketing that aligns with individual preferences. Businesses use customer data to tailor experiences, delivering content and offers that resonate personally (Artun & Levin, 2015). With AI and machine learning, firms automate customized recommendations, improving experience and sales opportunities. Additionally, e-commerce ensures smooth interactions and convenience. Online platforms provide user-friendly interfaces and secure transactions, enhancing shopping ease and loyalty. Personalized features and marketing improve customer relations and loyalty (Artun & Levin, 2015), boosting retention, value, and growth through positive referrals.

Disintermediation and supply chain optimization E-commerce has facilitated disintermediation, eliminating traditional middlemen and directly linking businesses with consumers (Chircu & Kauffman, 2000). This shift has dramatically affected supply chain management by streamlining operations, cutting costs, and enhancing efficiency. Direct-to-consumer models allow firms to bypass wholesalers and retailers, offering competitive prices and transferring savings to customers (Tsay & Agrawal, 2004). Controlling the entire supply chain enables businesses to smooth operations, lower inventory costs, and refine fulfillment processes. Moreover, e-commerce supports real-time inventory control, granting accurate insight into stock and demand trends (Ren et al., 2020). This helps businesses maintain optimal inventory, prevent shortages, and avoid excess stock. Integrating supply chain management with data analytics improves efficiency, ensuring timely and appropriate product availability. E-commerce also advances logistics and fulfillment, utilizing robust logistics networks for quicker, dependable deliveries. Real-time order tracking increases transparency and customer satisfaction.

Changes in consumer behavior and preferences E-commerce has transformed consumer behaviors and expectations, redefining business engagement strategies (Lempka & Stallard, 2013). Consumers now prioritize convenience, adaptability, and seamless digital interactions. Online shopping's ease has become a fundamental attraction, with consumers enjoying the ability to shop anytime, from any location, across multiple devices. Price comparisons, reviews, and extensive product selections have enhanced consumer empowerment and decision-making (Bilgihan et al., 2016). Moreover, e-commerce enables personalized marketing, allowing businesses to use consumer data for customized communications and offers, aligning with

individual needs, behaviors, and buying history (Akter & Wamba, 2016). Such personalization enhances the shopping experience, meeting consumer demands for quick, reliable deliveries, easy returns, and superior service. Success in e-commerce is tied to fulfilling these expectations, thereby securing customer loyalty. The rise of social commerce and user-generated content further influences consumer choices, with buyers valuing insights from social networks and peer reviews. Companies that engage with customers on social platforms and promote user content can enhance brand loyalty. Adapting to these consumer trends requires businesses to focus on creating user-friendly, secure online environments, offering excellent customer support, and providing optimized mobile experiences. Businesses that align with these consumer preferences can achieve a competitive advantage, ensuring customer satisfaction and loyalty.

2.2.3 Cross-border e-commerce

2.2.3.1 The meaning and characteristics of cross-border e-commerce.

The European Commission (EC) defines cross-border e-commerce as web-based digital transactions involving information gathering, customs processes, payments, services, and the distribution of goods across international borders. This encompasses online sales where the seller is based in a different country than the buyer and includes transactions completed by travelers in a country other than their country of residence (Xue et al., 2016).

The development of the Internet has significantly accelerated the growth of global online shopping, enabling consumers from various countries, speaking different languages, and using different currencies, to purchase products directly. This advancement has largely mitigated issues related to **universal payment security, payment methods, logistics, reverse logistics, and international language barriers** (A. Liu et al., 2021). Cross-border e-commerce, compared to traditional trade methods, is recognized for **its efficiency and speed** in facilitating transactions (Z. Liu & Li, 2020). Transactions are predominantly conducted online with electronic payments, transcending **geographical and temporal boundaries** (Prasad, 2023). In contrast with other forms of online trade, cross-border e-commerce is more untraditional. Cross-border e-commerce incorporates comprehensive aspects of international trade, including **customs clearance, insurance, and transportation** (Y. Wang et al., 2020). Even better, cross-border e-commerce allows for transactions to be conducted **via the Internet**, free from the constraints of location and time, across any country.

2.2.3.2 Cross-border e-commerce model

Cross-border e-commerce encompasses various components, including transaction objects, channels, circulation of goods, transfer of funds, exchange of information, and bill exchanges (W. H. Chen et al., 2023). Considering these elements, cross-border e-commerce can be classified based on the nature of the market relationship and technology. There are three primary e-commerce categories: Business to Business (B2B), Business to Consumer (B2C), and Consumer to Consumer (C2C) (Nemat, 2011).

Business-to-Business (B2B) E-commerce involves online transactions between businesses, also referred to as inter-organizational e-commerce (Ratnasingam, 2005). In such transactions, companies connect with their suppliers and distributors to globally exchange documents and process payments, leading to enhanced efficiency and productivity. B2B e-commerce supports organizations in reducing expenses related to purchase orders, production, and delivery (Lucking-Reiley & Spulber, 2001). Furthermore, it enables firms to monitor their documents and inventory levels, thereby diminishing the time needed for inventory restocking and fostering service improvement over time. On the other hand, intra-organizational e-commerce facilitates document communication and transfer within the same organization, aiming to improve communication between management and staff through the use of video conferencing and electronic mail (Pandey & Saurabh, 2007).

Business to Consumer (B2C) E-commerce focuses on the direct sale of products and services to consumers (Kumar & Raheja, 2012). These are online retail outlets that provide products to customers globally. Some retailers known as “clicks and mortar” or “clicks and bricks” possess a physical storefront in addition to their online sales channels. Several other variations of business models exist, such as online versions of direct catalogs, online malls, and manufacturer-direct online sales (Barnes et al., 2004).

Consumer-to-Consumer (C2C) E-commerce provides a platform where consumers can sell products directly to each other (Nemat, 2011). In this marketplace, sellers prepare their offerings and rely on intermediaries, such as eBay, which furnish catalogs and search functionalities to assist in finding and purchasing goods. This e-commerce model also allows individuals to engage with various auction sites that enable them to vend their items.

2.2.3.3 The process of cross-border e-commerce

The typical process of cross-border transactions includes market analysis, supply chain management, payment processing, logistics, customs, and tax compliance (Tu & Shangguan, 2018).

Supply Chain Management (SCM) The international supply chain in cross-border e-commerce involves collaborative relationships among logistics firms to manage the flow of capital, information, and goods effectively across borders, linking global manufacturers, suppliers, and distributors into a cohesive network (Chang et al., 2020). The key point of supply chain management is the coordination between different processes. Its purpose is to meet the needs of users to the greatest extent. Leveraging technologies like data analytics and blockchain, SCM enhances transparency and operational insights in global transactions. Thus, adept SCM is key to maintaining a competitive edge in cross-border e-commerce, optimizing international logistics, and meeting diverse market demands seamlessly.

(1) **Market analysis** In the dynamic context of global business, entering new markets necessitates comprehensive market analysis and strategic localization (Qi et al., 2020). An exemplary case is KFC's market penetration in China, which underscores the imperative of aligning product offerings with local consumer preferences. Their approach, grounded in rigorous market research, facilitated a nuanced understanding of the local market dynamics, allowing for tailored business strategies. This instance exemplifies the essentiality of sophisticated market analysis and cultural adaptability in achieving successful international market integration in the e-commerce era, highlighting the critical intersection of global branding and local consumer preferences.

(2) **Distribution Cost** Cross-border logistics significantly impact the e-commerce user experience, with international logistics management facing several challenges. Customs-related fees and taxes can increase the overall cost of goods, which are often passed on to the consumer, detracting from the user experience. Additionally, product returns can lead to a substantial increase in distribution costs.

(3) **Delivery Time** In cross-border e-commerce, delivery time is crucial and presents challenges. Despite advancements in transportation, delays often occur due to batch shipping practices, where goods are dispatched only after reaching a specified quantity, extending the delivery timeframe and impacting the customer experience (T. Y. Kim et al., 2017).

(4) **Payment processing** In the digital realm, establishing trust and nurturing customer relationships are critical for e-commerce success. Essential to this is the implementation of robust data security, including secure payment processing, alongside responsive customer service and active engagement for feedback (Gomez-Herrera et al., 2014). KFC's market strategy in China exemplifies this, with a strong focus on secure payment systems to protect customer data, enhancing trust. Their accessible customer support and proactive feedback mechanisms further demonstrate a commitment to improving the customer journey online.

However, challenges like fluctuating exchange rates and cultural disparities hinder the establishment of standardized regulations for cross-border payments, posing obstacles to the sustainable growth of e-commerce.

(5) **Delivery Information** In cross-border logistics, operations involve both domestic and international transport. Discrepancies between the actual logistics status and the reported information arise from time lags and the uneven advancement of information technology (Z. Liu & Li, 2020). This misalignment can impede the progress of the logistics sector and, by extension, e-commerce, while also negatively impacting the customer's experience with the product.

(6) **Policy environment** To cultivate an environment conducive to e-commerce growth, collaboration between policymakers and industry stakeholders is essential. Customs considerations are crucial in cross-border e-commerce (Matsudaira & Daly, 2022). Goods undergo scrutiny by domestic and international customs, impacting distribution, addressing tariffs and tax compliance is especially critical. Simplifying customs processes and aligning tax policies with e-commerce operations can mitigate trade barriers, enhancing international market access. Policymakers and industry stakeholders can team up to push e-commerce forward in the worldwide business landscape.

2.3 Intellectual property capability

2.3.1 The meaning and types of intellectual property

2.3.1.1 The definition of intellectual property and their characteristics: temporality and territoriality.

Intellectual property (IP) has emerged as an inevitable result of industrialization, modernization, and particularly the development of economic globalization. Economic globalization has highlighted the increasingly significant role of science and technology in fostering cooperation and competition across political, economic, social, and cultural domains globally. As a result, the protection of intellectual property has increasingly become a focus of interest (Maskus & Reichman, 2005).

Historically, traditional intellectual property has often been regarded as a type of informational right (H. E. Smith, 2006). However, with the advent of computer technology and the Fourth Industrial Revolution, humanity's shift from an industrial economy to a knowledge economy, and from an industrial society to an information society, has expanded the boundaries

and disciplinary scope of intellectual property (Z. W. Lee et al., 2018). **World Intellectual Property Organization** (WIPO, 2020) emphasizes that Intellectual property rights constitute exclusive entitlements to the outcomes of intellectual endeavors formulated by individuals in societal practice. IP encompasses intangible creations originating from human intellect, including inventions; literary and artistic works; designs; and symbols, names and images used in commerce (Gaikwad et al., 2020). Intellectual property often encompasses several categories, including "firm intellectual property", "government-affiliated institution intellectual property", and the "intellectual achievements of individuals" (WIPO, 2020).

From a formal perspective, intellectual property primarily encompasses three types: patents, trademarks, and copyrights (WIPO, 2020). With the rapid advancement of modern science and technology, industrial property rights of practical economic significance to commerce and industry, such as various "service marks, company names, or logos", are also recognized as forms of intellectual property (Parr, 2018). Additionally, knowledge that holds practical identification significance in the fields of literature, art, and other sciences is considered a form of property right (Rai, 1999). Thus, intellectual property not only includes copyrights but also extends to "performing artists" rights to their performances, recordings, and broadcast audio-visual works", thereby continuously enriching the traditional forms of intellectual property. Consequently, the concept of intellectual property exhibits the following four characteristics (Lemley, 2004):

Firstly, the **immateriality** of intellectual property. This is a crucial aspect that differentiates intellectual property from other forms of material rights. Intellectual property is fundamentally linked to the cognitive effort involved in creating knowledge products, embodying the results of human thought. Thus, regardless of the breadth of its definition or scope, intellectual property primarily consists of intellectual outputs presented to the world. These outputs generally manifest in forms such as trademarks, names, designs, and copyrights, all inherently immaterial.

Secondly, the **exclusivity** of intellectual property. Intellectual property rights are owned by the rights holder, whereas non-owners only have the right to use these intellectual achievements and lack ownership rights. For non-owners to acquire the rights to use these properties, they must engage in transactions such as purchases that transfer these rights from the owner. This exclusivity is primarily expressed in the form of exclusive rights to implement and use this intellectual property.

Thirdly, the **temporality** of intellectual property. On one hand, intellectual property essentially represents humanity's understanding of specific matters at a particular time, an understanding that is invariably shaped by temporal and conditional constraints. Consequently,

the rights derived from these intellectual results inherently possess characteristics of limitation and temporal relevance. On the other hand, human comprehension, including that of knowledge, is always evolving, continuously discarding the old for the new and consistently transcending past ideas. Thus, intellectual property inevitably exhibits conditional and temporal qualities (Hughes, 1988). Once the defined period expires, the exclusivity of these intellectual property rights ceases, potentially transforming what was once core technology into common knowledge, thereby likely transitioning into the public domain for unrestricted use. Specifically, copyright protection typically has a time limit that varies by country (Perlmutter, 1998). For countries adhering to the Berne Convention, the duration extends to at least 50 years posthumously, although nations may opt for longer periods. Trademark protection generally lasts for 10 years but can be indefinitely renewed as long as the trademark is actively used, and the requisite renewal fees are paid. This perpetual renewability ensures that as long as the brand remains active in the market, its unique identifier continues to be legally protected. Patent protection is typically granted for 20 years from the date of application. Upon expiration, the invention enters the public domain, allowing free use of the technology. This relatively brief period of patent protection is designed to stimulate innovation while ensuring that technological advancements benefit society at large. Industrial design rights are granted for a limited term. The duration of protection for industrial designs varies by country but is at least 10 years. In many countries, the total protection period is divisible into successive renewable terms.

Fourthly, the **territoriality** of intellectual property. The concept of territoriality in intellectual property indicates that its spatial extent is not boundless; it is confined to specific national borders or regional boundaries (Bradley, 1996). In principle, intellectual property rights are only applicable within the territories of the countries or regions where they were granted. To maintain protection beyond these borders, it is necessary to expand the scope of applications to include other countries, thereby securing legal protection under the laws of those additional jurisdictions.

2.3.1.2 Types of intellectual property.

Intellectual property (IP) encompasses a range of rights that protect the creations of the mind and the investment made in developing original works. This broad category includes copyright (for literary and artistic works), patents (for inventions), trademarks (for brand identity), industrial designs (for aesthetic creations of industrial products), geographical indications (which link a product to a specific geographical origin), and trade secrets (which protect confidential business information from competitors) (WIPO, 2020). These distinct types of IP

serve to safeguard the economic interests of creators and innovators, ensuring that their intellectual efforts are legally recognized and protected.

Copyright (or author's right) refers to the legal entitlements granted to creators over their literary and artistic productions. The range of works safeguarded by copyright encompasses not only books, music, paintings, sculpture, and films but also extends to computer programs, databases, advertisements, maps, and technical drawings (Miller, 1992). Copyrights represent a type of intellectual protection granted to creators of original works, which are fixed in any tangible medium of expression, implying that the work is recorded or conveyed in a form that can be perceived either directly or via a machine or device. In commercial sectors, these rights have been applied to protect proprietary business management software, as well as the design of nearly all e-commerce websites. Additional protected categories also include artistic and literary works, music compositions, graphic designs, and sound recordings.

A **patent** is an exclusive right for an invention, which can be either a product or a process that generally introduces a novel method of operation or provides a fresh technical solution to a problem (Kitch, 1977). To obtain a patent, the inventor is required to reveal technical details about the invention in a patent application, thereby making it accessible to the public (WIPO, 2020). Patents are often considered the most intricate of IP rights because they are defined through verbal claims and the extent of the technology covered is frequently articulated using complex legal terminology (Dratler Jr & McJohn, 2024). As a result of the extensive proliferation of patents, firms often overlook relevant patents during the early stages, potentially leading to difficulties in accessing necessary IP later on. Additionally, patented inventions are typically the result of cumulative innovation, which, compared to other forms of IP, may heighten the risk of further IP disputes (Giuri & Torrisi, 2010).

A **trademark** is a distinctive sign that identifies the goods or services of one enterprise as distinct from those of others and is safeguarded by intellectual property rights (Schechter, 1926). Trademarks thus protect a firm's brand identity by preventing competitors from using similar, misleading visuals or designs (WIPO, 2020). Beyond trademarking their business names, enterprises also secure trademark protection for their slogans, theme songs, logos, signature products, and the layouts of their offices and facilities. The trademarked element must be distinctive and not previously trademarked by another firm. Additionally, the motivation to enforce trademark rights is substantial because the associated benefits are considerable, given that trademarks often represent brands which substantially enhance value (Alcácer et al., 2015). Furthermore, such infringements are typically readily identifiable by the IP owner.

Furthermore, an **industrial design** refers to the aesthetic characteristics of an item. This

design might incorporate three-dimensional elements like the item's shape, or two-dimensional aspects such as patterns, lines, or colors (WIPO, 2020). A **geographical indication (GI)** is a sign applied to products that originate from a specific locale and exhibit qualities or a reputation derived from that geographical area (Giovannucci et al., 2009). To qualify as a GI, the sign must clearly indicate that a product hails from a given place. Moreover, the product's distinguishing features, qualities, or reputation must be intrinsically linked to its place of origin, emphasizing the connection between the product and its geographical production area (WIPO, 2020). **Trade secrets** represent intellectual property (IP) rights pertaining to confidential information that can be sold or licensed (WIPO, 2020). Generally, to be classified as a trade secret, the information must hold commercial value due to its confidentiality, be accessible to only a select circle of individuals, and be protected by the legitimate holder through reasonable measures, including confidentiality agreements with business partners and employees, to maintain its secrecy.

Nowadays, the strategic importance of IP in today's global economy cannot be overstated. As noted by Somaya (2012), IP has emerged as an important strategic battleground, where businesses and corporations establish robust IP positions to create barriers against imitation and optimize economic gains from their products, processes, and services. It has been further complicated by the strengthening and expansion of IP rights, alongside the emergence of products integrating multiple inventions, presenting an increased risk of inadvertent IP rights violations (Somaya et al., 2011). To navigate this complex landscape, companies must continually adapt their IP strategies to not only protect their own

2.3.2 Corporate capability theory

2.3.2.1 Core capabilities.

The Core Competencies Theory was initially established in the early 1990s, rooted in the resource-based view. Prahalad and Hamel (2009) asserted that corporate competition fundamentally revolves around core competencies. Beyond merely producing products, companies develop and embed knowledge and skills within their organizational structures. This theory elucidated the corporate "black box," pinpointing a company's core competencies as the crux of competitive advantage and advancing a new era in business theory. Building on this foundational theory, Wernerfelt (1989) introduced the concept of competence-based competitive advantage, which has since evolved to include perspectives on both core and dynamic capabilities.

The main researches in the Theory of Core Competencies primarily include Prahalad and

Hamel (1990), Leonard‐Barton (1992), Prahalad (1993), Meyer and Utterback (1992), Kesler et al. (1993), Cockburn and Henderson (1994), Thomas et al. (1996), Sanchez and Heene (1997), Coombs (1996), Durand (1997), Meyer (1997), Granstrand et al. (1997), Klein et al. (1998), etc.

(1) The connotation of core competencies.

Core capability perspectives can be categorized into eight types: integration, network, coordination, combination, knowledge carrier, component architecture, platform, and technology views. Prahalad and Hamel (1990) viewed core capabilities as collective learning within an organization, particularly involving the coordination of various production skills and integration of multiple technology streams. Unlike physical assets, core capabilities do not degrade with use; instead, they are enhanced through application and sharing. Prahalad (1993) and Coombs (1996) described core capabilities as a combination of various organizational abilities. Meyer and Utterback (1992) approached core capabilities from the value chain perspective, defining them as unique abilities embedded in a firm's value chain, such as R&D, manufacturing, and marketing capabilities. Klein et al. (1998) perceived core capabilities as networks of skills and their interrelations. Thomas et al. (1996) and Durand (1997) proposed that core capabilities involve the coordinated deployment of various assets and skills. Cockburn and Henderson (1994) applied systems thinking to suggest that core capabilities include both component and architectural capabilities. Leonard‐Barton (1992) argued that core capabilities consist of four main elements: knowledge and skills, management systems, physical systems, and values. Granstrand, Granstrand et al. (1997) emphasized technological capabilities, assessing core capabilities through dimensions such as patent shares and evident technological advantages. These perspectives illustrate that although there is no consensus in academia on the definition of core capabilities, they are generally understood to be integrations of knowledge and skills, characterized by their integrative, extensible, and distinctive nature.

(2) The Measurement of Core competencies.

To comprehensively understand and master corporate core competencies, it is necessary to identify the elements of core capabilities and assess their levels. J. Chen et al. (1999) summarized the measurement methods of core capabilities, categorizing existing methods into non-quantitative descriptive, semi-quantitative, quantitative, and a combined approach of semi-quantitative and quantitative methods. Besides, G. Chen et al. (2022) puts forward the concepts of "the extensiveness of knowledge acquisition" and "the concentration of knowledge application". The non-quantitative descriptive method uses text or diagrams to intuitively but

subjectively describe core capabilities; the semi-quantitative method calculates scores through a constructed index system based on subjective evaluations; the quantitative method employs strictly measurable indicators; and the combined method merges the advantages of both semi-quantitative and quantitative approaches, making it suitable for in-depth audits of core capabilities.

(3) The Development and Enhancement of Core Competencies.

Enhancing existing core competencies and constructing new ones has become a focal point for both the academic and business communities. “Construction” refers to the creation of new capabilities based on existing ones, involving deep changes such as corporate culture; “enhancement” refers to improving the level of existing core competencies without fundamental changes to their structure. Research on the construction and enhancement of core competencies primarily focuses on organizational learning (DiBella et al., 1996; Nevis et al., 2009; Prahalad & Hamel, 1990; Prahalad & Hamel, 2009), strategic alliances (Hamel, 1991; Zaheer & Bell, 2005), extended application (Thomas et al., 1996), and Parenting Advantage (Campbell & Goold, 1995; Goold et al., 1998).

In rapidly changing and uncertain external environments, an organization’s core competencies may become constraints. This phenomenon, known as core rigidity, refers to the inertial systems and irrelevant knowledge collections that hinder an organization’s sustained competitive advantage. For instance, innovations by competitors or the emergence of new technologies can force companies to address environmental volatility. Particularly in hypercompetitive contexts marked by swift technological advances and high uncertainty, strategic decisions must be made under conditions of substantial risk. Knight (LeRoy & Singell Jr, 1987) differentiated between “risk” and “uncertainty”. Thus, a critical challenge is how organizations can adapt their core competencies to complex environments to sustain their competitive edge. The perspective of dynamic capabilities offers a framework for addressing this, continuously evolving to meet these demands.

2.3.2.2 Dynamic capability view, dcv.

The concept and theory of dynamic capabilities were initially proposed by Teece and Pisano (1994) and further developed through the efforts of Teece and Pisano (2003) and Teece et al. (1997). Subsequently, it was studied in depth by a sea number of scholars.

(1) Concept of Dynamic Capabilities.

According to Teece and Pisano (1994) and Helfat et al. (2009), dynamic capabilities represent a set of competencies enabling firms to innovate and create new products and

processes in response to market changes. Teece et al. (1997) further clarify that dynamic capabilities involve the ability of firms to integrate, reconfigure, and build internal and external competencies to adapt to rapidly changing environments, serving as a crucial source of sustainable competitive advantage. Despite varied definitions, several core characteristics emerge: Firstly, the "dynamic" nature reflects the necessity for firms to continuously update themselves to adapt to and leverage environmental changes for sustained competitive advantage. Secondly, "knowledgeability" indicates that firms rely on both tacit and explicit knowledge to perceive environmental shifts and reorganize resources. Lastly, "learnability" suggests that building dynamic capabilities is an institutionalized process of transformation, where through learning and knowledge encoding, firms can facilitate rapid and effective organizational changes to meet environmental challenges.

(2) Measurement of Dynamic Capabilities.

Teece and Pisano (1994) along with Teece et al. (1997), articulate three key dimensions in the dynamic capabilities framework: managerial and organizational processes, positions, and paths. These processes emphasize a firm's integration and resource transformation capabilities and learning mechanisms. Positions cover the firm's technological assets, intellectual property, customer base, and supply chain ties. Paths reflect strategic and developmental opportunities. The theory emphasizes that market dynamics are a critical factor in the evolution of dynamic capabilities, necessitating that firms leverage innovation to improve resource allocation and enhance competitive positioning.

Eisenhardt and Martin (2000) argue that dynamic capabilities fundamentally consist of specific routines and processes, including resource integration, reconfiguration, acquisition, and transfer. Collis (1994) uses calculus to suggest that dynamic capabilities can be categorized into various levels based on the degree of change. Winter (2003) distinguishes between zero-level capabilities and higher-order dynamic capabilities, noting that firms with advanced capabilities are more adaptable in the face of disruptive changes. X. He et al. (2006) outline the theoretical dimensions of dynamic capabilities, including customer value orientation, technological support systems, and organizational support structures, and emphasize areas such as market potential and organizational learning as particularly salient for Chinese firms. Janssen et al. (2016) state the dynamic capabilities for service innovation, including conceptualization and measurement. C. L. Wang and Ahmed (2007) reviewed the research agenda of dynamic capabilities. Laaksonen and Peltoniemi (2018) put forward the essence of dynamic capabilities and their measurement. de Miguel et al. (2022) reviewed the measurement of dynamic capabilities and proposed indicators for the automotive industry. Buzzao and Rizzi (2021)

conceptualized and measured dynamic capabilities for sustainability by building theory through a systematic literature review.

(3) Dynamic Capabilities and Sustainable Competitive Advantage

Anand et al. (2010) suggests that dynamic alliance capabilities enable firms to select reliable partners and solidify relationships, thereby acquiring new knowledge and enhancing performance. Teece et al. (1997) highlight that dynamic capabilities are crucial for renewing competitive strength and improving performance, especially in dynamic market environments. Rindova and Taylor (2002) emphasize that in changing environments, dynamic capabilities fundamentally support the enhancement of managerial skills and the exploitation of developmental opportunities. J. Lee et al. (2002) argue that the ability of firms to identify and capitalize on opportunities in response to environmental changes is a source of competitive advantage. Eisenhardt and Martin (2000), however, indicate that while dynamic capabilities are necessary for sustained competitive advantage, they are not sufficient on their own and do not inevitably lead to superior firm performance. Zahra et al. (2006) argue that dynamic capabilities impact organizational performance through substantive capabilities, which encompass a firm's knowledge and abilities. Kale and Singh (2007) use data from U.S. companies to examine how the alliance learning process acts as a bridge between alliance functions and success, analyzing the mechanism through which learning operates within alliance contexts.

(4) The Evolution of Dynamic Capabilities and Influencing Factors.

Helfat and Peteraf (2003, 2015) introduced the theory of Capability Lifecycles, analogous to product lifecycles, categorizing the development of organizational capabilities into three stages: initiation, development, and maturity. They noted that during maturity, six potential branches might emerge: retirement, retrenchment, replication, renewal, redevelopment, and recombination, driven by the threats of obsolescence and the emergence of new opportunities. The lifecycle of capabilities does not directly correspond to that of products and may extend beyond the lifespans of products, companies, or even industries. This framework helps explain the underlying sources of firm heterogeneity.

In the study of dynamic capabilities, knowledge and learning are considered essential resources. Helfat and Raubitschek (2000) proposed a co-evolution model of products, knowledge, and capabilities, suggesting that product development depends on and enhances the firm's knowledge systems. Eisenhardt and Martin (2000) identified learning and market mechanisms as key drivers of dynamic capabilities evolution. Winter (2003) emphasized that formalizing and institutionalizing learning responses can effectively develop and implement dynamic capabilities. Parida et al. (2016) studied how ICT capabilities can influence dynamic

capabilities. D. Li and Liu (2014) provided evidence from China showing that dynamic capabilities significantly positively affect competitive advantage and that environmental dynamism is a driver rather than a moderator.

2.3.3 Intellectual property capabilities

2.3.3.1 The meaning of intellectual property capabilities.

The concept of intellectual property (IP) capabilities was first introduced in "Enhancing IP Capability Development to Foster Core Competitiveness (Q. X. Wang, 2006)".

Subsequently, in a practical case study, J. C. Wang (2007) discussed the importance of cultivating and developing intellectual property (IP) capabilities. W. Li and Bi (2009) explored the practical significance of improving corporate IP capabilities for independent innovation. W. Li and Xie (2010) analyzed the connotation and extension of corporate IP capabilities. W. Li and Chen (2011) proposed a comprehensive evaluation index system for corporate patents based on IP capabilities. Zhao and Yang (2013) assessed the IP capabilities of China's biopharmaceutical industry based on single indicators. Zhao and Ding (2013) conducted a comprehensive evaluation of regional IP capabilities using SVR methods. Song et al. (2013) investigated the measurement index system and methods for IP capabilities through empirical research. Deng and Chen (2014) conducted an empirical study on the IP capabilities of IP demonstration enterprises in Sichuan Province. Wei and Huang (2015) studied the cultivation of IP capabilities and competitive advantages in China's strategic emerging industries. Chi and Pan (2016a) examined the relationship between IP capabilities, external IP protection intensity, and corporate growth.

Additionally, Chi and Pan (2016b) analyzed the internal and external factors influencing the composition of IP capabilities and their driving force for corporate growth. J. H. Wu and Yuan (2016) evaluated the IP capabilities of China's military-industrial enterprises through empirical research. Y. H. Zhang et al. (2016) evaluated and compared the IP capabilities of high-tech industries in Xi"an. Pan (2016) studied the moderating effect of openness and technology level on the relationship between IP capabilities and corporate growth. Yu and Li (2017) used SEM to measure the influencing factors of corporate IP capabilities. J. Liu et al. (2017) examined the impact of IP capabilities and external IP protection on the innovation efficiency of animation enterprises. Chi and Pan (2017) analyzed the evolution path of corporate IP capabilities. J. H. Wu and Yuan (2016) explored the impact of IP capabilities on the innovation performance of military-industrial enterprises. H. Wang (2018) researched ways to improve the

IP capabilities of cultural enterprises. X. F. Liu et al. (2018) evaluated the IP performance of China's "985" universities. J. Liu et al. (2018) analyzed the influencing factors of IP capabilities in cultural and creative enterprises.

Recently, Gan and Qi (2018) analyzed how dual innovation and knowledge field activity influence IP capabilities. Xu et al. (2019) investigated IP capability development in service-oriented state-owned enterprises through a case study of Beijing Public Transport Group. X. Y. Zhang and Zhang (2019) assessed the impact of government patent incentives on small and medium-sized enterprises" performance, emphasizing the role of IP capabilities. Q. J. Xie et al. (2019) explored how collaborative networks and IP capabilities affect regional innovation using a moderated mediation model. Gan et al. (2020) examined the conflicts in knowledge exchange and territorial behaviors within multinational technological collaborations and their impact on IP capabilities. Yu et al. (2020) delved into the system coupling mechanisms of enterprise IP capabilities, while Yu et al. (2021) studied the stages of evolution in corporate IP capabilities.

Consequently, **IP capabilities** are ultimately defined as a company's ability to innovate, deploy, safeguard, and organize various forms of IP—including patents, trademarks, copyrights, and trade secrets—in pursuit of competitive advantage. The industry's technological landscape, market structure, and organizational scale not only dictate the strategies and methodologies a company employs in its IP endeavors but also influence its choice among different types of intellectual property.

2.3.3.2 The components of intellectual property capabilities.

Intellectual property (IP) capabilities represent an aggregation of capacities to create, utilize, protect, and manage various forms of IP such as patents, trademarks, copyrights, and trade secrets. The components of Intellectual Property (IP) capabilities are foundational to a company's ability to sustain competitive advantage and are defined by several core functions:

Creation and Acquisition: IP capabilities begin with a company's ability to generate IP through the creation, acquisition, licensing, and even mergers. This involves not only developing new IP internally but also acquiring rights from external sources to expand the company's IP portfolio.

Commercialization: Once IP is acquired or created, the next component is commercializing this IP through various channels such as transfers, licensing, cross-licensing, and direct implementation. This step is crucial as it turns intellectual assets into revenue-generating streams.

Protection: IP must be protected through strategies that include prevention, settlement,

mediation, litigation, and arbitration. Effective protection mechanisms ensure that a company's IP is not infringed upon or misused, safeguarding the company's investments in its intellectual assets.

Management and Organization: Supporting the creation, utilization, and protection of IP requires robust institutional design and structural arrangements. This includes aligning IP strategies with broader business objectives and ensuring that organizational structures support the effective management of IP.

Alignment with Business Strategy: Building and enhancing IP capabilities should align with the company's overall business strategies. This strategy helps the company to not only protect but also strategically leverage its IP to maintain a competitive position in the market.

Influence of External Factors: companies gain a competitive advantage through the creation, utilization, protection, and organization of intellectual property (IP), which is influenced by factors such as the technological background of the industry, company size, and market structure. For instance, companies in different technological sectors may opt for various forms of IP; the size of a company can affect its preferences for how it creates, utilizes, protects, and organizes its IP; and the structure of the market (degree of market competition) can also impact the realization and enhancement of a company's IP capabilities.

2.3.3.3 The relationship between a company's technological innovation capability and intellectual property capability.

The connection between a company's ability to innovate and its management of intellectual property is mutually beneficial. This relationship is crucial for promoting growth and maintaining a competitive edge in today's market (Feng & Jalali, 2024).

Protecting Intellectual Property Boosts Innovation: Robust intellectual property protection encourages businesses to increase their investment in innovation. With solid IP safeguards, firms are more inclined to pour resources into research and development, knowing their innovations will be shielded, thus gaining competitive advantages and economic benefits.

Technological Innovation Generates Intellectual Property: Through ongoing innovation activities, businesses can develop new technologies, products, or solutions that result in the creation of intellectual property, such as patents, trademarks, and copyrights. These IP rights enhance the competitive edge of businesses in the market.

IP Protection Facilitates Innovation and Commercialization: Effective IP protection helps businesses transform their technological innovations into marketable products or services. This protection allows companies to safely launch new products, minimizing risks and

uncertainties associated with technological transformation.

Managing IP Supports Innovation: An efficient intellectual property management system helps organize and manage innovation processes. By implementing standardized IP management practices, companies can better safeguard and handle the intellectual property created during R&D, thereby enhancing the efficiency and quality of innovation outcomes.

Intellectual property strategy to promote technological innovation: Innovation activities help shape and implement IP strategies. Businesses can craft targeted IP strategies based on their innovation goals and achievements, including the application, deployment, and utilization of intellectual property, ensuring better protection and commercial realization of their innovations.

2.3.3.4 The contribution of intellectual property capabilities to corporate value

IP capabilities are crucial for improving a company's value. They offer various benefits, including securing a competitive edge, opening up new revenue avenues, enabling market growth, drawing in investments, mitigating risks, and bolstering corporate image. Companies with robust IP portfolios are better equipped to drive innovation, stay competitive, and achieve sustainable growth in the international market.

Competitive Advantage: IP protection helps companies innovate and stand out in the market. Patents safeguard new inventions, giving companies the exclusive right to use and commercialize their innovations, which can lead to a dominant market position. Trademarks build brand recognition and loyalty, making it easier for customers to identify and trust the company's products.

Revenue Generation: Companies can earn income through licensing and royalty agreements by allowing other firms to use their IP, such as patents, trademarks, or copyrights. This practice is prevalent in sectors like technology, pharmaceuticals, and entertainment. Additionally, products protected by IP often command higher prices, leading to greater profit margins.

Product Sales: Strong IP portfolios can attract strategic partners and investors, facilitating collaborations, joint ventures, and entry into new markets. IP protection across multiple jurisdictions enables companies to compete globally, ensuring their innovations and brands are protected internationally.

Investment Attraction: A comprehensive IP portfolio enhances a company's valuation, making it more appealing to investors and venture capitalists. IP assets can also be used as collateral to secure loans and financing, providing additional financial leverage.

Risk Management: IP rights offer legal protection against counterfeiting, piracy, and unauthorized use, thereby safeguarding market share and revenue streams. They also reduce the risk of litigation from other IP holders by ensuring the company's freedom to operate in key markets.

Operational Efficiency: By securing proprietary processes and technologies, companies can achieve significant cost savings and operational efficiencies. Exclusive rights to advanced production methods or supply chain innovations can lead to substantial cost advantages.

Enhanced Corporate Image: A robust IP portfolio signals innovation and quality to customers, investors, and partners, enhancing the company's reputation. This builds consumer trust and loyalty, particularly in industries where IP is linked to product safety and reliability, such as pharmaceuticals and electronics.

Long-term Strategic Assets: In mergers and acquisitions (M&A), IP assets can significantly influence company valuation. Firms with valuable IP portfolios are attractive acquisition targets, and combining IP assets can create new growth and innovation opportunities.

2.4 Theory of competitive advantage

2.4.1 Development trajectory of competitive advantage theory

2.4.1.1 The meaning of competitive advantage.

The concept of "competitive advantage" is well-established within strategic management literature. Initially, Ansoff (1965) characterized competitive advantage as distinct attributes or specific qualities of product markets that bolster a firm's competitive stance. However, a significant milestone in framing competitive advantage within business strategy was marked by Porter (1985); Porter (2008). He proposed that competitive advantage stems from a firm's ability to deliver exceptional value to its customers. This value can manifest either through lower prices compared to competitors for the same benefits or by offering distinctive benefits that justify a higher price. The different definition of competitive advantage can be seen in the Table 2.1.

Since then, competitive advantage has generated a lot of discussion. Sigalas and Pekka Economou (2013) categorized these into two primary streams. The first stream interprets competitive advantage through performance metrics such as high relative profitability, above average returns, benefit-cost gap, superior financial performance, economic profits, positive differential profits in excess of opportunity costs and cross-sectional differential in the spread

between product market demand and marginal cost. The second stream emphasizes the foundational sources of competitive advantage, highlighting factors like particular properties of individual product markets , cost leadership, differentiation, locations, technologies, product features and a set of idiosyncratic firm resources and capabilities.

Table 2.1 The definition of *competitive advantage*

Order	Definition	Authors (Year)
1	Competitive advantage is the isolated characteristics or particular properties of individual product markets	Ansoff (1965)
2	Porter says "competitive advantage is at the heart of a firm's performance in competitive markets" and goes on to say that purpose of his book on the subject is to show "how a firm can actually create and sustain a competitive advantage in an industry—how it can implement the broad generic strategies." Thus, competitive advantage means having low costs, differentiation advantage, or a successful focus strategy. In addition, Porter argues that "competitive advantage grows fundamentally out of value a firm is able to create for its buyers that exceeds the firm's cost of creating it."	Porter (1985)
3	Dierickx and Cool (1989) have echoed J. B. Barney (1986) in arguing that competitive advantage is not obtainable from freely tradeable assets. "if a privileged product market position is achieved or protected by the deployment of scarce assets, it is necessary to account for the opportunity cost of those assets. Many inputs required to implement a strategy may be acquired in corresponding input markets. In those cases, market prices are indeed useful to evaluate the opportunity cost of deploying those assets in product markets. However, the deployment of such assets does not entail a sustainable competitive advantage, precisely because they are freely tradeable."	Dierickx and Cool (1989)
4	J. Barney (1991) delineated resource-based view by defining the key attributes that make resources "strategic" —that is, valuable, rare, inimitable, and non-substitutable—and highlighting their role in helping firms attain sustained competitive advantage.	J. Barney (1991)
5	Peteraf (1993) defines competitive advantage as "sustained above normal returns." She defines imperfectly mobile resources as those that are specialized to the firm and notes that such resources "can be a source of competitive advantage" because "any Ricardian or monopoly rents generated by the asset will not be offset entirely by accounting for the asset's opportunity cost" (i.e., its value to others).	Peteraf (1993)
6	Saloner, Shepard and Podolny say that "most forms of competitive advantage mean either that a firm can produce some service or product that its customers value than those produced by competitors or that it can produce its service or product at a lower cost than its competitors." They also say that "In order to prosper, the firm must also be able to capture the value it creates. In order to create and capture value the firm must have a sustainable competitive advantage."	Saloner et al. (2005)
7	Kay (1995) defines distinctive capabilities as ones derived from characteristics that others lack, and which are also sustainable and appropriable. "A distinctive capability becomes a competitive advantage when it is applied in an industry or brought to a market." measures the value of competitive advantage as valued added, with the costs of physical assets measured as the cost of capital applied to replacement costs.	Kay (1995)
8	Brandenburger and Stuart Jr (1996) discuss multi-agent games	Brandenburger

	(industries) and examine the conditions under which players can appropriate a portion of the total gains to trade. Agents include buyers, suppliers, and producers. Total gains to trade are maximum available from the assignments among agents. They conclude that the maximum value appropriated is limited by the agent's value added to the game—the amount the game's total value is increased by the agent's presence. In addition, "To have a positive added value it must be "different" from its competitors…… enjoying a favourable asymmetry……."	and Stuart Jr (1996)
9	Ghemawat and Rivkin (1999) say that "A firm such as Nucor that earns superior financial returns within its industry (or its strategic group) over the long run is said to enjoy a competitive advantage over its rivals."	Ghemawat and Rivkin (1999)
10	Besanko et al. (2000) say "When a firm earns a higher rate of economic profit than the average rate of economic profit of other firms competing within the same market, the firm has a competitive advantage in that market." They also carefully define economic profit as "the difference between the profits obtained by investing resources in a particular activity, and the profits that could have been obtained by investing the same resources in the most lucrative alternative activity."	Besanko et al. (2000)
11	J. B. Barney (2007) says that "a firm experiences competitive advantages when its actions in an industry or market create economic value and when few competing firms are engaging in similar actions." Barney goes on to tie competitive advantage to performance, arguing that "a firm obtains above-normal performance when it generates greater-than-expected value from the resources it employs. In this final case, the owners of resources think they are worth $10, and the firm creates $12 in value using them. This positive difference between expected value and actual value is known as an economic profit or an economic rent."	J. B. Barney (2007)
12	Competitive advantage is "the degree to which a firm has exploited opportunities, neutralized threats and reduced costs."	Newbert (2008)
13	Sigalas and Pekka Economou (2013) have recently crafted a stipulative definition that it incorporates all the latent characteristics of the competitive advantage concept, and it completely separates competitive advantage from its sources and from the concept of superior performance. In particular, Sigalas and Pekka Economou (2013) mention that competitive advantage is "the above industry average manifested exploitation of market opportunities and neutralization of competitive threats."	Sigalas and Pekka Economou (2013)

2.4.1.2 Sources of competitive advantage

(1) Resource-based view and dynamic capabilities view

In the field of strategic management, the Resource-Based View (RBV) and the Dynamic Capabilities View (DCV) are two critical theoretical frameworks. They emphasize the importance of a firm's internal resources and capabilities and its ability to adapt and innovate in rapidly changing market environments, respectively. This paper reviews the fundamental perspectives, development history, and empirical applications of these theories.

The Resource-Based View (RBV) originated in the late 1980s and early 1990s, proposed by scholars such as Jay Barney and David J. Teece. RBV posits that a firm's competitive advantage primarily stems from its unique resources and capabilities (J. Barney, 1991). These

resources and capabilities need to possess the following four characteristics: Valuable, Rare, Inimitable, and Organized, abbreviated as the VRIO model.

1) Valuable: Resources must help the firm exploit opportunities or neutralize threats, thus enhancing the firm's efficiency or effectiveness.

2) Rare: Resources should be scarce among current and potential competitors.

3) Inimitable: Resources should be difficult for competitors to replicate or substitute.

4) Organized: The firm must be able to organize and utilize these resources effectively.

RBV theory emphasizes that resources and capabilities with these characteristics are key to achieving sustained competitive advantage (Peteraf, 1993).

As the market environment changes rapidly, RBV's limitations have become apparent. To address these limitations, Teece and other scholars proposed the Dynamic Capabilities View (DCV) as an extension of RBV. Dynamic capabilities refer to a firm's ability to integrate, build, and reconfigure internal and external resources to maintain competitive advantage in rapidly changing environments (Teece et al., 1997).

The three key elements of dynamic capabilities are:

1) Sensing: The ability to identify and assess market opportunities and threats.

2) Seizing: The ability to effectively exploit opportunities and respond to threats.

3) Reconfiguring: The ability to continuously adjust and update resources and capabilities to adapt to market changes.

DCV emphasizes the flexibility and adaptability of firms, suggesting that long-term success in dynamic environments depends not only on owning valuable resources but also on the ability to innovate and adjust continuously (Eisenhardt & Martin, 2000).

A significant body of empirical research supports the effectiveness of RBV and DCV in explaining competitive advantage. Helfat and Peteraf (2003) proposed the concept of the capability lifecycle, explaining how capabilities evolve and develop over time. Studies have shown that firms with valuable, rare, inimitable, and well-organized resources and capabilities typically perform well in the market (J. Barney, 1991; Teece et al., 1997).

Eisenhardt and Martin (2000) noted that while dynamic capabilities are crucial, they are inherently replicable, which may not directly lead to sustained competitive advantage. This perspective provides new insights into the role of dynamic capabilities in different contexts.

The integration of RBV and DCV provides a comprehensive strategic management framework. RBV emphasizes the uniqueness and inimitability of a firm's resources, while DCV focuses on a firm's adaptability and innovation in dynamic environments. Together, they help firms maintain competitive advantage in both stable and changing environments.

RBV is more suitable for relatively stable market environments, emphasizing static resources, whereas DCV is applicable to rapidly changing markets, highlighting dynamic capabilities. By combining these two frameworks, firms can better identify and utilize their internal resources and capabilities to formulate competitive strategies for various environments.

The Resource-Based View and Dynamic Capabilities View are two important and complementary theoretical frameworks in strategic management. RBV provides the theoretical foundation for identifying and evaluating a firm's core resources, while DCV emphasizes the ability to innovate and adjust continuously in dynamic environments. Future research can further explore the application of these theories in different industries and environments, helping firms maintain competitive advantage in complex and changing markets.

(2) Technology and innovation for competitive advantage.

Innovation, distinct from pure scientific research, plays a crucial role in a nation's economic development by transforming research and development outcomes into commercially viable new products and services, thus creating value. Companies that innovate effectively not only capture a significant portion of this value, enhancing their own wealth, but also contribute to their country's and the global economy. Innovation encompasses both product and service innovations—new to the producer or the consumer, including end-users and distributors—as well as process innovations that reduce production costs or facilitate the creation of new products (Harmsen et al., 2000).

In essence, the most innovative firms are continuously on the lookout for improved products, services, and operational methods. They are committed to consistently refining their capabilities and resources. A nation's overall innovative capacity stems from the aggregate innovation of its firms. The greater the number of innovative firms, the stronger the national competitive advantage. Furthermore, innovation promotes productivity, defined as the value of outputs generated by each unit of labour or capital. A more productive firm utilizes its resources more effectively. Similarly, the higher the productivity of firms within a country, the more efficiently that country utilizes its resources (Knight & Kim, 2009). Innovation and entrepreneurship are pivotal to sustained economic growth. Typically, entrepreneurs are the first to market with new products and processes, injecting vital dynamism into the economy. For instance, the U.S. economy has greatly benefited from high levels of entrepreneurial activity, fostering rapid product and process innovations (Dasgupta et al., 2009).

(3) Human resources for competitive advantage.

Human resources refer to the individuals who make up an organization's workforce, a term also used in labour economics for sectors or entire nations. While traditional competitive

advantages like financial resources, technology, and economies of scale can create value, they are increasingly replicable and accessible. Consequently, they offer less competitive edge compared to more intricate social structures, such as employment systems. Therefore, human resource policies and practices may represent a particularly critical source of enduring competitive advantage, due to their complexity and difficulty to replicate (Jackson & Schuler, 1995).

In the best practices framework of strategic HRM, several key practices are identified. Firstly, internal career opportunities denote an organizational preference for internal promotions over external hiring. Second, training systems assess if organizations offer extensive training to employees or rely on recruitment and socialization to gain necessary skills. Thirdly, appraisals are viewed as outcome-based performance assessments that incorporate subordinate feedback. Fourthly, employment security indicates the level of job security perceived by employees, despite the general decline in formal job guarantees. Fifthly, employee participation highlights involvement in decision-making processes and the ability to suggest improvements. Sixthly, job descriptions detail the precision and clarity with which roles are defined to ensure employees understand their responsibilities. Lastly, profit sharing focuses on enhancing organizational performance sustainably (Akhtar et al., 2008). posit that future HR professionals will require four core competencies to effectively partner in strategic management: business competence, professional and technical knowledge, integration competence and ability to manage change. Human Resources aims to align the skills and qualifications of individuals with the strategic needs and future goals of the organization to enhance return on investment and ensure long-term viability. To achieve these goals, the HR function strategically implements human resource policies that are not only effective but also pragmatic, considering legal and ethical standards while maintaining workforce support and respect.

(4) Organizational structure for competitive advantage.

Organizations, often seen as clusters of various entities, may adopt diverse structural forms to align with their specific goals. The chosen organizational structure significantly influences how an organization functions and its efficiency. This structure delegates specific responsibilities to various units such as branches, departments, workgroups, and individuals. Employment within these structures is typically based on either finite contracts or permanent agreements. Furthermore, organizations are adapting their structures in response to escalating competitive pressures that demand a focus on core competencies and a redefinition of operational boundaries to sustain a competitive advantage. This pressure is evident in the evolution of organizational structures from functional to multi-divisional configurations,

marked by a trend towards smaller, decentralized units. Additionally, when essential skills or resources are external, companies increasingly turn to strategic alliances to supplement and sometimes enhance their capabilities. Whether through alliances, outsourcing, or downscaling, firms are increasingly concentrating their activities within more narrowly defined areas, adapting to competitive demands (Petison & Johri, 2008).

An effective organizational structure should improve working relationships among various entities within the organization and potentially increase efficiency within its units. It should maintain established order and control to monitor processes effectively. Moreover, the organization should adapt its command structure to effectively handle a variety of tasks and respond to changing conditions during operations. Organization should facilitate the use of individual skills to enhance flexibility and creativity. As businesses expand, the chain of command often lengthens and control spans widen, potentially stifling flexibility and diminishing creativity. Regular updates to the organizational structure are necessary to promote renewal. If internal resistance blocks these adjustments, dissolving the organization to enable a fresh start with a new setup may be required.

2.4.1.3 Strategies for competitive advantage.

The differentiation and cost leadership strategies aim for competitive advantage across a broad market or industry segments. In contrast, differentiation focus, and cost focus strategies target a narrower market or industry. A firm position itself by leveraging its strengths, which, as Porter (1985) argued, fall into either cost advantage or differentiation. Utilizing these strengths in either a broad or narrow scope leads to three generic strategies: cost leadership, differentiation, and focus. These strategies are applied at the business unit level and are termed “generic” because they are not firm or industry dependent.

(1) Differentiation.

This strategy involves selecting one or more criteria that buyers consider important in a market and then uniquely positioning the business to meet these criteria. Typically associated with this strategy is the practice of charging a premium price for the product, which often reflects the higher production costs and added value features offered to consumers. Differentiation involves setting a premium price that exceeds the additional production costs, providing customers with compelling justifications to choose the product over less differentiated alternatives.

Firms that effectively implement a differentiation strategy often possess the following internal strengths:

a) Access to advanced scientific research.

b) A highly skilled and inventive product development team.

c) A proficient sales team capable of effectively communicating the product's distinctive advantages.

d) A corporate reputation for quality and innovation.

(2) Cost Leadership.

With this strategy, the goal is to become the industry's lowest-cost producer. Many (perhaps all) market segments in the industry emphasize minimizing costs to the greatest extent. If the selling price at least matches or is close to the market average, the lowest-cost producer will theoretically achieve the highest profits. Typically, this strategy is linked with large-scale enterprises that offer standard products with minimal differentiation yet meet the needs of most customers. Occasionally, a cost leader may reduce prices to maximize sales, especially if it has a substantial cost advantage over competitors, thereby potentially increasing its market share further. Successful firms in cost leadership often possess key internal strengths:

a) Proficiency in designing products for efficient manufacturing, such as reducing component count to streamline the assembly process.

b) Extensive expertise in manufacturing process engineering.

c) Effective distribution channels.

(3) Focus.

In the differentiation focus strategy, a business seeks to differentiate within one or a few targeted market segments. The unique needs of these segments provide opportunities to offer distinctly different products compared to competitors who may target a wider audience.

Companies employing focused differentiation strategies offer customized products to niche market segments. This approach can succeed when either the production volumes are too small for larger industry players to pursue economically, or when the level of customization exceeds the capabilities of broad-scale differentiators. A crucial factor for businesses adopting this strategy is to verify that there truly are distinct customer needs and desires, indicating a legitimate basis for differentiation, and that these needs are not being met by existing competitor products.

2.4.2 International competitive advantage and its measurement (using performance metrics)

2.4.2.1 Proposing international competitive advantage.

Macroeconomists view national competitiveness as influenced by factors such as exchange rates, interest rates, and government deficits. However, some nations have achieved rapidly rising standards of living despite facing budget deficits, high interest rates, and appreciating currencies. To some economists, competitiveness correlates with the availability of cheap and abundant labour. However, countries like Germany, Switzerland, and Sweden have thrived despite high wages and prolonged labour shortages. Another perspective suggests that competitiveness is tied to ample natural resources, though some of the most successful trading nations are those with limited natural resources, relying heavily on imports for raw materials (Porter, 1990). The absence of a comprehensive explanation for national competitiveness led to the publication of The Competitive Advantage of Nations in 1990 (Porter, 1990). In this seminal work, Porter's central question is why firms based in certain nations can create and maintain competitive advantages against global competitors in specific industries or industry segments (Porter, 1990).

In Porter's framework, a nation's rising standard of living hinges on its firms" ability to enhance productivity consistently. Productivity is the principal determinant of a nation's long-term standard of living, influencing wages through the productivity of human resources and determining the returns on capital investments through the productivity of physical assets. Importantly, a nation need not excel in every industry. International trade enables a nation to specialize in industries where its firms are comparatively more productive and import products and services from sectors where they are less productive than foreign competitors, thereby increasing the overall productivity level across the economy. Porter (1990) observes significant variations in competitive success among industries within national economies. Typically, internationally competitive firms within a nation are concentrated in specific industries or even particular segments. Consequently, identifying the sources of high productivity and sustained productivity growth among a nation's successful firms in targeted industries or segments becomes essential.

Porter (1990) identifies four primary determinants of national advantage:

a) Factor conditions.

b) Demand conditions.

c) Related and supporting industries.

d) Firm strategy, structure, and rivalry.

The four sets of determinants identified by Porter (1990) are represented through the diamond framework. Factor conditions concern the availability of resources and skills essential for competitive advantage in an industry, divided into basic and advanced factors. Basic factors encompass natural resources, climate, location, unskilled and semi-skilled labour, and debt capital, while advanced factors include information and communications technology infrastructure, highly educated labour such as graduate engineers and computer scientists, and university research institutes specializing in advanced disciplines. Demand conditions within a nation influence the pace and nature of innovation by its firms. Firms achieve a competitive advantage when domestic consumers are among the most sophisticated and demanding globally for specific products or services, enabling these firms to identify new needs and collaborate on development in ways that foreign competitors cannot easily replicate. The diamond framework can be seen in Figure 2.1.

Related and supporting industries refer to the presence of supplier industries or related industries within a nation that are internationally competitive. These industries provide efficient, early, and often preferential access to cost-effective inputs and facilitate the adoption of new methods and technologies through continuous coordination. The fourth determinant—firm strategy, structure, and rivalry—focuses on aligning organizational goals with industry-specific competitive advantages and responding to the innovation and investment demands driven by intense domestic competition.

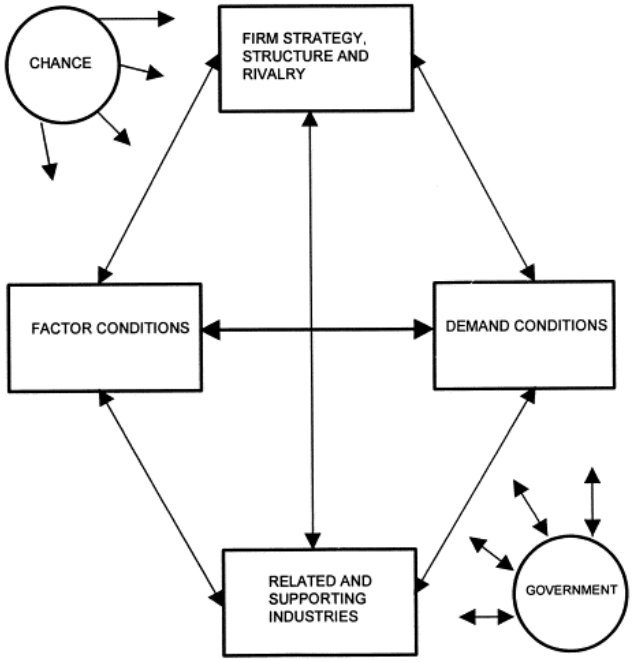


Figure 2.1 The diamond framework

Source: Porter (1990)

However, a review of the literature indicates that some scholars, such as Stopford et al. (1991), criticize Porter for his lack of formal analytical modelling. Others, including Bellak and Weiss (1993), Dunning (1992), Grant (1991), Balmer and Gray (1999), Rugman and D'cruz (1993), **question the originality of his framework**. Criticisms of Porter also extend to his handling of **macroeconomic policy** (Daly & Farley, 2011), **insufficient definitions of key determinants and terms** (Dobson & Starkey, 2002; Grant, 1991; Thurow, 1990), **his neglect of modern trade theory** (Bellak & Weiss, 1993), and the **emphasis of the role of national culture** (Van den Bosch & Van Prooijen, 1992).

Moreover, Porter's methodology has attracted substantial criticism, particularly for its **heavy reliance on world export shares as an indicator** of international competitiveness (Bellak & Weiss, 1993; Cartwright, 1993; Eilon, 1992; Grant, 1991; Rugman & D'cruz, 1993). Critics also point to **inadequate treatment of less competitive industries** (Yetton et al., 1992) and **issues related to his analysis of multinationals and foreign direct investment** (Bellak & Weiss, 1993; Dunning, 1993; Hodgetts, 1993; Rugman, 1991; Rugman & D'cruz, 1993; Rugman & Verbeke, 1993). Further critique arises from scholars such as Jacobs and De Jong (1992) and Narula (1993), who question **various aspects of his research approach**.

The **diamond framework itself** has faced criticism. For instance, the category "firm strategy, structure, and rivalry" is described as "an awkward catch-all" (Grant, 1991). Criticisms intensify regarding Porter (1990) emphasis on the **link between domestic rivalry and international competitiveness** (Dobson & Starkey, 2002; W. R. Smith, 1993). Additionally, Porter's indirect portrayal of the government's role is among the most criticized aspects of his framework (Stopford et al., 1991; Van den Bosch & De Man, 1994).

While Porter's study has been replicated across many countries**, few efforts have been made to formally "test" it,** largely due to the complexity of such an undertaking. O'Donnellan (1994) attempts to examine one aspect of the study by exploring the existence of Porter-type industrial clustering in Irish manufacturing and its correlation with industrial performance. He finds little association between sectoral clustering and various performance metrics in Ireland. Another evaluation by Cartwright (1993) tests the entire model based on New Zealand's experience, revealing that the Porter model aligns more closely with moderately competitive industries than with highly competitive ones.

Beyond these tests, various scholars propose **enhancements to the diamond framework**. Stopford et al. (1991) and Van den Bosch and De Man (1994) suggest that Porter's depiction of the **government's role is inadequate** and propose considering it as a fifth determinant within the framework. Dunning (1992, 1993) contends that Porter underestimates the role of

multinational corporations in the global economy and recommends including **"transnational business activity"** as a third exogenous factor alongside "chance" and "government." Van Den Bosch and Van Prooijen (1992) argue that **national culture's** impact on competitive advantage is insufficiently addressed in Porter's model, suggesting a more explicit consideration rather than adding it as a new determinant. Narula (1993) criticizes the model for its static nature, highlighting an oversight of **technology's** role in development. Furthermore, several scholars, including Hodgetts (1993), Rugman and D'cruz (1993), Rugman and Verbeke (1993), and Rugman (1991), support the idea that a model using double or multiple-linked diamonds might better capture the sources of competitive advantage than Porter's original single diamond framework.

2.4.2.2 Measurement of international competitive advantage.

(1) Measure 1: absolute labour productivity.

A country achieves international competitiveness in products where its output per unit of labour surpasses that of its trading partners.

Adam Smith argues that nations benefit from international trade when each has an absolute advantage in certain products, defined by higher labour productivity compared to trading partners(Schumacher, 2012). Smith's model suggests that trade patterns are based on absolute advantage, with countries exporting goods where they excel and importing those where they do not. This allows countries to enhance their consumption levels by focusing labour on more productive outputs. Thus, according to Smith, the international competitiveness of each product is determined by the country's labour productivity relative to its trading partners.

The application of the measure of absolute advantage is constrained due to Smith's analysis focusing on individual homogeneous products and a single factor of production with externally determined productivity. Comparisons, such as tonnes of wheat per worker, are valid across countries only when the product quality is consistent. Additionally, labour productivity can be influenced by capital accumulation and therefore can be altered by a country. Thus, labour productivity alone is insufficient to fully explain international competitiveness. Generally, comparing different products is challenging as there is no suitable standard for this purpose within the framework of absolute advantage analysis.

(2) Measure 2: comparative labour productivity.

A country is internationally competitive in products where its output per unit of labour effort surpasses that of its trading partners by the largest margin. Conversely, the country is not competitive in products where its labour productivity is the lowest relative to its trading partners.

Ricardo extends Smith's argument on the benefits of trade, showing that international trade can yield gains regardless of absolute labour productivity, as long as relative labour productivity varies across products between trading partners(Dimand, 2000). In Ricardo's model, the trade pattern is determined by comparative advantage. Countries export goods where they have higher relative labour productivity and import those with lower relative productivity. This allows countries to reallocate labour to more productive sectors, thereby increasing overall consumption levels.

Comparative advantage, like absolute advantage, is limited by differences in relative product values across countries, making aggregate comparisons invalid. These differences imply that each country must have a relative productivity advantage in some products to benefit from trade. Thus, international competitiveness pertains to specific sectors, not the entire economy.

(3) Measure 3: relative factor endowment.

A country is internationally competitive in products that heavily utilize its most abundant production factors relative to other countries. Conversely, it lacks competitiveness in products that require factors of production that are relatively scarce compared to their availability in other countries.

Both Smith and Ricardo base their analyses of trade gains on the labour theory of value, where the labour required to produce a good indicates its relative worth. Modern economics, however, uses simultaneous equilibrium of all product and input markets to determine value. This shift alters the interpretation of productivity measures, as productivity is now endogenously determined within the general equilibrium of prices and trade flows between countries. General equilibrium analysis implies that trade patterns are influenced by the relative scarcity of production inputs. According to the Heckscher-Ohlin theorem (Leamer, 1992), countries export goods that intensively use their abundant inputs and import goods that require relatively scarce inputs. The effect of factor endowments on international trade is most evident in natural resource differences. For example, Australia's abundant arable land makes it competitive in land-intensive agricultural products like wheat and wool. Similarly, Saudi Arabia excels in crude petroleum production due to its vast oil reserves, and Canada is competitive in softwood timber production thanks to its extensive forest resources.

General equilibrium trade theory focuses on relative factor endowments rather than the volume of trade. It does not emphasize the size of the traded goods sector. Consequently, measures of international competitiveness based on a large, traded goods sector or a high export-to-GDP ratio lack theoretical support from the Heckscher-Ohlin theory. Further, this

theory asserts that no single sector, such as manufacturing, is inherently more crucial as an export sector compared to agriculture or services. However, shifts in global demand and supply can challenge a country's competitiveness in specific sectors over time, even if the country initially had a relative abundance of certain production factors.

The role of labour and capital in international competitiveness is complex, as their levels are influenced by internal factors within a country. Firstly, Labour and capital are mobile and tend to move from areas of abundance to areas of scarcity, particularly when this scarcity or abundance is indicated by high or low prices, respectively. The quantities of labour and capital in a country are influenced by population growth and capital accumulation. These processes may not immediately reflect price or scarcity, and their impact on the total quantities can be gradual. However, there is significant potential to alter the composition of the labour force by improving skills and changing occupations, and to adjust the composition of capital by changing its physical form and distribution across industries. Modern trade theory suggests that adjusting capital and labour endowments through government intervention can enhance competitiveness. Additionally, such interventions are central to new growth theory, as they influence a country's industrial structure and the competitive capacity of specific industries.

(4) Measure 4: Balance of Payments.

A country with a fixed foreign exchange rate demonstrates a lack of international competitiveness if it consistently runs a balance of payments deficit. Conversely, it is considered internationally competitive if it achieves external balance or a surplus.

Recent discussions on international competitiveness measures emphasize indicators of external balance. Boltho (1996) argues that a country is competitive internationally if it can maintain internal balance—achieving desired levels of inflation and unemployment—without facing a balance of payments deficit or exchange rate instability. Under a fixed exchange rate regime, the balance of payments serves as an indicator of external balance. Without offsetting capital flows, a balance of payments deficit compels a country to buy its own currency in foreign exchange markets, constrained by the size of its foreign exchange reserves. Consequently, persistent deficits may necessitate domestic austerity or currency devaluation, signaling a lack of international competitiveness.

(5) Measure 5: real foreign exchange rate.

For a country with a floating exchange rate, international competitiveness is inversely related to the real exchange rate (Kosteletou & Liargovas, 2000).

In such a system, balance of payments deficits or surpluses are largely irrelevant, reflecting government foreign exchange operations unrelated to maintaining external balance. The real

exchange rate is the most commonly used measure of competitiveness for these countries.

The real exchange rate between two currencies is adjusted by relative price or cost levels, supported by the purchasing power parity theory. This theory states that with costless trade and perfect information, the exchange rate-adjusted price of any homogeneous traded product is equal across countries, following the "law of one price." If all products were traded, the exchange rate would be inversely proportional to the ratio of domestic price indexes. However, since not all goods are traded, domestic price indices are averages of traded and non-traded goods prices, with fluctuating proportions over time.

Additionally, export and import prices do not always move together. Empirical evidence often contradicts the law of one price (Ceglowski, 1994). However, countries with high inflation rates typically see their currencies depreciate. This suggests that purchasing power parity offers, at best, a rough approximation of exchange rate behavior. Thus, interpreting changes in the real exchange rate as indicators of a country's trading strength or weakness is risky. Both the balance of payments and the real exchange rate measure international competitiveness by reflecting a country's overall trading position. Earlier measures assumed external balance with balanced trade and no capital flows, but external imbalances can coexist with sector-specific trade gains.

In addition to the aggregate measure of competitiveness provided by the real exchange rate, individual product price comparisons are also important. These comparisons are made by calculating the ratio of product prices in each country, expressed in a common currency. When the law of one price holds, these prices are identical. Otherwise, they reflect aspects of external imbalance, as shown in real exchange rates, and aspects of comparative advantage.

(6) Measure 6: relative product price adjusted for exchange rate.

A country is internationally competitive in products priced lower than identical products in foreign countries. Conversely, it lacks competitiveness in products with higher prices compared to identical foreign products.

Comparative advantage is reflected in relative product prices through the influence of factor endowments on input prices and production costs. According to the Stolper-Samuelson theorem, in a scenario of costless and unrestricted trade, relative input prices would equalize across countries, leading to the equalization of relative production costs under perfectly competitive equilibrium (Wangwe, 1993). However, due to transaction costs and trade barriers, neither relative input prices nor product prices equalize globally. Thus, a country's comparative advantage is seen in its lower domestic product prices, which decrease the exchange rate-adjusted price of its products compared to identical foreign products.

(7) Measure 7: relative product margin (product level).

A country is internationally competitive in products with higher margins compared to competing foreign products. It lacks competitiveness in products with lower margins than those of competing foreign products.

Relative product margin (Measure 7) is most effective in assessing international competitiveness when combined with relative price (Measure 6). A product that has a high margin compared to competing foreign products and is sold at a relatively low price is clearly internationally competitive. This competitive pricing is achieved without reducing product margins, allowing the firm to strengthen its position by enhancing product variety and quality, and by deterring competitors through aggressive investment strategies.

In the new theory of international trade, product variety and quality are crucial determinants of a firm's competitive position. In the simplest model, a producer's sales quantity is proportional to the number of varieties it offers. Both product variety and quality are endogenous factors. Therefore, measuring product variety and quality could serve as an indicator of international competitiveness, similar to the relative product margin measure. Instead of direct measures of product variety and quality, proxy measures commonly associated with these aspects are used. The most common proxies are technological activity indicators, such as R&D expenditures or the number of scientists and engineers employed.

(8) Measure 8: relative R&D intensity (product level).

Products with higher R&D expenditures or more personnel compared to foreign competitors indicate a country's international competitiveness. Conversely, products with lower R&D activity signify a lack of competitiveness.

Although this measure of international competitiveness is appealing, it has significant limitations. R&D, driven by profit motives, often depends on factor endowments and market forces to determine its amount and direction. If R&D were solely a private good and government policies intervened in ways that conflicted with market forces by relocating R&D to areas without comparative advantage, it would result in resource misallocation and suboptimal global R&D levels. (Grossman & Helpman, 1991) argue that such circumstances lead to losses shared by all countries. Additionally, a country can benefit from R&D by importing advanced technologies from nations with a comparative advantage in R&D. Investing in R&D in sectors without comparative advantage is inefficient. Instead, importing cutting-edge technology that incorporates superior R&D from other countries is more cost-effective.

Nevertheless, R&D has a public good aspect. First, increasing R&D in one country does not necessarily reduce it in another. Second, the "development" part of R&D is closely linked to "research"—innovation and diffusion are practically inseparable (Bell & Pavitt, 1995).

Technical progress fuels further progress. Finally, optimal R&D capabilities often require public policy intervention due to non-rivalry in consumption, non-excludability of research output, and information asymmetries about risks, rather than relying solely on market forces.

Additionally, the level of R&D spending and investments in human capital are seenas crucial for a country's international competitiveness. Recent economic growth theories suggest that allocating resources to human capital and technological advancement allows countries to influence their economic growth rate, enabling them to grow faster if desired.

Unlike the original Solow-Swan neoclassical growth model, which treats technical progress as exogenous, modern theories consider technical change and growth as endogenous. Investments in R&D and human capital generate spillover effects that enhance productivity across sectors. Consequently, a country's long-term development and trade patterns are partly determined by its commitment to technological advancement and R&D. This allows countries to potentially shape their comparative and competitive advantages through strategic policy decisions.

(9) Measure 9: relative R&D activity (national level).

A country is considered internationally competitive when it allocates more resources, measured by expenditures or personnel, to R&D compared to other countries. Conversely, it lacks competitiveness if its R&D efforts fall behind those of other countries.

Evaluating the impact of public policy and public goods on R&D expenditure reveals two additional ways in which government actions can enhance private sector productivity through effective public spending and taxation policies (Westmore, 2013). They are government investment in physical infrastructure and human capital development. Governments can target investments in physical and human capital to enhance infrastructure in regions with actual or emerging comparative advantage, thus benefiting from Marshallian industry externalities.

Additionally, in the presence of internal economies of scale, strategic trade policy can enable a country to dominate an entire market before other potential entrants. This rationale also applies to R&D investment. The theoretical justification for such expenditures is robust. In the context of "strategic trade policy", the idea of international competitiveness as a competitive race with clear winners and losers aligns most closely with formal international trade theory. The new trade theory supports the idea that governments can and should intervene in specific sectors to enhance economic welfare, even if it comes at the expense of other countries. This directly challenges the conventional trade theory, which operates under assumptions of constant returns and perfect competition, suggesting that all trade is welfare-enhancing and that laissez-faire is the optimal policy for trade and industry.

(10) Measure 10: relative strategic industry policy expenditure.

A country gains international competitiveness in products when it invests more heavily in strategic industry policies than its trading partners. These policies include industry-specific infrastructure, export subsidies, and R&D expenditures (Harrison & Rodríguez-Clare, 2010). Without such strategic policies, a country risks losing its competitive edge.

Firstly, this measure is highly contentious. Even Paul Krugman, a key proponent of strategic trade policy, later questioned the need for such interventions, ultimately supporting free trade as the best approach (Krugman, 1987). He argued that allowing private interests to justify public expenditure poses significant risks and potential harm.

Secondly, a basic critique is that allocating resources to lower marginal costs in one sector inevitably raises marginal costs in others, making those sectors less competitive. Essentially, a subsidy for one sector becomes a cost for another. Additionally, if one country implements strategic industry and trade policies, others can do the same, leading to reduced overall competitiveness. Under reasonable assumptions, trade policy wars can reduce welfare for both countries, trapping them in a Prisoner's Dilemma. Another issue is the challenge of foresight. The "winners" from strategic industry policies are often only identifiable in hindsight. Targeting R&D or infrastructure strategically is highly risky. This challenge is exacerbated in a world of imperfect competition, where strategic policies might be beneficial. Predicting the success of a specific sector, especially one developing new technology or products, is difficult. Factors other than international competition can also hinder success.

Furthermore, each specific industry policy presents unique challenges. For instance, export subsidies for a "strategic sector" might lead to a focus on exports over domestic supply, disadvantaging local consumers. Similarly, subsidizing R&D to capture spillover effects raises the issue of accurately valuing these externalities, which are inherently difficult to measure. This complicates comparing subsidy costs with external benefits. Moreover, preventing knowledge spillovers to other countries is another issue, potentially leading to free-riding and enhancing the competitiveness of other nations at the expense of the subsidizing country.

Finally, there is the problem of rent-seeking. The potential for government subsidies or special treatment, regardless of theoretical justification, attracts lobbyists who will expend resources until the marginal benefit of the subsidy equals the marginal cost of lobbying. This raises uncertainty about whether any rents generated by strategic trade policy would be dissipated by the political economy of rent-seeking.

(11) Measure 11: relative labour productivity (national level).

A country achieves international competitiveness and strong economic performance when

its labour productivity surpasses that of other countries (Dollar & Wolff, 1993; Porter, 2011).

Relative labour productivity is a valuable long-term measure of economic performance. First, sustained per capita income growth is primarily driven by productivity growth, especially labour productivity growth (Baumol & Wolff, 1988).

Second, while aggregate labour productivity serves as a measure of economic efficiency, it overlooks the contributions of other factors, particularly capital. Countries using more capital-intensive techniques may exhibit higher labour productivity without necessarily being more efficient overall. However, labour and capital are complementary in production and less substitutable than textbook models suggest. Changes in factor prices often lead firms to adopt absolutely superior techniques rather than merely shifting between different factor combinations. Therefore, in the long term, rankings based on labour productivity are likely to reflect superior techniques and overall productive efficiency, not just differences in factor intensities.

Furthermore, low labour productivity countries can only compete with high labour productivity countries by offering lower real wages. To raise wages and living standards, these countries must increase labour productivity, likely by adopting techniques used in high labour productivity countries. Hence, the growth rate of labour productivity can indicate the adoption of more efficient techniques.

A necessary caveat is that these observations are long-term. In the short term, factors such as changes in employment, unemployment, and labour force participation rates will influence the relationship between per capita income and labour productivity. Similarly, fluctuations in the terms of trade can affect per capita incomes independently of labour productivity. However, over the long term, trends in these factors tend to be minimal or stable.

2.4.3 International competitive advantage of cross-border e-commerce (cbec) enterprises

Cross-Border E-Commerce (CBEC) represents an advanced form of e-commerce, allowing trading partners in different countries and regions to easily connect through its platform (Giuffrida et al., 2017). It refers to the use of information and communication technologies, the Internet as the main communication channel, initiation of transactions, cross-border movements, and online payments. According to the World Customs Organization, the framework of standards for CBEC is characterized as follows:

a) Online ordering, sale, communication and, if applicable, payment.

b) Cross-border transactions/shipments.

c) Physical (tangible) goods.

d) Destined to consumer/buyer (commercial and non-commercial).

This framework sets standards primarily for B2C and C2C transactions, but members are encouraged to apply the same principles and standards to B2B transactions. CBEC includes three basic types: B2B (Business-to-Business), B2C (Business-to-Customer), and C2C (Customer-to-Customer) (Miao et al., 2019). Additionally, CBEC activities can be categorized as either export or import according to other standards.

Research on the regional competitiveness of cross-border e-commerce can be divided into macro, meso, and micro levels. From a macro perspective, the competitiveness of e-commerce is reflected in various indices such as the overall Internet penetration rate (Buhalis & Deimezi, 2003; Gibbs et al., 2003), efficient logistics network construction (W. Wu, 2022), and marketing models (Gregory et al., 2007) and others. The level of cross-border logistics is a critical factor for e-commerce consumers (Hsiao et al., 2017). Enhancing international logistical performance can boost the efficiency of international trade, and there is a synergistic relationship between logistics development and economic growth (R. Xie et al., 2022). Indicators used to measure logistics infrastructure include the penetration rate of Internet of Things technology, flight convenience, cargo volume, and port throughput (Kljaić et al., 2023). Due to the unique nature of cross-border e-commerce, its growth heavily relies on advancements in computer technology, including software, hardware, and infrastructure. The development of algorithms related to cross-border e-commerce transactions also reflects the industry's progress (Y. Wang et al., 2020).

Research from a meso perspective primarily examines the competitiveness of cross-border e-commerce in cities and regions (da Costa Júnior et al., 2024). China's cross-border e-commerce shows distinct urban agglomeration, stemming from historical and natural factors: enterprises are concentrated in coastal areas with high population density and some central regions due to policy-driven factors. Current research focus on comprehensive pilot zones for cross-border e-commerce.

Research from a micro perspective focuses on the competitiveness of cross-border e-commerce enterprises. This model provides more trade opportunities for traditional small- and medium-sized enterprises (SMEs) (Tolstoy et al., 2023). Yadav (2014) suggested that the widespread use of the Internet could further lower the entry costs for trading enterprises. Delina and Tkáč (2015) proposed that using official websites and email could increase export volumes and thereby enhance corporate profits. Additionally, cross-border e-commerce serves as a means for large enterprises to undergo industrial transformation and upgrades. This is evident in the application of cross-border e-commerce service systems, where enterprises can boost

market exposure, improve supply chain management efficiency, and optimize customer value co-creation through self-built platforms or third-party trade platforms (C. Wang et al., 2023). Moreover, cross-border e-commerce extends the business models of traditional industries. Traditional trade models often suffer from inefficiencies in service links such as international logistics, payments, marketing, and customs clearance. In contrast, cross-border e-commerce systems facilitate the digital transformation of related industries and create a larger service system market (Goldman et al., 2021).

Chapter 3: Research Method

3.1 Selection of research methods

3.1.1 Qualitative comparative analysis method and its application

The Qualitative Comparative Analysis (QCA) method was first proposed by American sociologist Charles Ragin in the 1980s. This method is suitable for case studies with small to medium samples, focusing on studying complex phenomena through set theory, using a holistic analysis perspective to explain the combined effects of multiple factors, making it more aligned with real-world situations. Traditional quantitative research treats independent variables as mutually independent, studying the linear relationship and marginal "net effect" between independent and dependent variables, requiring a large sample size and failing to explain the interdependence and complex causality among independent variables. Traditional qualitative analysis tends to study "point" data of individual case samples, often using grounded theory and practical investigation to conduct in-depth analysis of single cases.

The QCA method innovatively integrates the advantages of traditional qualitative and quantitative research methods, inducing multiple antecedent variables from cases, and studying the complex relationships between combinations of multiple antecedent variables and outcome variables. The general steps are to calibrate the antecedent and outcome variables into data sets using QCA software, determine the necessity and sufficiency of each antecedent variable and their combinations for the outcome variable by calculating the subset relations among the sets, and then combine with actual cases for in-depth analysis based on this empirical analysis. This method addresses issues of multiple concurrent causality, causal asymmetry, and multiple equivalent solutions, making it highly generalizable.

3.1.2 Feasibility of choosing the QCA method

The use of the QCA method to study the comprehensive impact of patent capabilities and trademark capabilities on the international core competitiveness of cross-border e-commerce enterprises is mainly based on the following considerations:

First, the QCA method can effectively explore the complex causal relationships between patent capabilities and trademark capabilities and the international core competitiveness of

cross-border e-commerce enterprises. The international core competitiveness of cross-border e-commerce enterprises results from the combined effects of multiple factors, which are interdependent. Therefore, using traditional quantitative and qualitative analysis methods to study the influencing factors of cross-border e-commerce enterprises lacks strong persuasive power. It requires a holistic perspective and a configurational approach to explore the complex processes of interaction among multiple influencing factors. The QCA method can analyze the sufficiency and necessity of variables through calibration, addressing multi-level, multi-variable interactions. Therefore, choosing the QCA method for this research is more appropriate.

Second, the QCA method assumes that causality in research is asymmetric. Traditional quantitative analysis primarily uses regression analysis on large samples, assuming linear correlation, thus resulting in symmetric causality. However, in the process of forming the core competitiveness of cross-border e-commerce enterprises, the degree and direction of influence of relevant factors on the outcome variable may differ. For example, stronger patent capabilities of cross-border e-commerce enterprises indicate that the enterprise values the application and registration of international patents, actively laying out international patents to enhance the comprehensive utilization value of its patents, thereby gaining an advantage in the international market, avoiding related intellectual property compliance issues and malicious sanctions from international competitors, and enhancing the enterprise's international core competitiveness. However, from another perspective, applying for patents, especially international patents, involves long processes and time lags, and the research and maintenance of patents require the enterprise to bear certain costs, which increases operational costs. The reasons leading to the expected outcome and those leading to the non-occurrence of the expected outcome are different, i.e., causal asymmetry. The QCA method can effectively handle causal asymmetry, making it more aligned with real-world situations.

Third, the QCA method is suitable for small and medium sample studies. The number of cross-border e-commerce enterprises selected in this research is 39, which does not meet the statistical requirements of "large samples" and cannot handle multiple influencing factors like patent capabilities and trademark capabilities using traditional quantitative analysis methods, nor can it obtain robust results through traditional statistical methods. The robustness of QCA method results does not depend on sample size but on whether the individuals in the sample are representative. In qualitative comparative analysis, the sample size of 10-40 cases is considered a medium sample size. This research's sample size of 39, with two primary indicators and six secondary indicators, ensures high internal validity of the analysis results. This method surpasses traditional quantitative and qualitative analysis methods, allowing in-depth

exploration of cases while using quantitative analysis to simplify the relationships between antecedent and outcome variables, making it highly suitable for this research.

Additionally, the research will employs Necessity Condition Analysis (NCA) to complement the QCA findings. While QCA helps identify sufficient configurations for achieving high international competitiveness, NCA specifically focuses on determining whether certain individual conditions are necessary prerequisites for the outcome. The combination of these two methods provides several advantages. First, NCA can identify the degree of necessity through effect sizes, offering more nuanced insights than QCA's binary necessary condition analysis. Second, NCA can detect bottleneck conditions that might constrain international competitiveness, which is not directly possible with QCA alone. Third, by using both methods, we can validate our findings from different analytical perspectives, thereby enhancing the robustness of our conclusions. The complementary use of NCA and QCA allows us to develop a more comprehensive understanding of both the necessary conditions and sufficient configurations that contribute to the international competitiveness of cross-border e-commerce enterprises.

3.2 Data sources and sample selection

3.2.1 Data sources

The international patent data involved in this research are sourced from the IncoPat patent database, and the international trademark data are sourced from the World Intellectual Property Organization (WIPO) database. The IncoPat database is a technological innovation intelligence platform covering global patent information, including over 170 million patent documents from 158 countries, organizations, or regions. The patent data are sourced from official or reputable commercial data providers, with fast data updates and 24-hour dynamic updates, ensuring the accuracy, completeness, reliability, and timeliness required for scientific research. The WIPO database includes over 60 million data entries, covering international trademarks under the Madrid system, appellations of origin and geographical indications under the Lisbon system, emblems protected under Article 6ter of the Paris Convention, WHO International Nonproprietary Names, and trademarks from national and regional offices of contracting states, making it an authoritative and comprehensive online trademark search system.

3.2.2 Sample selection

The selection of company samples in this research draws on the definitions of cross-border e-commerce enterprises and the business scope of e-commerce enterprises from existing research. The sample range is selected from the cross-border e-commerce concept stocks in the A-shares of the Tonghuashun financial system, the Wind database, and the statistics from the E-commerce Research Center, resulting in a total of 202 cross-border e-commerce listed companies. Complete data samples of 39 listed companies from 2013 to 2023 are retained. The selection criteria for company samples are as follows:

1. Companies whose business descriptions and cross-border e-commerce development descriptions exclude keywords indicating that cross-border e-commerce is in its early stages or has just started.
2. Exclude companies marked as ST (Special Treatment), *ST (Special Treatment with risk of delisting), or PT (Particular Transfer). Companies marked as ST means to companies that have shown abnormal financial conditions or other risk factors. Companies marked as *ST have reported losses for three consecutive years or face other serious issues that put them at risk of delisting. PT (Particular Transfer) represents the final stage before delisting.
3. Exclude companies whose main business is cross-border e-commerce logistics or cross-border e-commerce services.
4. Exclude companies that have recently transformed into cross-border e-commerce businesses with a transformation period of less than five years. Only companies with relatively longer operational histories in cross-border e-commerce can provide meaningful data regarding their experiences and strategies in handling intellectual property challenges in international markets. Therefore, setting a minimum transformation period of five years helps ensure that the selected samples have established relatively stable intellectual property management systems and accumulated sufficient experience in international market operations, thereby enhancing the reliability and representativeness of our research findings.
5. Exclude samples with missing or unavailable condition variables and outcome variables, such as overseas revenue, in their annual reports.

After identifying 39 parent company samples, the corresponding subsidiaries consolidated in the parent company's financial statements are included in the study, resulting in a total of 1,273 companies participating in the search. Since the study involves the application and

registration status of international patents and international trademarks of companies, the corresponding English names of the parent companies and their consolidated subsidiaries are compiled based on information from Qichacha and Tianyancha.

The international trademark data of the sample companies are searched in the WIPO database using the corresponding English names of the sample companies as applicants. Since the database can only download the first 180 entries, which does not meet the study's requirements, the Octoparse data collector is used for programming to collect data from the international trademark data display interface of each sample company. The collected data includes trademark name, trademark image, owner, IPR, designated country/region, trademark status, status year, registration number, and Nice classification. During the cleanup of international trademarks, the data collected by Octoparse from the summary interface lacks more detailed information in the detail page. For example, a company's status is "terminated," but the page information collected only shows the "terminated" status date as "July 29, 2022," indicating that the international trademark was terminated on July 29, 2022, without the application and registration dates of the trademark. Some trademarks registered before 2014 lack expiration dates. Such information is in the detail page of each international trademark. Additionally, there are issues such as "unknown" status and missing relevant year data for some trademarks, which require checking the international trademark application interface of each corresponding sample company based on the registration number to fill in the missing or questionable data.

The patent data of the sample companies are searched using the company as the applicant. The search comparison reveals a high level of "noise" in the search terms. To reduce noise, each company is searched individually, filtering the applicants on the search interface. Using Tianyancha and Qichacha to confirm the company's former names, legal representative information, and joint patent applications, the noise is reduced before downloading the data, which includes patent name, abstract, applicant, publication country, PCT international application number, PCT international publication number, PCT national phase entry date, and other information. Ultimately, 1,771 international patent data and 3,217 international trademarks are collected.

3.3 Variable measurement and calibration

3.3.1 Variable measurement

Based on existing literature, this paper focuses intellectual property on two categories: patents and trademarks, studying the impact of a company's patent capabilities and trademark capabilities on its international competitiveness. Given the data spans from 2013 to 2023, which includes the pandemic period, the data for each sample company is divided into two phases, 2013-2019 and 2020-2023, with the average values taken for each phase. The specific measurement indicators for the variables in this research are as follows:

1. **Patent Capabilities** Drawing from the measurement indicators of intellectual property capabilities in research enterprises by Song Hefang, patent capabilities are refined into three condition variables: international patent Application, international patent authorization, and international patent protection scope. International patent Application is measured by the total number of international patent applications by the company; international patent authorization is measured by the total number of international patents registered by the company; international patent protection scope is measured by the cumulative number of countries involved in the PCT national phase entries for the company in a given year.
2. **Trademark Capabilities** Also drawing from Song Hefang's measurement indicators, trademark capabilities are refined into three condition variables: international trademark accumulation, international trademark authorization, and international trademark protection scope. International trademark accumulation is measured by the total number of international trademark applications by the company; international trademark authorization is measured by the total number of international trademarks registered by the company; international trademark protection scope is measured by the total number of countries designated for international trademark protection by the company.
3. **International Competitiveness** Based on data availability and research consistency, this paper measures the international competitiveness of cross-border e-commerce companies using revenue indicators. It is defined as the value of operating revenue obtained by a specific company in a foreign market within a certain period. Revenue indicators can comprehensively and intuitively measure and reflect the economic benefits obtained by companies in developing international markets; the explicit manifestation of a country's international competitiveness is the profitability of goods

and services in overseas operations and the sustainable development potential of overseas businesses. To avoid the impact of inflation, the formula R = R × (1 + r)^(2023 - y) is used to uniformly convert actual overseas revenue to the equivalent of 2023. Here, R represents the overseas revenue of the year, r represents the inflation rate, and y represents the current year.

3.3.2 Variable calibration

The fsQCA method, or fuzzy set qualitative comparative analysis, first requires the transformation and calibration of the collected condition variables. Following previous practices, this paper sets the 75th percentile of the raw data as the threshold for full membership, the 50th percentile as the crossover point, and the 25th percentile as the threshold for non-membership. The "compute" function in the "variables" section of fsQCA 4.0 software is then used to convert the condition and outcome variables into fuzzy membership scores ranging from 0 to 1. The definition of indicator can be seen in Table 3.1 as followed.

Table 3.1 Measurement indicators of patent capabilities, trademark capabilities, and international competitiveness

Primary Indicator	Secondary Indicator	Tertiary Indicator
Condition Variable	Patent Capabilities	International Patent Application (IPA): Measured by the annual patent application volume International Patent Licensing (IPL): Measured by the number of patents granted in the same year of application International Patent Protection Scope (NOIP): Measured by the total number of countries in PCT national phase entries in the current and previous years
	Trademark Capabilities	International Trademark Accumulation (ITA): Measured by the annual trademark application volume International Trademark Licensing (IPL): Measured by the registration date of registered and terminated trademarks International Trademark Protection Scope (NOIT): Measured by the number of countries/regions designated for trademark protection
Outcome Variable	International Competitiveness	Measured by the operating revenue obtained by a specific company in a foreign market within a certain period

However, the actual data of the sample companies show a significant polarization with few PCT national phase entries. Therefore, for this antecedent variable, a direct calibration approach is used: companies with PCT national phase entries are assigned a score of "1" for this indicator, and companies without such data are assigned a score of "0". The QCA Conceptual model diagram is shown in Figure 3.1.

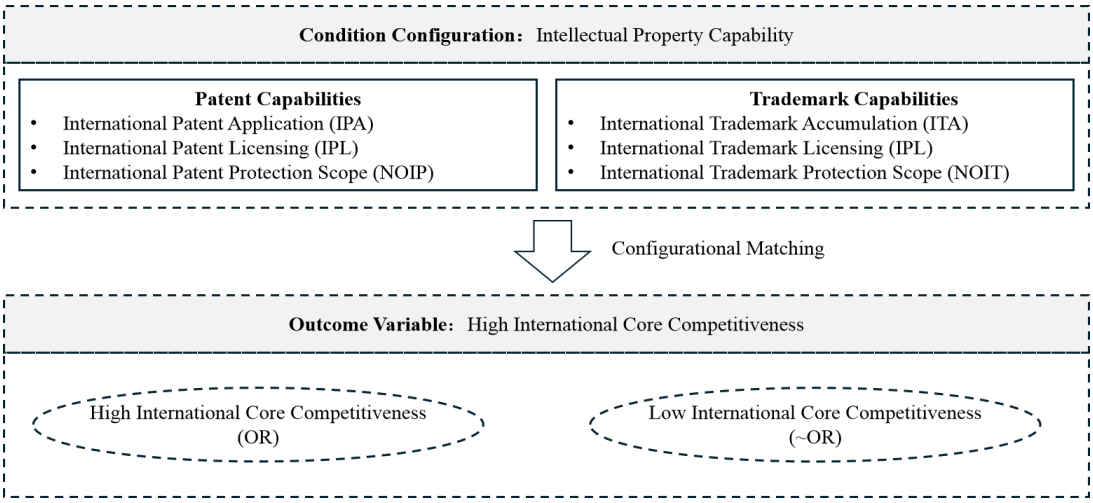


Figure 3.1 QCA conceptual model diagram

This chapter constructs the theoretical model of this research based on the relevant theories of intellectual property capabilities. On this basis, drawing from existing research literature and the actual data of sample companies, we constructed the measurement indicators and specific measurement metrics for international patent Application, international patent authorization, international patent protection scope, international trademark accumulation, international trademark authorization, international trademark protection scope, and international competitiveness of enterprises. Finally, the chapter details the calibration of the synthesized condition variables and outcome variables using the fsQCA method.

Chapter 4: Data Analysis and Empirical Results

4.1 Descriptive statistics results

The figure 4.1 shows the distribution of international patent applications (IPA) and international patent licensing (IPL) of sample enterprises by the end of 2023.

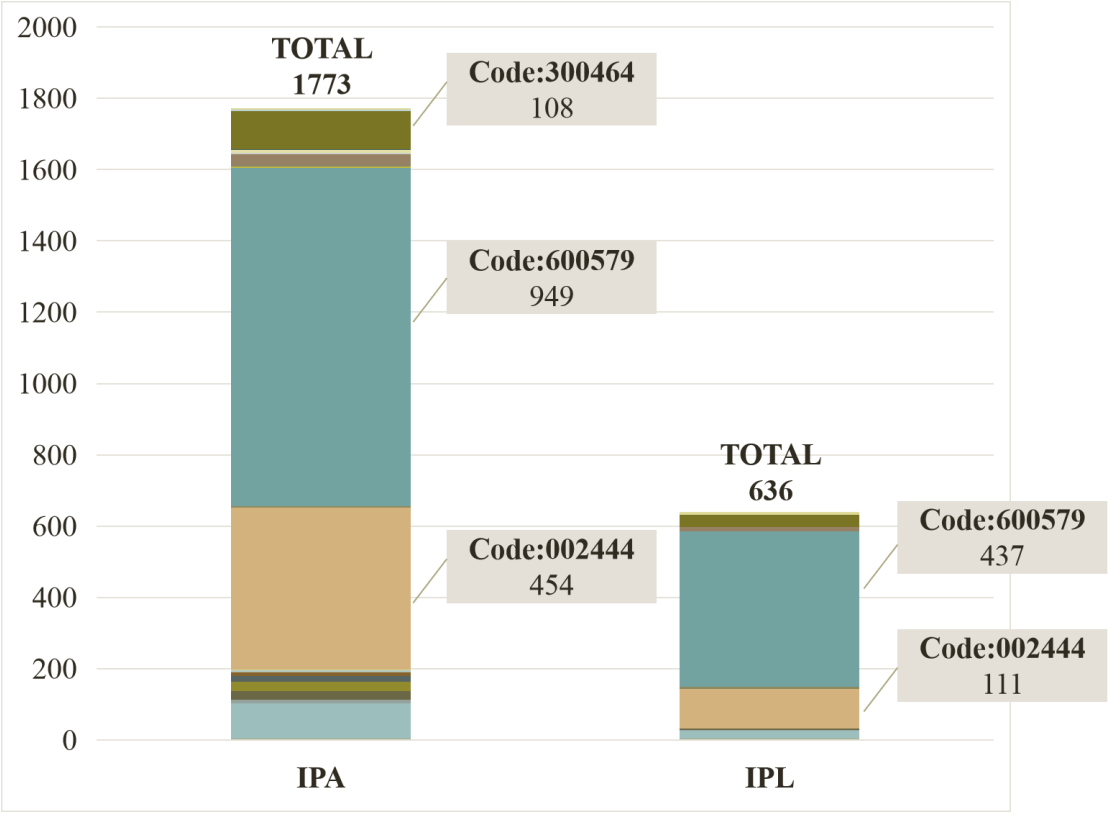


Figure 4.1 The international patent application (IPA) and the number of international patent licensing (IPL) of sample enterprises by the end of 2023

In terms of international patent applications (IPA), the total number reached 1,773. Among them, *Code: 600579* had the highest number of applications at 949, accounting for 53.5% of the total. *Code: 002444* had 454 applications, making up 25.6% of the total, and *Code: 300464* had 108 applications, accounting for 6.1%.

In terms of international patent licensing (IPL), the total number reached 636. Among them, *Code: 600579* had the highest number of licenses at 437, accounting for 68.7% of the total. *Code: 002444* had 111 licenses, making up 17.5% of the total.

In the area of international patent applications (IPA), *Code: 600579* significantly outpaced other enterprises, holding 53.5% of the total. Following this was *Code: 002444*, which

accounted for 25.6%. *Code: 300464*'s contribution was smaller, at only 6.1%.

Data analysis reveals that *Code: 600579* excels in both international patent applications and licensing, demonstrating its strong capabilities in innovation and intellectual property protection. Although *Code: 002444* also contributes to applications and licensing, it still lags behind *Code: 600579*. *Code: 300464*'s performance in these areas is relatively weak.

Overall, there are significant differences in the performance of enterprises in international patent applications and licensing. Leading enterprises such as *Code: 600579* show strong research and innovation capabilities, while most enterprises need to improve their patent capabilities.

The figure 4.2 shows the distribution of international trademark applications (ITA) and international trademark licensing (ITL) of sample enterprises by the end of 2023.

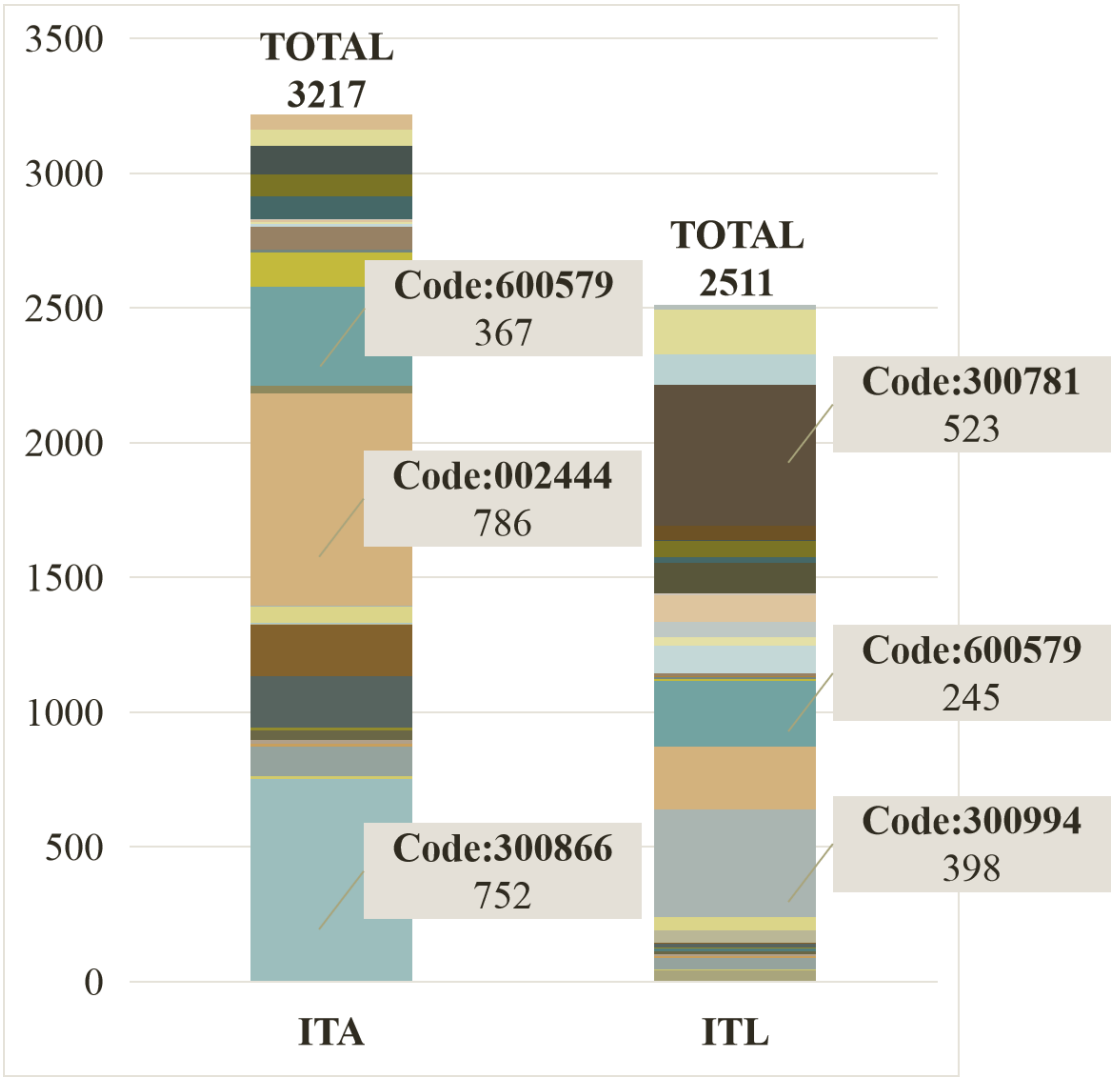


Figure 4.2 The international trademark accumulation (ITA) and the number of international trademark licensing (ITL) of sample enterprises by the end of 2023

In terms of international trademark applications (ITA), the total number reached 3,217.

Among them, *Code: 002444* had the highest number of applications at 786. *Code: 300866* followed closely with 752 applications, and *Code: 600579* had 367 applications.

In terms of international trademark licensing (ITL), the total number reached 2,511. Among them, *Code: 300781* had the highest number of licenses at 523, followed by *Code: 300994* with 398 licenses. *Code: 600579* had 245 licenses.

From the data, it can be seen that in terms of international trademark applications (ITA), *Code: 002444*, *Code: 300866*, and *Code: 600579* are the most prominent enterprises, accounting for 24.4%, 23.4%, and 11.4% of the total respectively. This indicates that these enterprises have made significant investments in trademark applications, which may be closely related to their international market expansion strategies. In terms of international trademark licensing (ITL), *Code: 300781* and *Code: 300994* are particularly outstanding, accounting for 20.8% and 15.8% of the total respectively. *Code: 600579* also holds an important position in trademark licensing, accounting for 9.8% of the total. These enterprises are not only active in trademark applications but also perform excellently in obtaining licenses, demonstrating their strong trademark protection in international markets.

Overall, there are significant differences in the performance of sample enterprises in international trademark applications and licensing. Some enterprises, such as *Code: 002444*, *Code: 300866*, and *Code: 600579*, are very active in trademark applications, showing their ambition in international market expansion. Meanwhile, *Code: 300781* and *Code: 300994* are more prominent in trademark licensing.

According to figure 4.3, the distribution of sample enterprises in terms of international patent protection scope (NOIP) and international trademark protection scope (NOIT) is as follows:

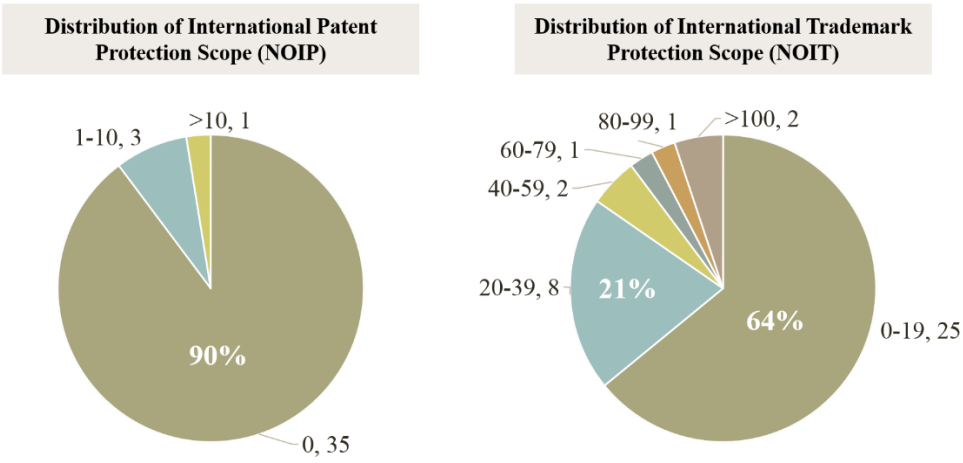


Figure 4.3 The distribution of international patent protection scope (NOIP) and international trademark protection scope (NOIT)

For international patent protection scope (NOIP):

- 35 enterprises have no international patents, accounting for 89.7%.
- 3 enterprises have 1-10 patents, accounting for 7.7%.
- 1 enterprise has more than 10 patents, accounting for 2.6%.

From the data, it can be seen that most enterprises have limited coverage in international patent protection scope (NOIP), with 89.7% of enterprises having no international patent protection, and only a small percentage having more than one international patent protection. This indicates that the overall protection of international patents among the sample enterprises is relatively weak.

For international trademark protection scope (NOIT):

- 25 enterprises have a protection scope of 0-19 countries, accounting for 64.1%.
- 8 enterprises have a protection scope of 20-39 countries, accounting for 20.5%.
- 2 enterprises have a protection scope of 40-59 countries, accounting for 5.1%.
- 1 enterprise has a protection scope of 60-79 countries, accounting for 2.6%.
- 1 enterprise has a protection scope of 80-99 countries, accounting for 2.6%.
- 2 enterprises have a protection scope of more than 100 countries, accounting for 5.1%.

In comparison, the situation in terms of international trademark protection scope (NOIT) is slightly better, but still, 64.1% of enterprises have no international trademark protection. Notably, 20.5% of enterprises have protection in 20-39 countries, indicating that some enterprises are more proactive in their international trademark strategies.

Overall, there is significant room for improvement in the protection of international patents and trademarks among the sample enterprises. Most enterprises have insufficient investment in international patent protection, and a substantial proportion also lack effective international trademark protection. However, a few enterprises are actively engaged in international trademark protection, demonstrating a strong internationalization strategy and market protection awareness.

The figure 4.4 displays the application trends of international patent application (IPA) and international patent licensing (IPL) for sample enterprises from 2010 to 2023.

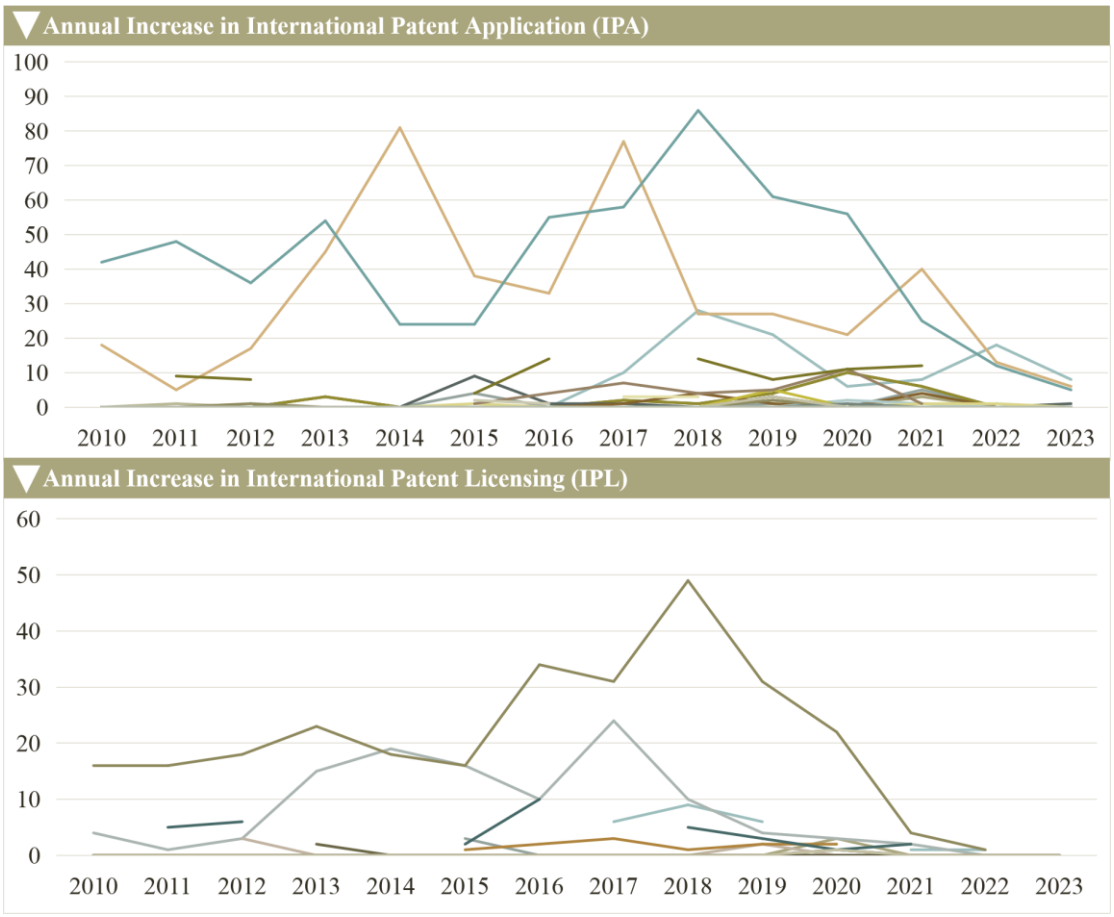


Figure 4.4 Application trends of international patent application (IPA) and international patent licensing (IPL) from 2010 to 2023 for sample enterprises

In terms of international patent application (IPA), the number of applications fluctuated significantly from 2010 to 2023. Peaks were observed in 2014 and 2017, with nearly 70 and 80 applications respectively. There were also high numbers of applications in 2015 and 2019, reaching over 40 and 50 respectively. The overall trend shows that after 2018, the number of applications gradually decreased, falling back to a lower level by 2023, which may also be due to many patent applications still being in the non-disclosure period.

For international patent licensing (IPL), the number of licenses also experienced significant fluctuations from 2010 to 2023. A peak was observed in 2018, with the number of licenses nearing 60. Other high points occurred in 2015 and 2017, with the number of licenses close to 30 and 40 respectively. Similar to IPA, the number of IPL licenses gradually declined after 2019, returning to a lower level by 2023, which may also be because many patents are still under review.

Both IPA and IPL application and licensing numbers show considerable annual fluctuations, reflecting the varying levels of emphasis on international patent R&D and applications by enterprises in different years. Sample enterprises were particularly active in international patent

R&D and applications in 2014, 2017, and 2018. The peaks in these years may be closely related to the enterprises' innovation cycles, market demands, and competitive pressures.

Since 2018, both international patent application (IPA) and international patent licensing (IPL) have shown a downward trend, indicating a gradual decrease in investment and output in international patents by the enterprises.

The figure 4.5 displays the application trends of international trademark accumulation (IPA) and international trademark licensing (ITL) for sample enterprises from 2010 to 2023.

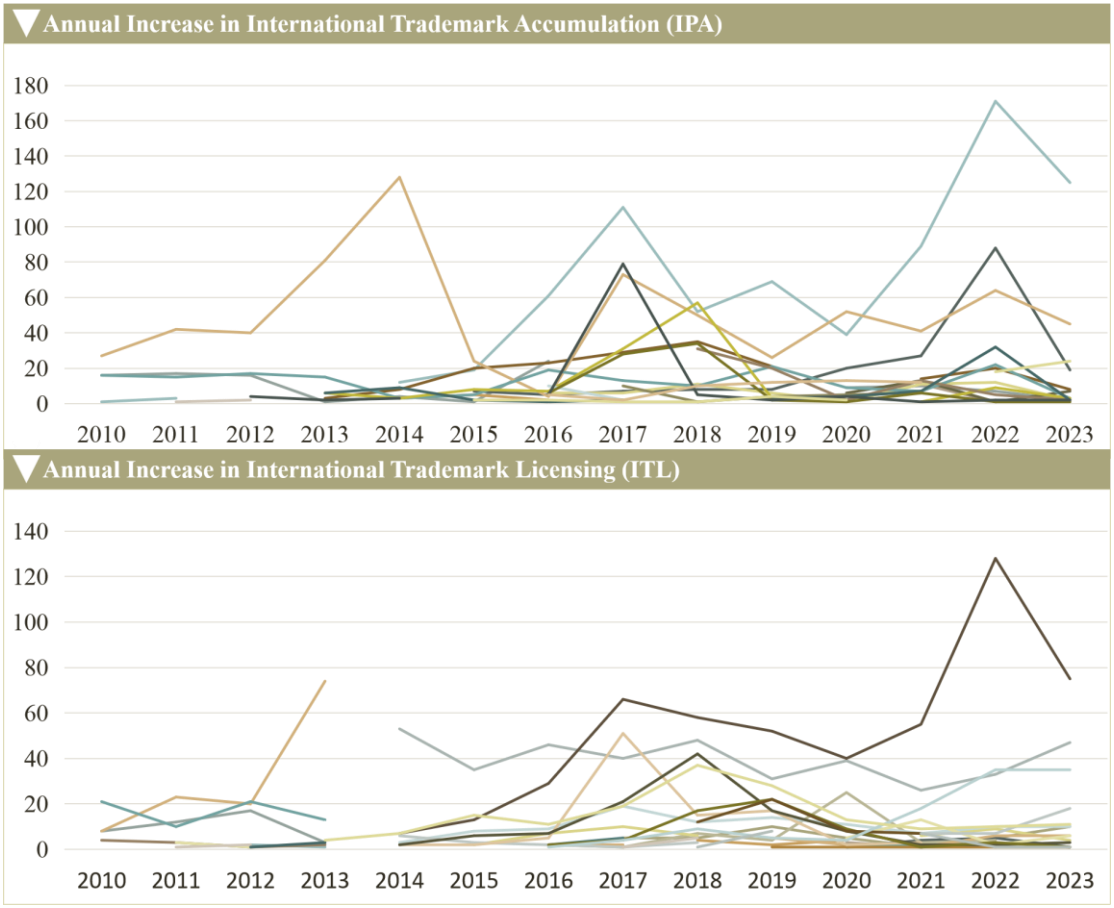


Figure 4.5 Application trends of international trademark accumulation (IPA) and international trademark licensing (ITL) from 2010 to 2023 for sample enterprises

In terms of international trademark accumulation (IPA), the annual increase fluctuated significantly from 2010 to 2023. Peaks were observed in 2014 and 2017, with nearly 120 and 80 new applications respectively. High numbers of new applications also appeared in 2016 and 2021, reaching 60 and 140 respectively. The overall trend shows that after 2019, the number of new applications gradually increased, reaching another peak in 2022.

For international trademark licensing (ITL), the annual increase also experienced significant fluctuations from 2010 to 2023. Peaks were observed in 2018 and 2021, with nearly 60 and 80 new licenses respectively. Other high points occurred in 2015 and 2017, with nearly

40 and 50 new licenses respectively. Similar to IPA, the number of ITL licenses gradually increased after 2019, reaching the highest point in 2022, then slightly decreasing in 2023.

The chart indicates that enterprises concentrated their international trademark applications and licensing efforts in these years. Overall, the trends of both IPA and ITL are quite consistent, showing an upward trend after 2019. This may be related to the expansion of global markets and the increasing awareness of brand protection among enterprises.

Sample enterprises were particularly active in international trademark applications and licensing in 2014, 2017, 2018, and 2021. The peaks in these years may be closely related to the enterprises' brand expansion strategies, market demands, and competitive pressures.

Since 2019, both international trademark accumulation (IPA) and international trademark licensing (ITL) have shown an upward trend, indicating a gradual increase in investment and awareness of protection in international trademarks by the enterprises.

4.2 Analysis of necessity of single conditions

After completing data calibration, it is essential to conduct a necessity analysis for each antecedent condition before studying the configurations that affect international competitiveness. Necessity Condition Analysis (NCA) can supplement the necessity analysis in the QCA method effectively. NCA's necessity condition analysis can determine the necessity of a single antecedent variable for the international core competitiveness of enterprises and identify corresponding bottleneck levels. Compared to the QCA method, it can also identify restrictive factors and judge the degree of necessity, making it more detailed and reliable.

4.2.1 Necessity analysis of single conditions under the NCA method

Necessity analysis can identify whether a condition factor is necessary for producing or promoting a specific outcome. The NCA method includes Ceiling Regression (CR) and Ceiling Envelopment (CE) to handle continuous and discrete variables, respectively. The constraint of the ceiling zone on the outcome is called the effect size, which ranges from 0 to 1, with larger values indicating a greater effect. Values less than 0.1 indicate a small effect, 0.1-0.3 indicate a medium effect, and 0.3-0.5 indicate a large effect. Compared to the necessity analysis in QCA, NCA's analysis is more precise. In the NCA method, a necessary condition must meet two criteria: an effect size (d) > 0.1 and $p \leq 0.01$. This research uses RStudio software to calculate the CR and CE estimation methods for the antecedent variables, obtaining precision, ceiling zone, range, effect size, and P-value.

According to Table 4.1, the results of the necessity analysis under the NCA method indicate that there are no necessary conditions in the study.

Table 4.1 Necessity analysis results under the NCA method

Antecedent Condition	Method	Precision	Ceiling Zone	Range	Effect Size (d)	P-value
International Patent Application (IPA)	CE	100%	0.05	0.91	0	1
	CR	100%	0.05	0.91	0	1
International Patent Authorization (IPL)	CE	100%	0.5	0.48	0	1
	CR	100%	0.5	0.48	0	1
International Patent Protection Scope (NOIP)	CE	100%	0	0.96	0	1
	CR	100%	0	0.96	0	1
International Trademark Accumulation (ITA)	CE	100%	0	0.96	0	1
	CR	100%	0	0.96	0	1
International Trademark Authorization (ITL)	CE	100%	0	0.95	0	1
	CR	100%	0.05	0.91	0	1
International Trademark Protection Scope (NOIT)	CE	100%	0.05	0.91	0	1
	CR	100%	0.05	0.91	0	1

Note: (1) Calibrated fuzzy set membership values. (2) $0.0 \leq d < 0.1$: "low level"; $0.1 < d < 0.3$: "medium level"; $0.3 < d < 0.5$: "high level"; ≥ 0.5: "high level". (3) P-value represents the significance of the effect size in the permutation test (resampling times = 10000) in NCA.

4.2.2 Bottleneck level analysis

The bottleneck level in NCA necessity analysis represents the minimum level of necessary conditions required to produce a specific outcome. The result is shown in Table 4.2.

Table 4.2 Bottleneck level analysis results under the NCA method

High International Core Competitiveness (OR)	IPA	IPL	NOIP	ITA	ITL	NOIT
0	NN	NN	NN	NN	NN	NN
10	NN	NN	NN	NN	NN	NN
20	NN	NN	NN	NN	NN	NN
30	NN	NN	NN	NN	NN	NN
40	NN	NN	NN	NN	NN	NN
50	NN	NN	NN	NN	NN	NN
60	NN	NN	NN	NN	NN	NN
70	NN	NN	NN	NN	NN	NN
80	NN	NN	NN	NN	NN	NN
90	NN	NN	NN	NN	NN	NN
100	NN	NN	NN	NN	NN	NN

Note: Using the CE method, NN = not necessary.

According to Table 4.2, it reports the bottleneck levels for international patent Application, international patent authorization, international patent protection scope, international trademark accumulation, international trademark authorization, and international trademark protection scope, showing that none exist.

4.2.3 Necessity analysis of single conditions under the qca method

This research further examines the calibrated antecedent conditions using the QCA method for necessity analysis. Relevant research shows that consistency is an important indicator of necessity. When the consistency level is greater than 0.9, the condition can be considered necessary for the outcome, indicating that the single antecedent condition plays a major role in the outcome variable. Table 4.3 shows that the consistency levels of international patent Application, international patent authorization, international patent protection scope, international trademark application volume, international trademark authorization, and international trademark protection scope are all below 0.9.

Table 4.3 Necessity test of single conditions under QCA

Condition Variable	**Outcome Variable** OR		~OR	
	Consistency	Coverage	Consistency	Coverage
IPA	0.625	0.624	0.407	0.447
~IPA	0.445	0.405	0.657	0.659
IPL	0.755	0.567	0.692	0.572
~IPL	0.430	0.559	0.476	0.681
NOIP	0.169	0.896	0.018	0.104
~NOIP	0.831	0.434	0.982	0.566
ITA	0.649	0.677	0.396	0.455
~ITA	0.478	0.418	0.719	0.693
ITL	0.515	0.535	0.497	0.568
~ITL	0.585	0.513	0.594	0.574
NOIT	0.581	0.584	0.492	0.544
~NOIT	0.547	0.494	0.624	0.621

This also confirms that in the field of cross-border e-commerce, the reasons for achieving high international core competitiveness are complex and diverse, with no single factor being significant. Coverage measures the extent to which the set relation passing the consistency test explains the study's outcome.

4.3 Configuration of conditions

The international core competitiveness of cross-border e-commerce enterprises is a complex system influenced by multiple dimensions and factors. This research uses fsQCA 4.0 software

to analyze the configurations of antecedent conditions for high and low international core competitiveness of cross-border e-commerce enterprises. These different configurations represent various combinations of influencing factors achieving the same result (high and low international core competitiveness of cross-border e-commerce enterprises). Configuration analysis mainly includes constructing the truth table, refining the truth table, and standardized analysis. Based on the theory of intellectual property capabilities and actual cases, an in-depth analysis of the discovered configuration paths is conducted.

4.3.1 Configuration analysis of international core competitiveness

First, fsQCA 4.0 software is used to construct the truth table. Following the research practices of domestic and foreign scholars, a series of thresholds are set before configuration analysis to preliminarily screen the truth table. According to existing research, the threshold setting mainly considers three standards. The first standard is determining the minimum case frequency to avoid trivial configurations in small sample studies, where the minimum case frequency can be 1 or 2. In large sample studies, a higher case frequency should be considered, retaining about 75% of the original cases. The second standard is determining the consistency threshold to ensure the configurations have explanatory power. Existing research indicates that a consistency greater than 0.75 is an acceptable standard. Additionally, PRI consistency should be maintained above 0.6 to avoid contradictory relationships of the same cause with different effects. With 39 cases in this research, categorized as a small to medium sample, the case frequency threshold is set to 1, the original consistency threshold to 0.75, and the PRI consistency threshold to 0.6.

Next, the truth table is refined. This step primarily resolves contradictory configurations in the truth table and uses relevant theories and knowledge to make assumptions about logical remainders for counterfactual analysis. Since no contradictory configurations appear in the initial truth table, this step is omitted. For counterfactual analysis, due to the lack of consensus or clear theoretical conclusions on the impact of six antecedent conditions on the core competitiveness of cross-border e-commerce enterprises, this paper assumes that the presence or absence of single factors contributes to the high core competitiveness of cross-border e-commerce enterprises.

Finally, a standardized analysis is conducted on the refined truth table. fsQCA 4.0 software outputs three solutions: complex, parsimonious, and intermediate. The complex solution is based on original data without any logical remainders; the parsimonious solution includes all logical remainders; the intermediate solution incorporates reasonable and theoretically and practically necessary logical remainders. One major advantage of intermediate solutions is that

they do not allow the elimination of necessary conditions, making them generally superior to the other two solutions. M. Zhang and Du (2019) also noted that reasonable, moderately complex intermediate solutions are usually the preferred choice for reporting and interpreting QCA research. Additionally, conditions in configurations are divided into core and peripheral conditions, with core conditions having a significant impact on the outcome and peripheral conditions having an auxiliary effect. The results of the parsimonious solution are used to identify the core conditions for a given configuration. Core conditions are those present in both the parsimonious and intermediate solutions, while peripheral conditions are those deleted in the parsimonious solution but present in the intermediate solution.

To clearly present the research results, "●" indicates the presence of a core condition, "●" indicates the presence of a peripheral condition, "⊗" indicates the absence of a core condition, and "⊗" indicates the absence of a peripheral condition. A blank indicates that the presence or absence of the condition does not affect the result.

A detailed analysis of the intermediate solution for the configuration of international core competitiveness, combined with the results of necessity analysis and condition configuration, is provided in Table 4.4. Each column represents a possible condition configuration.

Data analysis shows that there are three configurations supporting high international core competitiveness: Configuration 1 (IPA*IPL*ITA*ITL*~NOIT), Configuration 2 (IPA*IPL*NOIP*ITA*NOIT), Configuration 3 (~IPA*IPL*~NOIP*ITA*ITL*NOIT). The consistency of the three paths ranges between 0.80-0.90, higher than the acceptable minimum standard of 0.75, with an overall consistency of 0.86, greater than 0.75.

Thus, all three paths are sufficient conditions for supporting high international core competitiveness. The overall coverage is 0.33, which can well explain the issue studied in this paper.

There are two configurations supporting low international core competitiveness: Configuration 4 (IPL~*NOIP*~ITA~*ITL*NOIT), Configuration 5 (IPA*IPL*~NOIP~*ITA*ITL*~NOIT). The consistency of the five paths ranges between 0.80-0.85, with an overall consistency of 0.82, higher than 0.75. Both paths are sufficient conditions for supporting low international core competitiveness.

Table 4.4 Configuration paths of intellectual property capabilities affecting international core competitiveness

Condition Configuration	**High International Core Competitiveness (OR)**			**Low International Core Competitiveness (~OR)**	
	Configuration 1	Configuration 2	Configuration 3	Configuration 4	Configuration 5
IPA	•	•	⊗		●
IPL	•	•	•	•	•
NOIP		●	⊗	⊗	⊗
ITA	●	•	●	⊗	⊗
ITL	●		●	⊗	●
NOIT	⊗	•	•	●	⊗
Consistency	0.896	0.892	0.798	0.849	0.804
Original Coverage	0.174	0.118	0.120	0.187	0.111
Unique Coverage	0.096	0.115	0.045	0.139	0.063
Overall Coverage	0.334			0.250	
Overall Consistency	0.862			0.823	

Note: ● = presence of core condition; ⊗ = absence of core condition; • = presence of peripheral condition; ⊗= absence of peripheral condition; blank space indicates that the presence or absence of the condition does not affect the result.

4.3.2 Configuration analysis of high international core competitiveness

Configuration 1 shows that regardless of the presence of international patent protection scope, high international core competitiveness can be supported by the presence of core international trademark accumulation and international trademark authorization, the absence of core international trademark protection scope, and the presence of peripheral international patent Application and international patent authorization. Configuration 1 suggests that cross-border e-commerce enterprises should place the construction of the entire chain of international intellectual property at the core of their corporate strategy. The combination layout of international intellectual property, mainly represented by technological innovation patents and brand trademarks, is a key factor for enterprises to expand into international markets and increase market share. International patent authorization is an important indicator of a company's innovation and R&D capabilities and serves as an endorsement of product quality. The quality of a company's products directly affects the perceived value of the brand among consumers, determining the success or failure of the company's international brand strategy. In

a broader international competitive market, applying for and registering Madrid trademarks, cultivating and enhancing trademark awareness, and improving trademark utilization capabilities, quality, and quantity are beneficial for increasing the brand's visibility and added value. Possessing a large intellectual property portfolio enhances a company's bargaining power within the industry, providing a certain level of "deterrence." A typical example is Hangzhou GreatStar Industrial Co., Ltd. GreatStar's product sales and service network covers more than 180 countries and regions worldwide. The company has established a senior professional tool R&D team with five global R&D bases, including the China headquarters R&D center, the European toolbox R&D center, and the New Jersey fastening tool R&D center. According to the company's 2023 annual report, GreatStar invested 323 million yuan in R&D in 2023, a 0.97% year-on-year increase. GreatStar has strong product design and R&D capabilities, with the WORKPRO tool brand achieving annual sales of 70 million USD on Amazon, ranking first among domestic brands in the same category. To overcome brand barriers in the European and American markets, GreatStar continuously expands its product line through acquisitions, forming a matrix of world-class well-known tool brands such as ARROW, BeA, SK, PONY & JORGENSEN, and Goldblatt. The intellectual property utilization system constructed by the company has formed a unique advantage in participating in international competition.

Configuration 2 shows that regardless of the presence of international trademark authorization, high international core competitiveness can be supported by the presence of core international patent protection scope and the presence of peripheral international patent Application, international patent authorization, international trademark accumulation, and international trademark protection scope. Configuration 2 indicates that companies with intellectual property awareness and international layout can benefit the holders in product competition. In specific regional international market conditions, it can effectively avoid malicious competition and market seizing behaviors. Carefully designed and well-operated high-quality intellectual property, granted through strict examination, along with its actual value, allows companies to quickly take control during intellectual property litigation and effectively protect their commercial value. Patents themselves are also external factors of industry barriers and product quality, deterring potential competitors. Thus, enhancing the international core competitiveness of cross-border e-commerce enterprises. A typical example is Loctek Ergonomic Technology Corp. Loctek focuses on linear drives, smart offices, and healthy offices, specializing in the R&D and production of ergonomic products and linear drive components. The company's smart home and healthy office products are all independently developed and designed, with complete independent intellectual property and global patent layout, establishing

strong technical barriers. By 2023, the company had been granted 1,287 global patents, including 153 invention patents. The company has a team of over 700 R&D personnel, accounting for about 25% of the total employees, with a majority holding a bachelor's degree. The annual R&D expense rate has exceeded 4% in recent years, with an annual R&D expenditure of over 140 million yuan. By promoting development through innovation, the company continuously improves its technical level and product competitiveness. Leveraging strong product demand exploration and development capabilities, Loctek continuously launches new products that meet market and consumer demands, empowering the brand with better products.

Configuration 3 shows that high international core competitiveness can be supported by the presence of core international trademark accumulation and international trademark authorization, the absence of core international patent Application, the presence of peripheral international patent authorization and international trademark protection scope, and the absence of peripheral international patent protection scope. Configuration 3 indicates that for cross-border e-commerce enterprises operating non-high-tech products, gaining international market competitiveness requires building an influential corporate brand. The ability and level of comprehensive trademark utilization determine the core competitiveness of an enterprise, and the number of international trademarks has become a standard for measuring a country's core competitiveness. Cross-border e-commerce enterprises can increase product technical content, improve export product quality, strengthen brand awareness, reputation, and cultural expression, build consumer loyalty, and expand international market share. By continuously optimizing and innovating brand building and management methods based on market and consumer demands, and internalizing this dynamic capability as the enterprise's core competitiveness. A typical example is Winner Medical Co., Ltd. Winner Medical has demonstrated outstanding innovation and competitive advantages in both medical and consumer fields. Through meticulously built internationally renowned brands "Winner" and "Purcotton," it has achieved deep integration and synergy between the medical and consumer sectors. The company adheres to the core business philosophy of "quality over profit, brand over speed," establishing a strict and comprehensive medical-grade quality management system early on, certified by the ISO13485 medical device quality management system, indicating that the company's quality management has reached an international advanced level. Based on strict product quality control and deep brand value exploration, Winner Medical's products have gained widespread recognition and praise worldwide. Its products have obtained CE certification from the European Union, FDA certification from the United States, and certification from the Japanese Ministry of Health,

among other international authoritative certifications, recognized by the United Nations Industrial Development Organization as an "International Trustworthy Brand," and exported to more than 100 countries and regions, including Europe, America, and Japan. Winner Medical's international development achievements are remarkable, and its brand influence and market competitiveness continue to rise. With its forward-looking strategic layout and excellent brand influence, Winner Medical has gained strong international market competitiveness, playing an important and positive role in promoting the internationalization of Chinese national brands.

4.3.3 Configuration analysis of low international core competitiveness

Configuration 4 shows that regardless of the presence of international patent Application, low international core competitiveness is supported by the absence of core international trademark accumulation and international trademark authorization, the presence of core international trademark protection scope, the presence of peripheral international patent authorization, and the absence of peripheral international patent protection scope. Data show that 18.7% of cases supporting low international core competitiveness can only be explained by Configuration 4. Configuration 5 shows that the presence of core international patent Application and international trademark authorization, but the absence of core international trademark accumulation and international trademark protection scope, the presence of peripheral international patent authorization, and the absence of peripheral international patent protection scope, support low international core competitiveness. Data show that 11.1% of cases supporting low international core competitiveness can only be explained by Configuration 5.

In the current global economic landscape, many enterprises choose to engage in cross-border e-commerce to seek broader market space and development opportunities. However, some of these enterprises primarily operate products with relatively low technological content, such as apparel, pet supplies, and household items. These types of enterprises may have accumulated rich experience and resources in the domestic market, but once they enter the highly competitive international market, they face many new challenges.

International trademarks are not only a reflection of a company's brand value but also a crucial breakthrough for expanding into international markets. However, due to a lack of intellectual property strategic thinking in international layouts, enterprises often neglect the importance of international trademark registration and authorization, limiting themselves to obtaining trademark registration and usage rights in individual countries like the United States and Europe. This approach may seem cost-effective in the short term but is detrimental to the company's long-term development. As international market competition intensifies, malicious

competition and intellectual property infringement disputes become increasingly common. Cross-border e-commerce enterprises lacking comprehensive international trademark registration and authorization may find themselves at a disadvantage in infringement disputes. Relying solely on a small number of low-quality international trademarks and patents, these enterprises have relatively weak capabilities to resist intellectual property infringement risks and often fail to win in infringement lawsuits, ultimately damaging the company's reputation and potentially leading to significant compensation and fines. In severe cases, this may result in the company directly exiting the regional international market. Therefore, for cross-border e-commerce enterprises, building a strong and comprehensive intellectual property protection system is imperative.

4.4 Robustness test

In QCA-based configuration analysis, robustness testing is an essential step to determine the stability of the research results. The results of robustness test are shown in Table 4.5,

Table 4.5 Robustness test

Condition Configuration	**High International Core Competitiveness (OR)**			**Low International Core Competitiveness (~OR)**	
	Configuration 1	Configuration 2	Configuration 3	Configuration 4	Configuration5
IPA	•	•	⊗		●
IPL	•	•	•	•	•
NOIP		●	⊗	⊗	⊗
ITA	●	•	●	⊗	⊗
ITL	●		●	⊗	●
NOIT	⊗	•	•	●	⊗
Consistency	0.896	0.892	0.798	0.849	0.804
Original Coverage	0.174	0.118	0.120	0.187	0.111
Unique Coverage	0.096	0.115	0.045	0.139	0.063
Overall Coverage		0.334		0.250	
Overall Consistency		0.862		0.823	

Note: ● = presence of core condition; ⊗ = absence of core condition; • = presence of peripheral condition; ⊗= absence of peripheral condition; blank space indicates that the presence or absence of the condition does not affect the result.

Common methods for robustness testing in QCA include adjusting the thresholds for analysis, such as changing the case frequency threshold, consistency threshold, and PRI

threshold, as well as modifying the calibration thresholds of the data. When using these two methods for testing, if parameter adjustments do not lead to substantive changes in the number, composition, consistency, and coverage of configurations, the analysis results can be considered reliable, indicating high robustness.

In this research, the robustness test method involved adjusting the consistency threshold from 0.75 to 0.79. The results, as shown in Table 4.5, indicate that the configurations remained unchanged, suggesting that despite the change in the consistency threshold, there were no significant changes in the research results, demonstrating high robustness.

In this chapter, NCA necessity analysis and bottleneck analysis were conducted on the calibrated data, followed by necessity analysis using the QCA method. It was found that the international core competitiveness of cross-border e-commerce enterprises results from the combined effects of multiple antecedent conditions, with no single necessary condition. Subsequently, the truth table was constructed, refined, and standardized using fsQCA 4.0 software, and all possible paths were identified and interpreted through case studies. Finally, robustness testing was performed on the QCA method, and the results showed no significant changes after adjusting the consistency threshold, indicating high robustness of the research results.

[This page is deliberately left blank.]

Chapter 5: Case Study

5.1 Shenzhen Hello Tech energy co., ltd

5.1.1 Case background

Shenzhen Hello Tech Energy Co., Ltd. (hereinafter referred to as "Hello Tech"), since its establishment in 2011, has gradually built a leading position in the portable energy storage and green energy sectors. Hello Tech has developed two major brands, "Jackery" and "Geneverse" (corresponding to "Dian Xiao Er" and "Dian Zhang Gui" in the Chinese market), which focus on outdoor portable power stations and comprehensive home green energy markets, respectively. The company's core product lines include outdoor portable power stations, portable solar panels, and home energy storage systems. These products have successfully reached over 40 countries and regions worldwide, with cumulative sales exceeding 4 million units.

Hello Tech's development can be divided into three main stages:

(1) 2011-2014: Initial Development and Technology Accumulation Stage

Established in 2011, Hello Tech initially focused on ODM business for power banks. As the company grew, it deepened its expertise in lithium battery power management, industrial design, and structural design. During this period, Hello Tech accumulated a rich network of suppliers, including Panasonic, LG Chem, BAK Battery, and Avnet, as well as renowned clients such as Tesla, BMW, Duracell, DSG, and Clas Ohlson. The company's production and sales systems became increasingly sophisticated, strengthening its overall capabilities.

(2) 2015-2018: Brand Building and Industry Chain Extension Stage

Starting in 2015, Hello Tech began to develop its own brand, " Dian Xiao Er", gradually transitioning from an ODM business model to a dual model combining ODM with its own brands. The company embarked on its globalization journey and, in 2016, fully launched the international brand "Jackery", achieving a comprehensive layout both online and offline, domestically and internationally. In November 2016, Hello Tech successfully introduced its first lithium battery portable power station. The downstream market for portable power stations primarily targets outdoor travel, emergency preparedness, and other scenarios that require higher technical capabilities and offer greater product value compared to power banks.

(3) 2019-Present: Rapid Growth Stage of Portable Energy Storage Business

In this phase, Hello Tech continuously optimized its portable energy storage product series, enhanced brand recognition, and further improved both online and offline sales channels. The portable energy storage business experienced explosive growth, with significant increases in sales performance and market share, solidifying its leading position in the global portable energy storage market.

5.1.2 Challenges

Challenge 1: The Lack of Distinct Technological Barriers in Existing Business - How to Establish Core Advantages in Overseas Markets?

Although Hello Tech possesses certain technological advantages domestically, the challenge lies in how to reconstruct these technological barriers in the international market. While the company has a foundation in intellectual property, it has struggled to leverage this sufficiently in foreign markets. Large-scale patent and trademark deployments require significant time and financial investment.

From 2010 to 2014, China’s power bank industry experienced rapid growth. During this period, the burgeoning smartphone industry witnessed rapid technological advancements, yet battery energy density failed to keep pace, leading to power shortages. This situation presented growth opportunities for companies like Hello Tech.

In 2013, Hello Tech's "Dian Xiao Er" (known as "Jackery" internationally), along with "Pisen" and "Pineng," became the top three most recognized power bank brands in China, with " Dian Xiao Er " achieving a peak recognition rate of 19.3%. The top ten brands collectively captured 73.4% of consumer attention, indicating a relatively low concentration in the power bank market. Despite the variety of brands, product homogeneity was prevalent, and there were few technological innovations, **leading to growth bottlenecks**.

As a result, even though Hello Tech's products became a leading brand in the Chinese mobile power market, they failed to establish a robust "moat." This issue primarily stems from the inherent characteristics of power banks:

(1) Low Technological Threshold: The core technologies, including battery management systems, charge/discharge control, and battery materials, are relatively mature and widely applied, leaving limited room for innovation. Thus, the entry barrier is low, making it easy for other manufacturers to replicate and imitate.

(2) High Standardization: The power bank industry is highly standardized in terms of product design and manufacturing, with most products having similar functions, appearances,

and specifications, leading to minimal differentiation and weak technological barriers.

(3) Intense Market Competition: The low entry barrier has led to fierce competition, with numerous manufacturers vying for market share through price wars, distribution channels, and brand promotion rather than technological innovation, further diminishing the role of technological barriers.

(4) Mature Supply Chain: The supply chain for power banks is well-established, with numerous suppliers for key components like batteries, chips, and casings, making it easier for new entrants to acquire the necessary resources, thus lowering the technological barriers.

(5) Short Product Lifecycle: As a consumer electronics product, power banks have a fast-paced innovation cycle and short lifecycles. Companies often focus more on rapid product iteration and market demand shifts rather than deepening technological innovation.

These factors collectively contribute to the relatively low technological barriers in the power bank industry, where manufacturers rely more on economies of scale and marketing rather than technological breakthroughs to maintain a competitive edge. **Consequently, these characteristics, while facilitating Hello Tech's rapid growth through its ODM business, have also constrained its further expansion and business development.**

Similarly, while the power bank market was rapidly expanding both domestically and internationally, Hello Tech pursued a "go global" strategy similar to other Chinese manufacturers by entering overseas markets. Despite completing its initial development and technological accumulation between 2010 and 2014, and achieving a certain level of technological advantage and patent reserves, the inherent nature of the power bank industry made these technological accumulations insufficient to establish a solid "technological barrier." Although the company applied for numerous patents domestically, it failed to establish effective patent layouts in overseas markets. Technologically, Hello Tech struggled to create a comprehensive "patent thicket" to fend off competitors. Additionally, large-scale patent deployment imposes significant financial and time pressures on the company. Furthermore, although many technologies were patented in China, the lack of timely patent deployment in overseas markets poses potential infringement risks, especially in the power bank industry, where technology is highly standardized.

Given these limitations, when Hello Tech decided to implement its "go global" strategy, it faced the challenge of overcoming the limitations of its existing products and quickly establishing technological and patent advantages to secure and maintain a first-mover advantage in overseas markets.

Challenge 2: Lack of Mature Brand Management Experience and Brand

Accumulation due to ODM-Focused Business Model

Hello Tech initially focused on ODM (Original Design Manufacturing), where the company provided design and production services for other brands rather than directly promoting and marketing its own brand to consumers. As a result, the company's experience and capabilities in brand management were relatively weak, lacking systematic brand building and market promotion efforts.

Around 2014, when Hello Tech decided to pursue its "go global" strategy, the power bank market had shifted from a "blue ocean" to a "red ocean," with intense competition internationally, including established and well-known brands in certain countries and regions. Moreover, in some markets, trademark protection follows a "first-to-file" system, meaning that Chinese brands could be preemptively registered by others before entering the market, leading to potential trademark infringement lawsuits and preventing the company from using its own brand.

Hello Tech faced two strategic choices: continue with the ODM model or establish its own brand. Each option had its pros and cons. **The ODM model allowed Hello Tech to leverage its existing production and technological strengths, reducing market entry risks**. As the ODM model relies heavily on the brand strength of major clients, Hello Tech could avoid the high marketing costs and risks associated with direct consumer market engagement. Furthermore, the ODM model enabled the company to quickly expand its business by leveraging the channels and market resources of internationally recognized brands. However, while the ODM model provided stable orders and revenue, it limited the company's ability to achieve brand premium, making it difficult to move up the value chain and capture higher profits. Additionally, dependence on large client orders meant that Hello Tech's bargaining power and brand influence in the market were constrained, which could hinder sustainable development and market leadership in the long term.

On the other hand, establishing its own brand could help Hello Tech build an independent brand image and customer loyalty in international markets, thereby increasing product value and market competitiveness. An own-brand strategy could give the company greater market control and pricing power, enabling it to achieve stronger bargaining power and long-term growth potential in international markets. However, building a brand requires significant resource investment in brand development, market promotion, and channel expansion. In international markets, where strong brands already exist, Hello Tech faced challenges such as low brand recognition and high market entry barriers. Moreover, brand building is a long-term process with considerable uncertainty, requiring substantial initial

marketing costs and carrying high risks.

For Hello Tech, the shift from ODM in the domestic market revealed growth bottlenecks, prompting the company to adopt a "go global" strategy and establish its own overseas brand. However, as an enterprise transitioning from an ODM business model, Hello Tech faced challenges in resource allocation during the early stages of brand building, making it difficult to quickly establish a strong brand image. Under the ODM model, the company's focus was primarily on production efficiency and product quality, with brand building often being overlooked or secondary. This situation led to a lag in brand awareness and a lack of systematic brand strategy and market promotion plans when entering international markets. Additionally, brand building requires continuous resource investment, including market research, brand promotion, channel development, and customer service.

As the visual symbol of a brand, trademarks are the primary means for consumers to identify and remember a brand. By registering trademarks, a company can obtain exclusive legal rights to use them, preventing others from using identical or similar marks without permission, thereby protecting the brand's market share and reputation. A stable and well-known trademark can enhance consumer trust and loyalty to the brand. In a globalized context, companies operating in different countries and regions need to ensure the consistency of their brand image. The construction of a trademark system involves not only the registration and protection of trademarks in different markets but also the unified use and management of trademarks on a global scale. This consistency is crucial for brand recognition and expansion in international markets, helping companies establish a unified brand image worldwide. **Therefore, quickly and effectively constructing an overseas trademark system and establishing a unified global brand image is a significant challenge for Hello Tech in implementing its "go global" strategy.**

5.1.3 Path to resolution

1. From Power Banks to Portable Energy Storage: Precise Patent Strategy to Capture Niche Markets

To address the low technological barriers in the power bank market, Hello Tech decided to shift its business focus from power banks to portable energy storage while implementing its "go global" strategy. The aim was to capture niche markets and establish a "small but strong" technological barrier. Sun Zhongwei, the head of Hello Tech, mentioned that his experience at a trade show in the United States clarified the product direction for the "go global" strategy. Observing the passion of European and American users for outdoor activities and their

dependence on portable power solutions, Sun began considering the development of a large-capacity, high-power product to meet future outdoor electricity needs. This idea became the catalyst for Hello Tech's transition to the portable energy storage field.

Although portable energy storage products are more technically challenging compared to consumer electronic energy storage products like power banks, Hello Tech did not start from scratch in this field. Having been deeply involved in the lithium battery industry for many years, Hello Tech combined its mature technologies to provide innovative off-grid power solutions. However, when Sun proposed the transition to portable energy storage in 2014, over 90% of the company's team opposed the idea, delaying the advancement of this business. "The team had developed a path dependency in the consumer electronics energy storage field and preferred tasks with quick results," Sun noted, choosing a less-traveled path.

In 2016, the global shipment of portable energy storage devices was only 52,000 units. Portable energy storage products, which include high-energy-density lithium-ion batteries, provide stable AC/DC power output. Compared to ordinary power banks, which typically offer less than 50Wh and 20W, portable energy storage devices can provide 80-3600Wh and over 500W.

This strategic decision offered several advantages:

First, portable energy storage products have higher technological barriers compared to consumer electronic energy storage products (such as power banks), with the potential to create a "technological moat" that avoids the high homogeneity seen in power bank products.

Second, the key technologies of portable energy storage products determine their quality. Unlike industries like smartphones or automobiles, this field does not rely heavily on a large number of suppliers or long-term technical accumulation. Given that portable energy storage products were still in the early stages of development, Hello Tech could leverage its accumulated expertise in energy storage technology to quickly gain intellectual property advantages by establishing a "small but strong" patent layout.

In 2016, Hello Tech launched its first lithium battery portable energy storage product. The company gradually transitioned to an M2C model for portable energy storage products based on its own brand, applicable in scenarios like outdoor travel and emergency preparedness. The overseas brand Jackery initially introduced the Explorer series of portable power stations, designed primarily for outdoor travel and household emergency scenarios, featuring high cost-effectiveness and low charging noise. Subsequently, Jackery also launched the SolarSaga series of solar panels, which can be combined with portable power stations to form small solar power generation systems.

2018 marked a turning point for Hello Tech, with the refinement and implementation of R&D, production, manufacturing, and quality management processes for portable energy storage. The large capacity of portable energy storage devices allows them to be used in various scenarios, including outdoor travel, household emergency, and professional operations. The high output power of these devices enables them to support multiple interfaces and power high-demand appliances such as refrigerators and hair dryers. Compared to traditional small gasoline generators, portable energy storage products offer advantages such as safety, portability, environmental friendliness, noise-free operation, and ease of use, making them a viable replacement for small gasoline generators. Additionally, portable energy storage can be paired with solar panels to create small outdoor photovoltaic power systems, meeting more household and recreational needs and emergency preparedness scenarios.

Since 2020, the company has launched a series of home emergency backup energy storage products. In August 2022, Hello Tech officially released the Geneverse HomePower PRO series in San Francisco, USA. This series combines photovoltaic and energy storage technology, achieving dual fast charging with solar and AC power in just two hours. It supports 99% of household appliances and devices, with a maximum continuous usage time of up to seven days, allowing households to safely and conveniently enjoy sustainable energy during power shortages or outages. The HomePower PRO series features an integrated Maximum Power Point Tracking (MPPT) controller, achieving breakthrough dual fast charging, with AC charging completed in 1-2 hours and solar charging in 3-4 hours, making it nearly six times faster than similar products on the market.

With coverage of mainstream capacity segments, the product lineup is comprehensive. According to Hello Tech's prospectus, its current portable energy storage products cover capacities ranging from 160 to 2160Wh, including mainstream capacity segments, with a well-rounded product lineup. For example, the portable energy storage product with a 2160Wh battery capacity can charge eight devices simultaneously, support a high-pressure washer for 90 minutes, or run a lawnmower for 2.5 hours. Hello Tech places great emphasis on R&D innovation, with all its core technologies developed in-house. These core technologies include portable energy storage power structure technology, battery module safety technology, power management system technology, lithium battery pack energy balancing system technology, modular energy storage power technology, and parallel high-power output technology.

Between 2019 and 2021, Hello Tech's portable energy storage product sales increased from 172,600 units to 663,600 units. As the share of high-capacity products increased, the unit price of the company's products rose from 1,447 RMB to 2,765 RMB, showing a positive trend of

simultaneous growth in both volume and price. From 2018 to 2021, the compound annual growth rate (CAGR) of Hello Tech's related products reached 273.49%, with revenue share rising from 33.21% to 83.52%. The share of overseas sales revenue rose to 92.55% in 2021, demonstrating Hello Tech's strong strength and leading position in the portable energy storage field. Due to the low barriers and profitability in the power bank market, Hello Tech stopped setting up dedicated power bank production lines in 2019, reallocating resources to portable energy storage products and solar panels. By 2021, the company had ceased power bank production and shipments altogether, focusing all resources on portable energy storage products and solar panels.

Reflecting on Hello Tech's second phase of transition to portable energy storage, the growth bottlenecks in its original consumer electronics energy storage business became increasingly apparent. Sun Zhongwei remarked, "A business cannot wait until it's on the edge of a cliff before pulling back; a strong sense of crisis is essential for sustained development."

In 2023, Hello Tech's R&D expenses reached 152 million RMB, an increase of 28.90%, securing a total of 512 patents domestically and internationally, with 50 of them being invention patents. The company also has 435 patents under review. In addition, Hello Tech has won 76 international industrial design awards, including the Red Dot Best of the Best, Red Dot Product Award, German IF Design Award, CES Innovation Award, IDEA Design Award, and China Excellent Industrial Design Award, among others. The company leads the industry, focusing entirely on the portable energy storage field, with strong profitability. Hello Tech's solar energy storage products are globally innovative and leading in the industry. Under the "technological moat" of iterative innovation, Hello Tech has also been advancing its global market layout with a global vision.

Looking back on Hello Tech's "go global" process, the company adopted a "small but strong" strategy consistent with its product approach in patent technology deployment, fully focusing its resources on the niche market of portable energy storage. Through rapid and precise patent deployment, Hello Tech successfully built a technological barrier and patent moat, forming a core competitive advantage in this field. Hello Tech continues to increase its R&D investment, consolidating its technological leadership and patent advantages, ultimately achieving a transformation from a power bank OEM to a "unicorn" in the portable energy storage field.

2.From Domestic ODM to Overseas Independent Brands: Establishing Unique Differentiation Based on First-Mover Advantage

Hello Tech, focusing on the global portable energy storage market, strategically developed

two independent brands, "Jackery" and "电小二," to address cultural differences between domestic and international markets. This brand strategy allows the company to tailor brand promotion, product differentiation, model iteration, and after-sales services according to different cultural backgrounds and consumer markets, ensuring the competitiveness of its products in rapidly changing markets.

One of the key strategies for Hello Tech's successful establishment of an overseas independent brand was the early deployment of trademarks in international markets. Since 2014, Hello Tech gradually transitioned from an ODM-based business model to a dual model that combines ODM and independent branding, while also initiating its globalization process. In 2016, the company fully launched the international brand "Jackery." However, even before the release of its first lithium battery portable energy storage product in overseas markets in 2016, Hello Tech had already begun its trademark deployment abroad. Trademarks, being the core identifiers of a brand, play a crucial role in helping Hello Tech establish and strengthen its brand image in the global market. In 2014, Hello Tech registered "Jackery" as a trademark in the European Union, the United Kingdom, and Japan. In 2016, it registered trademarks in Australia and the United States, and in 2019, it successfully registered under the WIPO Madrid System. Since 2021, the company has further intensified its trademark deployment efforts abroad, with 11, 31, and 34 international trademark registrations for "Jackery" in 2021, 2022, and 2023, respectively. This increase was partly due to the prior registration of "Jackery" in Saudi Arabia, which hindered Hello Tech's market entry in that region, thereby highlighting the importance of trademark deployment and increasing the company's focus on this aspect. The trend of "Jackery" trademarks registrations overseas can been seen in Table 5.1.

Table 5.1 Trend of "Jackery" trademarks registrations overseas

Year	Registrations
2014	3
2016	3
2017	7
2018	5
2019	5
2020	3
2021	11
2022	31
2023	34
2024	12

The global trademark deployment ensures that "Jackery" and other brands maintain their uniqueness and recognizability in all target markets, facilitating rapid market expansion across diverse cultural backgrounds and consumer markets. This strategy has successfully allowed Hello Tech to leverage its first-mover advantage in the portable energy storage sector.

Relying on the "Jackery" brand, Hello Tech has expanded its business across multiple countries, gradually becoming a leading brand in the portable energy storage vertical. During its market expansion, Hello Tech has effectively utilized three main channels: online e-commerce platforms, its brand website, and offline retail partners, thereby building a solid market moat.

In terms of online channels, the company has successfully established a presence on major platforms like Amazon and enhanced its direct sales capabilities by creating its own brand website, which has also strengthened brand influence. Amazon, the company's primary e-commerce platform, accounts for approximately 75% of its online sales. "Jackery" products consistently rank high in keyword searches for portable energy storage products on platforms like Google, Amazon, Rakuten Japan, and Yahoo Japan, and they continue to receive Amazon's best-seller certifications. The proportion of sales from direct channels through the brand website rapidly increased from 0% in 2019 to 15% in 2021. The development of the brand website not only accelerated sales growth but also significantly improved profitability by reducing platform service fees.

Regarding offline channels, Hello Tech has established partnerships with globally recognized brands and retailers such as HVC, Canon, Harbor Freight Tools, Home Depot, Lowe's, and Sam's Club, achieving diversification in sales channels. By fully leveraging the "domestic + international" and "online + offline" channel advantages, Hello Tech effectively enhanced its operational management capabilities and drove rapid growth in product sales.

Between 2019 and 2021, Hello Tech's market promotion expenses increased from 25.86 million RMB to 267 million RMB, with a compound annual growth rate (CAGR) of 221.09%. In 2020, the global shipment market share of Hello Tech's portable energy storage products reached 16.6%, and the revenue market share reached 21.0%. The average unit price of its products was higher than the industry average, reflecting a certain degree of brand premium capability.

Compared to its peers, Hello Tech's marketing strategies are more proactive, and its sales channel layout is more comprehensive, which is crucial for maintaining its leadership position in the industry. Sales data from 2021 indicate that the share of overseas market sales increased to 92%, with overseas online sales revenue rising from 34% to 82% of total revenue, while the share of overseas offline sales revenue decreased from 58% to 11%. These figures demonstrate significant sales growth in both domestic and international markets, as well as across online and offline channels.

In summary, Hello Tech's trademark deployment is highly consistent with its brand strategy,

focusing on its core brand, "Jackery," to form a systematic and forward-looking trademark strategy. Firstly, Hello Tech began its trademark deployment two years prior to the official launch of its overseas "Jackery" portable energy storage products. This early deployment laid a solid intellectual property foundation for its "go global" strategy, ensuring that potential legal risks were effectively mitigated when the brand entered international markets and providing strong legal support for subsequent marketing activities. Secondly, Hello Tech adhered to a "small but strong" deployment strategy, consistently focusing resources on brand building and trademark deployment around the core brand "Jackery." This strategy not only reduced the cost of trademark deployment but also accelerated the pace of global trademark registration. Through this precise and concentrated deployment strategy, Hello Tech successfully established brand recognition in the portable energy storage market, effectively building a highly recognized independent brand.

The success of this trademark deployment strategy not only reflects Hello Tech’s strategic foresight and execution in brand building but also establishes a strong brand moat in the fiercely competitive global market, further consolidating its market leadership in the portable energy storage sector.

5.1.4 Case insights

From a low-barrier, low-profitability ODM manufacturer of power banks to a globally recognized leader in portable energy storage products, Hello Tech not only successfully achieved its "go global" strategy but also completed a significant corporate transformation. Throughout this process, the effective coordination of intellectual property management played a crucial role, becoming a key support for Hello Tech's successful transformation. The analysis of Hello Tech's case provides the following insights for domestic cross-border e-commerce companies:

1.Targeting Advantageous Niches with Precise Patent Deployment

Hello Tech's success demonstrates that selecting and focusing on market niches with high technological barriers and significant growth potential is key to standing out in the highly competitive international market. By precisely deploying patents in the portable energy storage sector, Hello Tech not only established a technological moat but also effectively enhanced its product market competitiveness. This strategy suggests that domestic cross-border e-commerce companies should conduct in-depth analysis of target markets and technological fields, focusing on niches with long-term development potential to deploy patents and secure an advantageous position in the global market.

2.Early Brand Intellectual Property Layout to Build a Strong Foundation

Before officially launching the "Jackery" brand overseas, Hello Tech conducted early trademark deployment, laying a solid intellectual property foundation for its brand's entry into international markets. This indicates that when expanding into overseas markets, companies must plan and execute brand intellectual property layouts in advance. Domestic cross-border e-commerce companies should recognize that early trademark and other intellectual property layouts not only protect the brand from infringement but also provide legal protection for subsequent brand promotion and market expansion, enhancing global brand recognition and influence.

3.Coordination of Intellectual Property and Product Strategies

The Hello Tech case also underscores the importance of coordinating intellectual property strategies with product strategies. By concentrating resources on building the core brand "Jackery" and closely integrating intellectual property deployment with product innovation, Hello Tech successfully established strong brand and technological advantages in the global market. For domestic cross-border e-commerce companies, intellectual property deployment should not be viewed merely as a defensive strategy but should be tightly integrated with product development and market promotion to form a comprehensive competitive advantage. This coordinated strategy can help companies respond quickly in international markets, adapt to market changes, and solidify their brand's position in target markets.

These insights indicate that for domestic cross-border e-commerce companies to succeed in international markets, they must focus on intellectual property deployment, ensuring it aligns with the overall corporate strategy and market goals. Through this comprehensive coordination, companies can better meet the challenges of the global market and achieve long-term sustainable growth.

5.2 Shenzhen TOMTOP technology limited

5.2.1 Case background

Shenzhen TOMTOP Technology Limited, established in 2004 and headquartered in Shenzhen, is a leading enterprise in China's cross-border e-commerce export retail sector. With twenty years of deep industry engagement, TOMTOP has earned numerous accolades, including National High-Tech Enterprise, National E-Commerce Demonstration Enterprise, National Digital Commerce Enterprise, Leading Cross-Border E-Commerce Enterprise in Guangdong

Province, Leading Digital Trade Enterprise in Guangdong Province, Large Key Enterprise in Guangdong Province, Shenzhen Direct Transport Enterprise, Key Service Trade Enterprise in Shenzhen, and Top 100 Export Enterprises in Longgang District.

TOMTOP drives the globalization of domestic brands through a combination of self-owned brands, self-built platforms, self-developed ERP systems, and self-operated overseas warehouses. Leveraging TOMTOP's vertical site and global e-commerce platforms such as Amazon, Walmart, AliExpress, and Mercado Libre, TOMTOP provides quality products to consumers in over 200 countries and regions worldwide, across more than ten categories, including instruments and tools, outdoor sports, home and garden, office supplies, and musical instruments, totaling nearly 100,000 products. In 2024, TOMTOP successfully completed a merger and restructuring with the A-share listed company Huakai Yibai (Stock Code: 300592). Moving forward, TOMTOP will continue to focus on cross-border e-commerce, driven by brand and digitalization, with the aim of becoming a global leader in the industry.

Moreover, through years of operation, TOMTOP has accumulated a portfolio of valuable stores on platforms like Amazon, eBay, and independent sites, which are considered high-quality assets. TOMTOP has also developed a series of brands, such as GOOLSKY (drones and accessories), ANSELF (beauty tools), TOOARTS (various categories), TOMTOP (various categories), KOOGEEK (plugs and power strips), and DODOCOOL (Bluetooth peripherals and multi-port USB hubs).

5.2.2 Challenges: high-frequency litigation risks under a large-scale product deployment strategy

Since its inception in 2004, the e-commerce industry has experienced rapid global growth, due to its relatively low entry barriers. Many Chinese companies, including TOMTOP, have leveraged their domestic manufacturing supply chain advantages and cost efficiencies to adopt large-scale product deployment strategies to enhance their competitiveness in international markets. TOMTOP is a typical example of this strategy. In 2016, TOMTOP's revenue reached 2.201 billion RMB, with a net profit of 131 million RMB and a gross profit margin of around 50%. In 2017, as capital flowed into the cross-border e-commerce industry, many companies achieved rapid growth through backdoor listings, with TOMTOP being acquired by Huading Shares for 2.9 billion RMB, a transaction that garnered significant attention in the industry.

However, despite having supply chain and cost advantages, Chinese cross-border e-commerce companies have not had smooth sailing in overseas markets. For example, in 2021, Amazon launched a large-scale crackdown on certain merchants, and TOMTOP was one of the

companies affected, with more than 50 of its store accounts on Amazon being banned, involving funds exceeding 40 million RMB.

A more serious incident occurred in 2022. On March 29, 2022, ST Huading (601113, SH) announced that its wholly-owned subsidiary, Shenzhen TOMTOP Technology Limited (hereinafter referred to as TOMTOP), had its PayPal accounts linked to its independent sites frozen due to violations of PayPal's Acceptable Use Policy, which resulted in fines. The primary reason for the fines was the sale of products on independent sites that allegedly infringed the trademark rights of the plaintiffs. The total amount frozen exceeded 600 million RMB, with TOMTOP being the most heavily affected, having 49 PayPal accounts frozen, amounting to a total of 69.0252 million RMB. The large-scale PayPal account freeze was related to two civil lawsuits, in which the plaintiffs demanded that TOMTOP's PayPal accounts be frozen, with one of the lawsuits seeking $2 million in compensation.

This issue is not unique to TOMTOP. In the Chinese cross-border e-commerce industry, especially among companies operating under the "large-scale product deployment" or "multi-category" business models, such problems are common.

In the field of cross-border e-commerce, American intellectual property law firms such as GBC (Greer Burns & Crain), Keith Vogt, Ltd, HSP (Hughes Socol Piers Resnick & Dym, Ltd.), and David Gulbransen are known as "fishing law firms." Among them, GBC is the most well-known, having represented brands like lululemon, Levi's, Burberry, and MAC in litigation. These law firms have developed efficient litigation processes to claim damages for their clients, forming a highly efficient litigation mechanism. According to reports, GBC filed 243 lawsuits in 2020, leading to the closure of 22,000 Chinese seller accounts and 5,900 websites, and generating nearly $1 billion in revenue from these infringement lawsuits.

Is "Made in China" a label of high-quality products or a synonym for counterfeit goods? The answer to this seemingly subjective question depends on the intellectual property laws of different countries.

China's highly developed manufacturing industry and complete supply chain, combined with differences in intellectual property perceptions across countries, often put Chinese sellers at risk of "crossing the line" in international markets. This situation is often the result of unintentional violations. However, under the strict intellectual property legal frameworks of many countries, many Chinese cross-border e-commerce sellers may be perceived as "unscrupulous merchants" engaged in deliberate infringement. Once involved in intellectual property infringement lawsuits, these sellers may face a series of severe consequences, including frozen payment accounts, seized funds, closed stores, and high compensation costs.

According to a report by Ebang Power, GBC filed 243 lawsuits in 2020, leading to the closure of 22,000 Chinese seller accounts and 5,900 websites. That year, GBC generated nearly $1 billion in revenue from infringement lawsuits. By comparison, the leading cross-border e-commerce company Anker Innovations had a revenue of 12.574 billion RMB in 2021, equivalent to about $2 billion. In January 2022, GBC was once again named the most active trademark litigation firm by the World Trademark Review.

Against the backdrop of widespread infringement, specialized law firms have increased their efficiency by accumulating a large number of cases, leading to higher claim amounts and gradually developing a standardized "assembly line" operation model. Specifically, from evidence collection to filing lawsuits to responding to lawsuits, these firms can obtain potentially high returns at relatively low costs. During the evidence collection phase, law firms collect PayPal account details, chat records, and other evidence from suspected infringing e-commerce sellers, depending on the type of infringement. For example, for sellers without brand authorization, the law firm may place an order and use the purchase as evidence; for sellers accused of infringing design patents, product images may suffice as evidence; the firm may even pose as a regular buyer, inquiring whether the seller can produce counterfeit goods, and use the payment of a deposit to obtain the seller's PayPal account as evidence. After collecting this evidence, the firm swiftly launches mass lawsuits, with each infringement case typically involving hundreds of sellers. This efficient litigation strategy highlights the severe challenges faced by cross-border e-commerce sellers in protecting intellectual property in a globalized market.

As plaintiffs, law firms usually first apply for a Temporary Restraining Order (TRO) to freeze the defendant's PayPal accounts and e-commerce stores. Then, the law firms file a motion for a Preliminary Injunction. After the court issues a TRO, it usually sends out a subpoena quickly. According to the relevant legal provisions, the defendant must respond within 21 days, or face a default judgment.

Because it is difficult to find the real address of cross-border e-commerce companies, plaintiff lawyers usually send legal documents via email, which is relatively simple but not formal enough. Some sellers may not discover that their PayPal accounts have been frozen until several months later, only then finding legal documents in their email inbox, by which time the case may have already entered the default judgment phase.

In fact, according to the Hague Service Convention (Hague Convention on the Service Abroad of Judicial and Extrajudicial Documents), the defendant can request that the plaintiff use a physical address and serve legal documents in written form, which can give sellers more

time to respond.

However, some law firms are unwilling to provide such a buffer, viewing Illinois as the primary location for suing infringing sellers. According to the cross-border legal service provider "Maijia Support," in Illinois court rulings on cross-border seller infringement cases, judges usually reject requests to use the Hague Service Convention. In the short 21-day response period, sellers are often at a disadvantage upon receiving a TRO infringement lawsuit. At this point, sellers face three choices: abandon their stores, respond to the lawsuit, or settle. In the worst-case scenario, sellers may face the following consequences: PayPal accounts remain frozen, e-commerce platform stores cannot resume operations; plaintiffs demand high compensation, but the seller's PayPal account balance is insufficient to cover the compensation, so the court may take enforcement actions, deducting funds from other related PayPal accounts to cover the compensation. From the account freeze to unfreezing, PayPal officials usually take a neutral stance and will not assist sellers. In infringement lawsuits, PayPal, as a commercial entity, must enforce court orders, and if it receives a TRO, it must execute the freeze order, or it will be held in contempt of court. Amazon, eBay, and other e-commerce platforms face the same situation when dealing with TRO infringement lawsuits. Even Chinese cross-border e-commerce platforms like AliExpress cannot provide direct legal support to sellers and can at most recommend lawyers for sellers to choose from.

Experts point out that legal fees in the United States are high, so choosing a response strategy requires careful consideration. In this situation, the core value of legal service providers lies in handling most of the case developments, directly coordinating with U.S. lawyers, reducing communication costs, and unfreezing payment accounts as early as possible to minimize potential losses. Legal service providers usually conduct detailed analysis for each case, considering factors such as case progress, store frozen amounts, sales of the allegedly infringing products, and the plaintiff's law firm's strategy to determine whether to respond to the lawsuit or settle.

In the "fishing" actions carried out by the aforementioned law firms, PayPal accounts are often the key evidence sought by plaintiff lawyers. Once the defendant's PayPal account is frozen, they are immediately at a disadvantage. Under such a legal system and platform rules, cross-border sellers who lack legal awareness are in an extremely vulnerable position, akin to "lambs to the slaughter."

These cases show that although Chinese cross-border e-commerce companies, represented by TOMTOP Technology, achieved rapid growth early on by leveraging industry dividends, they still face significant intellectual property challenges in the global market, particularly from

high-frequency lawsuits initiated by "fishing law firms." Therefore, cross-border e-commerce companies must place a high priority on intellectual property protection and compliance to avoid significant economic losses and damage to their brands due to infringement.

These situations indicate that although Chinese cross-border e-commerce companies, like TOMTOP Technology, achieved rapid growth in the early stages by leveraging industry dividends and supply chain advantages, they face increasingly severe intellectual property challenges as they expand globally. The opportunities and challenges of globalization coexist, especially in intellectual property protection and legal compliance. The complexity of international markets requires companies not only to face challenges from competitors but also to address legal risks arising from intellectual property infringement. Cross-border e-commerce companies entering international markets must prioritize intellectual property protection and management. This involves the design and development stages of products and requires companies to conduct thorough intellectual property layout and due diligence before launching products. Companies that fail to take proactive measures in these areas may face a series of serious consequences, including frozen payment accounts, withheld funds, closed stores, and large compensatory payments. These consequences can cause direct financial harm to the company and potentially result in long-term negative impacts on brand reputation and market position.

5.2.3 Path to resolution

1.From "Quantity" to "Quality": Gradual Transition to Brand Building

Due to the relatively low entry barriers in the cross-border e-commerce industry, TOMTOP initially capitalized on the product distribution model to quickly gain market dividends. However, as more sellers entered the market, the industry gradually fell into the trap of homogenized competition and price wars. In this context, how to achieve brand premiums through a branding strategy to support the company's sustainable development became a crucial path for cross-border e-commerce companies. To this end, TOMTOP began exploring the path of brand development in 2014 and established a separate department in 2016 dedicated to building its own brands, conducting technology research and development, and product design. However, due to cost considerations, the company temporarily shelved this strategy in 2018.

After experiencing intensified market competition and intellectual property disputes, TOMTOP recognized the importance of branding for long-term development and restarted the branding process. The company gradually transitioned from the original extensive "product distribution" model to a strategy focused on premium products and vertical niche markets. In

2023, TOMTOP officially launched a three-year "Quality Distribution and Branding" strategic plan. Currently, some core categories are showing strong growth, reflecting the initial success of the company's branding efforts. Additionally, TOMTOP is actively exploring fully managed models on the AliExpress platform to create new growth opportunities and enhance market competitiveness through optimized operational models. During this branding transformation, TOMTOP also recognized the importance of accumulating intellectual property, particularly in its areas of expertise such as outdoor products. By systematically managing and protecting intellectual property, the company can not only consolidate its position in core markets but also provide strong support for its branding strategy, ensuring long-term competitive advantages in international markets.

2.Strengthening Intellectual Property Awareness, Management, and Review

In the vast majority of cases, TOMTOP has been the defendant in intellectual property disputes, highlighting the company's past neglect of intellectual property risk prevention. To address this issue, TOMTOP began to strengthen its intellectual property department and implemented a series of systematic measures to improve intellectual property management.

First, TOMTOP conducts daily intellectual property compliance reviews of its listed products to prevent potential infringement. This preventive review mechanism has effectively reduced the occurrence of infringement cases. Second, in terms of intellectual property management, the company has entrusted professional trademark and patent agencies with registration to ensure compliance with European and other target market laws and regulations. Additionally, TOMTOP systematically manages trademarks and patents to prevent third-party registrations and conducts infringement risk assessments on products. These measures collectively form an effective intellectual property protection system, providing legal safeguards for the company's long-term development.

In the past, TOMTOP's intellectual property management strategy primarily relied on the needs of the sales department, lacking systematization and foresight. When the company's products were sued for intellectual property infringement, if it was internally confirmed that infringement had occurred, the company would typically hire U.S. lawyers to negotiate a settlement with the plaintiff, ultimately paying high settlement fees and legal costs. Moreover, infringing products could no longer be sold, potentially resulting in additional costs such as warehouse transfers and product disposal. In summarizing typical infringement cases, TOMTOP recognized that different industries have different intellectual property protection priorities. For example, the furniture industry emphasizes design patent applications and protection; the instrumentation industry focuses on technical invention and innovation,

requiring enhanced protection for utility models or invention patents; the office supplies industry emphasizes brand building and trademark registration prevention; the electronics industry, due to its fast-paced updates, requires special attention to the protection of technological patents and innovation points; the toy industry involves unique designs and character images, requiring a focus on design patent and copyright protection.

Through the implementation of these measures, TOMTOP gradually established a systematic intellectual property management mechanism, effectively reducing the occurrence of infringement cases and laying a solid legal foundation for the company's sustainable global development.

3. Shifting from Passive to Proactive: Strengthening Cooperation with Cross-Border E-Commerce Legal Institutions

TOMTOP strengthened its cooperation with cross-border e-commerce legal institutions, establishing regular legal consultation and risk warning mechanisms. This cooperation helps the company identify and mitigate potential intellectual property risks in product development, market promotion, and daily operations. Additionally, by introducing professional legal advisors, TOMTOP enhances its ability to respond to cross-border intellectual property disputes, ensuring that it can quickly take appropriate legal measures in the face of complex international legal environments, reducing potential economic losses and brand reputation risks, and improving the company's compliance operations.

5.2.4 Case insights

1.From Wild Growth to Fine-Tuning: Seizing the Trend of Upgrading the Cross-Border E-Commerce Market

In the early stages of cross-border e-commerce, many sellers rapidly expanded their markets through product distribution models, managing a large number of SKUs, but with a significant increase in infringement risks. For example, a small pattern on a product accessory could trigger a lawsuit, leading to severe legal and financial consequences. In contrast, the refined operation model encourages sellers to reduce the number of SKUs and conduct in-depth infringement risk analyses during the selection and sales process, significantly reducing the likelihood of being sued. In fact, e-commerce platforms like Amazon are more inclined to support sellers with their own brands, providing them with policy support. Forward-thinking sellers have already begun registering trademarks and patents overseas, creating their own intellectual property, and building unique brand images through storytelling. When a brand has enough market influence, these sellers are more likely to appear as plaintiffs in intellectual

property lawsuits, thereby more effectively protecting their rights. Therefore, at this time, Chinese cross-border e-commerce companies need to strengthen their compliance advantages in a timely manner to protect and enhance their supply chain advantages, thereby adapting to the trend of market upgrades.

2. Emphasizing Intellectual Property Awareness and Enhancing Intellectual Property Management Capabilities

Cross-border e-commerce companies should place a high emphasis on intellectual property management, fully raising awareness and capabilities for intellectual property protection. Through systematic intellectual property management, companies can prevent potential infringement risks in all aspects of product development, sales, and market promotion, ensuring the legality and sustainability of their business. This includes proactively registering trademarks and patents and monitoring the market environment and competitors' intellectual property to respond promptly to potential infringement allegations.

3. Strengthening Collaborative Cooperation and Proactively Responding When Necessary

In addition to fostering awareness of avoiding infringement and promoting a branding strategy, sellers should also be prepared to take up legal arms and actively counterattack when facing litigation attacks from "fishing law firms." For example, in January 2022, three PayPal users initiated a class-action lawsuit against the platform, accusing PayPal of freezing account funds without providing reasonable explanations and planning to withdraw approximately USD 250,000 in 180 days. In these "fishing" operations, PayPal accounts are often the key evidence sought by plaintiff lawyers, and once frozen, the defendant is at a severe disadvantage. Under such a legal system and platform rules, cross-border sellers who lack legal awareness are in an extremely vulnerable position. Moreover, an increasing number of Chinese cross-border sellers are choosing more stable and friendly payment and e-commerce platforms to avoid such risks. In the future, Chinese cross-border e-commerce companies can consider initiating class-action lawsuits against these "fishing law firms" and e-commerce platforms with unfair policies to protect their legitimate rights and interests effectively, turning from defendants into plaintiffs, and shifting from passive to proactive.

4. Policy Support and Industry Collaboration: Facilitating Healthy Development of Cross-Border E-Commerce

The development of the cross-border e-commerce industry is inseparable from policy support. Government and industry associations should enhance policy support for cross-border e-commerce companies, particularly in the areas of intellectual property protection and legal

compliance, providing guidance and assistance to these enterprises. Cross-border e-commerce associations can contribute by issuing industry standards, offering legal consultation, and providing training services to help companies better navigate intellectual property challenges in international markets. Such policy and industry-level support will help companies maintain a competitive edge globally, fostering the healthy development of the industry.

[This page is deliberately left blank.]

Chapter 6: Discussion and Findings

In the research questions outlined in Chapter 1, we proposed the following two main research questions: What are the current overseas intellectual property (IP) challenges faced by Shenzhen's cross-border e-commerce companies? How can Shenzhen's cross-border e-commerce companies bulid intellectual property capability and adopt effective strategies to address overseas IP challenges? This chapter will discuss the questions in detail based on the research results and review the theoretical and practical contributions made.

6.1 Discussion of results

This research focuses on the in-depth analysis of the intellectual property (IP) challenges faced by Shenzhen's cross-border e-commerce enterprises, revealing a series of unique issues encountered by these companies during their cross-border operations. The study thoroughly explores the impact of IP management capabilities on the competitiveness of cross-border e-commerce enterprises in international markets, expanding the existing literature on corporate competitiveness. Through empirical analysis, this research confirms the significant impact of IP management capabilities on corporate competitiveness in a globalized context, providing new perspectives for theoretical research in related fields.

Firstly, the study conducted a systematic review of existing literature, focusing on IP management in the cross-border e-commerce sector, platform business ecosystems, and competitive advantage theories. By analyzing these relevant theories, the study clarified the importance of IP management to corporate competitiveness in a globalized context. Additionally, the literature review section provided a detailed analysis of the operating models of cross-border e-commerce in different market environments and the IP challenges they face, further enriching the understanding of IP protection strategies for multinational enterprises. Furthermore, the study integrated theories of corporate capabilities and business ecosystems, exploring how companies can enhance their market competitiveness by improving their IP management capabilities in international markets. Finally, through the analysis of competitive advantage theories, the study provided theoretical support for cross-border e-commerce enterprises in formulating effective IP strategies in complex international markets, laying a foundation for subsequent empirical analysis.

Secondly, this research applied the Qualitative Comparative Analysis (QCA) method to the research on IP protection of cross-border e-commerce enterprises. The application of the QCA method allowed the study to identify different combinations of conditions and their impact on the effectiveness of IP management, providing new analytical tools and theoretical frameworks for corporate strategy research under complex conditions. Based on the QCA method, this research not only confirmed the impact of single factors on IP management but also revealed the complex causal relationships of multiple factor combinations. This multi-factor combination perspective offers more comprehensive theoretical support for how companies can adjust their IP strategies under different market conditions.

Thirdly, the study conducted an in-depth case analysis of Shenzhen Hello Tech Energy Co., Ltd. (Hello Tech) and TOMTOP Technology Limited (TOMTOP). By collecting and analyzing publicly available information, company reports, and industry analysis documents, along with conducting in-depth interviews with senior management and industry experts, the study thoroughly explored the challenges these two companies faced in their international market expansion (i.e., "going global"), such as technological barriers, litigation disputes, and the strategies they implemented to address these challenges.

In summary, this research systematically analyzed the IP challenges faced by Shenzhen's cross-border e-commerce enterprises. Through literature research, QCA analysis, and case studies, it revealed how Chinese cross-border e-commerce companies can establish competitive advantages through IP management. This section not only enriches theoretical research in the field of IP but also provides practical support for guiding the IP management of multinational enterprises. The specific conclusions formed by this research are as follows.

6.1.1 Typical challenges faced by chinese cross-border e-commerce in "going global"

Incomplete Intellectual Property Layout: Many Chinese cross-border e-commerce companies fail to establish a systematic intellectual property (IP) layout before entering international markets, particularly in patent and trademark application and protection. This oversight leads to frequent encounters with infringement disputes, such as trademark squatting and patent litigation, which adversely affect market entry and brand image.

(1) Low Technological Barriers and Lack of Innovation: Some Chinese cross-border e-commerce companies, especially those relying on low-technology products, face issues of low technological barriers and severe product homogenization. This makes it difficult for these companies to establish a solid "moat" through technological innovation in international markets, putting them at a disadvantage in intense market competition, where they can easily be imitated

or surpassed by competitors. From Figure 4.1 and Figure 4.2, it can be observed that the vast majority of sample companies have international trademark registrations. However, in terms of patent registrations, the differences between companies are quite significant. A small number of companies have a large number of patents, while most companies have only a few or even no patent registrations.

(2) Insufficient Intellectual Property Management Capabilities: Many Chinese cross-border e-commerce companies lack professional IP management teams, leading to a passive and ineffective response to complex IP issues in international markets. The insufficient emphasis on IP within the company and the failure to establish an effective IP protection and management mechanism further exacerbate legal risks during global expansion. From Figure 4.4 and Figure 4.5, it can be seen that the trend of international intellectual property layout for most companies does not show a steady year-on-year increase in line with their business development, but rather fluctuates. This may indicate that their intellectual property capabilities have not grown consistently.

(3) High-Frequency Intellectual Property Litigation Risks: Due to fierce competition in international markets, particularly in Europe and North America, some Chinese cross-border e-commerce companies face frequent IP litigation. These lawsuits not only consume significant company resources but can also result in severe consequences such as the closure of sales channels and freezing of funds, directly impacting the company's operations and profitability. As mentioned in the case analysis of this paper, TOMTOP Technology incurred a loss of tens of millions due to trademark litigation risks within a year.

(4) Delayed Brand Development: In the process of internationalization, some Chinese cross-border e-commerce companies lag in brand development and lack a systematic global brand layout. This results in insufficient brand recognition and influence in overseas markets, making it easy for local competitors to capture market share. The weak brand position also hinders the company from establishing a lasting competitive advantage in the market. As can be seen from the comparison of Figure 4.2 and Figure 4.3, many sample companies have already started international trademark layouts, but the scope of their protection is not sufficiently extensive.

(5) Complex International Legal Environment: The intellectual property legal systems and protection levels vary significantly across different countries and regions. Many Chinese cross-border e-commerce companies lack a deep understanding of these legal environments, leading to numerous legal obstacles in practice. The difficulty in timely adapting to and addressing these differing legal requirements increases the legal risks in their operations.

6.1.2 QCA analysis

This research systematically analyzed the intellectual property (IP) challenges faced by Shenzhen's cross-border e-commerce enterprises using Qualitative Comparative Analysis (QCA). The application of the QCA method enabled us to uncover the strategy combinations adopted by different companies in response to IP issues and their impact on outcomes. Through comparative analysis of multiple cases, this research identified several key factor combinations that directly influence the success or failure of companies in IP protection. According to the results of table 4.4, this research finds that:

The study found that even when the existence of international patent protection does not have a significant impact, the core presence of international trademark accumulation and international trademark authorization, along with the core absence of international trademark protection scope, and the marginal presence of international patent research and development and international patent authorization, can still support high international core competitiveness. This configuration suggests that cross-border e-commerce enterprises should place the construction of the entire international IP chain at the core of their corporate strategy. The organic combination of technological innovation patents and brand trademarks is a key factor in the expansion of enterprises in international markets and the growth of market share. Mudambi (2008) highlights the synergy between technological innovation and brand development, noting that the "technology-brand" dual driving force can help companies achieve sustainable competitive advantage in international markets.

Further analysis revealed that regardless of whether international trademark authorization is present, when the core presence of international patent protection is combined with international patent research and development, international patent authorization, and the marginal presence of international trademark accumulation and international trademark protection scope, high international core competitiveness can be supported. This indicates that a company's IP awareness and its strategy for international IP layout can effectively promote product competitiveness, especially in regional market conditions where market monopolistic behavior can be effectively avoided. High-quality IP, once granted through rigorous examination and effectively executed, can enable companies to swiftly take the initiative in IP litigation and effectively safeguard their commercial value. Somaya (2012) also suggests that a strong patent strategy can enhance a company's preparedness for litigation and serve as a powerful legal defense mechanism in intellectual property disputes.

The study also revealed that in the context of the core presence of international trademark

accumulation and international trademark authorization, the absence of core international patent research and development, combined with the marginal presence of international patent authorization and international trademark protection scope, along with the marginal absence of international patent protection scope, can still support high international core competitiveness. This suggests that for cross-border e-commerce enterprises dealing in non-high-tech products, building a strong corporate brand is crucial. This point is also emphasized in the subsequent case analysis.

When international patent research and development and international trademark authorization are core elements, but international trademark accumulation and international trademark protection scope are absent, with the marginal absence of international patent authorization and international patent protection scope, this configuration may support low international core competitiveness. Furthermore, data indicates that among the cases supporting low international core competitiveness, nearly 13.9% of them can only be explained by configuration 4. This suggests that companies lacking an international IP layout, even with investment in technological innovation, struggle to maintain competitiveness in overseas markets. Relying solely on technological innovation is insufficient for success in international markets; companies must also prioritize IP protection and management (Roy, 2013).

In summary, the QCA analysis revealed the significant impact of IP layout on the core competitiveness of cross-border e-commerce enterprises in international markets. The organic combination of international patents and trademarks, along with the comprehensive construction of the entire IP chain, is crucial for achieving high competitiveness in international markets. Companies that rely solely on technological innovation while neglecting IP protection may find it difficult to maintain competitiveness in international markets, even with technological breakthroughs.

6.1.3 Case study

Since its establishment in 2011, **Shenzhen Hello Tech Energy Co., Ltd.** (Hello Tech) initially focused on ODM (Original Design Manufacturer) operations, later shifting towards building its own brands by launching "Jackery" and "Geneverse," which successfully expanded into global markets. During its internationalization process, Hello Tech faced market homogenization challenges with low-technology-barrier products like power banks. To address these challenges, the company chose to focus on the portable energy storage sector, establishing strong technological barriers through precise patent layout. Additionally, Hello Tech proactively implemented a global trademark layout to ensure legal security for its brand in international

markets, successfully transitioning from an ODM to an own-brand model, significantly enhancing its market competitiveness and brand premium capabilities. Based on the case analysis of Hello Tech, this research draws the following three conclusions:

(1) Precise Patent Layout is Key to Building Technological Barriers: Hello Tech successfully established "small but strong" technological barriers in the portable energy storage sector through precise patent layout, avoiding market homogenization competition typical of low-technology-barrier products. This indicates that, in international markets, companies can solidify their market position and enhance product competitiveness by building technological barriers through patent layout. Pisano (2015) suggests that companies must determine how to gain a market advantage through product innovation, technological innovation, and business model innovation. He emphasizes that companies should align their strategies with their resource capabilities and market opportunities to develop a differentiated approach. As a "first mover," by employing precise patent positioning, a company can protect its technological innovations and build technological barriers. Patents not only prevent competitors from copying but also help companies secure a leading market position.

(2) Proactive Brand and Trademark Layout Ensures Legal Security in Global Markets: Before entering international markets, Hello Tech proactively established a trademark system, effectively avoiding brand squatting and infringement risks, and ensuring brand consistency and legal security in global markets. This experience suggests that companies implementing internationalization strategies should pay close attention to the global layout of brands and trademarks to avoid potential legal disputes and market entry obstacles. This aligns with the view of Kottler and Keller (2009) that trademarks and brands are core assets for businesses in building customer loyalty and market recognition in international markets.

(3) Transition from ODM to Own-Brand Enhances Long-Term Competitiveness: Hello Tech significantly enhanced its market bargaining power and brand premium capabilities by successfully transitioning from an ODM model to building its own brands. This indicates that companies can establish stronger customer loyalty and market control in global markets through brand strategies, leading to long-term sustainable growth. Ramasamy and Yeung (2016) research points out that businesses can not only gain pricing power through the establishment of their own brands but also more effectively control market entry strategies and customer experiences, thereby improving supply chain efficiency and creating differentiated competitive advantages in the global market. During the transition from ODM to self-owned brands, businesses can enhance their market share through brand building and technological innovation, increase brand premium capabilities, and further improve overall profitability and long-term

competitiveness.

TOMTOP Technology Limited (TOMTOP), a leading domestic cross-border e-commerce exporter, relies on its own brands and self-built platforms with a global sales network. However, the company's early large-scale distribution strategy, while facilitating rapid expansion, also led to frequent intellectual property (IP) litigation issues. Facing these challenges, TOMTOP gradually transitioned from an extensive operational model to a brand-oriented strategy, strengthening IP management, reducing infringement risks, and concentrating resources on building its own brands, thereby enhancing product competitiveness. The company's successful experience in brand transition and systematic IP management demonstrates its ability to compete in global markets. Based on TOMTOP's case analysis, this research draws the following three conclusions:

(1) Large-Scale Distribution Strategy Involves High IP Risks: TOMTOP's early adoption of a large-scale distribution strategy, although driving rapid market expansion, also resulted in frequent IP lawsuits. As this strategy involved a large number of SKUs, with some products not undergoing thorough IP compliance checks, the company faced significant legal risks in international markets. This indicates that companies in cross-border e-commerce operations may face severe legal and economic consequences if they do not adequately prioritize IP management.

(2) Brand Transition is a Key Path to Enhancing Competitiveness: In response to IP disputes, TOMTOP gradually transitioned from an extensive distribution model to brand-oriented operations, focusing resources on building its own brands, thereby improving product competitiveness and brand premium capabilities. This transition strategy suggests that for cross-border e-commerce companies to succeed in the fiercely competitive international market, they must achieve refined operations through brand strategies, thereby enhancing long-term competitiveness. According to Heinberg et al. (2017), in the global market, brand autonomy directly influences a company's market competitiveness. The accumulation of brand equity helps businesses increase their long-term market value, strengthen brand loyalty and customer relationships, thereby enhancing the company's long-term competitiveness.

(3) Systematic IP Management is the Foundation for Globalization: After experiencing frequent IP lawsuits, TOMTOP recognized the importance of systematic IP management and strengthened IP compliance checks and protection measures. This indicates that for companies to achieve sustainable development in global markets, they must establish and improve IP management systems, proactively prevent legal risks, and enhance their ability to respond through collaboration with legal institutions to ensure compliant operations.

[This page is deliberately left blank.]

Chapter 7: Conclusions

7.1 Conclusions of the research

This research systematically explores the intellectual property (IP) challenges faced by Shenzhen-based cross-border e-commerce enterprises in the overseas market and analyzes how these challenges impact their international competitiveness. The study's conclusions draw on the findings from each chapter, which collectively provide a comprehensive understanding of the intersection between IP management and global competitiveness.

In Chapter 1, the introduction outlines the significance of intellectual property management for cross-border e-commerce enterprises and its role in sustaining international competitiveness. It identifies the research gap, especially regarding how Chinese companies manage their IP in overseas markets, and establishes the research objectives and methodology.

Chapter 2 conducts a thorough review of existing literature on IP management, cross-border e-commerce, platform ecosystems, and competitive advantage theories. It emphasizes the importance of IP in sustaining long-term global competitiveness and identifies key theoretical frameworks that support this research. The literature review also highlights gaps in current research, particularly in the context of globalization and its impact on Shenzhen-based enterprises.

Chapter 3 details the research design, explaining the application of Qualitative Comparative Analysis (QCA) to explore how various combinations of factors contribute to the success or failure of IP strategies. It justifies the use of QCA to uncover complex causal relationships in IP management and competitiveness. This chapter also describes the case study approach, focusing on Shenzhen Hello Tech Energy Co., Ltd. and TOMTOP Technology Limited.

In Chapter 4 and Chapter 5. the QCA method is applied to analyze the combinations of IP management strategies that lead to international competitiveness. The analysis reveals that integrating technical innovation with brand development and proactive IP management is crucial for achieving success in global markets. Case studies provide concrete examples of how strategic patent positioning and global trademark registration contribute to market leadership.

Chapter 6 deeply discusses the key findings from the empirical results.Chapter 6: Conclusions

In conclusion, this research finds that intellectual property management capability is one of the key competencies for Shenzhen-based cross-border e-commerce enterprises to gain international competitive advantage. By enhancing their international intellectual property management capabilities and addressing legal and managerial challenges, enterprises can achieve sustained competitiveness and navigate the complexities of the global market.

7.2 Theoretical and practical contributions

7.2.1 Theoretical contributions

The theoretical contributions of this research are shown in Table 6.1.

Table 7.1 Theoretical contributions of this research

Topic	Viewpoints and Scholars	Contribution of This Research
Dynamic Capability View	(1) Dynamic capabilities represent a set of abilities that enable firms to innovate and create new products and processes in response to market changes. (Helfat, 1997; Teece & Pisano, 1994) (2) Dynamic capabilities involve a firm's ability to integrate, reconfigure, and build internal and external competences to address rapidly changing environments, serving as a key source of sustainable competitive advantage. (Teece et al., 1997) (3) The three key dimensions in the dynamic capability framework are managerial and organizational processes, positions, and paths. (Teece & Pisano, 1994; Teece et al., 1997)	This research validates the relevance of the dynamic capability theory in the context of Shenzhen cross-border e-commerce enterprises' international expansion and further extends the related conclusions as follows: (1) For Shenzhen's cross-border e-commerce, the rapidly changing market environment presents significant challenges. Among these, intellectual property (IP) capability is identified as one of the key dynamic capabilities during the international expansion process. (2) The research highlights the deficiencies in Shenzhen's cross-border e-commerce enterprises' capabilities in overseas markets, particularly in Europe and the U.S. Weak patent, trademark, and IP positioning capabilities do not constitute sufficient IP capacity. (3) The three key dimensions of dynamic IP capability consist of IP organization, IP assets, and IP management and strategy for positioning.
Intellectual Property Capability	Intellectual property capability is ultimately defined as a company's ability to innovate, deploy, protect, and organize various forms of intellectual property (including patents, trademarks, copyrights, and trade secrets) in pursuit of competitive advantage (Xiao et al., 2006).	Building on the traditional components of intellectual property capability, this research further examines the composition of IP capabilities that influence international core competitiveness, specifically within the cross-border e-commerce sector from an international IP perspective. For cross-border e-commerce, the core capabilities are constituted by international patent creation (IPA), international patent authorization (IPL),

		international patent protection scope (NOIP), international trademark accumulation (ITA), international trademark authorization (ITL), and international trademark protection scope (NOIT). The effective combination of these elements can significantly influence international core competitiveness.
Competitive Advantage Strategy	The three generic strategies for competitive advantage are cost leadership, differentiation, and focus. These strategies are applied at the business unit level and are termed "generic" because they are not dependent on any specific company or industry (Porter, 1985).	This research finds that cost leadership, differentiation, and focus strategies are applicable to the competition among Shenzhen cross-border e-commerce companies, but their emphasis varies at different stages of development. (1) Cost Leadership: Cost advantage is one of the competitive strengths of Shenzhen cross-border e-commerce, primarily reflected in supply chain capabilities. However, as the industry matures, maintaining cost leadership in overseas markets requires strengthening intellectual property rights. (2) Differentiation and Focus: Differentiation and focus are effective strategies for achieving competitive advantage during international expansion. These strategies apply not only to product differentiation and focus but also to the strategic execution of intellectual property layouts during international expansion.
E-commerce	(1) Brynjolfsson and Smith (2000) compared the pricing behaviors of Internet retailers and traditional retailers to investigate whether online markets have achieved "frictionless" commerce. The results showed that although the Internet reduces consumers' search costs, price dispersion still exists due to factors such as brand trust, service quality, and product differentiation. (2) Enterprises need to explore different digital business models, such as direct sales, subscription, and platform models, and examine the integration of online and offline channels to achieve a seamless customer experience. At the same time, they should pay attention to risk assessment	This research expands on the differentiated development paths of overseas cross-border e-commerce companies, based on their intellectual property accumulation and business models: (1) The case studies reveal that businesses relying on well-established cross-border e-commerce platforms like Amazon achieved notable success through positive customer reviews. However, excessive reliance on third-party platforms also presents challenges, especially in terms of intellectual property (IP). For cross-border e-commerce companies focused on mass product distribution and lacking proprietary IP, dependence on third-party platforms increases IP risks. (2) The success of Hello Tech's self-built website, bypassing third-party wholesalers and retailers, demonstrates that for Shenzhen cross-border e-commerce companies with strong IP advantages, establishing self-owned channels is an effective strategy. It helps reduce reliance on third-party platforms while enhancing market control and competitiveness.

	and compliance management, studying the global legal environment and the impact of intellectual property on digital business. As digital business expands globally, there are cross-cultural challenges, so it's important to research the balance between localization and global standardization.(Laudon & Traver, 2020)	

7.2.2 Practical contribution.

1.This research reveals the main challenges faced by Shenzhen-based cross-border e-commerce enterprises in overseas markets. These challenges encompass not only managerial aspects but also legal issues, both of which are closely interconnected and mutually influential. The management-related problems primarily manifest in insufficient intellectual property (IP) planning, delayed brand development, and unclear market entry strategies. On the legal side, frequent IP litigation, weak patent and trademark protection, and difficulties with international legal compliance are the main issues. By explaining these key challenges, this research aids in understanding the complex obstacles encountered by cross-border e-commerce enterprises in international markets, helping them identify management and legal risks. It provides valuable insights for devising more effective globalization strategies while offering both theoretical foundations and practical guidance to enhance international competitiveness, optimize IP management, and mitigate legal risks.

2.Through the application of the Qualitative Comparative Analysis (QCA) method, this research specifically uncovers the primary pathways through which Shenzhen cross-border e-commerce enterprises gain international competitive advantages. The use of QCA not only reveals the impact of individual factors on business competitiveness but also unveils the complex causal relationships formed by combinations of multiple factors. This method helps deepen the understanding of how cross-border e-commerce companies adopt multi-dimensional strategies in different market environments and achieve competitive advantages through various pathways. It enables businesses to adjust their strategic combinations flexibly when facing multiple international market challenges, adopting more targeted IP management and competition strategies based on specific market demands and legal environments. This also provides new theoretical tools and practical references for future research on the

internationalization of cross-border e-commerce.

3.Based on the results of the case analyses, this research provides a systematic framework for IP management, emphasizing the importance of precise patent and trademark planning for international competitiveness. This offers cross-border e-commerce enterprises specific guidance on IP strategic planning during global expansion. The research further demonstrates that the synergy between brand development and technological innovation is key to enhancing international market competitiveness. It offers concrete strategic suggestions on how companies can balance technical barriers with brand value enhancement when implementing global branding strategies.

7.3 Implications

7.3.1 Managerial implications for enterprises

1. How to build intellectual property capabilities in Cross-border E-commerce enterprises: Insights from Research Findings

The research results reveal specific pathways through which cross-border e-commerce enterprises can build intellectual property capabilities. Drawing directly from the research findings, we propose a framework for IP capability development that addresses the unique challenges identified in the study.

The necessity condition analysis revealed that trademark capability represents a fundamental prerequisite for international competitiveness. This finding underscores the importance of prioritizing trademark strategy development as the first step in building IP capabilities. Cross-border e-commerce enterprises should establish systematic trademark registration procedures in key markets before product launch, implement trademark monitoring systems, and develop brand protection strategies tailored to different jurisdictional requirements. As evidenced by the case analysis of TOMTOP, companies that proactively registered trademarks in multiple jurisdictions were better positioned to prevent trademark squatting and maintain brand consistency across markets.

QCA results demonstrated that high international competitiveness requires specific configurations of IP capabilities rather than isolated strengths. Specifically, the combination of high patent capability with either high trademark capability or high copyright capability formed sufficient conditions for success. This finding suggests that cross-border e-commerce enterprises should develop integrated IP management systems that coordinate different types of

IP protection. Companies should establish cross-functional IP committees that include R&D, marketing, and legal expertise to ensure alignment between product development, market expansion, and IP protection strategies. Hello Tech's experience illustrates how this integrated approach enabled them to transition successfully from ODM to branded manufacturing with protected proprietary technologies.

The identification of multiple pathways to success through the QCA analysis indicates that companies can customize their IP capability building based on their specific business models. Product-focused enterprises should prioritize patent capability development by implementing invention disclosure systems, establishing patent review committees, and creating incentive mechanisms for innovation. Service-oriented or brand-focused enterprises might emphasize copyright and trademark capabilities by developing content protection strategies and comprehensive brand management systems. This flexible approach allows enterprises to align IP capability building with their core competitive advantages.

The case studies revealed that successful companies develop organizational capabilities to address the specific IP challenges in cross-border contexts. To overcome jurisdictional complexity, enterprises should establish specialized legal teams with expertise in key markets and develop standardized procedures for multi-jurisdictional IP filings. The challenge of IP enforcement across borders requires developing relationships with local authorities, creating rapid response mechanisms for infringement, and establishing dedicated enforcement budgets. TOMTOP's establishment of a specialized IP department with country-specific expertise exemplifies this organizational capability development.

2. Intellectual Property Management Strategies Should Align with Product Strategies

QCA analysis reveals that the effectiveness of a single IP strategy is limited under different market conditions; therefore, companies should flexibly adjust their IP protection strategies to adapt to varying market environments and product needs. Furthermore, companies need to balance technological innovation with brand development, ensuring that both work synergistically to enhance international competitiveness.

The international protection scope of patents and trademarks (NOIP and NOIT) has a significant impact on the path to high international competitiveness. Companies should not be content with applying for patents and trademarks only in their domestic market but should also expand their international protection scope. This means that before entering new markets, companies should proactively layout their IP in the relevant countries and regions, ensuring that their brand and technology are fully protected on a global scale. By broadening their international IP layout, companies can effectively mitigate infringement risks and strengthen

their competitive advantage in international markets.

The accumulation (ITA) and authorization (ITL) of international trademarks also significantly influence international competitiveness. The brand is a crucial asset for establishing and maintaining competitiveness in international markets. Therefore, companies should prioritize the international registration and protection of trademarks, actively applying for and accumulating international trademarks. A broad trademark protection not only increases brand visibility in the market but also enhances consumer trust in the brand. Additionally, trademark authorization and management should comply with the laws and regulations of each target market to ensure the brand's long-term development globally.

Similarly, the cases of Shenzhen Hello Tech Energy Co., Ltd. and TOMTOP Technology Limited demonstrate that a company's IP management strategy should closely align with its product strategy. Chinese cross-border e-commerce companies often face issues where IP layout is not well integrated with product strategy when expanding internationally. Shenzhen Hello Tech Energy Co., Ltd. successfully established a technological advantage and effectively protected its core products through precise patent layout. Companies should develop differentiated strategies based on the IP environment of their target markets.

3.Proactively Address Legal Challenges in International Markets

Given the complex legal environment of international markets, companies must develop the capability to address IP disputes, particularly in key markets. This includes collaborating with experienced legal advisors to promptly resolve overseas IP disputes. In enhancing international competitiveness, cross-border e-commerce enterprises should actively seek cross-border collaboration and leverage the policy support of various countries to optimize their IP management strategies. For example, by working with international patent and trademark agencies, companies can better navigate the complex legal environments of different countries, ensuring effective protection of their IP globally. Cross-border e-commerce companies should also actively seek partnerships with internationally renowned legal service providers. By hiring professional law firms, companies can better handle cross-border IP disputes. Additionally, companies should utilize local legal resources to develop IP protection strategies tailored to the specific characteristics of the local market.

7.3.2 Policy implications

For government administrators, the following approaches should be actively pursued to support Chinese cross-border e-commerce enterprises in enhancing their international competitiveness:

1. Support Enterprises in Proactively Engaging in Overseas Intellectual Property

Layout

QCA analysis indicates that the need for intellectual property protection varies significantly across different market conditions. The government should encourage enterprises to develop diversified intellectual property protection strategies based on the characteristics of different markets. To this end, the government can provide corresponding policy support, such as funding enterprises to carry out patent layouts and trademark registrations in emerging markets. This will help companies effectively reduce the costs of intellectual property protection and enhance their competitiveness in international markets.

The strategic importance of proactive overseas IP layout is clearly demonstrated in the Hello Tech case study. Hello Tech's early and systematic trademark and patent registrations in key markets like North America and Europe provided them with significant competitive advantages, enabling smooth market entry and effective brand protection. However, even this forward-thinking company encountered challenges in the Middle East, where insufficient trademark registration led to litigation issues and market access barriers. Local entities had already registered similar trademarks in several Middle Eastern countries, forcing Hello Tech to either rebrand or engage in costly trademark acquisition negotiations in these regions.

Specifically, policy measures should include establishing market-specific IP pre-entry assessment services that provide intelligence on regional IP landscapes, developing subsidized trademark pre-filing search services for key emerging markets, and creating specialized funding programs that prioritize "first-mover" IP applications in non-traditional markets. Additionally, government agencies should coordinate with industry associations to develop region-specific IP protection guidelines, organize collective trademark registration initiatives for small and medium enterprises targeting the same markets, and establish regular briefings on IP environment changes in emerging regions like the Middle East, Southeast Asia, and Latin America.

2. Strengthen Legal Services for Intellectual Property Protection

Access to legal resources is one of the key factors for enterprises to address intellectual property challenges. To help companies better navigate intellectual property issues in international markets, the government should provide more public legal service resources, especially in the cross-border e-commerce sector. By establishing specialized intellectual property legal assistance programs, the government can offer enterprises professional support in patent applications, trademark registrations, and intellectual property dispute resolution, ensuring that their legal rights are protected in overseas markets.

The need for enhanced legal support is particularly evident from the TOMTOP case study,

where the company faced significant challenges when dealing with overseas litigation. TOMTOP encountered a steep learning curve when confronted with patent infringement claims in the United States, lacking both experience and institutional support. Before litigation, the company had limited access to pre-litigation risk assessment resources, relevant case databases, or guidance on U.S. intellectual property enforcement practices. During and after litigation, TOMTOP received minimal support from government agencies or industry associations, forcing them to navigate complex foreign legal procedures independently and at considerable expense. This experience highlights the urgent need for establishing specialized IP legal aid centers with expertise in major markets like the U.S. and EU, developing pre-litigation consultation services, creating litigation response guidelines, and forming industry mutual assistance alliances. Government agencies should establish overseas IP emergency response mechanisms that provide immediate consultation when companies face foreign litigation, offer partial financial support for legitimate defense cases, and coordinate post-litigation knowledge sharing to benefit other enterprises. Additionally, industry associations should develop collective defense mechanisms for common IP challenges, enabling companies like TOMTOP to benefit from shared resources and experiences rather than facing these challenges in isolation.

3.Promote International Cooperation on Intellectual Property Protection and Fair Competition

The government should actively protect domestic enterprises' intellectual property rights in overseas markets through diplomatic channels and international legal frameworks. This includes providing support and assistance through embassies, consulates, and international arbitration institutions when domestic companies encounter unfair treatment or intellectual property infringement. Additionally, the government should ensure that domestic companies receive the same level of intellectual property protection as local enterprises in foreign markets, preventing losses due to market entry barriers or legal inequities.

Moreover, with the increase in cross-border commercial activities, international intellectual property disputes are also on the rise. The government should advocate for the establishment of an international mechanism for resolving intellectual property disputes, such as through international arbitration bodies and multilateral organizations like the World Intellectual Property Organization (WIPO). Establishing a unified dispute resolution procedure will help domestic enterprises effectively address intellectual property disputes in international markets, reducing uncertainties caused by differences in legal systems, and thereby safeguarding their legitimate rights.

For cross-border e-commerce industry associations, the following approaches should be

actively pursued to assist Chinese cross-border e-commerce enterprises in increasing their international competitiveness:

4. Provide Intellectual Property Training and Education

Industry associations can organize regular training sessions and seminars to provide companies with the latest information and best practices on intellectual property protection, management, and legal regulations. These training sessions can help companies enhance the intellectual property awareness of their entire workforce, reducing the risks companies face due to intellectual property issues. They can also organize domestic and international intellectual property exchange activities, such as forums, exhibitions, and study tours, to help companies understand the intellectual property environment and trends in international markets, and learn advanced international intellectual property management practices. These exchange activities will enable companies to better adapt to global markets and enhance their international competitiveness.

5. Establish an Industry-Wide Intellectual Property Cooperation Mechanism

Industry associations can promote the establishment of an intellectual property cooperation mechanism within the industry, encouraging information sharing and collaboration among companies, especially when jointly addressing intellectual property challenges in international markets. For example, associations can organize joint efforts among industry companies to respond to cross-border patent litigation, creating a collective force to reduce the cost of rights protection for individual companies.

6. Provide Legal Consultation and Support

Industry associations can collaborate with professional intellectual property legal service institutions to offer legal consultation and support to member companies. The association can establish an intellectual property consultation platform to help companies obtain professional advice on patent applications, trademark registrations, and handling infringement disputes, ensuring that their intellectual property strategies are effectively implemented.

7. Advocate for Industry Interests and Policy Development

Industry associations can represent companies within the industry to voice their interests to the government and international organizations, advocating for the formulation of policies and regulations that favor intellectual property protection for businesses. Through communication with government departments, industry associations can seek greater policy support, such as financial subsidies for intellectual property protection, legal assistance, and opportunities for international cooperation.

7.4 Research limitations and future research

7.4.1 Research limitations

Despite the effective results obtained in analyzing the intellectual property (IP) challenges faced by Shenzhen's cross-border e-commerce enterprises, this research has certain limitations:

(1) Lack of Large-Scale Empirical Sample for Regression Analysis: This research primarily relies on Qualitative Comparative Analysis (QCA) and case studies to reveal the relationship between IP management and international competitiveness. However, the absence of a large-scale empirical sample for regression analysis may limit the generalizability and applicability of the research conclusions. Employing regression analysis on a large-scale sample could provide a more comprehensive validation of the findings and offer more statistically significant empirical support for IP management in cross-border e-commerce enterprises.

(2) Lack of Analysis Focused on Specific National Markets: The research predominantly focuses on the IP environment in European and American markets and the challenges faced by cross-border e-commerce enterprises in these regions, without delving deeply into the market environments of other regions such as the Asia-Pacific. Since significant differences exist in IP protection levels and market environments across different countries and regions, including more regions, particularly the Asia-Pacific market, could provide a more comprehensive reflection of the global IP challenges faced by cross-border e-commerce enterprises, offering broader reference points for companies formulating international strategies.

(3) Insufficient Consideration of IP Management Challenges in a Dynamic Environment: The study mainly analyzes the IP management of cross-border e-commerce enterprises within the current market environment, without fully considering the potential impacts of future market changes (e.g., legal policy changes, technological advancements, market demand shifts) on companies' IP strategies. In a dynamic environment, companies may need to continuously adjust and optimize their IP management strategies. Future research could explore the adaptability and flexibility of IP management in such dynamic environments.

7.4.2 Future research

(1) **Exploring the Combination of QCA with Other Quantitative Analysis Methods**: Future research could attempt to combine QCA with other quantitative analysis methods to more comprehensively reveal the complex relationships within corporate IP management. For instance, integrating regression analysis and other quantitative research methods could validate

the relationship between IP management and corporate international competitiveness from a broader sample perspective. Large-scale empirical analysis could enhance the generalizability of the research conclusions and provide more reliable management recommendations for cross-border e-commerce enterprises.

(2) **Expanding the Geographic Scope of Research to Cover More Regional Markets**: While this research primarily focuses on European and American markets, future research could further extend to regions like Asia-Pacific, Africa, and South America. These regions, with their unique stages of market development, legal environments, and IP protection levels, could offer a more comprehensive reference for global cross-border e-commerce enterprises' IP management, as well as reveal unique challenges and response strategies in different regions.

(3) **Exploring the Application of Emerging Technologies in IP Protection**: With the rapid development of emerging technologies such as blockchain and artificial intelligence, there is significant potential for their application in IP protection. Future research could focus on how these technologies can help companies manage and protect their IP more effectively on a global scale.

(4) **Deepening Interdisciplinary Research**: IP management involves multiple academic fields, including law, economics, management, and technology. Future research could further deepen interdisciplinary research methods. By integrating theories and methods from different disciplines, research can more comprehensively reveal the complexities of IP management and provide more systematic and holistic management recommendations for companies.

(5) **Empirical Analysis of Policy Impact**: Future research could conduct empirical analyses to explore the impact of different national and regional policies on the effectiveness of IP protection for cross-border e-commerce enterprises. This would provide more scientific evidence for policymakers, helping them to formulate more effective IP protection policies.

Bibliography

Abrate, G., & Viglia, G. (2019). Personal or product reputation? Optimizing revenues in the sharing economy. *Journal of Travel Research*, *58*(1), 136–148.

Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management*, *43*(1), 39–58.

Akhmedova, A., Marimon, F., & Mas–Machuca, M. (2020). Winning strategies for customer loyalty in the sharing economy: A mixed–methods study. *Journal of Business Research*, *112*, 33–44.

Akhtar, S., Ding, D. Z., & Ge, G. L. (2008). Strategic HRM practices and their impact on company performance in Chinese enterprises. *Human Resource Management*, *47*(1), 15–32.

Akter, S., & Wamba, S. F. (2016). Big data analytics in E–commerce: A systematic review and agenda for future research. *Electronic Markets*, *26*, 173–194.

Alt, R., & Zimmermann, H.D. (2019). *Electronic markets on platform competition.* Springer.

Anand, J., Oriani, R., & Vassolo, R. S. (2010). Alliance activity as a dynamic capability in the face of a discontinuous technological change. *Organization Science*, *21*(6), 1213–1232.

Anderson, E. G., Lopez, J., & Parker, G. G. (2022). Leveraging value creation to drive the growth of B2B platforms. *Production and Operations Management*, *31*(12), 4501–4514.

Ansoff, H. I. (1965). *Corporate strategy: An analytic approach to business policy for growth and expansion*. McGraw-Hill.

Artun, O., & Levin, D. (2015). *Predictive marketing: Easy ways every marketer can use customer analytics and big data*. John Wiley & Sons.

Bakos, Y., & Katsamakas, E. (2008). Design and ownership of two–sided networks: Implications for Internet platforms. *Journal of Management Information Systems*, *25*(2), 171–202.

Balmer, J. M., & Gray, E. R. (1999). Corporate identity and corporate communications: Creating a competitive advantage. *Corporate Communications: An International Journal*, *4*(4), 171–177.

Bansal, G., & Chen, L. (2011, May 20). *If they trust our e–commerce site, will they trust our social commerce site too? Differentiating the trust in e–commerce and s–commerce: the moderating role of privacy and security concerns*. MWAIS 2011 Proceedings, Omaha, NE, USA.

Barnes, D., Hinton, M., & Mieczkowska, S. (2004). Managing the transition from bricks–and-mortar to clicks–and–mortar: A business process perspective. *Knowledge and Process Management*, *11*(3), 199–209.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.

Barney, J. B. (1986). Organizational culture: Can it be a source of sustained competitive advantage? *Academy of Management Review*, *11*(3), 656–665.

Barney, J. B. (2007). *Resource–based theory: Creating and sustaining competitive advantage*. Oxford University Press.

Baumol, W. J., & Wolff, E. N. (1988). Productivity growth, convergence, and welfare: reply. *The American Economic Review*, *78*(5), 1155–1159.

Bell, M., & Pavitt, K. (1995). The development of technological capabilities. *Trade, Technology and International Competitiveness*, *22*(4831), 69–101.

Bellak, C. J., & Weiss, A. (1993). A note on the Austrian" diamond". *Management International Review*, *33*(2), 109–118.

Benlian, A., Titah, R., & Hess, T. (2012). Differential effects of provider recommendations and consumer reviews in e–commerce transactions: An experimental study. *Journal of Management Information Systems*, *29*(1), 237–272.

Besanko, D., Dranove, D., Shanley, M., Schaefer, S., & Besanko, D. (2000). *Sustaining competitive advantage*. John Wiley & Sons.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. v. (2013). Digital business strategy: Toward a next generation of insights. *Mis Quarterly*, *37*(2), 471–482.

Bianchi, C., Andrews, L., Wiese, M., & Fazal–E–Hasan, S. (2017). Consumer intentions to engage in s–commerce: A cross–national study. *Journal of Marketing Management*, *33*(5–6), 464–494.

Bilgihan, A., Kandampully, J., & Zhang, T. (2016). Towards a unified customer experience in online shopping environments: Antecedents and outcomes. *International Journal of Quality and Service Sciences*, *8*(1), 102–119.

Boltho, A. (1996). The assessment: International competitiveness. *Oxford Review of Economic Policy*, *12*(3), 1–16.

Boudreau, K. (2010). Open platform strategies and innovation: Granting access vs. Devolving control. *Management Science*, *56*(10), 1849–1872.

Bradley, C. A. (1996). Territorial intellectual property rights in an age of globalism. *Virginia Journal of International Law*, *37*, 505.

Brandenburger, A. M., & Stuart Jr, H. W. (1996). Value–based business strategy. *Journal of Economics & Management Strategy*, *5*(1), 5–24.

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

Buhalis, D., & Deimezi, O. (2003). Information technology penetration and E–commerce developments in Greece, with a focus on small to medium–sized enterprises. *Electronic Markets*, *13*(4), 309–324.

Bullinger, A. C., Rass, M., Adamczyk, S., Moeslein, K. M., & Sohn, S. (2012). Open innovation in health care: Analysis of an open health platform. *Health Policy*, *105*(2–3), 165–175.

Buzzao, G., & Rizzi, F. (2021). On the conceptualization and measurement of dynamic capabilities for sustainability: Building theory through a systematic literature review. *Business Strategy and the Environment*, *30*(1), 135–175.

Campbell, A., & Goold, M. (1995). Corporate strategy: The quest for parenting advantage. *Harvard Business Review*, *73*(2), 120–132.

Cartwright, W. R. (1993). Multiple linked "diamonds" and the international competitiveness of export–dependent industries: The New Zealand experience. *Management International Review*, *33*(2), 55–70.

Cecere, G., Corrocher, N., & Mancusi, M. L. (2020). Financial constraints and public funding of eco–innovation: Empirical evidence from European SMEs. *Small Business Economics*, *54*(1), 285–302.

Ceglowski, J. (1994). The law of one price revisited: New evidence on the behavior of international prices. *Economic Inquiry*, *32*(3), 407–418.

Chakravarty, A., Kumar, A., & Grewal, R. (2014). Customer orientation structure for internet–based business–to–business platform firms. *Journal of Marketing*, *78*(5), 1–23.

Chang, Y., Iakovou, E., & Shi, W. (2020). Blockchain in global supply chains and cross border trade: a critical synthesis of the state–of–the–art, challenges and opportunities. *International Journal of Production Research*, *58*(7), 2082–2099.

Charles, R. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies*. University of California Press.

Chen, G., Wang, J., Liu, W., Xu, F., & Wu, Q. (2022). Knowledge is power: Toward a combined model of knowledge acquisition and knowledge application of enterprises. *Nankai Business Review International*, *13*(2), 220–245.

Chen, J., Wang, Y., & Xu, Q. R. (1999). 国外核心能力研究述评[A literature review of foreign core competencies research]. *Science Research management*, *20*(5), 8.

Chen, W. H., Lin, Y.C., Bag, A., & Chen, C.L. (2023). Influence factors of small and medium–sized enterprises and micro–enterprises in the cross–border e–commerce platforms. *Journal of Theoretical and Applied Electronic Commerce Research*, *18*(1), 416–440.

Chen, Y., Richter, J. I., & Patel, P. C. (2021). Decentralized governance of digital platforms. *Journal of Management*, *47*(5), 1305–1337.

Chi, R. Y., & Pan, L. P. (2016a). 知识产权能力、外部知识产权保护强度与企业成长性[Intellectual property capability, external intellectual property protection intensity and enterprise growth]. *Science & Technology Progress and Policy*, *33*(1), 5.

Chi, R. Y., & Pan, L. P. (2016b). 知识产权能力构成、内外影响因素与企业成长——内力驱动,还是外部推进?[Composition of IP Capabilities, Internal and External Influencing Factors and Enterprise Growth: Driven by Internal Forces or Promoted by External Forces?]. *Studies in Science of Science*, *34*(1), 8.

Chi, R. Y., & Pan, L. P. (2017). 企业知识产权能力演化路径——基于战略导向视角[The evolution path of enterprise intellectual property capabilities: Based on the perspective of strategic orientation]. *Science Research Management*, *38*(8), 9.

Chircu, A. M., & Kauffman, R. J. (2000). Reintermediation strategies in business–to–business electronic commerce. *International Journal of Electronic Commerce*, *4*(4), 7–42.

Choudary, S. P. (2015). *Platform scale: How an emerging business model helps startups build large empires with minimum investment*. Platform Thinking Labs.

Christopher, M. (2016). *Logistics and supply chain management: Logistics & supply chain management*. Pearson UK.

Cockburn, I., & Henderson, R. (1994). Racing to invest? The dynamics of competition in ethical drug discovery. *Journal of Economics & Management Strategy*, *3*(3), 481–519.

Collis, D. J. (1994). Research note: How valuable are organizational capabilities? *Strategic Management Journal*, *15*(1), 143–152.

Constantinides, P., Henfridsson, O., & Parker, G. G. (2018). Introduction–platforms and infrastructures in the digital age. *Information Systems Research*, *29*(2), 381–400.

Coombs, R. (1996). Core competencies and the strategic management of R&D. *R&D Management*, *26*(4), 345–355.

Cui, L., Huang, S., Wei, F., Tan, C., Duan, C., & Zhou, M. (2017, August 1–6). *Superagent: A customer service chatbot for e–commerce websites*. Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics, New York, USA.

da Costa Júnior, J. F., Macedo, D. L., Calazans, S., de Andrade, A. P. V., & de Araújo, A. G. (2024). Internationalization ecosystems: a framework proposal for the international business theory. *Internext*, *19*(2), 130–152.

Daly, H. E., & Farley, J. (2011). *Ecological economics: principles and applications*. Island Press.

Dasgupta, M., Sahay, A., & Gupta, R. (2009). The role of knowledge management in innovation. *Journal of Information & Knowledge Management*, *8*(4), 317–330.

de Gusmão, A. P. H., Silva, M. M., Poleto, T., e Silva, L. C., & Costa, A. P. C. S. (2018). Cybersecurity risk analysis model using fault tree analysis and fuzzy decision theory. *International Journal of Information Management*, *43*, 248–260.

de Miguel, P. M., Martínez, A. G., & Montes–Botella, J. L. (2022). Review of the measurement of Dynamic Capabilities: A proposal of indicators for the automotive industry. *ESIC Market*,

53(1), 283–283.
De Reuver, M., Sørensen, C., & Basole, R. C. (2018). The digital platform: A research agenda. *Journal of Information Technology*, *33*(2), 124–135.
Delina, R., & Tkáč, M. (2015). Role of e–business in the perception of ICT impact on revenue growth. *Journal of Business Economics and Management*, *16*(6), 1140–1153.
Deng, C. W., & Chen, J. H. (2014). 企业知识产权能力实证研究——以四川省知识产权示范企业为例 [An empirical study on the intellectual property capabilities of IP demonstration enterprises in Sichuan Province]. *Science and Technology Management Research*, *34*(4), 147–151.
DiBella, A. J., Nevis, E. C., & Gould, J. M. (1996). Understanding organizational learning capability. *Journal of Management Studies*, *33*(3), 361–379.
Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. *Management science*, *35*(12), 1504–1511.
Dimand, R. W. (2000). Ricardo and international trade theory. *History of Economic Ideas*, *8*(3), 7–24.
Dobson, P., & Starkey, K. (2002). The competitive advantage of nations. *Journal of Management Studies*, *29*(2), 253–255.
Dollar, D., & Wolff, E. N. (1993). *Competitiveness, convergence, and international specialization*. MIT Press.
Downes, L., & Nunes, P. (2013). *Big bang disruption*. Harvard Business Review Press.
Dratler Jr, J., & McJohn, S. M. (2024). *Intellectual property law: Commercial, creative and industrial property*. Law Journal Press.
Dubosson-Torbay, M., Osterwalder, A., & Pigneur, Y. (2002). E-business model design, classification, and measurements. *Thunderbird International Business Review*, *44*(1), 5–23.
Dunning, J. H. (1992). The competitive advantage of countries and the activities of transnational corporations. *Transnational Corporations*, *1*(1), 135–168.
Dunning, J. H. (1993). Internationalizing Porter's diamond. *Management International Review*, *33*, 7–15.
Durand, T. (1997). Strategizing for innovation: Competence analysis in assessing strategic change. In European Institute for Technology and Innovation Management (Eds.), *Bringing technology and innovation into the boardroom* (pp. 124–132). Palgrave Macmillan.
Eaton, B., Elaluf–Calderwood, S., Sørensen, C., & Yoo, Y. (2015). Distributed tuning of boundary resources. *Mis Quarterly*, *39*(1), 217–244.
Eilon, S. (1992). On competitiveness. In S. Eilon (Ed.), *Management Strategies* (pp. 141–148). Springer New York.
Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, *21*(10–11), 1105–1121.
Ert, E., Fleischer, A., & Magen, N. (2016). Trust and reputation in the sharing economy: The role of personal photos in Airbnb. *Tourism Management*, *55*, 62–73.
Evans, D. S. (2016). Matchmakers: the new economics of multisided platforms. *Harvard Business Review Press*.
Fehrer, J. A., Woratschek, H., Germelmann, C. C., & Brodie, R. J. (2018). Dynamics and drivers of customer engagement: within the dyad and beyond. *Journal of Service Management*, *29*(3), 443–467.
Feng, B., & Jalali, M. (2024). The Influence of Technological Innovation Capability on Sustainable Supply Chain Management Implementation–Evidence from Patent–Intensive Industries. *Sustainability*, *16*(12), 5183.
Gaikwad, A., Dhokare, C., & CMA, A. (2020). A Study of intellectual property rights and its significance for business. *Journal of Information and Computational Science*, *10*(2), 552–561.

Gan, J. X., & Qi, Y. (2018). 双元创新, 知识场活性与知识产权能力的路径分析[Path analysis of dual innovation, knowledge field activity, and intellectual property capabilities]. *Studies in Science of Science*, *36*(11), 2078–2091.

Gan, J. X., Qi, Y., & Tian, C. (2020). 企业跨国技术合作中的知识交流冲突, 领地行为与知识产权能力[Knowledge exchange conflicts, territorial behaviors, and intellectual property capabilities in multinational technological cooperation]. *Management Science*, *33*(1), 54–74.

Ganapati, S., & Reddick, C. G. (2018). Prospects and challenges of sharing economy for the public sector. *Government Information Quarterly*, *35*(1), 77–87.

Gawer, A. (2009). Platform dynamics and strategies: From products to services. *Platforms, Markets and Innovation*, *45*, 57.

Gawer, A. (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, *43*(7), 1239–1249.

Ghazawneh, A., & Henfridsson, O. (2010, December 12–15). *Governing third–party development through platform boundary resources*. Proceedings of the International Conference on Information Systems. Saint Louis, Missouri, USA

Ghemawat, P., & Rivkin, J. (1999). *Creating competitive advantage: Text and cases*. Prentice Hall.

Gibbs, J., Kraemer, K. L., & Dedrick, J. (2003). Environment and policy factors shaping global e–commerce diffusion: A cross–country comparison. *The Information Society*, *19*(1), 5–18.

Gibreel, O., AlOtaibi, D. A., & Altmann, J. (2018). Social commerce development in emerging markets. *Electronic Commerce Research and Applications*, *27*, 152–162.

Giovannucci, D., Josling, T. E., Kerr, W., O'Connor, B., & Yeung, M. T. (2009). *Guide to Geographical Indications: Linking products and their origins*. International trade centre Geneva.

Giuffrida, M., Mangiaracina, R., Perego, A., & Tumino, A. (2017). Cross–border B2C e–commerce to Greater China and the role of logistics: a literature review. *International Journal of Physical Distribution & Logistics Management*, *47*(9), 772–795.

Giuri, P., & Torrisi, S. (2010, September 20–21). Cross–licensing, cumulative inventions, and strategic patenting. 5th Annual Conference of the EPIP Association, Maastricht, Netherland.

Goldenberg, J., Libai, B., & Muller, E. (2002). Riding the saddle: How cross–market communications can create a major slump in sales. *Journal of Marketing*, *66*(2), 1–16.

Goldman, S. P., van Herk, H., Verhagen, T., & Weltevreden, J. W. (2021). Strategic orientations and digital marketing tactics in cross–border e–commerce: Comparing developed and emerging markets. *International Small Business Journal*, *39*(4), 350–371.

Gomez–Herrera, E., Martens, B., & Turlea, G. (2014). The drivers and impediments for cross–border e–commerce in the EU. *Information Economics and Policy*, *28*, 83–96.

Goold, M., Campbell, A., & Alexander, M. (1998). Corporate strategy and parenting theory. *Long Range Planning*, *31*(2), 308–314.

Granstrand, O., Patel, P., & Pavitt, K. (1997). Multi–technology corporations: why they have "distributed" rather than "distinctive core" competencies. *California Management Review*, *39*(4), 8–25.

Grant, R. M. (1991). Porter's 'competitive advantage of nations': an assessment. *Strategic Management Journal*, *12*(7), 535–548.

Greckhamer, T., Misangyi, V. F., & Fiss, P. C. (2013). Chapter 3 The two QCAs: From a small–N to a large–N set theoretic approach. In P. C. Fiss, B. Cambré, & A. Marx (Eds.) *Configurational theory and methods in organizational research* (pp. 49–75). Emerald Group Publishing Limited.

Gregory, G., Karavdic, M., & Zou, S. (2007). The effects of e–commerce drivers on export marketing strategy. *Journal of International Marketing*, *15*(2), 30–57.

Grossman, G. M., & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European Economic Review*, *35*(2–3), 517–526.

Habbershon, T. G. (2006). Commentary: A framework for managing the familiness and agency advantages in family firms. *Entrepreneurship Theory and Practice*, *30*(6), 879–886.

Hajli, M. (2012). Social commerce adoption model. *IEEE Transactions on Engineering Management*, *71*, 3599–3612.

Hajli, N. (2015). Social commerce constructs and consumer's intention to buy. *International Journal of Information Management*, *35*(2), 183–191.

Hajli, N., Lin, X., Featherman, M., & Wang, Y. (2014). Social word of mouth: How trust develops in the market. *International Journal of Market Research*, *56*(5), 673–689.

Hajli, N., Wang, Y., Tajvidi, M., & Hajli, M. S. (2017). People, technologies, and organizations interactions in a social commerce era. *IEEE Transactions on Engineering Management*, *64*(4), 594–604.

Hamari, J., Sjöklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, *67*(9), 2047–2059.

Hamel, G. (1991). Competition for competence and interpartner learning within international strategic alliances. *Strategic Management Journal*, *12*(1), 83–103.

Han, J. H., & Kim, H. M. (2019). The role of information technology use for increasing consumer informedness in cross–border electronic commerce: An empirical study. *Electronic Commerce Research and Applications*, *34*, 100826.

Harmsen, H., Grunert, K. G., & Declerck, F. (2000). Why did we make that cheese? An empirically based framework for understanding what drives innovation activity. *R&D Management*, *30*(2), 151–166.

Harrison, A., & Rodríguez–Clare, A. (2010). Trade, foreign investment, and industrial policy for developing countries. *Handbook of Development Economics*, *5*, 4039–4214.

He, J., & Zhang, S. (2022). How digitalized interactive platforms create new value for customers by integrating B2B and B2C models? An empirical study in China. *Journal of Business Research*, *142*, 694–706.

He, X., Li, X., & Fang, H. (2006). Measuring and efficiency of dynamic capabilities: An empirical study in China. *Management world*, *3*, 94–103.

Heimburg, V., & Wiesche, M. (2022, June 18–24). *Relations between actors in digital platform ecosystems: A literature review*. 30th European Conference on Information Systems, Timișoara, Romania.

Heinberg, M., Ozkaya, H. E., & Taube, M. (2017). The influence of global and local iconic brand positioning on advertising persuasion in an emerging market setting. *Journal of International Business Studies*, *48*, 1009–1022.

Helfat, C. E. (1997). Know–how and asset complementarity and dynamic capability accumulation: The case of R&D. *Strategic Management Journal*, *18*(5), 339–360.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource–based view: Capability lifecycles. *Strategic Management Journal*, *24*(10), 997–1010.

Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, *36*(6), 831–850.

Helfat, C. E., & Raubitschek, R. S. (2000). Product sequencing: co–evolution of knowledge, capabilities and products. *Strategic Management Journal*, *21*(10–11), 961–979.

Hodgetts, R. M. (1993). Porter's diamond framework in a Mexican context. *Management International Review*, *33*, 41–54.

Hsiao, Y. H., Chen, M. C., & Liao, W. C. (2017). Logistics service design for cross–border E–commerce using Kansei engineering with text–mining–based online content analysis. *Telematics and Informatics*, *34*(4), 284–302.

Hughes, J. (1988). *The philosophy of intellectual property.* ANU Press.

Hurni, T., & Huber, T. (2014, June 9–11). *The interplay of power and trust in platform ecosystems of the enterprise application software industry*. 22nd European Conference on Information Systems, Tel Aviv, Israel.

Hutt, M. D., & Speh, T. W. (2021). *Business marketing management: B2B*. South–Western, Cengage Learning.

Iansiti, M., & Levien, R. (2004). Keystones and dominators: Framing operating and technology strategy in a business ecosystem. *Harvard Business School*, *3*, 1–82.

Iyer, B., & Davenport, T. H. (2008). Reverse engineering Google's innovation machine. *Harvard Business Review*, *86*(4), 58–68.

Jackson, S. E., & Schuler, R. S. (1995). Understanding human resource management in the context of organizations and their environments. *Human Resource Management: Critical Perspectives on Business and Management*, *2*(1), 45–74.

Jacobs, D., & De Jong, M. W. (1992). Industrial clusters and the competitiveness of the Netherlands: Empirical results and conceptual issues. *de Economist*, *140*(2), 233–252.

Janssen, M. J., Castaldi, C., & Alexiev, A. (2016). Dynamic capabilities for service innovation: Conceptualization and measurement. *R&D Management*, *46*(4), 797–811.

Jarvis, C. (2020). *Crypto wars: The fight for privacy in the digital age: A political history of digital encryption*. CRC Press.

Joglekar, N., Anderson Jr, E. G., Lee, K., Parker, G., Settanni, E., & Srai, J. S. (2022). Configuration of digital and physical infrastructure platforms: Private and public perspectives. *Production and Operations Management*, *31*(12), 4515–4528.

Jones, N., & Pu, P. (2007, August 19–22). *User technology adoption issues in recommender systems*. Proceedings of the 2007 Networking and Electronic Commerce Research Conference, Minneapolis, MN, USA.

Kale, P., & Singh, H. (2007). Building firm capabilities through learning: the role of the alliance learning process in alliance capability and firm–level alliance success. *Strategic Management Journal*, *28*(10), 981–1000.

Katz, M. L., & Shapiro, C. (1985). Network externalities, competition, and compatibility. *The American Economic Review*, *75*(3), 424–440.

Kay, J. A. (1995). *Why firms succeed*. Oxford University Press.

Kesler, M., Kolstad, D., & Clarke, W. (1993). Third generation R&D: the key to leveraging core competencies. *Columbia Journal of World Business*, *28*(3), 34–45.

Kim, S., & Park, H. (2013). Effects of various characteristics of social commerce (s–commerce) on consumers' trust and trust performance. *International Journal of Information Management*, *33*(2), 318–332.

Kim, T. Y., Dekker, R., & Heij, C. (2017). Cross–border electronic commerce: Distance effects and express delivery in European Union markets. *International Journal of Electronic Commerce*, *21*(2), 184–218.

Kitch, E. W. (1977). The nature and function of the patent system. *the Journal of Law and Economics*, *20*(2), 265–290.

Klein, J., Gee, D., & Jones, H. (1998). Analysing clusters of skills in R&D—Core competencies, metaphors, visualization, and the role of IT. *R&D Management*, *28*(1), 37–42.

Kljaić, Z., Pavković, D., Cipek, M., Trstenjak, M., Mlinarić, T. J., & Nikšić, M. (2023). An overview of current challenges and emerging technologies to facilitate increased energy efficiency, safety, and sustainability of railway transport. *Future Internet*, *15*(11), 347.

Knight, G. A., & Kim, D. (2009). International business competence and the contemporary firm.

Journal of International Business Studies, *40*, 255–273.
Kopalle, P. K., Kumar, V., & Subramaniam, M. (2020). How legacy firms can embrace the digital ecosystem via digital customer orientation. *Journal of the Academy of Marketing Science*, *48*, 114–131.
Kosteletou, N., & Liargovas, P. (2000). Foreign direct investment and real exchange rate interlinkages. *Open Economies Review*, *11*, 135–148.
Kottler, P., & Keller, K. L. (2009). Marketing management. *Jakarta: Erlangga*.
Krugman, P. R. (1987). Is free trade passé? *Journal of Economic Perspectives*, *1*(2), 131–144.
Kumar, V., Lahiri, A., & Dogan, O. B. (2018). A strategic framework for a profitable business model in the sharing economy. *Industrial Marketing Management*, *69*, 147–160.
Kumar, V., & Raheja, G. (2012). Business to business (b2b) and business to consumer (b2c) management. *International Journal of Computers & Technology*, *3*(3), 447–451.
Kumar, V., Sharma, A., Shah, R., & Rajan, B. (2013). Establishing profitable customer loyalty for multinational companies in the emerging economies: A conceptual framework. *Journal of International Marketing*, *21*(1), 57–80.
Kwahk, K.Y., & Ge, X. (2012, January 4–7). *The effects of social media on e–commerce: A perspective of social impact theory*. 2012 45th Hawaii International Conference on System Sciences, Maui, HI, USA.
Laaksonen, O., & Peltoniemi, M. (2018). The essence of dynamic capabilities and their measurement. *International Journal of Management Reviews*, *20*(2), 184–205.
Lal, P. (2017). Analyzing determinants influencing an individual′ s intention to use social commerce website. *Future Business Journal*, *3*(1), 70–85.
Laudon, K. C., & Traver, C. G. (2020). *E–commerce 2019: Business, technology, society*. Pearson.
Lee, J., Lee, K., & Rho, S. (2002). An evolutionary perspective on strategic group emergence: a genetic algorithm–based model. *Strategic Management Journal*, *23*(8), 727–746.
Lee, Z. W., Chan, T. K., Balaji, M., & Chong, A. Y. L. (2018). Why people participate in the sharing economy: An empirical investigation of Uber. *Internet research*, *28*(3), 829–850.
Lemley, M. A. (2004). Property, intellectual property, and free riding. *Texas Law Review*, *83*, 1031.
Lempka, R., & Stallard, P. D. (2013). *Next generation finance: Adapting the financial services industry to changes in technology, regulation and consumer behaviour*. Harriman House Limited.
Leonard‐Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, *13*(1), 111–125.
LeRoy, S. F., & Singell Jr, L. D. (1987). Knight on risk and uncertainty. *Journal of Political Economy*, *95*(2), 394–406.
Li, D., & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, *67*(1), 2793–2799.
Li, W., & Bi, L. F. (2009). 企业知识产权能力提升对自主创新的现实意义[The practical significance of improving corporate intellectual property capabilities for independent innovation]. *Commercial Times* (21), 35–36.
Li, W., & Chen, Q. L. (2011). 基于知识产权能力的企业专利综合评价指标体系[Comprehensive evaluation index system for corporate patents based on intellectual property capabilities]. *Science and Technology Management Research*, *31*(12), 146–150.
Li, W., & Xie, X. K. (2010). 企业知识产权能力的内涵和外延[The connotation and extension of corporate intellectual property capabilities]. *Science and Technology Management Research* (21), 155–158.
Lin, J., Luo, Z., Cheng, X., & Li, L. (2019). Understanding the interplay of social commerce affordances and swift guanxi: An empirical study. *Information & Management*, *56*(2), 213–

224.
Lin, P., Raj, B., Sandfort, M., & Slottje, D. (2000). The US antitrust system and recent trends in antitrust enforcement. *Journal of Economic Surveys*, *14*(3), 255–306.
Liu, A., Osewe, M., Shi, Y., Zhen, X., & Wu, Y. (2021). Cross–border e–commerce development and challenges in China: A systematic literature review. *Journal of Theoretical and Applied Electronic Commerce Research*, *17*(1), 69–88.
Liu, J., Zhan, S. W., & Li, Z. (2017). 知识产权能力, 外部知识产权保护与动漫企业创新效率[Intellectual property capabilities, external IP protection, and innovation efficiency of animation enterprises]. *Soft Science*, *31*(9), 40–44.
Liu, J., Zhan, S. W., & Wang, M. (2018). 文化创意企业知识产权能力的影响因素——基于西安市园区企业问卷调查的分析[Influencing factors of intellectual property capabilities in cultural and creative enterprises: An analysis based on a survey of enterprises in Xi'an parks]. *Forum on Science and Technology in China* (3), 124–134.
Liu, X. F., Du, H. R., & Yan, L. (2018). 我国 “985” 高校知识产权能力绩效评价[Performance evaluation of intellectual property capabilities in China's "985" universities]. *Science and Technology Management Research*, *38*(2), 65–74.
Liu, Y., Mezei, J., Kostakos, V., & Li, H. (2017). Applying configurational analysis to IS behavioural research: A methodological alternative for modelling combinatorial complexities. *Information Systems Journal*, *27*(1), 59–89.
Liu, Z., & Li, Z. (2020). A blockchain–based framework of cross–border e–commerce supply chain. *International Journal of Information Management*, *52*, 102059.
Lucking–Reiley, D., & Spulber, D. F. (2001). Business–to–business electronic commerce. *Journal of Economic Perspectives*, *15*(1), 55–68.
Lusch, R. F., & Nambisan, S. (2015). Service innovation. *Mis Quarterly*, *39*(1), 155–176.
Lutz, C., Hoffmann, C. P., Bucher, E., & Fieseler, C. (2018). The role of privacy concerns in the sharing economy. *Information, Communication & Society*, *21*(10), 1472–1492.
Lutz, C., & Newlands, G. (2018). Consumer segmentation within the sharing economy: The case of Airbnb. *Journal of Business Research*, *88*, 187–196.
Malthouse, E. C., Haenlein, M., Skiera, B., Wege, E., & Zhang, M. (2013). Managing customer relationships in the social media era: Introducing the social CRM house. *Journal of Interactive Marketing*, *27*(4), 270–280.
Manners–Bell, J., & Lyon, K. (2019). *The logistics and supply chain innovation handbook: disruptive technologies and new business models*. Kogan Page Publishers.
Mantena, R., & Saha, R. L. (2012). Co–opetition between differentiated platforms in two–sided markets. *Journal of Management Information Systems*, *29*(2), 109–140.
Maskus, K. E., & Reichman, J. H. (2005). *International public goods and transfer of technology under a globalized intellectual property regime*. Cambridge University Press.
Matsudaira, T., & Daly, M. (2022). How trade and tax policies are shaping customs. In P. Azcárraga, & A. Azaze (Eds.), *Strengthening customs administration in a changing world* (pp 33–65), International Monetary Fund.
McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal*, *38*(1), 141–160.
Medjahed, B., Benatallah, B., Bouguettaya, A., Ngu, A. H., & Elmagarmid, A. K. (2003). Business–to–business interactions: Issues and enabling technologies. *The VLDB Journal*, *12*, 59–85.
Meyer, M. (1997). *The power of product platforms*. Simon and Schuster.
Meyer, M. H., & Utterback, J. M. (1992). The product family and the dynamics of core capability. *Mit Sloan Management Review*, *34*, 77–92.
Miao, Y., Du, R., Li, J., & Westland, J. C. (2019). A two–sided matching model in the context of B2B export cross–border e–commerce. *Electronic Commerce Research*, *19*, 841–861.

Miller, A. R. (1992). Copyright protection for computer programs, databases, and computer–generated works: Is anything new since CONTU. *Harvard Law Review*, *106*, 977.

Misangyi, V. F., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., & Aguilera, R. (2017). Embracing causal complexity: The emergence of a neo–configurational perspective. *Journal of Management*, *43*(1), 255–282.

Mobasher, B., Burke, R., Bhaumik, R., & Williams, C. (2007). Toward trustworthy recommender systems: An analysis of attack models and algorithm robustness. *ACM Transactions on Internet Technology (TOIT)*, *7*(4), 23.

Moore, J. F. (1996). *The death of competition: leadership and strategy in the age of business ecosystems*. Harper Paperbacks.

Mudambi, R. (2008). Location, control and innovation in knowledge–intensive industries. *Journal of Economic Geography*, *8*(5), 699–725.

Narula, R. (1993). Technology, international business and Porter's" Diamond": Synthesizing a dynamic competitive development model. *Management International Review*, 85–107.

Nehf, J. P. (2007). Shopping for Privacy on the Internet. *Journal of Consumer Affairs*, *41*(2), 351–375.

Nemat, R. (2011). Taking a look at different types of e–commerce. *World Applied Programming*, *1*(2), 100–104.

Nevis, E. C., DiBella, A. J., & Gould, J. M. (2009). Understanding organizations as learning systems. *Knowledge, Groupware and the Internet*, *36*(2), 43–63.

Newbert, S. L. (2008). Value, rareness, competitive advantage, and performance: a conceptual‐level empirical investigation of the resource‐based view of the firm. *Strategic Management Journal*, *29*(7), 745–768.

Nistor, N., Stanciu, D., Lerche, T., & Kiel, E. (2019). "I am fine with any technology, as long as it doesn't make trouble, so that I can concentrate on my study": A case study of university students' attitude strength related to educational technology acceptance. *British Journal of Educational Technology*, *50*(5), 2557–2571.

Noor, A. D., Sulaiman, R., & Bakar, A. A. (2014, November 18‐20). *A review of factors that influenced online trust in social commerce*. Proceedings of the 6th International Conference on Information Technology and Multimedia, Putrajaya, Malaysia.

O'Donnellan, N. (1994). The presence of Porter's sectoral clustering in Irish manufacturing. *The Economic and Social Review, 25*(3), 221–232.

Ondrus, J., Gannamaneni, A., & Lyytinen, K. (2015). The impact of openness on the market potential of multi–sided platforms: a case study of mobile payment platforms. *Journal of Information Technology*, *30*(3), 260–275.

Palmer, C. (1988). Using IT for competitive advantage at Thomson Holidays. *Long Range Planning*, *21*(6), 26–29.

Pan, L. P. (2016). "开放驱动, 还是技术决定?"——开放度, 技术水平对知识产权能力与企业成长的调节作用研究[Open–driven or technology–determined? The moderating effect of openness and technology level on the relationship between intellectual property capabilities and corporate growth]. *Zhejiang Social Sciences* (10), 81–87.

Pandey, U., & Saurabh, S. (2007). *E–commerce and mobile commerce technologies*. S. Chand Publishing.

Papamitsiou, Z., Economides, A. A., Pappas, I. O., & Giannakos, M. N. (2018, March 7‐9). *Explaining learning performance using response–time, self–regulation and satisfaction from content: An fsQCA approach*. Proceedings of the 8th international conference on learning analytics and knowledge, Sydney, Australia.

Papamitsiou, Z., Pappas, I. O., Sharma, K., & Giannakos, M. N. (2020). Utilizing multimodal data through fsQCA to explain engagement in adaptive learning. *IEEE Transactions on Learning Technologies*, *13*(4), 689–703.

Pappas, I. O., Giannakos, M. N., Jaccheri, L., & Sampson, D. G. (2017). Assessing student behavior in computer science education with an fsQCA approach: The role of gains and barriers. *ACM Transactions on Computing Education (TOCE)*, *17*(2), 1–23.

Pappas, I. O., Kourouthanassis, P. E., Giannakos, M. N., & Chrissikopoulos, V. (2016). Explaining online shopping behavior with fsQCA: The role of cognitive and affective perceptions. *Journal of Business Research*, *69*(2), 794–803.

Pappas, I. O., Papavlasopoulou, S., Mikalef, P., & Giannakos, M. N. (2020). Identifying the combinations of motivations and emotions for creating satisfied users in SNSs: An fsQCA approach. *International Journal of Information Management*, *53*, 102128.

Parida, V., Oghazi, P., & Cedergren, S. (2016). A study of how ICT capabilities can influence dynamic capabilities. *Journal of Enterprise Information Management*, *29*(2), 179–201.

Park, Y., Fiss, P. C., & El Sawy, O. A. (2020). Theorizing the multiplicity of digital phenomena: The ecology of configurations, causal recipes, and guidelines for applying QCA. *Management of Information Systems Quarterly*, *44*, 1493–1520.

Park, Y., & Mithas, S. (2020). Organized complexity of digital business strategy: A configurational perspective. *Mis Quarterly*, *44*(1), 85–127.

Parker, G., Van Alstyne, M., & Jiang, X. (2017). Platform ecosystems. *Mis Quarterly*, *41*(1), 255–266.

Parker, G. (2016). *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. WW Norton & Company.

Parr, R. L. (2018). *Intellectual property: Valuation, exploitation, and infringement damages*. John Wiley & Sons.

Pei, Z., & Yan, R. (2019). Cooperative behavior and information sharing in the e–commerce age. *Industrial Marketing Management*, *76*, 12–22.

Peltier, J. W., Dahl, A. J., & Swan, E. L. (2020). Digital information flows across a B2C/C2C continuum and technological innovations in service ecosystems: A service–dominant logic perspective. *Journal of Business Research*, *121*, 724–734.

Peres, R., Muller, E., & Mahajan, V. (2010). Innovation diffusion and new product growth models: A critical review and research directions. *International Journal of Research in Marketing*, *27*(2), 91–106.

Perlmutter, S. (1998). Future directions in international copyright. *Cardozo Law's Arts & Entertainment Law Journal*, *16*, 369.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource–based view. *Strategic Management Journal*, *14*(3), 179–191.

Petison, P., & Johri, L. M. (2008). Dynamics of the manufacturer‐supplier relationships in emerging markets: A case of Thailand. *Asia Pacific Journal of Marketing and Logistics*, *20*(1), 76–96.

Pisano, G. P. (2015). You need an innovation strategy. *Harvard Business Review*, *93*(6), 44–54.

Porter, M. E.(1985). *How information gives you competitive advantage*. Harvard Business Review Press.

Porter, M. E. (1990). New global strategies for competitive advantage. *Planning Review*, *18*(3), 4–14.

Porter, M. E. (2008). *Competitive advantage: Creating and sustaining superior performance*. Simon and Schuster.

Porter, M. E. (2011). *Competitive advantage of Nations: Creating and sustaining superior performance*. Simon and Schuster.

Prahalad, C. K., & Hamel, G. (1990). *The core compefence offhe corporofion*. Harvard Business Review Press.

Prahalad, C. K. (1993). The role of core competencies in the corporation. *Research–Technology Management*, *36*(6), 40–47.

Prahalad, C. K., & Hamel, G. (2009). *Knowledge and strategy*. Routledge.
Prasad, R. (2023). Cyber borderlines: exploring the interplay between e–commerce and international trade law. *Studies in Law and Justice*, *2*(4), 1–9.
Qi, X., Chan, J. H., Hu, J., & Li, Y. (2020). Motivations for selecting cross–border e–commerce as a foreign market entry mode. *Industrial Marketing Management*, *89*, 50–60.
Ragin, C. C. (2009). *Redesigning social inquiry: Fuzzy sets and beyond*. University of Chicago Press.
Rai, A. K. (1999). Regulating scientific research: Intellectual property rights and the norms of science. *Northwestern University Law Review*, *94*, 77.
Ramasamy, B., & Yeung, M. C. (2016). The determinants of parts and components trade: the role of trust and commitment. *International Journal of Trade and Global Markets*, *9*(3), 249–271.
Ratnasingam, P. (2005). Trust in inter–organizational exchanges: a case study in business to business electronic commerce. *Decision Support Systems*, *39*(3), 525–544.
Ren, S., Choi, T. M., Lee, K. M., & Lin, L. (2020). Intelligent service capacity allocation for cross–border–E–commerce related third–party–forwarding logistics operations: A deep learning approach. *Transportation Research Part E: Logistics and Transportation Review*, *134*, 101834.
Rindova, V., & Taylor, S. (2002). Dynamic capabilities as macro and micro organizational evolution. *Robert H. Smith School of Business–Smith Papers Online*, *1*(11), 1–11.
Ritala, P., & Jovanovic, M. (2024). Platformizers, orchestrators, and guardians: Three types of B2B platform business models. In A. Aagaard (ed.), *Business model innovation: Game changers and contemporary issues* (pp. 91–125). Springer International Publishing Cham.
Rochet, J. C., & Tirole, J. (2003). Platform competition in two–sided markets. *Journal of the European Economic Association*, *1*(4), 990–1029.
Rong, K., Hu, J., Ma, Y., Lim, M., Liu, Y., & Lu, C. (2018). The sharing economy and its implications for sustainable value chains. *Resources, Conservation and Recycling*, *130*, 188–189.
Roy, D. (2013). Intellectual property strategy for competitive advantage. *International Journal of Intellectual Property Management*, *6*(1–2), 36–61.
Rugman, A. M. (1991). *Diamond in the rough: Porter and Canada's international competitiveness*. Ontario Centre for International Business.
Rugman, A. M., & D'cruz, J. R. (1993). The" double diamond" model of international competitiveness: The Canadian experience. *Management International Review*, *33*, 17–39.
Rugman, A. M., & Verbeke, A. (1993). Foreign subsidiaries and multinational strategic management: An extension and correction of Porter's single diamond framework. *Management International Review*, *33*, 71–84.
Saloner, G., Shepard, A., & Podolny, J. (2005). *Strategic management*. John Wiley & Sons.
Sanchez, R., & Heene, A. (1997). Reinventing strategic management: New theory and practice for competence–based competition. *European Management Journal*, *15*(3), 303–317.
Saridakis, C., Angelidou, S., & Woodside, A. G. (2020). What type of CSR engagement suits my firm best? Evidence from an abductively–derived typology. *Journal of Business Research*, *108*, 174–187.
Schafer, J. B., Konstan, J., & Riedl, J. (1999, November 3–5). *Recommender systems in e–commerce*. Proceedings of the 1st ACM conference on Electronic commerce, Denver Colorado, USA.
Schechter, F. I. (1926). Rational basis of trademark protection. *The Harvard Law Review*, *40*, 813.
Schermuly, L., Schreieck, M., Wiesche, M., & Krcmar, H. (2019, February 24 – 27). *Developing an industrial IoT platform–Trade–off between horizontal and vertical*

approaches. Wirtschaftsinformatik, Siegen, Germany.

Schreieck, M., Wiesche, M., & Krcmar, H. (2016, June 12–15). *Design and governance of platform ecosystems–key concepts and issues for future research*. Twenty–Fourth European Conference on Information Systems, İstanbul, Turkey.

Schumacher, R. (2012). Adam Smith's theory of absolute advantage and the use of doxography in the history of economics. *Erasmus Journal for Philosophy and Economics*, *5*(2), 54–80.

Shang, Z., Tan, S., & Ma, D. (2021). Respiratory syncytial virus: from pathogenesis to potential therapeutic strategies. *International Journal of Biological Sciences*, *17*(14), 4073.

Shanmugam, M., Sun, S., Amidi, A., Khani, F., & Khani, F. (2016). The applications of social commerce constructs. *International Journal of Information Management*, *36*(3), 425–432.

Shaw, C., Dibeehi, Q., & Walden, S. (2010). *Customer experience: Future trends and insights.* Palgrave Macmillan London.

Shree, D., Singh, R. K., Paul, J., Hao, A., & Xu, S. (2021). Digital platforms for business–to–business markets: A systematic review and future research agenda. *Journal of Business Research*, *137*, 354–365.

Sigalas, C., & Pekka Economou, V. (2013). Revisiting the concept of competitive advantage: Problems and fallacies arising from its conceptualization. *Journal of Strategy and Management*, *6*(1), 61–80.

Simon, P. (2013). *Too Big to Ignore: The Business Case for Big Data* (Vol. 89). Wiley.

Smith, H. E. (2006). Intellectual property as property: delineating entitlements in information. *Yale Law Journal*, *116*, 1742.

Smith, W. R. (1993). International economy and state strategies: recent work in comparative political economy. *Comparative Politics*, *25*(3), 351–372.

Somaya, D. (2012). Patent strategy and management: An integrative review and research agenda. *Journal of Management*, *38*(4), 1084–1114.

Somaya, D., Teece, D., & Wakeman, S. (2011). Innovation in multi–invention contexts: Mapping solutions to technological and intellectual property complexity. *California Management Review*, *53*(4), 47–79.

Song, H. F., Li, Y. G., & Qu, W. (2013). 知识产权能力测度指标体系与方法及实证研究——以某国立科研机构为例[Measurement index system and methods for intellectual property capabilities: An empirical study on a national research institution]. *Studies in Science of Science*, *31*(12), 1826–1834.

Stopford, J. M., Strange, S., & Henley, J. S. (1991). *Rival states, rival firms: Competition for world market shares*. Cambridge University Press.

Suarez, F. F. (2009). The Role of Services in Platform Markets. In A. Gawer (Ed.), *Platforms, Markets and Innovation* (pp. 123–156). Edward Elgar Publishing.

Suominen, K. (2019). *Revolutionizing world trade: how disruptive technologies open opportunities for all*. Stanford University Press.

Teece, D., & Pisano, G. (1994). The dynamic capabilities of firms: An introduction. *Industrial and Corporate Change*, *3*(3), 537–556.

Teece, D., & Pisano, G. (2003). *The dynamic capabilities of firms*. Springer.

Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533.

Thomas, H., Heene, A., & Sanchez, R. (1996). Dynamics of competence–based competition: theory and practice in the new strategic management. *Long Range Planning*, *30*(1), 141.

Thurow, L. C. (1990). The Competitive Advantage of Nations By Michael E. Porter (Book Review). *Sloan Management Review*, *32*(1), 95.

Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research commentary–Digital infrastructures: The missing IS research agenda. *Information Systems Research*, *21*(4), 748–759.

Tiwana, A. (2010). Systems development ambidexterity: Explaining the complementary and

substitutive roles of formal and informal controls. *Journal of management information systems*, *27*(2), 87–126.

Tiwana, A. (2013). *Platform ecosystems: Aligning architecture, governance, and strategy*. Newnes.

Tiwana, A., & Bush, A. A. (2014). Spotting lemons in platform markets: A conjoint experiment on signaling. *IEEE Transactions on Engineering Management*, *61*(3), 393–405.

Tkacz, E., & Kapczynski, A. (2009). *Internet–technical development and applications* (Vol. 64). Springer Science & Business Media.

Tolstoy, D., Melén Hånell, S., & Özbek, N. (2023). Effectual market creation in the cross–border e–commerce of small–and medium–sized enterprises. *International Small Business Journal*, *41*(1), 35–54.

Troisi, O., Maione, G., Grimaldi, M., & Loia, F. (2020). Growth hacking: Insights on data–driven decision–making from three firms. *Industrial Marketing Management*, *90*, 538–557.

Tsay, A. A., & Agrawal, N. (2004). Channel conflict and coordination in the e‐commerce age. *Production and Operations Management*, *13*(1), 93–110.

Tu, Y., & Shangguan, J. Z. (2018). Cross–border E–commerce: A new driver of global trade. In J. Agarwal, & T. Wu (Ed.), *Emerging issues in global marketing: A shifting paradigm*, Springer.

Ulrich, D., Brockbank, W., & Yeung, A. (1989). Beyond belief: A benchmark for human resources. *Human Resource Management*, *28*(3), 311–335.

Van den Bosch, F. A., & De Man, A. P. (1994). Government's impact on the business environment and strategic management. *Journal of General Management*, *19*(3), 50–59.

Van den Bosch, F. A., & Van Prooijen, A. A. (1992). The competitive advantage of European nations: the impact of national culture—A missing element in Porter's analysis? *European Management Journal*, *10*(2), 173–177.

Wan, X., & Chen, J. (2019). The relationship between platform choice and supplier's efficiency–evidence from China's online to offline (O2O) e–commerce platforms. *Electronic Markets*, *29*, 153–166.

Wang, C., Chen, M., Wang, Q., & Fang, Y. (2023). The study of value network reconstruction and business model innovation driven by entrepreneurial orientation. *International Entrepreneurship and Management Journal*, *19*(4), 2013–2036.

Wang, C., & Zhang, P. (2012). The evolution of social commerce: The people, management, technology, and information dimensions. *Communications of the Association for Information Systems*, *31*(1), 5.

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, *9*(1), 31–51.

Wang, H. (2018). 文化企业的知识产权能力如何提升[How to improve the intellectual property capacity of cultural enterprises]. *People's Tribune* (2), 3.

Wang, J. C. (2007). 应高度重视培育和发展知识产权能力[Great importance should be attached to cultivating and developing intellectual property capabilities]. *China Economic and Trade Herald* (9), 36–36.

Wang, Q. X. (2006). 云南中药产业应提升知识产权能力[Yunnan's traditional Chinese medicine industry should enhance intellectual property capabilities]. *Medical Industry Information* (4), 84–85.

Wang, Y., & Hajli, M. (2014, August 7–9). *Co–creation in branding through social commerce: The role of social support, relationship quality and privacy concerns*. Proceedings of Twentieth Americas Conference on Information Systems, Savannah, Georgia, USA,

Wang, Y., Jia, F., Schoenherr, T., Gong, Y., & Chen, L. (2020). Cross–border e–commerce firms as supply chain integrators: The management of three flows. *Industrial Marketing Management*, *89*, 72–88.

Wang, Y., & Yu, C. (2017). Social interaction–based consumer decision–making model in social commerce: The role of word of mouth and observational learning. *International Journal of Information Management*, *37*(3), 179–189.

Wangwe, S. (1993). *New trade theories and developing countries: Policy and technological implications* (Vol. 7). United Nations University.

Wei, G. P., & Huang, Y. P. (2015). 中国战略性新兴产业知识产权能力与竞争优势培育 [Cultivation of intellectual property capabilities and competitive advantages in China's strategic emerging industries]. *Journal of Nanjing University of Political Science* (6), 42–46.

Wernerfelt, B. (1989). From critical resources to corporate strategy. *Journal of General Management*, *14*(3), 4–12.

Westmore, B. (2013). *R&D, patenting and growth: The role of public policy*. OECD Publishing.

Wiesche, M., Schermann, M., & Krcmar, H. (2011, September 22–24). *Understanding the role of information technology for organizational control design: Risk control as new control mechanism. governance and sustainability in information systems*. Managing the Transfer and Diffusion of IT: IFIP WG 8.6 International Working Conference, Hamburg, Germany

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, *24*(10), 991–995.

WIPO. (2020). *What is intellectual property.* World Intellectual Property Organization.

Wirtz, J., So, K. K. F., Mody, M. A., Liu, S. Q., & Chun, H. H. (2019). Platforms in the peer–to–peer sharing economy. *Journal of Service Management*, *30*(4), 452–483.

Wu, J. H., & Yuan, X. D. (2016). 我国军工企业知识产权能力评估方法与实证研究 [Evaluation methods and empirical research on intellectual property capabilities in China's military–industrial enterprises]. *Journal of Information*, *35*(4), 152–159.

Wu, W. (2022). Analyzing the construction of the international logistics supply chain management model from the perspective of cross–border E–commerce. *Journal of Electronic Research and Application*, *6*(3), 26–30.

Xiao, Y. G., Liu, J., Li, R., & Xiang, Z. M. (2006). Analysis on the intellectual property rights capability of IT enterprises in Shenzhen. *The Journal of Electronic Science and Technology*, *4*(4), 429–433.

Xie, Q. J., Feng, C. J., & Song, W. (2019). 合作网络,知识产权能力与区域自主创新程度:一个有调节的中介模型[Cooperative Networks, IP capabilities and regional degree of independent innovation: A moderated intermediary model]. *Science Research Management*, *40*(11), 10.

Xie, R., Huang, H., Zhang, Y., & Yu, P. (2022). Coupling relationship between cold chain logistics and economic development: A investigation from China. *PloS One*, *17*(2), e0264561.

Xu, K., Liu, H. B., & Xiao, B. (2019). 基于轻型知识产权的服务型国企知识产权能力培育——以北京公交集团为例[Cultivation of intellectual property capabilities in service–oriented state–owned enterprises based on lightweight IP: A case study of Beijing Public Transport Group]. *Modern Management*, *39*(2), 45–47.

Xue, W., Li, D., & Pei, Y. (2016, May 26–28). *The Development and current of cross–border E–commerce*, WHICEB 2016, Wuhan, China.

Yadav, N. (2014). The role of internet use on international trade: Evidence from Asian and Sub–Saharan African enterprises. *Global Economy Journal*, *14*(2), 189–214.

Yahia, I. B., Al–Neama, N., & Kerbache, L. (2018). Investigating the drivers for social commerce in social media platforms: Importance of trust, social support and the platform perceived usage. *Journal of Retailing and Consumer Services*, *41*, 11–19.

Yetton, P., Craig, J., & Davis, J. (1992). Are diamonds a country's best friend? A critique of

Porter's theory of national competition as applied to Canada, New Zealand and Australia. *Australian Journal of Management*, *17*(1), 89–119.

Yu, L. Y., Cao, X. Y., & Wang, L. (2021). 企业知识产权能力演进阶段研究[Research on the evolutionary stages of corporate intellectual property capabilities]. *Science and Technology Management Research* (6), 156–160.

Yu, L. Y., Chen, W., & Wang, L. (2020). 企业知识产权能力系统耦合机理研究[Research on the system coupling mechanism of corporate intellectual property capabilities]. *Science and Technology Management Research* (15), 182–186.

Yu, L. Y., & Li, J. L. (2017). 基于 SEM 的企业知识产权能力影响因素测度[Measurement of influencing factors of corporate intellectual property capabilities based on SEM]. *Journal of Industrial Technological Economics* (1), 146–151.

Zaheer, A., & Bell, G. G. (2005). Benefiting from network position: Firm capabilities, structural holes, and performance. *Strategic Management Journal*, *26*(9), 809–825.

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, *43*(4), 917–955.

Zhang, H., Lu, Y., Gupta, S., & Zhao, L. (2014). What motivates customers to participate in social commerce? The impact of technological environments and virtual customer experiences. *Information & Management*, *51*(8), 1017–1030.

Zhang, M., & Du, Y. Z. (2019). 组织与管理研究中 QCA 方法的应用:定位,策略和方向[Application of QCA Methods in Organization and Management Research: Positioning, Strategy and Direction]. *Chinese Journal of Management*, *16*(9), 12.

Zhang, X. Y., & Zhang, X. (2019). 政府专利奖励促进了中小企业绩效吗?———基于知识产权能力调节作用的实证检验[Do government patent rewards improve the performance of small and medium–sized enterprises? An empirical test based on the moderating role of intellectual property capabilities]. *Science and Technology Management Research* (8), 134–140.

Zhang, Y. H., Xue, P. Z., & Yang, Y. H. (2016). 西安高新技术产业知识产权能力评价与比较分析[Evaluation and comparative analysis of intellectual property capabilities in Xi'an high–tech industries]. *Forum on Science and Technology in China* (6), 88–95.

Zhao, X. C., & Ding, L. L. (2013). 基于 SVR 的区域知识产权能力综合评价研究[Comprehensive evaluation of regional intellectual property capabilities based on SVR]. *Science and Technology Management Research*, *33*(10), 146–150.

Zhao, X. C., & Yang, X. (2013). 基于单项指标的我国生物医药产业知识产权能力评价[Evaluation of intellectual property capabilities in China's biopharmaceutical industry based on single indicators]. *Science and Technology Management Research*, *33*(6), 151–154.

Webliography

Alcácer, J., Beukel, K., & Cassiman, B. (August 27, 2015). *Capturing value from IP in a global environment*. Harvard Business School. Retrieved April 1, 2024 from https://www.hbs.edu/ris/Publication%20Files/17-068_f95fdbcc-6541-4df6-bef1-2bb13febaf08.pdf

Beijing Municipal Intellectual Property Office. (November 5, 2021). *多管齐下加强跨境电商知识产权保护[Multi-pronged approach to strengthen intellectual property protection in cross-border e-commerce]*. China Intellectual Property News. Retrieved May 1, 2024 from https://zscqj.beijing.gov.cn/zscqj/sjd/mtfb21/11143713/index.html

Cecere, L., Owyang, J., Li, C., Etlinger, S., & Tran, C. (November 1, 2010). *Rise of social commerce: A trail guide for the social commerce pioneer*. Altimeter Group. Retrieved April 10, 2024 from http://supplychainshaman.com/wp - content/uploads/2010/11/ rise_of_social_commerce_ final.pdf

Evans, P. C., & Gawer, A. (January 14, 2016). *The rise of the platform enterprise: A global survey*. The Center for Global Enterprise. Retrieved April 10, 2024 from https://www.thecge.net/app/uploads/2016/01/PDF-WEB-Platform-Survey_01_12.pdf

Hopkins, J. (October 11, 2022). *3 C's of Social Media Marketing: Content, Community & Commerce*. Hubspot. Retrieved May 2, 2024 from https://blog.hubspot.com/blog/tabid/6307/bid/15948/3-c-s-of-social-media-marketing-content-community-commerce.aspx

Johnson Intellectual Property Agency. (February 23, 2023). *The 2nd CCBEC China (Shenzhen) Cross-Border E-Commerce Development Summit-Intellectual Property Special Forum*. TIIP International Forum. Retrieved May 1, 2024 from The 2nd CCBEC China (Shenzhen) Cross-Border E-Commerce Development Summit-Intellectual Property Special Forum was held successfully – Johnson IP

Leamer, E. E. (January 13, 1992). *Testing trade theory*. National Bureau of Economic Research. Retrieved May 5, 2024 from https://www.nber.org/papers/w3957.

Manyika, J. (May 1, 2011). *Big data: The next frontier for innovation, competition, and productivity*. McKinsey Global Institute. Retrieved May 2, 2024 from https://www. mckinsey.com/capabilities/mckinsey-digital/our-insights/big-data-the-next-frontier-for-innovation

Mero, K. (August 12, 2022). *E-Commerce*. Studocu. Retrieved May 27, 2024 from https://www.studocu.com/row/document/girne-amerikan-universitesi/electronic-circuits-i/ecommerce/9184918

Tripathi, A. (June 6, 2023). *The impact of e-commerce on international business: A comparative study of traditional and online business models*. Seinäjoki University Of Applied Sciences. Retrieved May 3, 2024 from https://www.theseus.fi/bitstream /handle/10024/811217/ Tripathi_Arun.pdf?sequence=2

Winterman, D., & Kelly, J. (2013, September 16). *Online shopping: The pensioner who pioneered a home shopping revolution*. BBC. Retrieved May 3, 2024 from *https://www.bbc. co. uk/news/magazine-24091393*.