External knowledge absorption in Chinese SMEs

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1 Innovation and External Knowledge Absorption

Organizations are nowadays facing an increasingly dynamic environment both within and beyond their organizational boundaries. Companies are forced to try to realize their full potential to meet conflicting demands from different stakeholders (cf. Pache and Santos 2010, Hadi 2017). In the business world, the task of satisfying the needs of end-users has become increasingly urgent as new technologies and innovations continuously emerge and customers become progressively demanding. Even the established big companies cannot merely rely on their own knowledge and capabilities to meet the demand of the end-users. Increasing labor mobility, abundantly available venture capital, and widely dispersed knowledge across multidisciplinary fields motivate organizations to engage with their external environment for knowledge creation and innovation (cf. Chesbrough 2003, van de Vrande, Vareska *et al.* 2009, Dingler and Enkel 2016).

This chapter provides a run-up and an overview of the entire thesis. Section 1.1 provides the broad background of this study. Then, we formulate our Problem Statement (PS) in Section 1.2, followed by three Research Questions (RQs) in Section 1.3. With the PS formulated and the RQs raised, our study's focus, external knowledge absorption in SMEs, is set. The methodology of the study is described in Section 1.4. Finally, we describe the structure of the study in Section 1.5.

1.1 Research Backgrounds

This section deals with the backgrounds of the study. We discuss knowledge and competitive advantages in Subsection 1.1.1. Then we deal with knowledge management (KM) across organizational boundaries in Subsection 1.1.2. Subsection 1.1.3 introduces the concept of absorptive capacity (AC). In Subsection 1.1.4, the importance of SMEs in economies is discussed. Then we link AC and SMEs in Subsection 1.1.5.

1.1.1 Knowledge and Competitive Advantages

Knowledge has become the critical driving factor of modern economies (cf. Keep 2000, cf., Andersson *et al.* 2009, Antonelli and Fassio 2016). It is widely recognized by scholars in various scientific fields (e.g., innovation studies, entrepreneurship studies, and science and technology studies) that knowledge lies at the center of building up competitive advantages in organizations and economies (e.g., Grant 1996, 2002, Fagerberg *et al.* 2012, Dima *et al.* 2018).

To handle the concept of knowledge resources, we have to agree on the definition of knowledge. In our study, knowledge (see Definition[1] 1.1) is defined as follows.

Definition 1.1: Knowledge

> *Knowledge* is defined as "a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information" (Davenport and Prusak 1998, p. 5).

Knowledge is often generated and applied in the minds of human beings, persons who know what they are talking about. According to Davenport and Prusak (2000), knowledge is embedded in routines, processes, practices, and norms, as well as in documents and repositories.

In academia, KM (see Definition 1.2) has become a multidisciplinary research subject. KM has been studied by scholars in a variety of fields. Here we mention business management (e.g., Long and Fahey 2000, Hislop *et al.* 2018), innovation management (cf. Stuermer *et al.* 2009, Dahlander and Gann 2010, 2010, Faems *et al.* 2010), information systems (e.g., Schultze and Leidner 2002, Vernadat *et al.* 2018), and information and library science (e.g., Al-Alawi and Chaudhry 2013, Marouf 2017).

[1] All definitions in this dissertation are provided in the context of our research. For understanding the background of the definitions, we provide relevant references. Our study does not aim to launch a discussion on the philosophical aspects of the definitions. Our claim is that they should be "workable" definitions.

Many new corporate strategies and tactics that are developed around the question of how to improve KM capabilities have been advocated by scholars. Many of them turned out to be well received in management practice and have been successfully implemented. Moreover, a large number of companies have invested substantial efforts in building up KM practices to boost knowledge creation and utilization. Usually, the KM practices are embedded in one of the wide concepts of the business structure, e.g., information technology (IT) infrastructure, human resource management (HRM), business networks, and other business practices (cf. Addicott *et al.* 2006, Durst and Runar Edvardsson 2012, Cabrilo and Leung 2019).

Definition 1.2: Knowledge Management

Knowledge management (KM) is the "deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation. This coordination is achieved through creating, sharing, and applying knowledge as well as through feeding the valuable lessons learned and best practices into corporate memory in order to foster continued organizational learning" (Dalkir 2017, p. 3).

Already fifty years ago, the resource-based view on firms treated knowledge as one of the crucial resources that would lead to organizational competitive advantage (e.g., Wernerfelt 1984, Barney 2001, Kraaijenbrink *et al.* 2010). The knowledge-based view goes one step further. It recognizes knowledge as the most strategically valuable resource. As knowledge usually is socially complicated and difficult to copy, the knowledge-based view argues that seeking to obtain and master different kinds of knowledge and capabilities is the key to superior organizational performance and competitive advantages (cf. Grant 1996, Darroch 2005, North and Kumta 2018, Bloodgood 2019).

KM researchers have devoted efforts to enhance our understanding of how organizations identify and leverage collective knowledge with the goal to increase innovativeness and responsiveness for competition (e.g., Gupta and Sharma 2004, Girard 2015). For this purpose, Chesbrough advocates an open innovation model. Firms

should purposively use "inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough 2003, p. 2). Many studies have established that firms employing the open innovation strategy tend to have a better performance than those not having an open innovation strategy (e.g., Laursen and Salter 2006b, Du *et al.* 2014, Rauter *et al.* 2019).

A large number of empirical studies indicate that a firm's KM capability increases its dynamic capability. In turn, the dynamic capability enhances the firm's performance and provides competitive advantages (e.g., Tseng and Lee 2014, Lu and Liang 2017, Najmi *et al.* 2018). The concept of dynamic capabilities is defined as follows (Definition 1.3).

Definition 1.3: Dynamic Capabilities

Dynamic capabilities (DC) are "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece *et al.* 1997, p. 516).

1.1.2 Knowledge Management across Organizational Boundaries

Worldwide, many firms invest substantially in collaboration with external partners to tap external sources of knowledge. Large multinational firms such as Cisco, IBM, Intel, Procter & Gamble, DuPont, and Philips have been viewed as their role models. For example, Cisco has already 20 years ago transformed itself successfully into a platform leader in the industry, relying exclusively on external R&D and open standards (see Gawer and Cusumano 2002). Moreover, Japanese firms are also known for their abilities to orchestrate close relations with their suppliers, customers, and even competitors for knowledge sharing and collective innovation (cf. Dyer 1997, Dyer and Nobeoka 2000, Zhu *et al.* 2010, Khojasteh and Abdi 2016).

When we look at governments across the world, then we see that they are also increasingly aware of the value of (1) improving the knowledge circulation in economic activities and (2) devising strategies to encourage a knowledge flow across boundaries of public and private entities. The European Commission, together with a group of national research funders, has launched a plan to open up publicly funded research (see

Thornton 2018). They aim to make it freely and openly accessible to the public from 2020 onwards. In fact, the United States of America has initiated this idea by requiring that federal funding agencies should make federally funded research accessible to the public, industry, and the scientific community in an open and free manner (see Holdren 2013). This being so, we see that more proactive knowledge sharing activities are also going on in the private sector. For instance, Tesla Motors has decided it will share all its patents with anyone who will use them properly, even to competitors (see Ramsey 2014). Following the decision by Tesla, the companies Toyota, LG group, Panasonic Facebook, and Bitstream announced that they would share their technology in all or some specific areas for free. Similarly, Google, DuPont, IBM, GE, and Pfizer have taken the same steps to share their technology with others (see Chien 2015).

The inter-organizational knowledge sharing activities are partially boosted by various new IT infrastructures (see Definition 1.4) and technologies.

Definition 1.4: Information Technology Infrastructure

The information technology (IT) Infrastructure is defined as a set of IT components that are the foundation of an IT service. Typically they are physical components (e.g., supercomputers, network connection facilities), and various software and network components belong to them (adapted from Wikipedia 2020).

The advancement of the IT infrastructure, e.g., cloud computing, the internet of things (IoT), and artificial intelligence (AI), makes access to various sources of external knowledge much easier, cheaper, and faster. Nowadays, a variety of information and knowledge is stored across different organizations and media. By investing in the KM system and facilities, firms can better leverage knowledge creation, sharing, and utilization within and across organizational boundaries, which in turn increases their innovation capabilities (cf. López-Nicolás and Merono-Cerdán 2011, Santoro *et al.* 2018).

The value of new knowledge can be realized or multiplied if they are shared and utilized in different entities. For instance, a variety of organizations are willing to utilize external knowledge. They are also prepared to share their own knowledge to fully realize its potential. The advancement of the IT infrastructure makes that the knowledge which is traditionally isolated in various organizational boundaries is now much more accessible. It is particularly beneficial to small and medium-sized enterprises (SMEs) (Definition 1.5).

Definition 1.5: Small and Medium-sized Enterprises

Small and medium-sized enterprises (SMEs) are businesses of which the personnel numbers fall below certain limits. This study refers to SMEs as the firms employing up to 300 workers, with the following breakdown: micro (1 to 10), small (11 to 100), and medium (101-300).

1.1.3 Absorptive Capacity

Scholars in the innovation network stream suggest that firms should "seek to create value and extract value from the network" (Dhanaraj and Parkhe 2006, p. 659). Cohen and Levinthal (1989, 1990) advocate that organizations need to develop their own AC in order to better benefit from accessing external knowledge. The definition of AC in this study is defined as follows (see Definition 1.6).

Definition 1.6: Absorptive Capacity

Absorptive capacity (AC) is defined as various organizational capabilities that allow the organization to quickly "recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen and Levinthal 1990, p. 128).

Scholars who advocate dynamic capabilities of firms consider the AC as an essential element of dynamic capabilities (e.g., Zahra and George 2002, Adner and Helfat 2003). Many studies have provided evidence that the ability of firms to absorb external knowledge significantly influences their innovative capability and firm performance (e.g., Caloghirou *et al.* 2004, Liao *et al.* 2007, Berchicci 2013, Vrontis *et al.* 2017 etc.).

Three Essential Processes

According to Cohen and Levinthal (1990), AC is considered to contain three essential processes. The first process is *external knowledge recognition (EKR)* (see Definition 1.7). It involves a variety of activities, including (1) searching for potential external knowledge by scanning the environment to check whether there is new knowledge, (2) evaluating the external knowledge with certain criteria, (3) determining what to assimilate and how to do it based on the evaluation.

Definition 1.7: External Knowledge Recognition

External knowledge recognition (EKR) is a process of searching for external knowledge candidates and evaluating the potential of specific external knowledge with certain criteria (adapted from Cohen and Levinthal 1990).

The second process is *external knowledge assimilation (EKA)* (see Definition 1.8). It refers to the organizational practice of (1) getting access to the intended external knowledge, (2) acquiring it, and (3) combining it with the existing knowledge base in the firm.

Definition 1.8: External Knowledge Assimilation

External knowledge assimilation (EKA) is a process of accessing potential external knowledge sources, acquiring the intended knowledge, transforming it if necessary, and combining it with the existing knowledge base (adapted from Cohen and Levinthal 1990).

The third process is *external knowledge utilization (EKU)* (see Definition 1.9). It is the process of realizing the value of the assimilated knowledge by using it to meet a practical or particular purpose, for example, translating it into new or improved products and services, lower costs, or better customer satisfaction.

Definition 1.9: External Knowledge Utilization

External knowledge utilization (EKU) is a process of realizing the value of the assimilated knowledge by using it to meet a practical or particular purpose (adapted from Cohen and Levinthal 1990).

Since its origin, the AC framework has been applied to analyze how AC behave in the fields of strategic management (e.g., Lenox and King 2004, Lichtenthaler 2016), technology and innovation management (e.g., Stock *et al.* 2001, Zobel 2017), international business (e.g., Lane *et al.* 2001, Peng and Lin 2019), entrepreneurship management (e.g., Gray 2006, Sakhdari and Burgers 2018), information system (e.g., Roberts *et al.* 2012, Cooper and Molla 2017), and organizational economics (e.g., Durham 2004, Kharabsheh *et al.* 2017). Our study see AC as one aspect of DC (see Subsection 2.1.4 Dynamic Capabilities and Fig. 2.2 in Subsection 2.1.5 Embedding AC in Other Theories)

1.1.4 SMEs in China

SMEs play essential roles in enhancing social well-being and economic development. SMEs represent 99% of all businesses and generate about 60% of employment in the OECD area (see OECD and Outlook 2019). According to the annual report on European SMEs 2018/2019, SMEs accounted for 99.8% of all enterprises in the EU-28[2] non-financial business sector (NFBS), generating 56.4% of value-added and 66.6% of employment in the NFBS (see Hope *et al.* 2019). According to the World Bank, in emerging markets, most formal jobs are generated by SMEs, which create 7 out of 10 jobs (see World Bank 2020).

SMEs are particularly important in developing countries as developing countries are in great need of eradicating poverty, creating employment, increasing per-capita income in order to realize economic growth and development. Taking China as an example, it has experienced very fast economic growth since its market reform in 1978. SMEs have

[2] The EU-28 is the abbreviation of European Union (EU) which consists a group of 28 countries: https://www.igi-global.com/dictionary/employment-in-innovation-performance/58384

been the primary engine of China's economic development (cf. Cunningham 2011, Deng and Zhang 2018). According to China's Fourth Economic Census (2019), the roles of SMEs in China's economic development and social progress are clearly visible (see Table 1.1) and still growing. China had over 18 million SMEs by the end of 2018, which accounted for 99.8% of all businesses or corporate legal entities. They created more than 233 million jobs, which accounted for nearly 80% of the total corporate employment in China. Most of the SMEs in China are in the non-high-tech sectors such as wholesale and retail, manufacturing, and service industry.

Table 1.1: SMEs in China's Economy

Total number of SMEs	Percentage of SMEs to all corporations	Jobs created by SMEs	Percentage of SME employment to all corporate employment
18 million	99.8%	233 million	80%

Source: Fourth Economic Census of China (2019)

China saw that the number of technology-based firms had increased significantly in recent years (see Table 1.2)[3]. In 2018, the number of SMEs in the communication, software, and IT industry was more than three times bigger than it had been in 2013, reaching 0.91 million. Its proportion to the total number of SMEs was doubled. The number of SMEs focusing on scientific research and technology services has increased by 2.5 times since 2013, reaching 1.14 million in 2018. Its proportion to the total number of SMEs in 2018 is about 2.5 times as big as in 2013. The trend indicates that SMEs have played an increasingly important role in the innovation and technological development of China.

Table 1.2: Trends of Technology-based SMEs in China

Technology-based SMEs in Different Industry	Total Number		Percentage of Total SMEs	
	2013	2018	2013	2018
Communication, software, and IT	0.22 million	0.91 million	2.6%	5%
Scientific research and technology	0.33 million	1.14 million	2.6%	6.3%

Source: Fourth Economic Census of China (2019)

[3] We performed this research in the years 2015-2020. Our information gathering has been performed before the outbreak of Covid-19. This implies that we have not taken into account the disruptive break in economic activities. We have included the general trend in our final conclusion.

SMEs are particularly important in developing countries as developing countries are in great need of eradicating poverty, creating employment, increasing per-capita income in order to realize economic growth and development. However, developing countries are usually prone to fragile institutions, harsh business environments, complex economic and social problems compared with developed countries (cf. Sorasalmi and Tuovinen 2015, Bilal *et al.* 2016). For instance, despite significant development, SMEs in China continue to face institution-based barriers such as unfair competition, the weak rule of law, inadequate intellectual property protection, insufficient support system, etc. (cf. Zhu *et al.* 2012, Huang 2017, Jia *et al.* 2020).

Except for formal institutions such as legal and regulatory systems, informal institutions play an essential role in business management in China and other developing countries (cf. Chan *et al.* 2015, Hitt and Xu 2016, Bian 2019). Chinese SMEs operate in the context of Chinese culture (see Wu and Tseng 1985, Yau 1988, Fan 2000) and are governed by its underlying core values that distinguish Chinese society from western societies. For instance, Confucianism is one of the most influential thoughts that form the foundation of the Chinese culture and provides guidelines for social and business behavior (see Bell *et al.* 2003, Yao 2008, Bell 2010). Influenced by the culture, the Chinese exhibit a relatively more calm, silent, and obedient character than their western counterparts. When applied to business management, it shows a paternalistic management style and emphasizes guanxi in the Chinese business community (cf. Li and Moreira 2009, Bian 2019).

1.1.5 Absorptive Capacity and SMEs

In innovation studies, SMEs have already been considered, for a long time, as essential players in generating, applying, and disseminating innovations within local economies (cf. Curran and Blackburn 1994, Simmie 2002, Liu *et al.* 2010b). Notably, in the science-driven sectors, such as nanotech and biotech, SMEs have been the primary sources of many radical innovations (cf. Genet *et al.* 2012, Cusmano *et al.* 2018).

Due to a lack of internal resources and competencies when compared to larger companies, it is difficult for SMEs to rely only on internal resources and knowledge to innovate. Thus, SMEs have a strong motivation to absorb external knowledge and adopt more open innovation practices (cf. Sağ *et al.* 2016, Kraus *et al.* 2020). Participation in innovation networks has been offered as a solution for absorbing the needed knowledge and competencies.

As SMEs have to deal with the liability of smallness and the resultant resource shortage, SMEs exhibit different characteristics in how they absorb external knowledge (cf. Gray 2006, Lee *et al.* 2010, Huang *et al.* 2015b). To integrate the new knowledge learned by employees in a strategic alliance into the existing knowledge base, a company must establish certain standards and routines. These specific standards and routines are less likely to exist in SMEs than in big firms. Thus resource constraints incentivize SMEs to rely on less expensive and less risky alternatives than formal in-house R&D (cf. Dahlander and Gann 2010, Spithoven *et al.* 2013). Some researchers (e.g., Huang *et al.* 2015a) have indicated that, if managed well, SMEs may benefit more from external networking than large companies.

However, the specific countries' formal and informal institutions may affect how and how effectively firms can share knowledge between their member employees and learn from other companies in the environment (cf. Weir and Hutchings 2005, Latukha and Veselova 2019). The theoretical foundations of KM and AC studies are mainly based on western experiences. How companies in developing countries absorb external knowledge deserve more attention from scholars. As one of the biggest and most rapidly developing economies, the Chinese case will be more valuable and relevant to other developing countries. Thus, our investigation will be focused on the Chinese experience of SMEs.

1.2 Problem Statement

Knowing how KM works across organizational boundaries (see Section 1.1), we would like to investigate how SMEs absorb knowledge from external sources. In this

regard, scholars are aware of the gain and potential costs of utilizing external knowledge (cf. Dahlander and Gann 2010, Wales *et al.* 2013). Moreover, merely gaining much exposure from external knowledge sources does not suffice for assimilating and utilizing them successfully (cf. Escribano *et al.* 2009, Enkel *et al.* 2017).

Though some specific factors that influence organizational AC and outcomes of organizational AC efforts have been uncovered, and different processes of AC have been distinguished, research has neglected how organizations engage in absorbing new knowledge throughout the phases of the AC process. Our knowledge of what companies do in each phase, what challenges they face, and how effectively they can absorb intended external knowledge remains scant. We lack detailed insights into how companies progress through the processes of identifying valuable knowledge, ensuring its assimilation and acceptance, and, ultimately, ensuring the exploitation of new knowledge. Such a knowledge gap constrains our understanding of how different organizational knowledge-absorption processes emerge, interact, and evolve.

Compounding this issue, the initial theory development of AC has been based mainly on the big firms, which is mostly manifested in the fact that many authors treat AC as a byproduct of R&D activities and use R&D-related indicators to represent AC (cf. Cohen and Levinthal 1990, George *et al.* 2001, Aldieri *et al.* 2018). However, most SMEs are in non-technology industries. And even in the technology-based industries, SMEs tend to lack resources to invest heavily in R&D (cf. Narula 2004, Väyrynen *et al.* 2017). Thus, the conclusions reached from AC studies on big firms may not apply to SMEs.

It is well known that SMEs operate differently from the way that big companies follow. Smaller firms tend to be more flexible, have a short chain of command, operate in a relatively informal way, and are thus more sensitive to market changes. As small firms grow big, they are likely to become more bureaucratic. Big firms tend to have a more complicated structure, formal communication, formal management styles, and a more predefined list of activities and tasks (cf. Hill and Stewart 2000, Lazarević-Moravčević *et al.* 2014, Lai *et al.* 2016). Therefore, the AC of SMEs deserves special

attention from researchers. Hence, more studies should look into how SMEs deal with external knowledge.

In summary, SMEs operate differently as big companies in how they collaborate with external partners for innovation. Our knowledge of how SMEs deal with external knowledge in each of the AC phases is still not sufficient. AC of SMEs deserves special attention. Based on the analysis, we formulate the following PS of the dissertation.

PS: *How do SMEs deal with external knowledge in order to improve firm performance?*

There is a variety of directions we can work on in order to enhance our understanding of the stated problem. We take the perspective of AC and its processes in SMEs. Our study is focused on the following three goals: (1) to understand the way how SMEs absorb external knowledge, (2) to identify the potential challenges SMEs face in the knowledge-absorbing processes, and (3) to assess the impacts of different knowledge assimilation mechanisms on the performance.

1.3 Research Questions

By formulating the PS and identifying the three goals of our study, we now formulate three RQs as the target of our investigation.

Our first goal is to understand how SMEs absorb external knowledge. SMEs operate differently from the way that big companies follow, and our understanding of how SMEs absorb external knowledge in each of the AC phases is still not sufficient. The AC of SMEs deserves special attention from scholars. Thus, the first RQ is phrased as follows.

RQ 1: *How do SMEs absorb external knowledge?*

The second goal of our study is to identify the specific challenges SMEs may face in their knowledge-absorbing processes. According to the analysis in Section 1.2, SMEs operate differently from large companies and may face unique challenges when dealing with external knowledge. Thus, the second RQ is expressed as follows.

RQ 2: *What challenges do SMEs face when absorbing external knowledge?*

Our third goal is to investigate the impact of different knowledge assimilation mechanisms on the performance of SMEs. By answering RQ 1, it is expected that crucial mechanisms that SMEs utilize to assimilate external knowledge can be identified. Then, our investigation proceeds to test which knowledge assimilation mechanisms may have a positive impact on organizational performance. Hence, we phrase the third RQ as follows.

RQ 3: *Which knowledge assimilation mechanisms do have an impact on the performance of SMEs?*

1.4 Research Methodology

According to the different nature of the three RQs, we utilize different methodologies to address them.

The examination of RQ 1 regarding how SMEs absorb external knowledge is described in Chapter 3. The goal of the examination is to generate insights into what SMEs do in each of the essential phases of their knowledge-absorbing processes. It has an exploratory and qualitative nature. We designed a semi-structured interview scheme that covers questions related to RQ 1 and conducted in-depth interviews with 16 SMEs in China. All the interviews were recorded and transcribed into text. The content of the text was analyzed systematically using qualitative research techniques, including grounded theory and content analysis. The text notes were analyzed with professional qualitative data analysis software MAXQDA[4].

The investigation of RQ 2 is described in Chapter 4 and regards what challenges SMEs may face in their knowledge-absorbing processes. Here we adopted the same method and processes as in the examination of RQ 1. Semi-structured questions on the perceived challenges of SMEs are added to the 16 interviews mentioned above. The data collection and analysis processes are similar to the ones described above.

[4] MAXQDA is a software program designed for computer-assisted qualitative and mixed methods data, text and multimedia analysis in academic, scientific, and business institutions. See further information at https://www.maxqda.com/.

To answer RQ 3, we tested if the different knowledge assimilation mechanisms identified by the qualitative study (described in Chapter 5) may have an impact on the performance of SMEs. We designed a survey to measure the intensity of each of the knowledge assimilation mechanisms in the SMEs and their respective performances. Their relations are tested with linear regression analysis with the Statistical Package for Social Science (SPSS). The data was based on 221 Chinese SMEs in various industries and areas of China.

1.5 Structure of the Dissertation

Chapter 1 introduces the background of this study and embeds the research topic in the AC field. The PS is formulated, and three RQs are raised accordingly. The research methods used to address each RQs are introduced. The overall structure of this dissertation is presented at the end of the chapter.

Chapter 2 presents an extensive literature review to position the AC study in related theories. We review four theories that underpin the theoretical origin of the AC study. The relations between these fields and AC are discussed. Then it provides a review of major topics within the existing AC literature and the AC studies that are focused on SMEs.

Chapter 3 presents our examination on RQ 1 regarding how SMEs absorb external knowledge in terms of its recognition, assimilation, and utilization. Accordingly, the investigation is divided into examining three sub-RQs regarding (1) How do SMEs recognize external knowledge? (2) How do SMEs assimilate external knowledge, and (3) How is external knowledge utilized in SMEs? Specifically, it examines the criteria that SMEs use to evaluate external knowledge, the mechanisms they use to assimilate external knowledge, and their purposes of utilizing external knowledge.

Chapter 4 provides an examination of RQ 2: What challenges do SMEs face when absorbing external knowledge? It attempts to reveal the frictions or barriers that SMEs face in their knowledge absorbing absorptive processes, which include factors that

hinder the processes of absorbing external knowledge or making the processes more difficult or costlier.

Chapter 5 proceeds to investigate the performance implications of the way that how SMEs assimilate external knowledge (RQ 3). In Chapter 3, we are able to identify five external knowledge assimilation (EKA) mechanisms that SMEs often use. Based on the findings, we proceed to explore whether these EKA mechanisms can affect the performance of SMEs with a quantitative approach.

In Chapter 6, the conclusion of the study is provided. Based on the findings of previous chapters, it summarizes and provides answers to the three RQs and PS. The theoretical and managerial implications of the study are discussed. Contributions and potential limitations and constraints of our study are pointed out. Finally, the chapter provides three possible avenues for future studies.