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Factors influencing the development of radical innovation capabilities in small and medium enterprises

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Master's thesis

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Abstract

Organizations need to innovate in order to gain competitive advantage. Due to the fast-changing conditions of markets, firms maintain their survival through the creation of innovations. More specifically, the development of radical innovations disrupts markets and enables firms to differentiate themselves from competitors. Small and medium enterprises (SMEs) in particular can develop radical innovations in order to compete against their larger counterparts. This thesis focuses on SME radical innovation capability, i.e. the ability of SMEs to develop radical innovations. The thesis examines what internal and external factors influence the development of radical innovation capability in SMEs. Through a systematic literature review, existing research is integrated to identify what those factors are. The findings reveal that SME leadership, organizational culture, human capital, knowledge and technology management, customer and market orientation, entrepreneurial orientation, resources availability, and collaboration with external stakeholders are key factors for radical innovation capabilities to be developed in SMEs. Theoretically, the thesis contributes to the understanding of innovation capabilities in SMEs and what factors influence their development. Practically, it offers insights to SME leaders and managers that help them better position their firms to produce radical innovations. Through participatory leadership, a psychologically safe organizational culture, effective allocation of scarce resources, as well as active collaboration with external stakeholders, SMEs can strengthen their ability to produce radical innovations (radical innovation capability).

Keywords: Innovation capability, Radical innovation capability, SMEs, internal factors, external factors, factor interdependency

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1 Introduction

1.1 Setting the stage: Innovation in SMEs

Innovation is generally accepted in business as a means to attain competitive advantage and gain economic profits (McKinsey & Company 2022). In times when constant and rapid market change is the norm, the ability to innovate has become crucial for survival of organizations (Baregheh *et al.* 2009, 1323). By innovating, companies attain competitive advantage by creating new and/or improved products and services (Distanont & Khongmalai 2020,18). Innovation enables firms to create new value for customers and improve performance (Crossan & Apaydin 2010,1155,1176; Bowen *et al.* 2010,1183).

However, not all firms equally possess the ability to innovate in order to stay competitive. Large firms are at an advantage due to their superior financial endowments and assets. More to that, having stronger financial abilities avails more knowledge and highly skilled talent to the big firms (Rogers 2004,143). Conversely, studies show that small and medium enterprises (SMEs) are often baffled by resource scarcities which hinders their innovation efforts. Despite their resource deficiencies, smaller firms usually possess flatter hierarchies, less bureaucracy and are more agile when responding to changes in their operational environments (Rogers 2004,143; Saunila & Ukko 2014,33; Omri *et al.* 2024, 6372). The focus on SMEs is also highly relevant because of their contribution to overall economic development. In 2024, over 99.8 % of businesses in the European Union were classified as SMEs, and employed more than 89 million people altogether (European Commission 2025,11). Due to the significance of innovation for organizational survival, it is imperative to understand how SMEs can develop the required capabilities to innovate despite shortcomings like resource scarcity.

Innovation is especially critical for SMEs as markets become more competitive (Farida & Setiawan 2022,2). SMEs can compete with larger firms by developing radical innovations i.e. novel products that are disruptive and cause fundamental changes in the markets (Damanpour & Aravind 2012,436; Gherghina *et al.* 2020, 2). The challenge however, lies in the fact that radical innovations are more expensive to produce as they require new advanced technologies, new skills, and longer time investment (McDermott & O'Connor 2002,425). It is therefore especially challenging for SMEs that struggle with resource scarcity to develop radical innovations.

With the established challenges and opportunities for SMEs, this research is focused on examining the factors that enable such organizations to develop radical innovations. The concept of innovation

capability emphasizes a firm's ability to innovate (Lawson & Samson 2001, 384). Radical innovation capability which is embedded in the broader innovation capability concept, concentrates on the ability of an organization to produce breakthroughs or purely original products (Slater *et al.* 2014,553; Rampa & Agogué 2021,212). This thesis focuses on what influences the development of radical innovation capabilities in SMEs.

1.2 Research gap and questions

Numerous studies on the concept of innovation capability are carried out in large firms (Forsman 2011,739). Yet, large firms and SMEs inherently differ in their approaches to innovation. The amount and accessibility to resources in both contexts varies, and therefore a distinction between innovation capabilities is bound to exist. (Forsman 2011,739; Saunila 2020,260.) Theoretical and empirical studies whose unit of analysis has been large enterprises may not accurately reflect the situation in SMEs.

Furthermore, innovation capabilities have been mostly studied in a generalized manner without distinguishing between radical innovation capability and incremental innovation capability (Yusof *et al.* 2023, 3, Saunila 2020,264). However, research shows that there are stark differences between the capabilities needed to develop radical innovations versus incremental innovations (Forsman 2009,502). Subramaniam and Youndt (2005,452) emphasize that the acquisition and organization of resources (knowledge, finances, technologies) for radical and incremental innovation varies. Radical innovations are developed through the process of exploration i.e. identifying and obtaining new resources to create novel products/services (Clauss *et al.* 2021, 204-205). On the contrary, incremental innovations arise from exploitation i.e. use of existing firm resources to improve current products/services (Clauss *et al.* 2021,205). These different processes involved call for further examination and clarity on how SMEs can build and sustain radical innovation capability.

Several studies explore the key determinants or enablers of innovation capability. Those studies present a wide range of factors including management style and leadership (Mendoza-Silva 2021; Le & Lei, 2019; Pierre & Fernandez 2018; Saunila & Ukko 2014), external and network relationships (Albaladejo & Romijn 2000), organization culture (Le & Lei 2019; Saunila 2020), technology and knowledge management (Martínez-Román & Romero 2017; Pertuz *et al.* 2018) etc. These determinants are to be seen as dynamic and interacting in nature, with each one influencing the other (Djournessi *et al.* 2018,2). Moreover, Saunila and Ukko (2014,42) emphasize that innovation capability is “multi-faceted construct” that depends on several internal and external factors of the organization. However, these broad and often overlapping factors are often not

explained in the context of developing radical innovations in SMEs (Slater *et al.* 2014; 533; Maes & Sels 2019, 142-143). Therefore, there is a need to clarify how these factors influence the development of innovation capabilities in SMEs. And more specifically, the factors most crucial for the radical innovation process need to be studied. With this background, the thesis is guided by the main research question;

- What are the factors that influence the development of radical innovation capability in SMEs?

To address the main research question, three sub-questions are utilized;

- What internal organizational factors contribute to the development of radical innovation capabilities in SMEs?
- What are the external factors that contribute to the development of radical innovation capabilities in SMEs?
- How do interdependencies between internal and external factors facilitate the development of radical innovation capabilities in SMEs?

Through a systematic literature review, the study integrates existing knowledge of what internal and external factors affect an SME's ability to generate radical innovations. The first two sub-questions concentrate on identifying which key organizational (internal) and external factors support radical innovation capability development. The third sub-question further aims to examine how those factors relate and depend on one another to facilitate the development of radical innovation capabilities in SMEs. Addressing these three sub-questions enhances the understanding of the internal and external organizational factors which influence the development of radical innovation capability is developed in SMEs.

2 Innovation and Innovation Capability

2.1 An overview of innovation

2.1.1 Definition of innovation

The concept of innovation is credited to the economist Schumpeter who explained that innovation is when businesses utilize or design a new product, service or process in order to gain strategic advantage over their competitors (Schumpeter 1934, 47-48; Crossan & Apaydin 2010, 1154; Bessant & Tidd 2015, 11; Kochetkov 2023, 263). Drucker (1985, 67) explained innovation as “the effort to create purposeful, focused change in an enterprise’s economic or social potential”.

Innovation is understood as a process through which organizations alter themselves to respond to changes in market environment conditions. It is however, not solely about reactive adaptation to external changes in existing markets. Rather, through innovation, organizations can become pioneers in the creation of new markets. (Damanpour 1996,694.) Innovation is the creation and use of new ideas, methods and products to achieve economic gains while responding to market changes (Verloop 2013, 3-5). From these definitions, innovation can be considered as dual in nature. Firstly, innovation is observed in terms of the change or new idea, method, product i.e. innovation as an outcome. Secondly, innovation describes the processual activities with which organizations re-arrange themselves to creating something new, i.e. innovation as a process. (Kahn 2018,454.)

Quintane *et al.* (2011) outlined three major attributes that strengthen the definition of innovation; duplicability, newness, and usability. Duplicability implies that innovation (process or outcome) should be replicable within the boundaries of the organization. Secondly, innovation should be new in the environment in which it is introduced. And finally, innovation should be useful in that it improves the current situation of a firm for instance by enabling access to new untapped markets (Quintane *et al.* 2011, 939-940). For the purpose of this study, innovation is understood as the practice of creating and introducing new and usable ideas, products, processes that bring value to those who adopt them. This definition aligns well with the research questions of the thesis which focus on the examining the ability of SME’s organizational goal and process of generating and implementing or benefiting from novel ideas, process, products and more. The definition offers a lens through which innovation capability, i.e. the ability of a firm to create new things (Lawson & Samson 2001, 384) can be studied.

Engaging in innovation activities yields competitive advantage and improves a firm’s internal capabilities and competencies in the long run (Neely & Hii 1998,29). Furthermore, organizations

become more attractive to potential employees; gain access to external knowledge and generally perform better financially (Chapman 2006 35-37; Klomp & Van Leeuwen 2001,359; Tidd, 2006; Tidd & Bessant 2018). Most studies discuss innovation on an organization level; however, it is also a multi-level phenomenon affecting nations, industries and individuals (Daft 1978; Damanpour 1996, 694; Neely & Hii 1998, 15-21). This thesis also focuses on innovation at the firm (organizational) level. Innovation at the national level is understood as a broader system where different organizations and institutions collaborate with one another for innovative outcomes (Balzat & Hanusch 2004,197-198). Therefore, at the core of wider innovation systems is the individual organization. For this reason, the thesis looks closely at firm level dynamics, specifically deciphering what factors affect the development of radical innovation capabilities.

2.1.2 Innovation as a process

As a process, innovation is described as spanning over multiple stages and enabling organizations to transform ideas/knowledge into new useful products, processes and services (Baregheh *et al.* 2009, 1334). For many decades, innovation has been viewed as a linear model with consecutive stages namely; research, development, production and finally marketing (Kline & Rosenberg 2009, 183-184). Another perspective of this multi-stage process labels the steps differently: basic research, development and diffusion (Godin 2006, 659). In their study of large multinational corporations, Hansen and Birkinshaw (2007) devised a similar model, the innovation value chain which is depicted in Figure 1. The innovation value chain follows a three-step process from idea generation, to conversion and lastly diffusion.

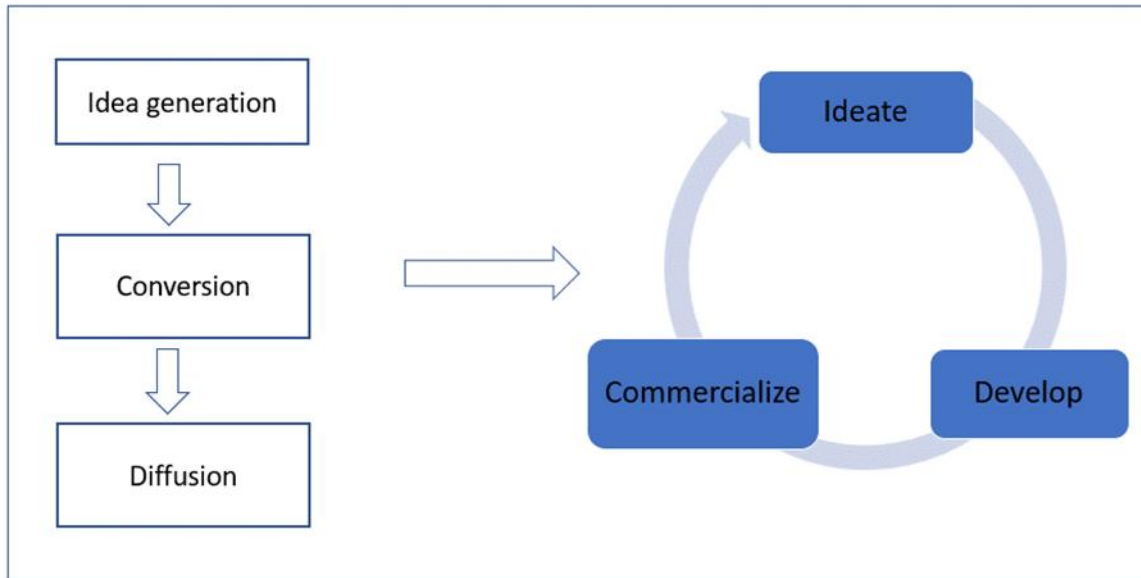


Figure 1. The innovation value chain and cycle

Despite differing nomenclature and terminologies in research, the definitions and contents of the individual stages remain the same. Innovation follows a sequence of steps where firm resources are recombined to generate new knowledge and ideas, which are then later developed and commercialized (Garud *et al.* 2013). The first phase of the process involves gathering knowledge and ideas on how to respond to change (external or internal change). Ideas can either be generated from within company boundaries or outsourced from external networks. Once knowledge/ideas have been acquired, the conversion phase begins. In this phase, ideas are screened. The firm evaluates the feasibility and potential of an idea to be converted or developed into a profitable innovation such as a new product, business process, service or market (Hansen & Birkinshaw, 2017). The third and final step is the diffusion. Diffusion refers to a “buy-in” by customers or intended users of the new developed innovation (Hansen & Birkinshaw 2007,125; Aarika-Stenroos *et al.* 2014,367).

However, these steps in the innovation process do not occur in independently. The process is characterized by consistent feedback between phases (Kline & Rosenberg 2009,286; Salerno *et al.* 2015). In this regard, the innovation process evolves from a traditional linear model to a cyclic one characterized by active feedback loops aimed at enhancing the quality of innovation outcomes (Kahn 2018, 457). Garcia and Calantone (2002, 112) also asserted that innovation is an iterative process.

2.1.3 Innovation as an outcome

Innovation as an outcome refers to the output resulting from the innovation process. It is categorized into product innovation, process innovation, marketing innovation, business model innovation, supply chain innovation and organizational innovation (Kahn 2018,454). Table 1 describes the attributes of each category.

Table 1. Innovation outcomes

Outcome	Characteristics
Product and service innovation	Improvements to product and service offerings. Novel products and services that create new markets
Process innovation	Changes in the methods and processes within a firm e.g. production system optimization
Marketing innovation	Development of new marketing tools
Business model innovation	Changes in unique value propositions
Supply chain innovation	Changes in supply chain networks, supply chain technologies and processes
Organizational innovation	New organizational structures, work structures, collaboration tactics

Product and service innovation entails improvements that are made to existing products or services. Alternatively, a completely new product/service may emerge from the process of innovation. Process innovation involves making changes to the methods, techniques and processes used within a firm. In process innovation, the focus is on the organizational process changed or improved. In marketing innovation, new marketing tools such as promotional materials are developed and applied (Kahn 2018,456; Kafetzopoulos & Psomas 2015,106). Business model innovation causes a shift in the industry of operation and how revenues are earned (Kahn 2018,456). A common example of this is Netflix. The company revolutionized the entertainment industry by shifting from DVD rentals to subscription-based streaming service. The production of their own movies and shows also helps them beat competition by being more than just a streaming service (Tomlinson, 2016). Supply chain innovation refers to incremental or radical changes in supply chain technologies, networks and processes (Kahn 2018,456-457). An example of this innovation outcome can be seen within Zara's supply chain. The company adopted a vertical integration method whereby the company fully owns and controls production which supports its just-in-time strategy (Sinha, 2024). Finally, organizational innovation presents new ways of management, new

organizational structures, new collaboration tactics to mention but a few. Furthermore, these changes may not only concern the firm internally but also extend to their relations with other organizations (Kahn 2018, 457; Kafetzopoulos & Psomas 2015,107).

2.1.4 Radical and incremental innovation

Newness is a fundamental characteristic of innovation proposed both in literature and practice (Quintane *et al.*2011). However, the degree of novelty of products, services and processes may vary (Johannessen *et al.* 2001). Innovation outcomes can be classified based on their originality, and what changes they cause to the markets or environments they introduced into. Organizations may choose to innovate by making continuous changes to already existing products or creating a revolutionary new product that completely disrupts systems, markets and processes (Utterback 1994, 200; Gailly 2011, 22-23). These forms of innovation are commonly referred to as incremental and radical innovations respectively. Incremental innovations require less time, financial and technological investments (Ali 1994, 50).

Incremental innovations arise when an organization exploits its existing resources to bring about improved products, services or processes. Incremental innovations usually cause no drastic changes to their existing markets or user profiles, but instead offer added efficiency and upgrades to them (Ferreira *et al.* 2020, 3-4). On the other hand, radical innovations are born from exploration activities in a firm. Exploration implies experimenting with completely new technologies, knowledge and skills to generate a product/service (Ferreira *et al.*2020,4). Such innovations cost more financially and time-wise (McDermott & O'Connor 2002,425). Radical innovations create completely new markets, and are usually more financially rewarding to the innovating firm (Garcia & Calantone 2002,117; Flor *et al.* 2018,184-185).

Despite their high investment requirement, most radical innovations do not originate from large successful firms. This is because larger firms have more rigid cultures, bureaucracies and prefer low-risk innovation activities (Stringer 2000, 72-74; McDermott & O'Connor 2002,425). Smaller companies are more open radical innovation activities (Stringer 2000,74).

2.2 Innovation capability

2.2.1 Defining innovation capability

The concept of innovation capability is increasingly becoming more relevant for innovation research and practice (Mendoza-Silva 2021,707). Innovation capability as a term has been used to

explain why some organizations are able to generate more innovative outcomes than others (Rajapathirana & Hui 2018, 46-49). Innovation capability encompasses a firm's capacity to create new things (Neely *et al.* 2001, 117). It is instrumental for organizations aiming to boost their technological and management performance (Rangone 1999,235). Lawson & Samson (2001, 384) formally defined innovation capability concept as "the ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders". This definition is adopted for the purpose of this study. However, researchers also note that one cannot simply pinpoint innovation capability in an organization. It is rather described as a "high-order integration capability" that combines other capabilities to enable innovation in a firm (Lawson & Samson 2001,379-380). When defined as an integration capability, innovation capability can consist of learning capabilities, R&D capabilities, manufacturing capability, resource exploitation capabilities and more (Guan & Ma 2003, 740).

Another perspective characterizes innovation capability as a combination of three key features namely; innovation potential, innovation processes and innovation results (Saunila & Ukko 2012, 357-360). Firstly, innovation potential describes the factors that facilitate a firm to go through the innovation process. These factors may include firm leadership, employee creativity, organizational structures and climate etc (Saunila & Ukko 2012, 358-359). Secondly, innovation processes constitute idea generation, development and introduction to the market (Saunila & Ukko 2012,359). The phenomenon is also explained in Section 2.1.1. Finally, innovation results are the new products, services that are born from using the firm's innovation potential to initiate the innovation process (Saunila & Ukko 2012, 359-360). This last feature of innovation capability corresponds to the innovation outcomes highlighted in Section 2.1.2. By demonstrating innovation capability as a collection of three key aspects (innovation potential, innovation processes and innovation results), Saunila and Ukko (2012,358-359) stress the significance of innovation capabilities as a means to understand what firms should consider in order to produce innovation and sustain competitive advantage.

Some studies further categorize innovation capability based on innovation outcomes i.e. product process innovation capability, marketing innovation capability, organizational innovation capability and more (Vu 2020,488; Saunila & Ukko 2014,33). Other studies classify innovation capability into incremental and radical innovation capability (Subramaniam & Youndt 2005). As defined earlier, incremental innovations arise from the exploitation of existing firm resources. Radical innovations, however, necessitate the acquisition of new resources which are then exploited to generate

completely new outcomes. These differences in innovation outcomes imply that the capabilities of an organization to develop either one will also vary (Subramaniam & Youndt 2005,452-453).

2.2.2 Theoretical foundations of innovation capability

The literature on innovation capability suggests that the concept draws its essence from two major theories namely; resource-based view theory and dynamic capabilities theory (Lawson & Samson, 2001; Breznik & Hisrich, 2014; Iddris 2016, 239; Agyapong *et al.* 2018,804; Mendoza-Silva 2021, 708). In resource-based view theory, Barney (1991,101) underscores how firm resources including assets, knowledge, skills and firm attributes are used to create value and maintain competitive advantage. Furthermore, resource-based view theory is the basis for the VRIO framework which highlights the characteristics of firm resources that lead to sustained competitive advantage. The VRIO framework states that firm resources must be valuable, rare, imitable and organized in order to increase firm competitiveness (Barney 1991,106-111; Barney 2001,42-45). Companies attain competitive advantage by exploiting their unique resources to produce innovations (Coates & McDermott 2002,437).

The dynamic capabilities theory offers a complementary viewpoint by emphasizing how companies organise themselves to respond to dynamic environments (Teece *et al.* 1997). Eisenhardt and Martin (2000, 1107) described dynamic capabilities as “organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die”. The core of innovation in organizations is organizing and utilizing resources to make something new (Damanpour 1996,964). Therefore, it is logical to propose that innovation capability i.e. the ability to create new things, has foundations in dynamic capability theory (Breznik & Hisrich, 2014). Furthermore, Teece (2009,17-19) states that the foundation of dynamic capabilities lies in the ability of an organization to sense opportunities and threats, and seize them in order to remain competitive. Firms with strong sensing and seizing capabilities are able to identify emerging trends, changing consumer needs and rearrange their resources to create innovative solutions. The combination of resource-based view and dynamic capabilities offers a comprehensive understanding of innovation capability by linking internal resource strengths with the necessary adaptability to external changes. This theoretical integration is critical to understanding how firms foster and sustain innovation in competitive and evolving markets.

2.2.3 Determinants of firm innovation capability

Studies on innovation capability have focused on what determines innovation capability development within a firm. Nevertheless, due to the differences in business contexts, there is still no consensus as to what foretells that a company is able to effectively innovate. (Mendoza-Silva 2021, 708; Saunila 2020, 263.) Lawson and Samson (2001,387,389) confirm this by re-iterating that due to the differences in firm resources, innovation strategies and desired outcomes; innovation capabilities vary from firm to the other. Nevertheless, some commonalities exist in innovative organizations which inform Lawson and Samson (2001,388)'s summarization of key elements of the innovation capability concept, as shown in Figure 2.

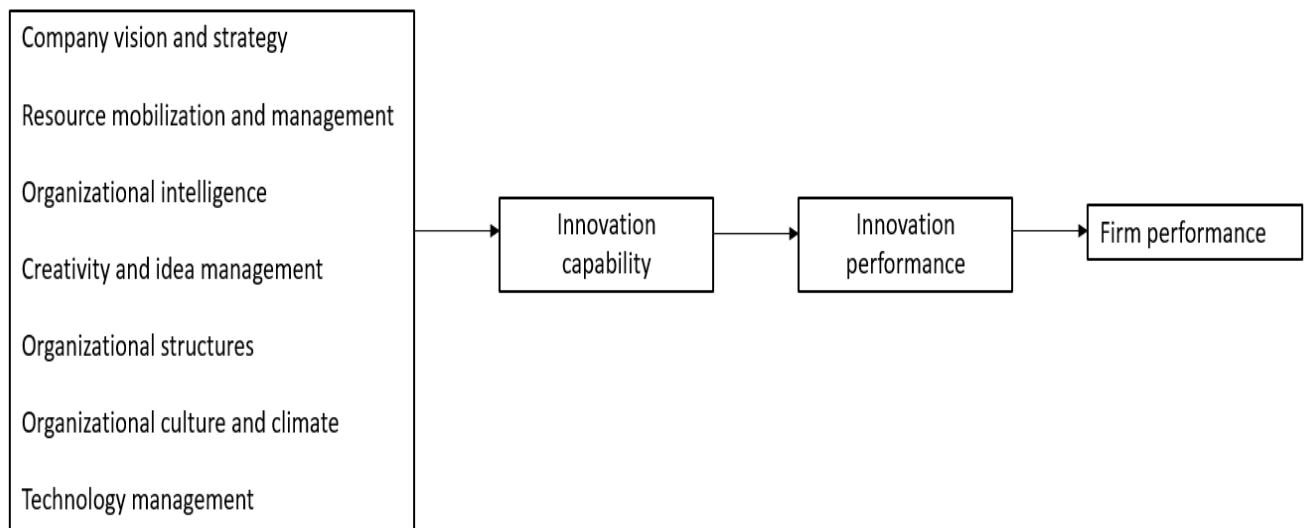


Figure 2: Determinants of firm innovation capability

The ability of an organization to produce innovations is rooted in its vision and strategy. A vision and strategy that encourages innovation should be shared and upheld across the organization, by the leaders (Lawson & Samson, 2001). Secondly the management of resources affects organizational innovation capabilities. Acquisition of resources including human, financial and physical facilitates innovation activities within the firm. (Pierre & Fernandez 2018,146.) In addition to that, firms need to stay alert to new technological developments and acquire the needed ones for innovation (Koc & Ceylan 2007, 110-111). Without the appropriate resources, a company is unable to innovate or remain competitive.

A crucial resource for innovation is information. Information is indeed the catalyst for innovation. Information encompasses the knowledge and ideas an organization possesses, which can be utilized to generate innovations. (Lawson & Samson 2001,391). Sources of information could be market

demand, competitor strategies, networks or internal organizational needs (O'Reilly & Binns 2019,51-54). Such sources provide firms with ideas of what problems could be solved through innovation. However, without proper management of this information, organizations can not benefit from it (Cohen & Levinthal 1990, 128-129; Glynn 1997, 1082.) Therefore, firms need to develop organizational intelligence. Organizational intelligence is defined as:

“An organisation’s capability to process, interpret, encode, manipulate and access information in a purposeful, goal-oriented manner, so it can increase its adaptive potential in the environment in which it operates” (Glynn 1996, 1088).

This implies that the ability to innovate is determined by how well a firm is able to learn from and use information to drive innovation (Wang & Ahmed 2003, 12-13).

Knowledge sharing is another important aspect of organizational innovation capability. Knowledge sharing involves the transfer of experiences, insights, skills and know-how between employees of organizations (Castaneda & Cuellar 2020,159-160; Azeem *et al.* 2021, 2-3). Sharing knowledge encourages creativity which often leads to the conception of innovative solutions (Kremer *et al.* 2019, 67). This view is strengthened by Le and Lei (2019, 540), who found that knowledge sharing strengthens innovation capability for both product and process innovation outcomes.

In addition to having mechanisms for managing information, an organization needs effective creativity management tools in place. Managers need to employ efficient idea management practices as well as devise incentives for employees to generate ideas for the innovation process (Van Knippenberg & Hoever, 2021). For a firm to have the ability to generate innovations there needs to be an active flow of creative ideas (Ferreira *et al.* 2020,11).

Firm characteristics such as organizational structures, culture and climate also affect innovation capability development. Saunila & Ukko (2014,34) point out that a supportive culture is key to enhancing firm innovation capabilities. A supportive culture encourages employees to take risks, and build self-confidence. Additionally, when organizational structures are less centralized and flexible, the sources of innovative ideas increase (Wan *et al.*2005). Mendoza-Silva (2021) further groups the determinants into three categories: managerial, intraorganizational and interorganizational determinants, as illustrated in Table 2.

Table 2: Classes of innovation capability determinants (adapted from Mendoza-Silva (2021, 711-712))

Managerial determinants	Intraorganizational determinants	Interorganizational determinants
<ul style="list-style-type: none"> • Management style and leadership • Strategy and vision 	<ul style="list-style-type: none"> • Resource management practices • Work climate and culture • Organizational structure • Technology management • Know-how development • Personal characteristics and motivation of employees 	<ul style="list-style-type: none"> • External relationships (e.g. with suppliers, customers, competitors, universities) • Network characteristics

These three categories further demonstrate that innovation capability is a multi-dimensional concept. The classification shares common features with the foundational work of Lawson and Samson (2001). Managerial determinants deal with the strategic direction of a company, which is usually influenced by the management team (Mendoza-Silva 2021; Le & Lei, 2019; Pierre & Fernandez 2018; Saunila & Ukko 2014). Secondly, intraorganizational determinants delineate the internal characteristics of the firm which enable it to initiate innovation activities (Saunila & Ukko, 2014; Saunila,2020; Mendoza-Silva,2021). Finally, the interorganizational determinants describe how the firm interacts with external players to boost innovation (Saunila & Ukko, 2014; Saunila,2020; Mendoza-Silva,2021). Ultimately, this detailed classification highlights that not one single factor is responsible for innovation capability, instead it is their interaction that yields the overall ability to create new things.

3 Methodology

3.1 Research approach

The thesis follows a systematic literature review as the research methodology. A systematic literature review offers a structured, reproducible, and transparent approach to identifying, summarizing and analyzing the existing body of knowledge on the topic of research (Tranfield *et al.* 2003,208; Xiao & Watson 2018, 93; Booth *et al.* 2022, 23; Sauer & Seuring 2023,1899). Unlike traditional narrative literature reviews, the systematic literature review is an effective method which provides a superior level of rigor and minimizes biases such as selection and publication biases (Booth *et al.* 2022, 32).

Using a systematic literature review as the research methodology in this thesis is appropriate for several reasons. Firstly, the literature on innovation capability in SMEs is rather less compared to that which considers large enterprises (Maldonado-Guzmán *et al.* 2019, 49). Additionally, the topic of innovation capability garnered scholarly attention in the 2000s, and is therefore still under development. Most researchers take Lawson and Samson (2001)'s work as the foundation (Strønen *et al.* 2017,95). Since systematic literature reviews are useful for evaluating and synthesizing existing literature to advance knowledge in given area (Fisch & Block 2018, 103), conducting a systematic literature review is fitting for this research. This method helps disentangle and unify current limited and fragmented body of knowledge on innovation capability. The main aim of the thesis is to find out what internal and external factors influence the development of radical innovation capability in SMEs. To achieve this, an integration of existing knowledge on those factors and their interdependencies is essential.

Secondly the topic of radical innovation capabilities has gained very little attention in research in comparison to the broader innovation capability concept. Few studies have explicitly examined the key factors for the development of a radical innovation capability (Slater *et al.*2014,553). Many studies however highlight that there are differences in innovation capability when a firm develops incremental innovations versus more breakthrough or radical ones (Mendoza-Silva 2021,708). Consequently, these research gaps need to be closed using the systematic literature review method which synthesizes current knowledge.

Finally, a key contribution of systematic literature reviews is that they reveal whether contextual factors have any effect on the topic of examination (Snyder 2019,335). Contextual factors such as size of the firm, industry type, market environment, network characteristics have been observed to

affect innovation capabilities of an organization (Saunila & Ukko, 2014; Saunila, 2020). Furthermore, for radical innovation capability development, firms differ largely in terms of the challenges and opportunities they experience. For instance, the management and leadership characteristics shapes the openness to the pursuit of radical outputs (Stringer,2000; Li *et al.* 2020). The literature review process enables the researcher to consider these contextual differences to clarify radical innovation capability within the boundaries of SME environments.

The systematic literature review process is conducted by following five steps that are common to business and management research (Tranfield et al. 2003,214-218; Snyder 2019, 336-338; Xiao & Watson 2017,103; Sauer & Seuring 2023,1915). Figure 4 illustrates the steps.

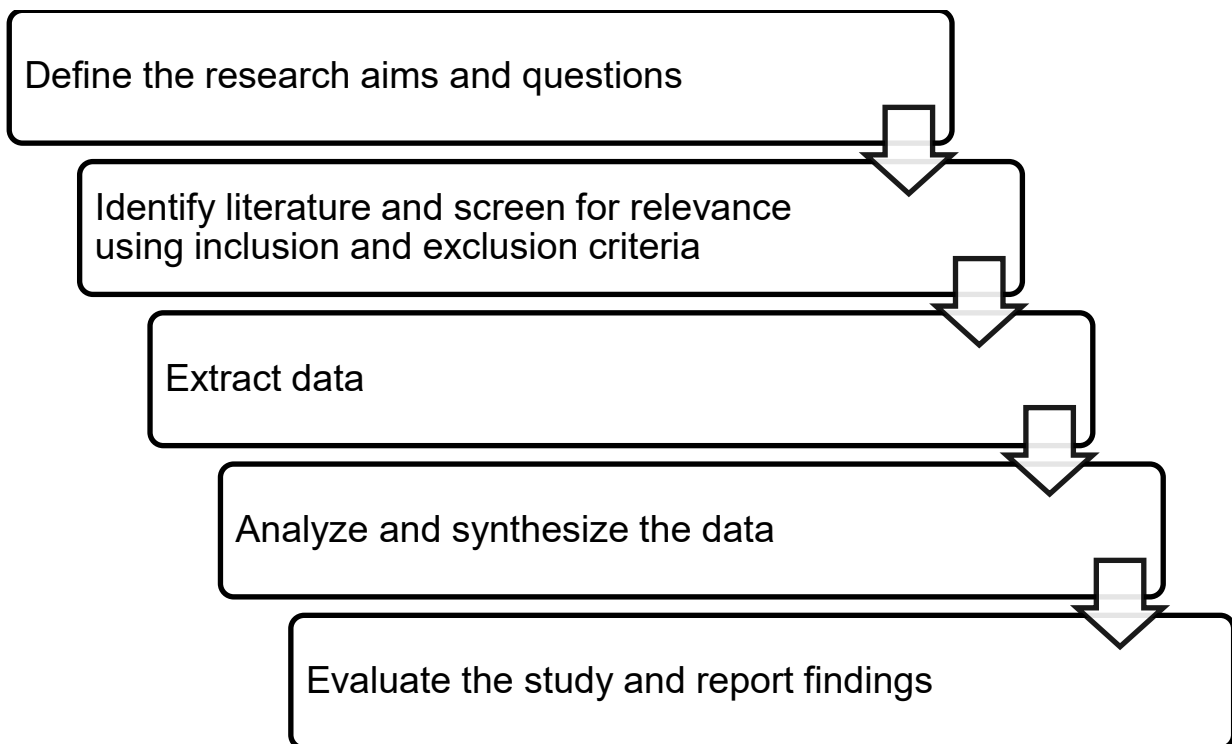


Figure 3: Steps for conducting a systematic literature review (adapted from Tranfield et al. (2003, 214-219); Xiao and Watson (2017,103); Linnenluecke *et al.* (2020,178-181); Sauer and Seuring (2023,1915))

By going through these steps, the researcher ensures that the review is not only describing data but also analyzing the data to respond to the research questions. The first step involves specifying the research aims and questions of the study (Fisch & Block 2018,104; Paul et al. 2021). The main question of the study what factors influence the development of radical innovation capability in SMEs. To find answers for the main research question and accompanying sub-questions, the following subsections of this chapter present how data was collected and analyzed.

3.2 Data collection

3.2.1 Data search

This section deals with the second step of the systematic literature review process as illustrated in Figure 3. The first task is to identify the relevant literature using a systematic search strategy. Key to designing a search strategy is establishing inclusion and exclusion criteria which guide the researcher's collection of data (Booth *et al.* 2022,286). The data constitutes academic literature that has been gathered from two main sources namely; Scopus and Web of Science. The databases have been selected primarily for their breadth of coverage on the topic of innovation capabilities in SMEs.

The search for literature includes first identifying main concepts of the study, developing search strings and then entering the search strings into the databases to retrieve data. The search strings are developed based on the content of the main research question: what are the key factors for the development of radical innovation capability in SMEs? From here, the key words are identified as shown in Table 3. These key words enable the researcher to formulate search strings to generate initial data in both Scopus and Web of Science.

Table 3: List of search terms

Focus	Search terms and possible variations
Innovation capability	innovation capability, innovation capacity, innovative capability, innovation potential, innovativeness, innovation development
Radical innovation	radical innovation, disruptive innovation, breakthrough innovation, discontinuous innovation
SME	small and medium firm, small firm, sme, small and medium company, small and medium firm, small and medium enterprise, small enterprise, msme
Factors and SME innovation capability	organizational culture, resources, leadership, management, knowledge, network, strategy, technology, market, employees

The search terms were repeatedly combined using Boolean operators (AND, OR, NOT), as well as truncated to capture variations in terminology. Appendix 1 shows the used search string combinations as well as the number of literature items produced from each database.

3.2.2 Inclusion and exclusion criteria

A collection of inclusion and exclusion criteria was used to determine the selection process for further analysis and synthesis. The criteria developed was applied when collecting articles, skimming through the title, abstract and then the whole text. This helped to ensure that the whole body of an article addresses the research questions and objectives of the study. Table 4 demonstrates the inclusion and exclusion criteria that guided the selection of academic literature for this study.

Table 4: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> • Work published between 2000 and 2025 • Work published in the English language • Articles that focus on innovation capability and radical innovation capability in SMEs • Articles highlighting factors that influence radical innovation capabilities in SME environments • Papers focusing on firm level innovation activities 	<ul style="list-style-type: none"> • Articles published outside of the 2000-2025 timeframe • Non-peer-reviewed literature • Papers whose unit of analysis is large firms

The concept of innovation capability became more prominent in literature in the 2000s (Strønen et al. 2017,95). This justified the choice of years the last 25 years (2000-2025) as inclusion criteria for the systematic literature review. While articles published outside of this time window may still be relevant, the researcher also intended to gather more recent data, considering that the thesis process also had time constraints. Papers published outside the 2000-2025 timeframe were excluded in the review. Secondly, only articles published in the English language were taken into consideration. By doing so, the researcher saved time on translating materials from different languages. Additionally, translation may cause misinterpretation of data and so; by limiting the language to only English, the researcher mitigated the occurrence of such risks.

The third and fourth inclusion criteria are focused on the main topic of the research study. Only articles that address innovation capability and radical innovation capability in SME environments were considered. Furthermore, the articles chosen contained empirical evidence of how certain factors affected the development of innovation capabilities and/or radical innovation capabilities in

SMEs. This also relates to the last exclusion criteria in Table 4. It emphasizes that papers where the discussion was factors affecting large firm innovation capability, were excluded.

Papers were only included if their focus was on firm-level innovation activities. As highlighted, innovation spans over industries, nations, and individuals (Daft 1978; Damanpour 1996, 694; Neely & Hii 1998, 15-21). However, the thesis study concentrates on how SMEs as organizations innovate. Therefore, it was imperative to include only those articles that address innovation at this level. Finally, the systematic literature review excluded papers that were not peer-reviewed. Peer review processes subject papers to high standards of academic rigor and quality checks. This implies that their reliability and credibility are also high (Taylor & Francis Group, 2026). For this reason, papers that were not peer-reviewed were excluded from the review.

Figure 4 portrays the literature search process. The initial search in the two databases yielded 402 articles in total. In the initial search, some of the inclusion and exclusion criteria was used. The year of publication as well as language were adjusted in both databases to fit the aforementioned criteria. Furthermore, as both databases contained a plethora of articles from different disciplines, the 'field of publication' was also narrowed down. In Scopus database, the researcher refined the search by subject area including articles in 'Business, Management and Accounting'. In Web of Science, the search was refined to include papers in the categories 'Management', 'Business' and 'Economics'. This was done to maintain relevance to the study program area.

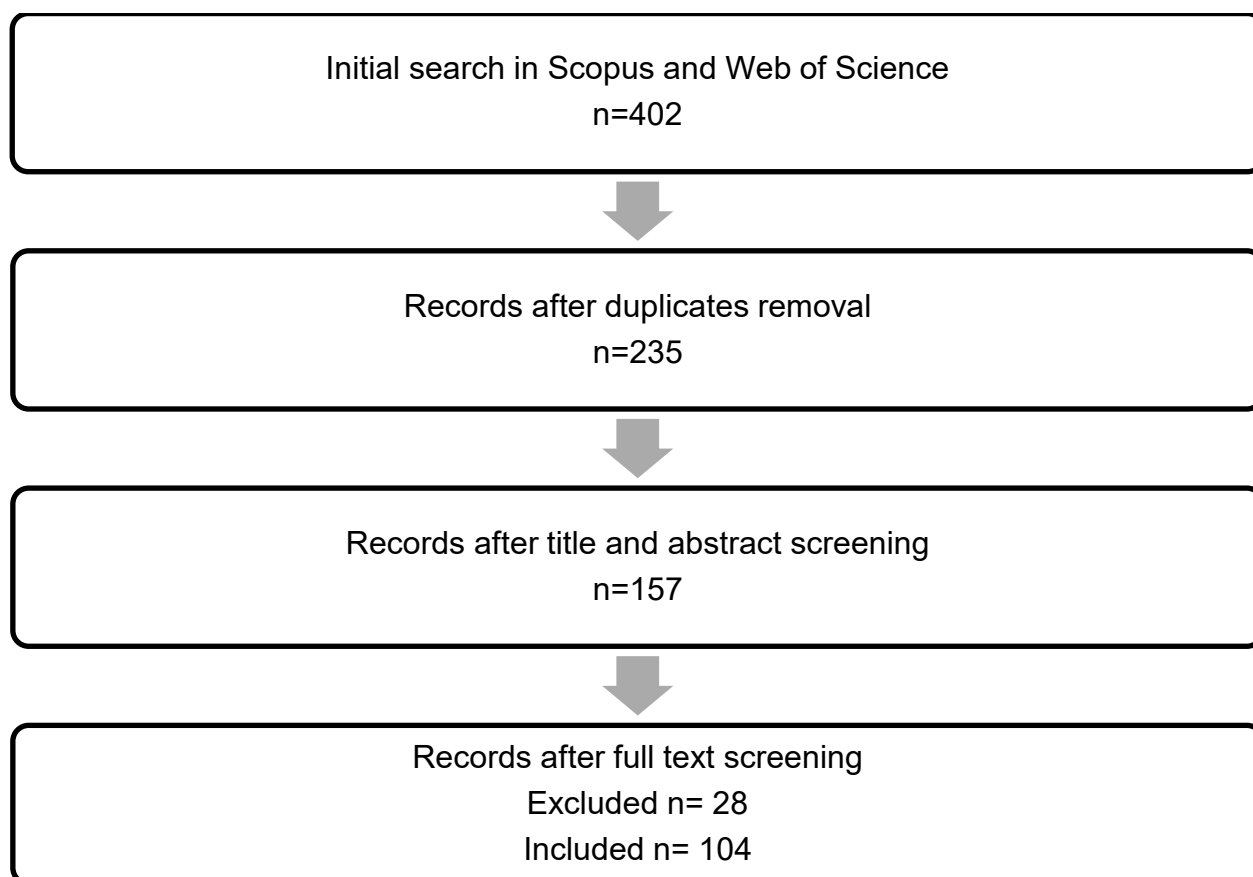


Figure 4: Literature search process

The articles were exported from their source databases and stored in Zotero software for easier management. The Zotero software enabled the researcher to identify duplicates i.e. exact same record or article that appeared more than once in the collection of retrieved literature. Duplicates were removed from the collection of retrieved articles, leaving 235 articles for the next stage of the process. The 235 records were then screened by title and abstract. Records/papers were excluded at this stage if the title and/or abstract did not focus on the factors for the development of innovation capability and radical innovation capability in SMEs. Moreover, the quality of journals which published the articles was assessed using the JUFO portal¹. At the end of the title and abstract screening stage, 157 full texts were considered for full text screening. At this stage, the researcher

¹ JUFO portal is a service developed by the Federation of Finnish Learned Societies through the initiative of Universities Finland UNIFI. The portal assesses the quality of scientific publication channels such as journals, publication series, and book publishers in various research fields. The portal contains ratings of more than 30,000 journals, and well over 4000 book publishers. The quality of publication channels is rated on levels 1 to 3. Level 1 symbolizes basic; Level 2 are leading publication channels with high quality and wide impact. Level 3 is the top classification with prestigious publication channels, with the highest quality and widest impact. (JUFO Portal, n.d.)

was able to access 132 full text documents. A total of 25 articles were therefore not included in the full text screening process. The retrieved full texts were imported into NVivo software for analysis.

At the full text screening stage, 28 of the 132 articles were excluded. Reasons for exclusion at this stage included inadequate or weak empirical evidence on the topic. For example, a study analysed both large and SME firm innovation capability factors, but offered generalized results (see Xu & Yuan, 2025). Others contained interdependencies between factors that could not be confirmed within those studies. The final set of articles which fulfilled the criteria had 104 articles. These were coded and analysed.

3.3 Data analysis

The thesis utilizes a pragmatist research philosophy which focuses on the research questions in order to produce actionable solutions that inform future practice (Saunders *et al.* 2019, 151). This research philosophy is suitable for the present study because its purpose is to identify what factors influence development of radical innovation capability in SMEs while also highlighting the interdependencies between those factors. In doing so, the research findings generated not only offer theoretical insights, but also specify practical steps to enhance SME radical innovation capabilities.

The analysis of selected papers was done through an integrative thematic analysis approach. This approach is advantageous because it enables the researcher to interpret and synthesize a wide range of data. Integrative thematic analyses are appropriate when reviewed studies employ different methodologies. As illustrated in Figure 5, 88 articles included in the study used quantitative methods. 9 studies used qualitative methods, while 7 utilized mixed methods. An integrative thematic approach allows the integration of related data especially when two different data sources have been used (Saunders *et al.* 2019, 651). Because of the utilization of two different databases (Scopus and Web of Science), an integrative thematic analysis is appropriate for this research. The analysis was done in an inductive manner. The systematic review was carried by using existing knowledge (in literature) (Hayes & Heit 2010) to arrive at a conclusion on what factors influence radical innovation capability development in SME environments.

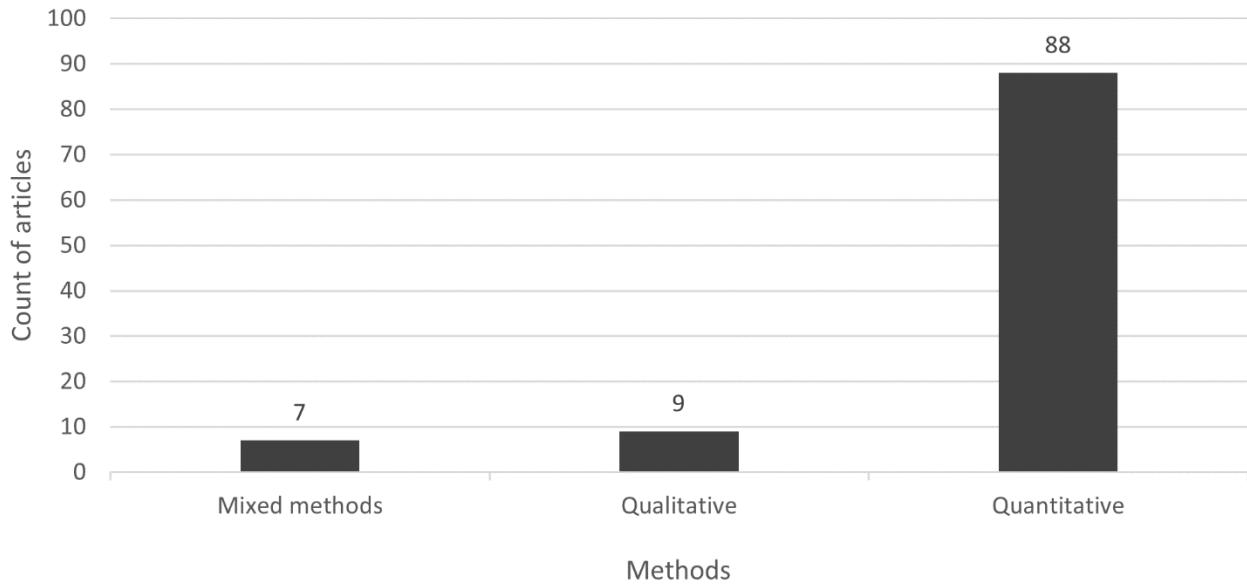


Figure 5: Count of articles versus the research methods used

Using the NVivo software, the reviewed articles were analyzed through three coding phases namely open, axial and selective coding (Williams & Moser 2019,47-54). Firstly, open coding was done to take note of the recurring factors on innovation capabilities topic in SMEs. In the second phase, axial coding is applied to arrange these factors into categories. This was done by identifying relationships between open codes (Williams & Moser 2019,50). During the final phase, codes were grouped into either internal or external factors to respond to the research questions. Table 5 shows the coding process with example studies and extracts. Furthermore, Appendix 2 displays the codebook used in NVivo software.

Table 5: Examples of coding in NVivo

Study	Extract	Open codes	Axial codes	Selective codes
Felício et al. (2019)	“The analysis shows that disruptive innovation develops in organizational environments with flexible structures that are adaptable and open to learning, where communication is implicit, with informal and easy social relations between workers.”	organizational environments with flexible structures, adaptable, open to learning, implicit communication, easy social relations	Organizational culture Organizational learning	Internal factor
Hayaeian et al. (2021)	“Therefore, SMEs often search for tacit knowledge outside firms’ boundaries such as suppliers and clients (Chen et al., 2006; Desouza and Awazu, 2006), and these external relations facilitate SMEs to move beyond their technological limitations and gain radical innovative knowledge.”	tacit knowledge outside the firm, external relations, technological limitations, radical innovative knowledge	External knowledge	External factor
Eggers et al. (2014)	“Therefore, networking may be most strongly linked to radical innovativeness among SMEs exhibiting high levels of responsiveness towards customer needs.”	Networking linked to radical innovativeness, SMEs that respond to customer needs	External knowledge Customer orientation	Internal factor External factor

During open coding, the whole record was read in order to capture any factors affecting radical innovation capability in SMEs. Open codes were more generalized and broad containing explanatory sequences of words. For instance, as seen in Table 5, a part of the article emphasizes that “organizational environments with flexible structures” enable the development of disruptive innovations. In the next phase of coding (axial coding), the open codes are refined to formulate categories or themes. Using the aforementioned statement example, the axial code “organizational climate” is formed. This axial code combines the open codes describing how workers in an organization relate and communicate with each other. This process of moving from open codes to axial codes further helped to define the selective codes. The selective codes were designed according to the research questions of the thesis. In the same example, the selective code was “internal factor” because it addresses an internal aspect of the firm that enables radical innovation capabilities to develop. As shown in Table 5, external relationships for instance fall under the

selective code “external factor”. This code captures how an SME can collaborate not only within its firm’s boundaries but also outside, in order to gain radical innovation capabilities (Hayaeian et al. 2021). The interdependencies between external and internal factors were also noted by a selective code.

3.4 Evaluation of the research

Before reporting the findings, an evaluation of the researching process has to be conducted. It is an important last step that established the rigor of the systematic literature review (Nowell et al. 2017; Paul et al. 2021,10.) This ensures that the results of the research fulfill the trustworthiness requirements, i.e. they are credible, reliable and worth consideration by the broader scientific community (Lincoln & Guba 1985, 290; Ahmed 2024,1). Accordingly, the research is evaluated through four key criteria for ensuring trustworthiness namely: credibility, transferability, dependability and confirmability (Lincoln & Guba 1985,301-327).

3.4.1 Credibility

Credibility refers to how true the results of the study are. This criterion ensures that the researcher’s interpretations and conclusions are true, believable and supported by available data (Lincoln & Guba 1985,290,296,301). Triangulation is one of the strategies that increases the probability of credible findings and interpretations. Triangulation involves the use of many different sources, methods and theories to draw conclusions in research. This study used two different databases (Scopus and Web of Science) to gather data for answering the research questions. Although, the two databases promise breadth and a wide coverage of the research topic, other similar databases such as EBSCOHost are ignored in this research. This is a limitation as relevant studies may have been excluded.

Despite the use of two data sources, the study was limited by the scarcity of literature specifically addressing radical innovation capabilities in SMEs. 25 out of the 104 articles included in the systematic literature review explicitly addressed internal or external factors influencing the ability to produce radical innovations in SME environments (see Figure 6). As a result, the influence of certain factors on the development of SME radical innovation capabilities remains unclear. Moreover, the interdependencies between factors that would facilitate the development of SME radical innovation capabilities are narrowly addressed in literature.

Due to this scarcity, the scope of the study was extended to include literature on general innovation capability. Radical innovation capability is considered a constituent of the broader concept

innovation capability (Slater *et al.* 2014,553; Rampa & Agogué 2021,212). It appears however, that the two terms are not studied separately in literature. Consequently, this thesis incorporated articles on the broader innovation capability concept to help identify internal and external factors that influence its development in SMEs. This reduced the credibility of the research in answering the research questions which were strictly related to radical innovation capabilities in SMEs.

Another strategy used to ensure credibility was peer debriefing. In peer debriefing, the researcher shares their work to external parties who assess the quality of the research process (Lincoln & Guba 1985, 308; Nowell *et al.* 2017,3). A group of evaluators regularly appraised the thesis research process, checked the systematic literature search process and offered feedback. This feedback was then used to improve the quality and rigor of the research.

3.4.2 Transferability

Transferability ensures that the findings can be applied to other contexts. To maintain transferability, the researcher has to offer a ‘thick description’ for their audience. This means that the researcher discloses the context and settings in which their study is carried out. Consequently, the readers/audience can assess the extent to which findings are applicable to other different contexts. (Lincoln & Guba 1985, 316; Nowell *et al.* 2017,3.) Therefore, to ensure transferability, the inclusion and exclusion criteria of the systematic literature review process were specified. These criteria included the time period in which included articles were published, the key topics considered in the literature, as well the unit of analysis SMEs.

Transferability in this study was limited by a lack of specificity in contexts being studied. The research included no restrictions on aspects such as country of origin of SME, industry sector, age of the SME etc. Only a few factors or interdependencies were discussed in relation to an industry sector (see Mulyana & Wasitowati 2021, 214,222). Consequently, the results of the study are broad and cross-contextual and their applicability in more specific cultural, economic and organizational settings remains unclear. This reduced the qualitative depth related to contexts reduced transferability.

3.4.3 Dependability

Dependability refers to the consistency and transparency of the research process. Researchers guarantee dependability by making sure that their research process is logical, traceable and well documented (Lincoln & Guba 1985, 316-318; Nowell *et al.* 2017, 3; Ahmed 2024, 2). To achieve dependability of the research, each step of the literature search process was described. The author

followed established procedures of conducting a systematic literature review (see Tranfield *et al.* 2003,214-218; Snyder 2019, 336-338; Xiao & Watson 2017,103; Sauer & Seuring 2023,1915; Lame 2019; Paul *et al.*2021). By outlining the literature search process, researcher's own bias was minimized. The outlined steps done in this study can therefore be replicated and/or further developed by other scholars.

The search strings used both in Scopus and Web of Science are reported (see Appendix 1). The number of articles generated by the search strings is also made visible in Appendix 1. The inclusion and exclusion criteria used were also revealed. Furthermore, the coding process of the included articles is represented by the NVivo codebook in Appendix 2. An example of the coding process is also presented in Table 5. These steps together increased the dependability of this study.

3.4.4 Confirmability

Confirmability is about verifying that interpretations and findings have indeed evolved from the data used in the research. Confirmable findings and interpretations are supported by data, objective in nature and free from researcher's own biases. (Ahmed 2024, 2.) Conducting systematic literature reviews also demands that the researcher reports findings strictly based on their relevance to the research topic or question, and not on how intriguing a literary piece is (Fisch & Block 2018,105). When the prior criteria of credibility, transferability and dependability are fulfilled, confirmability is also attained. (Nowell *et al.* 2017, 3.) Techniques to ensure confirmability include creation of audit trails. An audit trail is simply an account of the raw data, analysis tools, synthesis mechanisms in the research process, which is the evaluated by an auditor (Lincoln & Guba 1985, 318-327.) For this thesis, the audit trail contained an outline of the data search and collection procedures, data analysis approach as well as the coding process. The audit trail was also assessed by a group of evaluators. This transparent approach in turn strengthened the overall trustworthiness of the emerging study (Lincoln & Guba, 1985; Booth *et al.* 2022, 32; Sauer & Seuring 2023, 1901).

Confirmability was limited by the imbalance of methodological approaches in the set of included articles. 87 out of 104 articles used quantitative research methodologies. Only 10 utilized qualitative means while the remaining 7 were mixed methods. Even though these studies provided valuable insights regarding what internal and external factors matter for the development of innovation capabilities, they were limited in thoroughly explaining underlying processes in which this happens. Therefore, the conclusions made in this research were drawn based only on the measured variables in included studies, instead of the explicit phenomenon in which they influence innovation capabilities or radical innovation capabilities in SMEs. More specifically, lived experiences in

different contexts would have provided richer understanding of the interdependencies between internal and external factors.

4 Results of the systematic literature review

4.1 Overview of the data

The systematic literature review confirmed that in innovation research, the discussion of SME innovation capabilities in a generalized manner is more prevalent. This implies SME innovation capability is studied in most of the articles, with no explicit mention of SME radical innovation capability. As presented in Figure 6, the focus of most articles (79) was general innovation capability in SMEs. Only a few (25) addressed the factors that influence the development of radical innovation capability in SMEs.

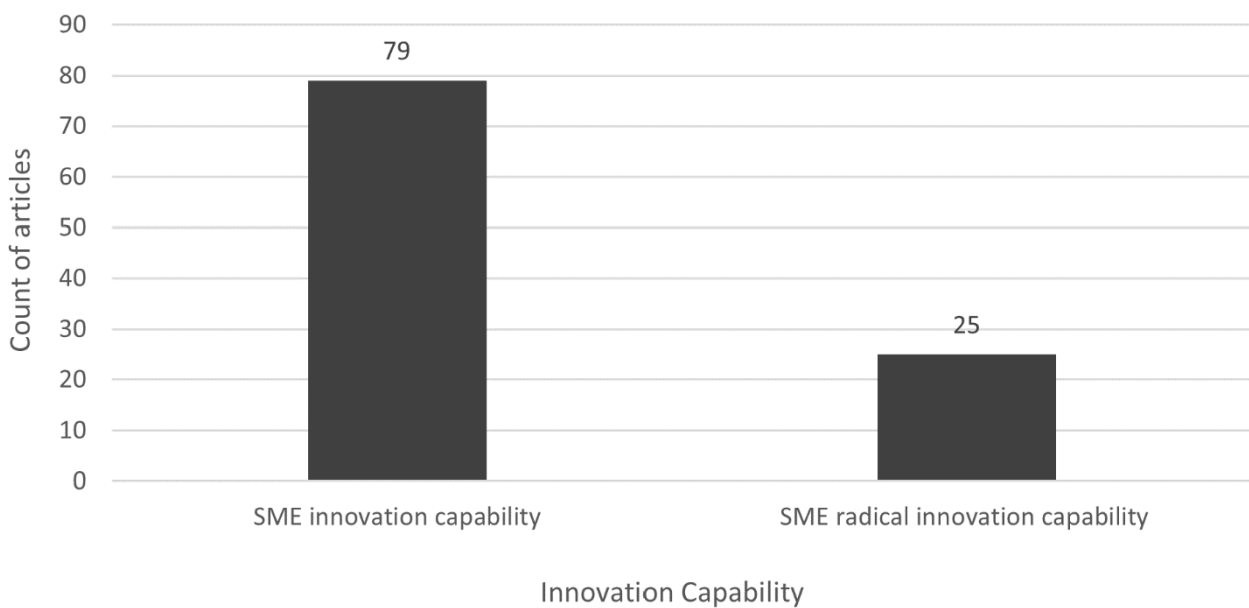


Figure 6: Innovation capabilities discussed versus count of articles

This distribution of reviewed articles further strengthens the research gap existing around the topic of radical innovation capabilities in SMEs. Even though some studies point out that there are differences between innovation capabilities required for the development of radical innovations versus incremental innovations (Subramaniam & Youndt 2005,452; Forsman 2009,502), that distinction is still not reflected in recent research. Consequently, the results of the thesis research are structured in a way that the researcher delves into the internal and external factors influencing innovation capability (as is the focus of much of the included articles). Where possible and supported by the systematic literature review process, those factors are then discussed in relation to their relevance for the development of radical innovation capability in SMEs. It is also inferred that radical innovation capability is a subset of innovation capability. Therefore, firms that develop their

innovation capabilities ultimately strengthen that ability for both radical and incremental innovations. (Slater *et al.* 2014,553; Rampa & Agogué 2021,212.)

Additionally, the literature review process revealed that much of the research on SME innovation capabilities is concentrated in Asia. As depicted in the pie chart (Figure 7), and in Appendix 3, more than 50% of the articles included in the review discussed SMEs based in Asia. The countries most represented were China and Indonesia. Other countries such as Vietnam, Malaysia, and Pakistan also followed closely. 7.7% of the 104 included articles were of research conducted in Southern Europe where Italian and Portuguese SMEs were represented.

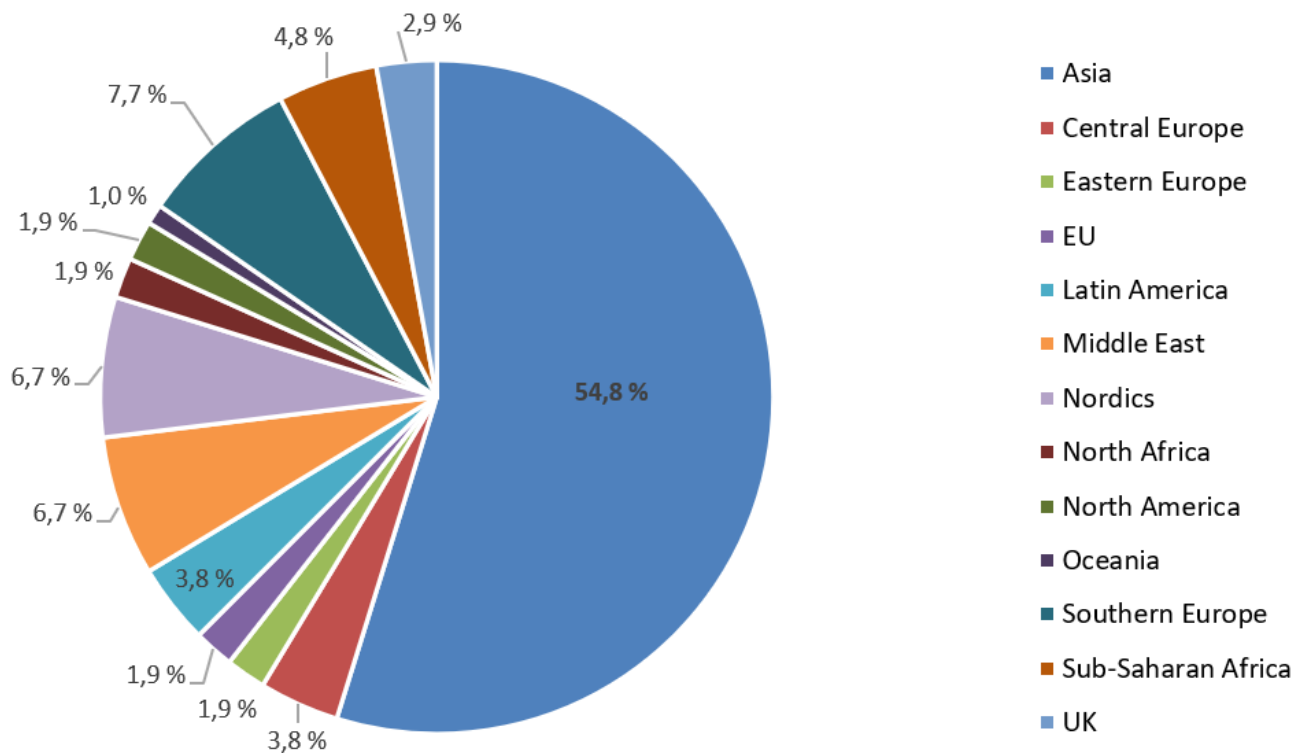


Figure 7: Regions represented in the systematic literature review

The Middle East was also present (6.7%) in the review with SMEs based in Iran, Kuwait and Saudi Arabia. Similarly, 6.7% of articles (7 articles) included in the review examined SMEs based in the Nordics countries; Denmark, Finland, Norway and Sweden. The next more prevalent region was Sub-Saharan Africa (4.8%) with SMEs based in the countries Nigeria, Ghana, Kenya, Ethiopia and Eritrea. Only 1 article from the Oceania region (New Zealand) was included in the review.

Literature from Latin America (Brazil, Colombia, Mexico) and Central Europe (Austria, Belgium) each accounted for 3.8% of the final dataset. The articles from EU contained sample data which was collected from databases such as World Bank Group (see Chit *et al.* 2023, 117) or Orbis (a data

source on private companies) (see Grashof & Kopka 2023, 781). Therefore, no specific countries were highlighted in the research.

The line graph (Figure 8) illustrates the year of publication of the included articles. The literature on SME innovation capability and specifically radical innovation capability has been steadily increasing since 2003, however with some fluctuations. The reviewed articles show a dip in numbers between 2013 and 2014, followed by fluctuations till 2019. The trend shifts sharply upward after 2019, however a flatline then occurs from 2021. The rise-and-fall trend continues after 2021. Overall, the graph demonstrates a growing interest in SME innovation capabilities over time, particularly after 2020.

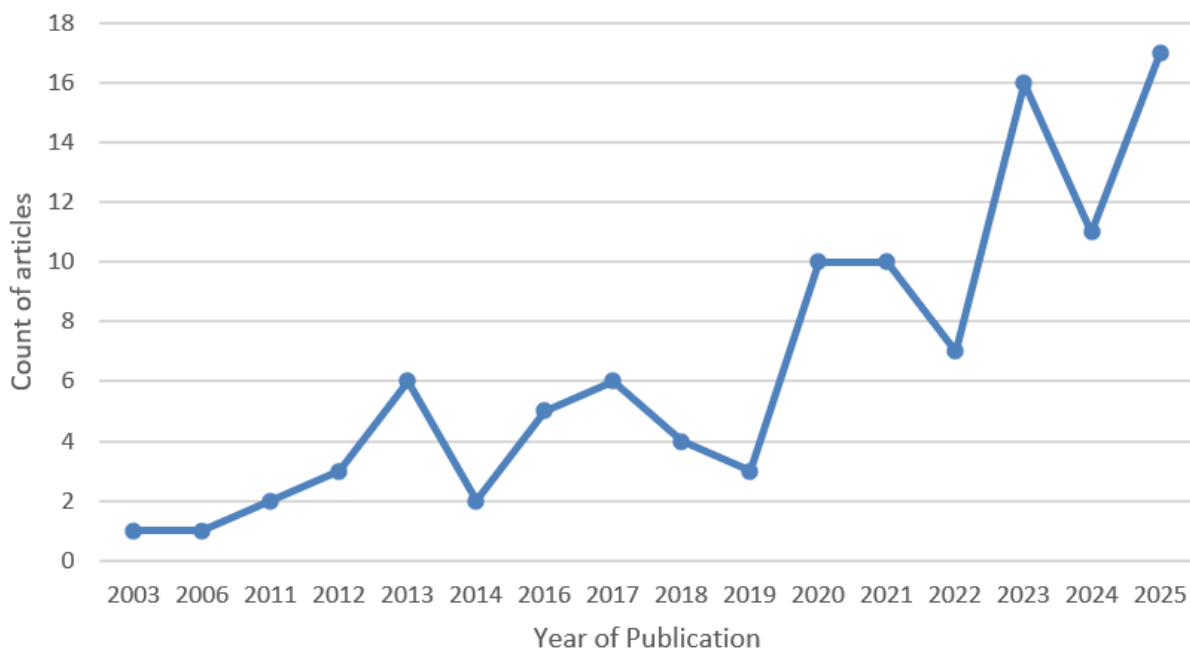


Figure 8: Count of articles published per year

As shown in Table 6, multiple industries were represented in the 104 articles. Much of the research (54 articles) did not specify the industry. In the 'mixed' category, researchers only took into account that their dataset contained SMEs but did not single out industry sector. The second most occurring sector in the articles is manufacturing with 26 articles discussing SMEs in the field.

Table 6: Industries represented in the included articles

Industry sector	Count of Literature items
Mixed	54
Manufacturing	26
Technology & Information	11
Agriculture	4
Exports	2
Fashion	2
Retail & Consumer goods	2
Energy	1
Services	1
Tourism	1
Grand Total	104

The Technology and Information sector was also present in the final list of literature items. The 11 articles in this category examined SMEs in fields such software development, telecommunication, industrial IT and Internet of Things (IoT). 4 articles represented the agriculture sector which included fields such as dairy and food firms. For the remaining sectors; energy, exports, fashion, services, retail & consumer goods and tourism, only 1 or 2 articles studied SMEs in those industry sectors.

4.2 Overview of factors influencing the development of SME innovation capability

The review of articles identified eight major factors that affect the development of both general and radical innovation capabilities in SMEs. The factors are outlined in Table 7.

Table 7: Summary of factors influencing SME innovation capability

Factor	Issues discussed
Human capital	Personnel knowledge and skills Employee commitment
Entrepreneurial orientation	Dimensions: Risk-taking, proactiveness, innovativeness Entrepreneurial bricolage
Leadership characteristics	Leaders' agility Transformational leadership Motivating and supporting teams to innovate Participatory (democratic) leadership
Organizational culture and strategy	Flexible structures Teamwork and collaboration Knowledge sharing Psychological safety and trust Team learning
Management of knowledge and technology	Knowledge sharing Role of absorptive capacity Technology adoption
Customer and market orientation	Customer needs and preferences Market trends Responsiveness to markets
Resource availability	Social capital Human capital Organizational capital Technological resources Physical resources
Collaboration with external stakeholders	Collaboration with governments Formal vs. informal ties Network types (buyer-supplier, peer collaboration, equity-based) Mutually beneficial relationships

Table 7 depicts both the internal and external factors that affect SME's ability to innovate. Internal factors (human capital, entrepreneurial orientation, organizational culture and strategy, management of knowledge and technology, customer and market orientation, resource availability) are governed within the boundaries of the SME. While all factors are in some way controlled by the SME organization itself, the external factors (collaboration with external partners) are categorized this way to capture the firm's reliance on actors outside the organization.

4.3 Internal factors affecting the development of SME innovation capability

4.3.1 Human capital

In a study on the innovation potential of Serbian SMEs, researchers concluded that human resources are the most crucial factor affecting innovation (Marković *et al.* 2019, 531). Another study on Mexican software SMEs suggested that innovation will cease to exist if the organizations' "most important asset – human capital" is not developed (Pérez *et al.* 2011, 54). The availability of skilled staff boosts innovation within SMEs. A talented labor force is able to acquire new knowledge and use it to generate novel solutions within the organization (Kassa & Kegne 2025,8-9). SMEs that actively invest in building the capacities (knowledge, skills, and abilities) of their employees achieve stronger innovation capabilities in the long run. This is because such companies train their talent to effectively respond to ever-changing market environments, thereby fostering innovation (Lustono & Wening 2023,228-230).

Employee organizational commitment is a crucial factor affecting innovation capabilities of SME firms (Nirjar, 2013). The theory of organizational commitment has been defined as the psychological connection an employee has towards the company they work for. It describes the relationship an employee has with a company (Meyer & Allen 1997,21-22). Organizational commitment has three components namely; affective, continuance and normative. Affective commitment is defined as the "employee's emotional attachment to, identification with, and involvement in the organization" (Meyer & Allen 1997, 22). Continuance commitment on the other hand, explains the awareness of the costs one would incur if they left an organization. Finally, normative commitment describes the sense of obligation or moral responsibility to maintain their employment with a certain organization (Meyer & Allen 1997,23-24).

In a study on Indian software SMEs, it was revealed that workers who exhibited affective and normative organizational commitment contributed actively towards innovation in their respective companies (Nirjar, 2013). Those who demonstrated both forms felt a sense of belonging to the company, and therefore were more open to upskilling and partaking in innovation projects that would push the company forward. Continuance commitment in Indian software SMEs was also high as employees wished to move to bigger multinational companies who offered higher pay. However, these desires were diminished by the level of interest an employee had in their current work, how valued they were in the SME and personal needs/benefits that were met only if they continued working in that specific SME (Nirjar 2013,400-405). Consequently, employee

organizational commitment determines whether skilled and talented labour will stay in an SME and contribute to the production of novel things.

Studies acknowledge that different conditions are required for human capital to develop radical and incremental innovations (Chit *et al.* 2023, 115). However, only a few disclose what those are. Agostini and Nosella (2017,791, 799) conclude that in addition to hiring personnel with highly specialised knowledge and skills, SMEs can boost radical innovation capabilities by strengthening management support. Moreover, when employees feel encouraged by managers, they are able to use their skills to utilize both internal and external knowledge sources to generate radical innovations (Agostini & Nosella 2017,799).

4.3.2 Entrepreneurial Orientation

Studies show that entrepreneurial orientation is a key factor for the enhancement of innovation capabilities in SMEs (Sulistyo & Ayuni, 2020; Aloulou, 2024). Entrepreneurial orientation refers to a firm's strategic propensity to generate value by engaging in entrepreneurial activities or behaviours (Wales *et al.* 2013,357). Entrepreneurial orientation has three dimensions namely: risk-taking, proactiveness and innovativeness (Sarsah *et al.* 2020, 553). Risk-taking enables the firm to strategically allocate resources even when uncertain conditions are present in the markets. Proactiveness reflects the company's ability and willingness to look for opportunities with the aim of responding to unmet needs (Aloulou 2024,3). Finally, the innovativeness dimension has been defined as "the tendency to engage in and support new ideas, novelty, experimentation and creative process that may result in new products, services or technological processes" (Lumpkin & Dess 1996, 142). These three dimensions support the development of firm innovation capability as they push SME managers and employees to be alert and explore new opportunities for innovative outcomes.

Hashim *et al.* (2024) emphasized that entrepreneurial bricolage enhances the innovation capabilities of SMEs. Entrepreneurial bricolage has been explained as the practice of 'making do'. Bricolage is about finding new ways to combine the available resources, however limited they may be, in order to create something new (Baker & Nelson 2005, 333-336). Entrepreneurial bricolage is especially important for SMEs that operate in resource-constrained conditions. This is because such businesses will aim to discover new ways to overcome such resource challenges (Hashim *et al.* 2024, 1274-1275). In their study, Hashim *et al.* (2024) found that small businesses characterized by bricolage behaviours were able to not only able to innovate better but also performed better than

others. All in all, SMEs where entrepreneurial behaviours are encouraged, innovation capabilities will also be developed.

Researchers also affirm that an entrepreneurial orientation contributes to the development of radical innovation capabilities in SMEs (Zortea-Johnston *et al.* 2012; Aftab *et al.* 2025; Sarsah *et al.* 2020). Entrepreneurial orientation practices stimulate SMEs to take risks, search for, and seize opportunities that bring about novel products which disrupt existing markets (Aftab *et al.* 2025). Studies show that such firms aim to “dominate the market through their aggressive and proactive actions” (Sarsah *et al.* 2020,554). Consequently, an entrepreneurial orientation increases the potential of an SME to produce radical innovations.

4.3.3 Leadership characteristics

The characteristics of SME leaders affect innovation capability in SMEs (Kustiyadji *et al.* 2021; Jalil *et al.* 2022; Akinwale & Alshraim, 2024). Researchers underline the importance of leadership agility for SME innovation capability development (Kustiyadji *et al.* 2021, 308). Leadership agility as an attribute implies the capability to proactively respond to changes in volatile, uncertain, complex and ambiguous environments (Horney *et al.* 2010, 33-34). Agile leaders are characterised by flexibility which enables them to adapt in such dynamic environments (Kustiyadji *et al.* 2021, 304). Studies confirm that having efficient leadership management encourages innovative activities within SME firms (Jalil *et al.* 2022, 255, 263; Osano, 2023, 267). This is because such leaders are more proactive and unafraid to invest resources in developing new things (Do *et al.* 2025, 304). The education, skills and experience of leaders also facilitate innovation capability development in SMEs (Barrett *et al.* 2025; Akinwale & Alshraim, 2024). The more years of experience a leader has, the more confident the leader is to embrace challenges of the innovation process. Coupled with an entrepreneurial orientation and passion, such leaders have been observed to motivate their employees towards innovation pursuits (Barrett *et al.* 2025, 17).

For radical innovation capabilities, SMEs succeed when a transformational leader who is unafraid to take risks guides the organization (Chen *et al.* 2017; Felício *et al.* 2019, 613). Sarsah *et al.* (2020, 562) found that managers who took bold risks by investing in uncertain and new technologies and processes, achieved greater success with radical innovation development. This risk-taking attribute of transformational leaders is also re-iterated as a dimension of entrepreneurial orientation.

The capability to innovate radically is improved when learning diversity exists within the leadership team (Wesemann *et al.* 2024,96). Differences in learning behaviours create cognitive conflict within the firm. It is through this cognitive conflict that leaders are able generate knowledge and ideas for radical innovations (Wesemann *et al.* 2024, 96).

Ambidextrous leadership capabilities can contribute to the development of radical innovation capabilities in SMEs (Hasnawati *et al.* 2024). The theory of ambidextrous leadership came about due to the need for ambidexterity in organizational innovation. Ambidextrous leaders are characterized by their ability to effectively influence teams through exploration and exploitation while still having the flexibility to shift between both when required. (Rosing *et al.* 2011, 966.) This form of leadership does not only encourage incremental innovations, but also guides teams to creatively explore and reshape existing products (Hasnawati *et al.* 2024, 512-513). Radical innovation capabilities are therefore influenced by the type of leadership within an SME organization.

4.3.4 Organizational culture and strategy

The culture in a firm can influence the development of innovation capabilities (Felicio *et al.* 2019,612). Organizational culture determines the behaviours of individuals within a company. Culture establishes the structures, policies, values and procedures which are considered acceptable in the organization. SME organizations that welcome creativity, risk-taking and teamwork are better at innovation than others (Dadfar *et al.* 2013, 822; Do *et al.* 2025, 303-304). Ali *et al.* (2020, 964)'s research on Chinese SMEs found that when organizations maintained flexible structures and collaboration across departments was enforced, innovation was more likely to happen in the firm. This was also confirmed in Ethiopian SMEs showing that when such organizations emphasize a culture of sharing information, it ultimately boosts their innovation capabilities (Kassa & Kegne 2025, 10,25). Additionally, flexible and open structures enable employees to explore different ideas, which may lead to radical innovation (Felicio *et al.* 2019, 612). For instance, a study on the application of artificial intelligence in innovation revealed that large firms usually have stricter and more formalized procedures while smaller firms exhibit more flexibility. This in turn improves the capability of SMEs to produce radical products (Grashof & Kopka 2023,787).

A high level of psychological safety in SMEs will advance innovation capabilities (Andersson *et al.* 2020). Psychological safety especially in the context of work teams is defined as “the shared belief that a team is safe for interpersonal risk-taking” (Edmondson 1999, 354). Psychologically safe work organizational environments allow room for trust, collective learning, making mistakes and errors

which in turn can lead to innovative outcomes (Andersson *et al.* 2020,2). Psychological safety is especially important for radical innovation capability development. Radical innovations are highly risky and often require new knowledge, skills and therefore learning is essential in such a process. A corporate climate where employees feel safe to experiment, make mistakes and learn is associated with increased production of radical innovations. (Andersson *et al.* 2020, 10-11.)

Having a clear innovation strategy is key to developing innovation capabilities in SME environments (Dadfar *et al.* 2013; Vijayakumar & Chandrasekar 2022, 6). An innovation strategy alters organizational structures, systems and routines thereby enhancing innovation capabilities (Chen *et al.* 2017, 144-145). In a study on Malaysian SMEs, it was concluded that the intentional pursuit and long-term focus on innovation ultimately boosts strengthens firm innovation capability (Jalil *et al.* 2022, 255, 266). The same results were confirmed in a study on Saudi Arabian SMEs. When a firm has a clear innovation strategy, resources are organized in order to achieve set innovation goals. (Larabi 2025, 10-11.)

4.3.5 Customer and market orientation

Customer and market orientation advance SME capabilities for innovation (Purnomo *et al.* 2022, 90; Sang *et al.* 2024). Customer orientation is a business strategy whereby firms aim to “gather, analyze and displace customer needs” (Fahmi *et al.* 2024, 489). Market orientation is a related concept which describes a strategic approach where firms obtain information about customers, competitors, market trends, regulations in order to create products that fulfil those needs, and gain competitive advantage (Fahmi *et al.* 2025, 42). In other words, market-oriented firms not only focus customers but instead extend their view to include various market actors.

In customer-oriented SME firms, customers become participants in the innovation process. This enables the firm to develop products and services that are tailored to their needs and preferences (Ali *et al.* 2020,964; Fahmi *et al.* 2025, 49). Furthermore, by taking note of current and future trends, SME firms are able to produce innovations that are both relevant for today and can withstand changes in market conditions. Information collected in a market-orientation helps strengthen capabilities to respond to changing market conditions. (Fahmi *et al.* 2025, 49.)

Customer and market orientations are however less important for the development of radical innovation capabilities (Zortea-Johnston *et al.* 2012). By characteristic radical innovations are wholly original products and services that disrupt current markets (Woschke *et al.* 2017, 196-197). Zortea-Johnston *et al.* (2012, 156-157) argue that while customers may express their needs, they

don't often know what they want until a novel product or service has been introduced to the market. This implies customer feedback is more relevant for incremental innovations and less for radical ones. Customer and market orientation therefore have constraints when it comes to the development of radical innovation capabilities.

4.3.6 Management of knowledge and technology

The management of knowledge is key to developing innovation capabilities in SMEs (Inkinen *et al.* 2015; Kambey *et al.* 2018, 29). Knowledge resources are a necessity for the innovation process, and therefore their acquisition is crucial (Markovic *et al.* 2020, 537; Nurfarida *et al.* 2023, 144). A study on Indian SMEs disclosed that knowledge management ranked highest in importance amongst the factors enhancing innovation capabilities (Raghuvanshi & Garg 2018, 290-291). More than its acquisition, knowledge has to be properly assimilated and disseminated in the organization in order to generate innovative outcomes (Lustono & Wening 2023, 229).

Due to resource-constraints, SMEs must be willing to share knowledge (Sulistyo & Ayuni 2020,19). Knowledge sharing within and outside the organization generates new information and ideas that can be used to create novel products and services (Ahmad *et al.* 2023, 3). For knowledge sharing outside the SME's boundaries requires the development of absorptive capacity. Absorptive capacity enables SMEs to recognize, collect and integrate useful external knowledge for innovation purposes (Lustono & Wening 2023,229-230). Absorptive capacity has been defined as the organization's ability to identify valuable external knowledge, assimilate it and exploit it to strengthen innovation capabilities (Cohen & Levinthal 1990). A study on SMEs in Indonesia revealed that in order for innovation capabilities to be developed, it is of major significance that they engage in knowledge sharing. Both donating and collecting knowledge inside and outside the organization expands the sources of ideas, expertise, and information that can be used to create novel solutions (Wuryaningrat 2013). However, to benefit fully from external knowledge, SMEs ought to strengthen their absorptive capacities (Pramono *et al.* 2025, 477).

Technological knowledge is considered an essential requirement for innovation to take place (Almulhim 2020, 355). The innovation abilities of Chinese SMEs were observed to increase when digital platforms were implemented. This is because those platforms availed useful information such as customer and supplier data that could be used in the innovation process (He & Sun 2025). Another study on Chinese SMEs confirmed that the use of big data facilitates the development of radical innovation capabilities in SMEs. Big data technologies provide access to information on customer expectations, future trends, suppliers and competitors which in turn can be used to disrupt

markets (Wang *et al.* 2023). However, as SMEs are often characterized by limited technological resources, a dependence on external sources offers the needed solutions (Roxas & Chadee 2016, 516). SMEs in the Iranian pharmaceutical industry, for instance, overcome their technology shortcomings by relying on international partners and adapting the acquired technologies to their innovation needs. Absorptive capacity plays a crucial role in this process (Dadfar *et al.* 2013, 820-821.) Scouting and sourcing for technology in the external environment also enables SMEs to produce radical innovations (Guan *et al.* 2006, 675; Parida *et al.* 2012, 301; Maes & Sels 2014).

4.3.7 Resource availability

Without resources, it is impossible to have capabilities for innovation (Sukri *et al.* 2023,18). The concept of innovation capability has theoretical foundations in resource-based view, therefore firm resources are a prerequisite to initiating innovation (Sarsah *et al.* 2020,563; Taleb *et al.* 2023,80; Akinwale & Alshraim 2024,2). Taleb *et al.* (2023, 81-82,92-93) proposed a collection of “entrepreneurial resources” that are vital for SMEs to develop innovation capabilities. Firstly, and most importantly, social capital which entails the social networks a business builds with customers, suppliers, governments etc. so as to obtain useful knowledge for innovation. Secondly, organizational capital which involves intangible aspects such as culture, systems, processes, and skills allow innovation to take place in an SME.

Access to financial capital is key to developing innovation capabilities (Frey *et al.* 2013, 358-359). Most small enterprises abandon their innovation projects due to lack of enough finances, especially for radical innovations (Chen *et al.* 2017, 144). The availability of other resources including human, technological and physical resources (workspaces) facilitate both general and radical innovation capability development (Yasmina *et al.* 2023, 20).

4.4 External factors affecting the development of SME innovation capability

4.4.1 Collaboration with governments

SMEs can establish close links with governments. Governments set up public policies that support SME innovation for example through subsidies for technology acquisition, innovation funds, tax credits or training. (Osano 2023,275.) This collaboration was observed to enhance SME innovation capabilities in Korea (Lee & Kim, 2015), in Mexico (Pérez *et al.* 2011), in Myanmar (Han & Chen, 2021), and in Ethiopia (Kassa & Kegne, 2025) and in many other countries.

Government support plays a pivotal role in enhancing radical innovation capabilities of SMEs (Chen *et al.* 2017, 142,154). In their study on Chinese SMEs, Chen *et al.* (2017) note that due to limited financial resources, information access and more; dependence on the Chinese government is advised. SMEs can approach government bodies such as the Ministry of Science or Bureau of SMEs and obtain “research funds, construction support and service platforms, access to industry and technology information and technical support, policy support to protect intellectual property”. (Chen *et al.* 2017, 142.) A similar trend is observed in Italian SMEs whereby firms that had access to funding from their national or regional governments were able to kickstart the innovation process (Frey 2013, 359).

4.4.2 Collaboration with other external stakeholders

Multiple researchers affirm that collaboration and participation in networks affect the development of innovation capabilities in SMEs (Lee & Kim, 2015; Ilori & Lawal 2017; Bel Hadj & Adel, 2019; Eggers *et al.* 2018; Mulyana & Wasitowati 2021; Deng *et al.* 2021; Wijaya *et al.* 2024; Le & Scaringella 2025). SMEs gain several advantages from collaborating with external stakeholders. Cooperation with universities, research institutes and technology centres can strengthen research and development (R&D) capabilities of the firm. This relationship enables the SME to easily access new technologies which may be essential to develop new products (Frey *et al.* 2013, 355-356).

The nature of ties that SMEs have with external stakeholders also affects the ability to innovate. Formal ties are explicit contractual relationships existing between two or more stakeholders. Conversely, informal ties are not contractual and are often based on personal relationships and mutual trust. (Apa *et al.* 2021, 964-966.) For example, a study revealed that SMEs in the marine renewable industry in Ireland depended on both informal and formal ties with partner companies. Collaboration with one another took on a more informal style. However, non-disclosure agreements (NDAs) were also signed to safeguard confidential company knowledge. (Barrett *et al.* 2025, 15.)

Apa *et al.* (2021, 975-976) also found an interesting trend in Italian SMEs whereby collaboration with universities often started as informal ties. However, when the SME recognized opportunities that would arise from this relationship e.g. technological expertise, they then established a more formal association which enhanced the SME’s ability to innovate. Informal collaborations allow SMEs to flexibly and quickly assess the benefits of a relationship before investing their typically limited resources (Santoro *et al.* 2020, 6).

Radical innovation capacity of SMEs can be enhanced through networking (Oke & Onwegbuzie 2013; Eggers *et al.* 2014). Hao and Feng (2016, 760-761) conceptualized how three forms of business networks enable small firms to manufacture radical products. Firstly, buyer-supplier networks help firms gain access to technological expertise and market data. Secondly, peer collaboration involves cooperation with other firms, mostly larger established organizations. Hao & Feng (2016, 762) suggest that the more heterogenous these firms are, the higher the likelihood that newer knowledge will be acquired thus supporting radical innovation. Thirdly, equity-based networks benefit SMEs by providing financial investments to maintain ties. Equity-based networks however may pose the challenge of crowding out smaller firms, and therefore could hinder radical innovation development (Hao & Feng 2016, 763-765).

4.5 Interdependencies between internal and external factors

Foundational studies on the concept of innovation capability affirm that a firm's ability to produce innovations is not dependent on one single factor, but rather the continuous interaction of those factors (Lawson & Samson 2001, 396; Djoumessi *et al.* 2018,2). This was confirmed in a study on Finnish SMEs, where the factors influencing development of innovation capabilities were observed not follow each other in a subsequent manner. Rather, the connection and interaction of these factors led to better firm innovation capabilities. (Saunila & Ukko 2012, 370.) The findings of the systematic literature review also reveal that the combination and interdependence of both internal and external factors influences SME innovation capability development, and more specifically the capabilities to develop radical innovations (see Dadfar 2013, 828; Shin 2017, 185; Fahmi *et al.* 2025, 42). The following sub-sections highlight the interdependencies existing between internal and external factors, and how they facilitate the development of innovation capability and specifically radical innovation capability in SMEs.

4.5.1 Interdependence between leadership, organizational culture, human capital and knowledge management

A key role of SME leaders is that they shape the organizational culture in which SME employees work. Researchers have found that leaders who involve employees in decision-making, establish feedback loops, and encourage idea generation and knowledge transfer ultimately increase the innovation capabilities of their SMEs (Jalil *et al.* 2022, 263; Thongyai & Potipiroon, 2022; Osano 2023,267; Do *et al.*2025, 304). This emphasizes the interdependence between two factors; leadership characteristics and organizational culture. Leaders who are characterized by proactiveness, and risk-taking behaviours create an organizational culture that encourages

innovation (Sarsah *et al.* 2020, 563). In Chinese SMEs for example, the SME owners (entrepreneurs) are most often the initiators and organizers of innovation within the firm (Chen *et al.* 2017, 143-144). For this reason, their personal characteristics, ability to motivate staff as well as gather innovation resources, contributes to the development of innovation capabilities (Chen *et al.* 2017,144; Rahman P *et al.* 2025, 11). SME innovation capability is improved when SME leaders create a culture of innovation, and encourage collaboration across departments internally (Sawaeen *et al.* 2019, 373-374; Fahmi *et al.* 2025, 42).

Research also shows that a leader's openness to sharing knowledge contributes to the development of innovation capabilities (Kambey *et al.* 2018). This highlights the interdependence between factors; leadership, organizational culture, management of knowledge and collaboration with external partners. Kambey *et al.* (2018,33-35) explained that a transformational type of leadership designs a culture where employees become more open to sharing knowledge, thereby increasing the ability to innovate. This happens because transformational leaders closely guide, nurture and inspire their employees. Additionally, such leaders serve as role models to the team. When such role model leaders are open to sharing knowledge, their employees will adopt the same behaviour and attitudes. This openness also allows knowledge to flow in from the external partners such as suppliers, which contributes to innovation capability. (Kambey *et al.* 2018, 34.) The development of radical innovations is also made possible when SME leaders guide employees to be open to external knowledge sources (Agostini & Nosella, 2017). Especially, for SMEs characterized by resource scarcity, SME leaders not only communicate the value of external knowledge but also train staff to understand and utilize external knowledge thereby increasing the ability to develop radical innovations (radical innovation capability) (Agostini & Nosella 2017,800). Overall, the leadership characteristics are a core factor influencing and interacting with almost all factors to facilitate the development of SME innovation capability, even for radical innovations.

4.5.2 Interdependence between collaboration and resource availability

As emphasized in section 4.4, collaboration with stakeholders outside an SME's borders contributes to resource availability which in turn facilitates the development of innovation capabilities (Frey 2013, 359; Crema *et al.* 2013; Wuryaningrat 2013, 66; Dadfar 2013, 820; Almulhim 2020, 354; Zhang & Zhu 2021, 190-191; Nguyen 2022, 146; Osano 2023, 265). SMEs usually struggle with resource scarcity (Roxas & Chadee 2016, 516; Le & Scaringella 2025, 369). Collaboration with other organizations, be it governments or firms, shapes the firm's ability to innovate. This is because the scarcity of innovation resources is eliminated or reduced. In essence, this accentuates

the interdependence of internal (resource availability) and external factor (collaboration with governments and other external stakeholders).

SMEs also require a favourable business environment to operate in. The external environment dictated by country governments affects the internal capabilities of SMEs to innovate (Kassa & Kegne 2025, 7). Government policies do not only affect resource acquisition but also how resources in SMEs are utilized. A study on Chinese firms revealed that the external pressures of US sanctions caused low innovation outputs. (Li *et al.* 2025, 2384-2385.) Smaller, less profitable firms which usually depended on external (and international) sources of technology, knowledge and raw materials were forced to invest less in innovation and instead focus on survival (Li *et al.* 2025, 2385). Moreover, the sanctions pushed small firms to produce more incremental innovations than radical/breakthrough innovations. Fewer resources were invested in innovation projects and instead redirected to other operations to maintain financial stability in an unfavourable environment (Li *et al.* 2025, 2382). It is therefore important that government policies create an environment which ensures the development of innovation capabilities of resource-constrained SMEs. This is done through implementing favourable tax systems, competition restrictions, funding opportunities, and strengthening the collaboration between companies, universities and other institutions (Nguyen 2022, 146).

4.5.3 Interdependence between strategic orientations, collaboration and leadership

Eggers *et al.* (2018)'s study investigated the impact of strategic orientations on the capability of SMEs to innovate. The strategic orientations in their study included a combination of entrepreneurial orientation and market and customer orientation (Eggers *et al.* 2018, 2-3). Their study shows that it is not only one strategic orientation that contributes to successful innovation, but rather their combination. An entrepreneurial orientation coupled with market orientation increases the ability to innovate. (Eggers *et al.* 2018, 6.) The same results were observed in Malaysian SMEs. An entrepreneurial orientation allows firms to be open to new ideas, be on the lookout for entrepreneurial opportunities that can be exploited in order to shape and disrupt markets. (Al Mamun 2019,18.)

Furthermore, entrepreneurial orientation and customer orientation are enablers of one another. The distinction between customer orientation and market orientation lies in their focus. Customer orientation deals with fulfilling the expressed needs of customers while market orientation deals with both known and unrealized needs of customers. (Eggers *et al.* 2018,2.) Entrepreneurial orientation which is characterized by risk-taking, proactiveness and innovativeness (Sarsah *et al.* 2020, 553), boosts customer orientation and vice versa. Risk-taking, proactive and innovative SMEs

search for opportunities to satisfy the identified needs of their customers, using the resources they have (Zortea-Johnston 2011,156; Hashim *et al.* 2024, 1274-1275). It is therefore evident that not one orientation influences the capability of an SME to innovate. Instead, they complement one another to form a strategic posture that promises innovation success. (Eggers *et al.* 2018,7; Al Mamun 2019, 18; Fahmi *et al.* 2025,48.) The combination of these three orientations strengthens the capability to develop radical innovations (Sarsah *et al.* 2020, 556).

The three orientations push firms to be open to collaboration with customers, other businesses, governments and other institutions. Firms that are entrepreneurially oriented, customer and market oriented continuously engage with customers and other market actors to generate ideas for innovation. (Sang *et al.* 2024,4.) For instance, a study found that Indonesian SMEs that were entrepreneurially oriented used social media platforms to engage with customers. Furthermore, they initiated partnership with other firms in order to gain knowledge resources for innovation. (Panjaitan 2025, 9-14.) Another study on Indonesian SMEs in the fashion industry confirmed that due to their entrepreneurial, customer and market orientation; such firms collaborate with customers, competitors, and suppliers to acquire useful knowledge for innovation. Close collaboration is in fact inevitable due to the fast and constant changes occurring in the fashion industry. (Mulyana & Wasitowati 2021, 214,222.) Consequently, the SME's strategic orientation acts as catalyst for collaboration which strengthens the firm's capability to innovate through enabling access to resources.

Needless to say, the strategic orientations of an SME are dependent on the qualities of the leaders (Chen *et al.* 2017, 143-144; Thongyai & Potipiroon 2022,188). Leaders who are entrepreneurially minded influence their employees to search for and exploit opportunities for innovation thereby creating an SME with entrepreneurial orientation (Sawaeon *et al.* 2020, 373-374). An entrepreneurial orientation is observed in SMEs where the managers take risks to produce innovations (Sulistyo & Ayuni 2020,13).

Ultimately, the internal and external factors influencing the ability of SMEs to innovate do not operate in silos. Instead, innovation capability and specifically radical innovation capability develops from the interdependencies existing between those factors. As pictured in Figure 9, firm dependent factors (internal factors) transcend the firm boundary and interact with external factors in order to facilitate the development of innovation capabilities.

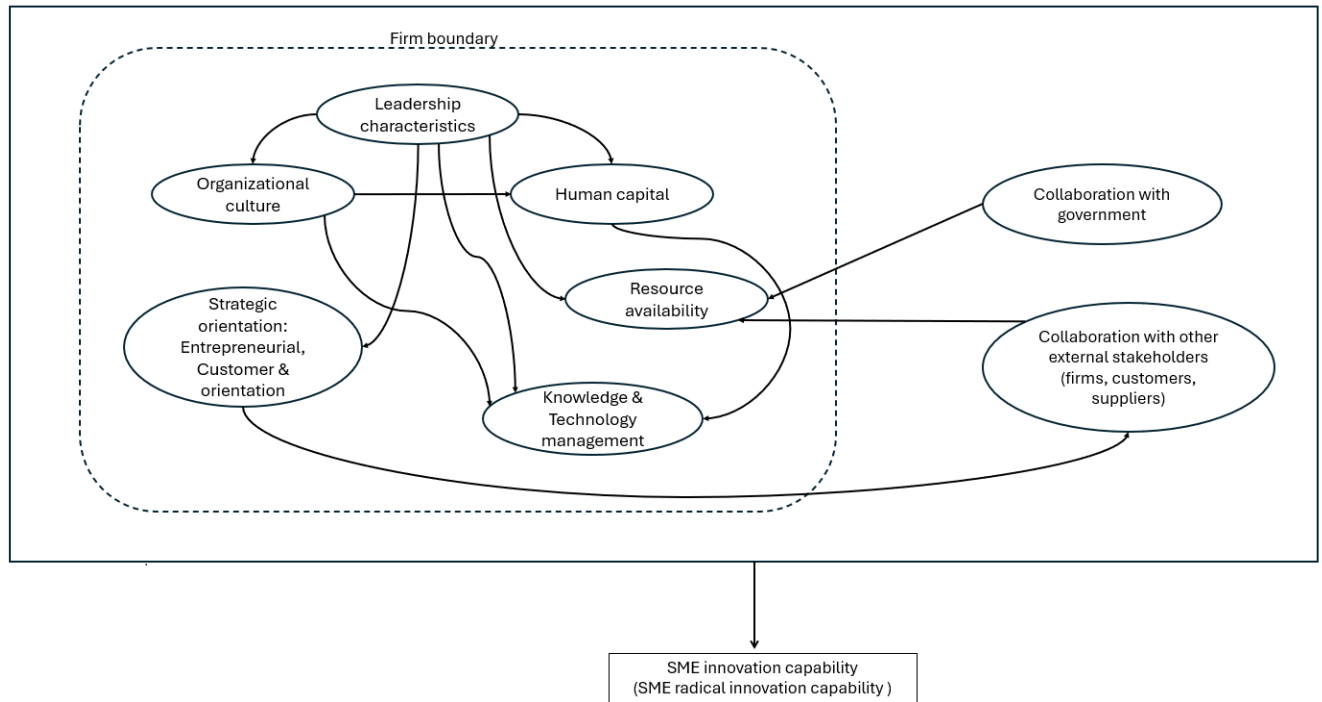


Figure 9: Interdependencies between the factors for development of SME innovation capabilities

The factors shown in Figure 9 reflect an interconnected system that reinforces SME's ability to innovate. Leadership characteristics in the SME are a central factor which shape how the organization works. Leaders not only avail resources for innovation (Rahman P *et al.* 2025, 11), but also create the organizational culture in which employees can fully utilize their skills and talents to exploit those resources (Dadfar *et al.* 2013, 822; Ali *et al.* 2020, 964; Osano 2023,26; Do *et al.* 2025, 303-304). An organizational culture denoted by psychological safety and trust, reinforces knowledge sharing within the firm thus enhancing the ability to innovate (Andersson *et al.* 2020). Leaders also dictate the strategic orientation of the firm (Chen *et al.* 2017, 143-144; Thongyai & Potipiroon 2022,188; Sawaeen *et al.* 2020, 373-374). Those who are entrepreneurially-minded create SMEs characterized by openness to the external environment (governments, other firms, customers, suppliers etc) which in turn becomes a source of new ideas for innovation (Eggers *et al.* 2018; Al Mamun 2019,18; Sulisty & Ayuni, 2020; Sarsah *et al.* 2020, 553). Additionally, collaboration with other parties is linked to resource availability. Through the formation of networks, SMEs can overcome resource scarcities and gain new knowledge, technology and funding to support their innovation projects (Pérez *et al.* 2011Frey 2013, 359; Crema *et al.* 2013; Wuryaningrat 2013, 66; Dadfar 2013, 820; Lee & Kim, 2015; Almulhim 2020, 354; Han & Chen, 2021; Zhang & Zhu 2021, 190-191; Nguyen 2022, 146; Osano 2023, 265; Kassa & Kegne, 2025).

5 Conclusions

5.1 Theoretical contribution of the study

The significance of this study is that it offers a comprehensive understanding of what factors influence the development of innovation capability and radical innovation capability in SMEs. Innovation is especially important for SMEs as they have to compete with larger organizations that usually have more competitive advantages relating to their size (Forsman 2011,739; Saunila 2020,260). The thesis concentrates on radical innovations as these types of innovations enable smaller companies to position themselves better than their competitors through unique and breakthrough market offerings (Freixanet & Rialp 2021,74-75).

The study contributes to theory by integrating existing literature to identify a set of key factors which influence the development of innovation capability and radical innovation capability in SMEs. The thesis concludes that 7 internal organizational factors including the leader's characteristics (Kambey *et al.* 2018; Kustiyadji *et al.* 2021, 304), organizational climate (Andersson *et al.* 2020; Do *et al.* 2025, 303-305), human capital (Nirjar, 2013; Agostini & Nosella 2017, 791, 799), availability of resources (Sukri *et al.* 2023, 18), management of knowledge (Sulistyo & Ayuni 2020,19; Pramono *et al.* 2025,477), customer and market orientation (Purnomo *et al.* 2022), and an entrepreneurial orientation (Hashim *et al.* 2024; Aloulou,2024) influence the development of innovation capabilities.

Furthermore, the thesis concludes that SMEs can also collaborate with different external stakeholders to increase their innovation capabilities (Lee & Kim 2015; Kassa & Kegne 2025, 24). Governments can provide funding opportunities, access to networks and also set up policies that encourage SME innovation (Kassa & Kegne 2025,7-8). Additionally, collaborating with other firms or institutions such as universities boosts access to resources for innovation (Oke & Onwegbuzie, 2013; Apa *et al.* 2021). These are the external factors that influence the development of innovation capabilities (including radical innovation capabilities) in SMEs.

The interdependencies between internal and external factors are also put forward in this thesis. This advances existing literature since the factors have mostly been studied in isolation and their interconnectedness often ignored (Djoumessi *et al.* 2018,2). Both internal and external factors are considered dynamic and interacting with one another (Lawson & Samson, 2001; Saunila & Ukko 2014,42). The study elaborates the interdependencies existing between leadership, organizational culture, human capital and knowledge management. The results of the literature review highlight

that leaders' characteristics dictate the work environment, how open employees are to using their skills and sharing knowledge both inside and outside the SME (Agostini & Nosella, 2017; Chen *et al.* 2017, 143-144; Kambey *et al.* 2018, 33-35). Moreover, the thesis stresses the interdependence between collaboration with both governments and other external stakeholders (large firms, universities) and resource availability. In cases where an SME is challenged by inadequacy of resources for innovation, collaborating with other parties helps alleviate the problem hence enabling innovation capability development (Frey 2013,359; Zhang & Zhu 2021, 190-191, Kassa & Kegne 2025, 7). This is crucial for radical innovations which are costly in terms of time, technology, skills and knowledge. (McDermott & O'Connor 2002, 425.). Finally, the study illuminates the interdependence between leadership, the strategic orientations of the SME and their effect on collaboration, that in turn influences innovation capabilities of the firm. Leaders who are entrepreneurial promote customer and market orientation in the SME, which boost collaboration with external stakeholders (Sawaeen *et al.* 2020, 373-374; Thongyai & Potipiroon 2022, 188; Panjaitan 2025, 9-14).

Based on the overview of the data in systematic literature review (Figure 7 and Appendix 3), it is evident that much of the research has been conducted in Asia, in emerging economies such as Indonesia, Malaysia and China. The emerging economy context is characterized by low incomes, rapid growth and economic liberalization (Bruton *et al.* 2013, 169-172). This explains the increased focus of research on how companies, even smaller ones can develop innovation capabilities. The identified internal and external factors as well their interdependencies are therefore relevant for the emerging economy context where innovation is desired, but resource constraints may prevail. Consequently, collaboration with governments and other external stakeholders is the most emphasized factor for SMEs in these regions. Appendix 2 discloses that collaborating and gathering external knowledge has the most references in the coded articles. This reveals that SMEs in emerging economies heavily rely on one another as well as external partnerships to overcome resource limitations (Frey *et al.* 2013, 355-356; Lee & Kim, 2015; Chen *et al.* 2017, 142,154; Apa *et al.* 2021, 975-976).

The results of the systematic literature review echo Lawson and Samson (2001)'s notion that innovation capabilities can be explained using the resource-based view and dynamic capabilities approach. The ability to innovate, i.e. innovation capability, is firstly influenced by the unique resources a firm has such as knowledge (Markovic *et al.* 2020, 537; Nurfarida *et al.*2023, 144; Raghuvanshi & Garg 2018,290-291), technology (Almulhim 2020, 355; Guan *et al.* 2006, 675), finances (Frey *et al.* 2013, 358-359) and human capital (Nirjar, 2013, Perez *et al.* 2011, 54). Firms

then organize themselves through strategic orientations (Purnomo *et al.* 2022, 90; Ali *et al.* 2020, 964) effective leadership (Horney *et al.* 2010, 33-34; Osano 2023, 267), and effective organizational structures (Do *et al.* 2025, 303-304) so as to use those resources to sense and seize opportunities in their environments. The essence of the resource-based view theory is to recognize unique firm resource firm resources while dynamic capabilities theory encourages the strategic use of those same resources to remain competitive in changing business environments (Barney 1991, 101; Eisenhardt & Martin 2000, 1107; Coates & McDermott 2002, 437).

5.2 Practical contributions of the study

In terms of practice, the study offers useful insights for SME leaders and managers on how to foster innovation capabilities in SMEs. By showcasing the factors most crucial for developing innovations and radical innovations in particular, the thesis informs managers on what to focus on to increase the ability to innovate radically. Firstly, leaders should adopt a participatory leadership where feedback and information sharing are commonplace. This boosts innovation within the firm. (Felicio *et al.* 2019, 612; Ali *et al.* 2020, 964; Kassa & Kegne 2025, 10,25.) Leaders should also act as role models and continuously motivating employees to take risks and be creative (Dadfar *et al.* 2013, 822; Do *et al.* 2025,303-305). Leaders should aim create a work environment in which employees feel safe enough to make mistakes. This is because radical innovations are highly risky, and are mostly achieved by learning through mistakes. (Andersson *et al.* 2020, 10-11).

Moreover, SME managers need to cultivate an entrepreneurial orientation in the firm. Entrepreneurial orientation pushes employees to find creative ways to use the available scarce resources to create new things (bricolage) (Hashim *et al.* 2024, 1274-1275). Apart from that, combining entrepreneurial orientation with customer and market orientation enables SME staff to not only exploit existing resources, but also search for new opportunities to explore. This strengthens the capability to innovate radically (Eggers *et al.* 2018, 6; Al Mamun 2019, 18).

The thesis also amplifies the value of collaborating with external partners to overcome resource constraints. The development of radical innovations requires more resources compared to incremental innovations (McDermott & O'Connor 2002, 425). To attain these resources, SMEs can engage in networks with governments, large firms, universities etc. (Eggers *et al.* 2014; Eggers *et al.* 2018; Mulyana & Wasitowati, 2021; Le & Scaringella, 2025). SME leaders and managers ought to leverage networks to gain more resources for innovation.

5.3 Limitations and future research directions

Multiple avenues for future research emerge from this thesis. Firstly, the systematic literature review was not confined to a specific industry or business sector. A multi-sectoral view of SMEs was instead employed in the research. Different industries however, operate under different conditions. Therefore, the identified factors and their interdependencies may not have the same effect or be as meaningful for innovation capability development in all industries. Future studies could therefore examine whether there are industry-specific factors and interdependencies influence innovation capabilities. This could reveal nuances that may have been missed with a broad multi-sectoral view.

Moreover, variations exist even within the same industry sector. For example, in the manufacturing sector, a firm may operate as a labour-intensive or technology-intensive manufacturer. Both types of firms were present in the included articles, however this characteristic was not considered. Future research would therefore ascertain whether the factors affecting the development of innovation capabilities vary. This could also reveal intra-sectoral differences exist.

Apart from the SME characteristic, other firm traits were not considered in this research. However, some studies show that firm ownership influences the development of innovation capabilities. For instance, in family-owned SMEs, innovation capabilities are strengthened when family members identify strongly with the firm. (Filser *et al.* 2017, 13-15.) Another study considers the effect of the age of an SME (see Withers *et al.* 2011). Older SMEs are expected to have more innovation resources such as knowledge, talent and networks compared to younger SMEs (Withers *et al.* 2011,530). However, younger SMEs are often more agile and more adaptable to change (Rahman P *et al.* 2025, 10-11). This signifies that their abilities to innovate are superior to those of older firms, and that firm age does influence innovation capabilities Therefore, the current research is limited in that other firm characteristics such as age are not examined.

The research process covered multiple regions across the world. However, geographic regions and even countries themselves differ strongly in economically, politically, socially and in technological advancement. Consequently, the environmental conditions in which SMEs operate will also vary. For instance, the thesis generalized Asia as a region. Yet, all countries in Asia do not have similar market conditions, institutional structures or level of firm innovation. Considering large regions as one unit overlooks several contextual nuances. As a result, further research could focus on one economic region such as East Asia or European Union as well as study individual countries themselves.

The thesis does not focus on what factors are most important at what stage in the innovation process. Innovation is a process comprised of multiple stages from idea generation to development to adoption/diffusion (Baregheh *et al.* 2009,1330-1334). Further research can be conducted to observe how the factors influencing SME's capability to innovate interact at different stages of the innovation process.

Finally, innovation is also defined in terms of the outcome (Kahn 2018). Innovation can be a product, a process, a business model, organizational structures etc. (Kahn 2018,454-457). Many of the studies included in the literature review do not distinguish between capabilities required to develop the different innovation outcomes. Future research could therefore analyse whether innovation capability, the factors (including their interdependencies) influencing its development differ depending on the intended innovation outcome.

6 Summary

The purpose of the thesis was to identify what internal and external factors influence the development of radical innovation capabilities in SMEs. More to that, the study intended to describe the interdependencies between the internal and external factors which facilitate the development of radical innovation capabilities. Through a systematic literature review, the study found that the general concept of innovation capability is more prevalent. Only a few articles point towards the concept of radical innovation capability in SMEs. Nevertheless, the thesis utilizes the research on general innovation capability to ascertain the factors that influence the development of radical innovation capabilities in SMEs.

The study identifies 7 key internal factors namely; leadership characteristics, organizational culture, human capital, entrepreneurial orientation, customer and market orientation, management of knowledge and technology and resource availability. These factors are governed within the boundaries of the firm. SME leaders who are agile, open to taking risks and able to motivate their employee teams to innovation, ultimately influence the innovation capability of SMEs. An organizational culture denoted by psychological safety and trust, feedback giving and receiving, and flexible structures increases the ability of an SME to innovate. Especially for the radical innovation process, SME employees need a firm culture and environment whereby taking risks and learning through making mistakes is welcomed.

An entrepreneurial orientation, customer and market orientation influences the SME's ability to innovate. These orientations push SME leaders and employees to look out for opportunities to create new value for customers. SMEs that are strategically oriented to proactively acquire information about other market actors, future trends, and customer preferences increase their ability to produce radical innovations.

The management of knowledge and technology also influences SME's ability to innovate. Knowledge and technology resources are imperative inputs for the innovation process. SME firms benefit from both internal knowledge often from employees' skills and talents. However, sharing knowledge with stakeholders outside the firm's borders generates added advantages. Knowledge sharing expands the sources of ideas, expertise and information that can be useful for creation of radical innovations. SMEs need to develop their absorptive capacities in order to benefit fully from external knowledge and technologies. Technologies such as social media, big data also influence innovation capabilities. SMEs are able to establish close connections with customers and suppliers

which generates information that can be used in the innovation process. Technology use and sharing therefore influences SME's capability to create new things.

The study identifies 2 external factors which deal with how the SME collaborates with stakeholders outside the firm. Firstly, governments influence SMEs innovation capability in that they set up the policies under which firms operate. Favourable policies such as tax credits, subsidies for technology acquisition enable SME firms to increase their ability to innovate. Furthermore, governments are sources of innovation resources for example through national innovation and research funding.

Secondly, collaboration with other stakeholders such as universities, large firms, and technology centres affects the development of innovation capabilities in SMEs. Cooperating with such stakeholders helps SMEs overcome resource constraints, and therefore are able to kickstart their innovation processes. Especially for radical innovations that tend to cost more financially, SMEs can collaborate with other parties to forego a portion of the innovation costs.

The study emphasizes that the internal and external factors do not act in isolation. Instead, it is their interdependence and interaction that influences the SME's capability to produce innovations. The thesis stresses that the organizational culture in which employees work depends on the characteristics of the leader. The strategic orientation (entrepreneurial, customer and market orientation) also depends on the leader's openness, and risk-taking nature. The availability of resources depends on how open the SME is to collaborate with external stakeholders. The openness to collaboration is also dependent upon the leader of the SME. These interdependencies show that the capability to innovate radically emerges from the integration of both internal and external factors.

The findings of the thesis contribute to the theory of SME innovation capability and radical innovation capability. Previously, the factors influencing innovation capability have been studied in isolation. The thesis clarifies that they are interdependent and collectively influence an SME's innovation capability. The scarcity of research on SME radical innovation capability is highlighted.

The study offers actionable steps for SME leaders on how to increase their firm's capability to innovate. Through fostering a collaborative culture, managers encourage employees to innovate. Psychologically safe work environments will stimulate experimentation which leads to more innovation outputs. Leaders should also decide on the strategic orientation of SMEs, ideally one that promotes opportunity search, recognition and proactive exploitation of those opportunities. Finally,

SME managers should be open to sharing knowledge, technology and expertise both inside and outside the organization's boundaries.

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Appendices

Appendix 1 Search strings and number of results

String number	String	Scopus (n=)	Web of Science (n=)
1	("innovat* capabilit*") AND ("small and medium business*" OR "small and medium enterprise*" OR "small and medium firm*")	121	84
2	("radical innovat* capabilit*") AND ("small and medium business*" OR "small and medium enterprise*" OR "small and medium firm*" OR "small firm*")	0	0
3	("innovat* capac*") AND ("small and medium business*" OR "small and medium enterprise*" OR "small and medium firm*")	31	21
4	("innovat* capabilit*") AND ("radical innovation") AND ("small and medium business*" OR "small and medium enterprise*" OR "small and medium firm*")	1	1
5	("radical innovation") AND ("innovat* capa*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	5	6
6	("radical innovat* capa*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	1	1
7	("radical innovativeness") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	3	6
8	("radical innovation") AND ("capacity") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	7	26
9	("radical innovation*") AND ("capacit*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	7	28
10	("radical innovation" OR "breakthrough innovation" OR "discontinuous innovation") AND (capabilit* OR "dynamic capabilit*" OR "absorptive capacity" OR "innovation capability" OR "learning capability" OR "knowledge capability") AND ("internal factor*" OR "organizational factor*" OR "firm-level" OR "internal resources" OR "organizational resources" OR "organizational culture" OR "knowledge management" OR "learning process*" OR "R&D" OR "human capital") AND	8	19

String number	String	Scopus (n=)	Web of Science (n=)
	(SME* OR "small and medium*" OR "small firm*" OR "small enterprise*")		
11	("radical innovation* development") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	0	0
12	("disruptive innovation*") AND ("capabilit*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	8	11
13	("disruptive innovation*") AND ("capacit*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	3	2
14	("breakthrough innovation*") AND ("capacit*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	0	0
15	("breakthrough innovation*" AND ("capabiliti*") AND ("small and medium business*" OR "sme*" OR "msme*" OR "small firm" OR "small and medium firm*" OR "small and medium compan*")	0	2

Appendix 2 Codebook in NVivo

Name	Files	References
General innovation capability	61	140
External Factors	3	3
Collabs & External knowledge	50	112
Institutional support	18	29
Internal Factors	10	19
Ambidexterity	1	1
Customers & Market orientation	8	15
Employees	18	28
Entrepreneurial Orientation	18	34
Knowledge & Tech management	18	29
Leadership x-tics	13	26
Org. structure x-tics	8	11
Resource availability	8	8
SME Strategy	4	8
Interactions	14	23
Climate, external know, leadership	6	7
Collabs & Resources	20	30
CRM, MO, HC	1	3
ENT & Customer	3	5
ENT & External knowledge & MO	7	13
External Knowledge & Customer orientation	7	8
Gov't	13	16
HC and External knowledge	13	17

Name	Files	References
Leadership, Strategy, Resources	4	6
Strategy and External knowledge	2	3
Tech, Strategy, Knowledge sharing	10	10
Radical innovation capability	26	78
External	2	2
RIC_External knowledge	14	30
RIC_Institutions	2	5
Internal	1	1
RIC_Customer orientation	4	8
RIC_EO	3	6
RIC_Human capital	1	4
RIC_Leadership	6	7
RIC_Organisational climate	3	6
RIC_Organizational learning	2	2
RIC_Resource investment	5	5
Theoretical Foundation	12	15

Appendix 3 Countries represented in the included articles

Region & Countries	Count of Literature items
Asia	57
China	10
India	6
Indonesia	20
Malaysia	7
Myanmar	1
Pakistan	3
Philippines	1
South Korea	3
Thailand	2
Vietnam	4
Central Europe	4
Austria	2
Belgium	1
Central Europe (general)	1
Eastern Europe	2
Serbia	1
Slovenia & Croatia	1
EU (general)	2
Latin America	4
Brazil	1
Colombia	1
Latin America (general)	1
Mexico	1
Middle East	7
Iran	2
Kuwait	1
Saudi Arabia	4
Nordics	7
Denmark	1
Finland	2
Norway	1
Sweden	3
North Africa	2
Morocco	1

Region & Countries	Count of Literature items
North Africa (general)	1
North America	2
USA	2
Oceania	1
New Zealand	1
Southern Europe	8
Italy	7
Portugal	1
Sub-Saharan Africa	5
Eritrea	1
Ethiopia	1
Ghana	1
Kenya	1
Nigeria	1
UK	3
Ireland	1
UK (general)	2
Grand Total	104

Appendix 4 List of articles included in the systematic literature review

- Ab Wahab, N.Y.A. – Ramdan, M.R. – Zakaria, M.F.B. – Abu Hassan, M.H.A. – Hudin, N.S. – Kujat, C. (2025) Exploring the innovation factor: a systematic review of SMEs performance. *TEM Journal*, Vol. 14 (3), 2134–2145.
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Appendix 5 Use of Generative Artificial Intelligence (AI)

Declaration of the Use of Artificial Intelligence (AI)

I hereby declare that generative artificial intelligence was used as a tool to support the work in this thesis. In accordance with the policies of the Turku School of Economics, a detailed description of the tools used and their specific application in the research process is provided in this Appendix 4.

Tool 1: Open AI's ChatGPT (GPT-4o version)

- **Stage of use:** Data collection and analysis
- **Purpose of use:** I used ChatGPT as a help tool while using Zotero and NVivo 15 for file management and data analysis. As a novice user of both Zotero and NVivo 15, I prompted the AI tool for steps on how to use the software, and to understand their key features.
 - **Example prompt 1:** *In Zotero I now have one collection of all articles, how do I remove the duplicates in this collection?*
 - **Verification:** The AI tool generated a step-by-step process (tutorial) on how to remove duplicates in Zotero. I followed the process steps.
 - **Example prompt 2:** *What are the steps to import files from Zotero software into NVivo?*
 - **Verification:** ChatGPT generated a step-by-step process of how to import the final dataset from Zotero to NVivo. I followed the suggested steps.
 - **Example prompt 3:** *How is coding for a systematic literature review done in NVivo 15?*
 - **Verification:** The AI tool provided generated a list of steps to go through when starting the coding process in NVivo 15. I followed these suggested steps.

Tool 2: Microsoft Copilot (via Guest access)

- **Stage of use:** Composition and editing process
- **Purpose of use:** Microsoft Copilot was used mainly for word generation and language enhancement, such as looking for synonyms of words or correcting the grammar and tone of sentences.

- **Example prompt 1:** *Synonyms for strengthen*
- **Verification:** The tool provided an extensive list of alternative words with similar meaning as ‘strengthen’, including how and when those words can be used. According to the context in my text as well as fit, I chose an appropriate synonym.
- **Example prompt 2:** *Make this sentence better: The distinction between customer orientation and market orientation is that Customer orientation is focused on fulfilling the needs of customers while market orientation deals with both known and unrealized needs of customers*
- **Verification:** The AI tool provides a polished version of the sentence. I read the generated text to make sure that the meaning was still the same as my original text. I used the ideas from the AI tool to formulate a final sentence to include in the text. My final sentence read as follows: Customer orientation deals with fulfilling the expressed needs of customers while market orientation deals with both known and unrealized needs of customers (page 47).