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Under Pressure: Innovation and Process Adaptation in Financially Constrained SMEs

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Abstract

Small and medium-sized enterprises (SMEs) rely on innovation to remain competitive, yet their innovation processes often unfold under limited financial resources. While previous research shows that financial constraints reduce innovation activity, less is known about how such constraints shape the internal progression of innovation processes. This study examines how financial constraints influence innovation processes within SMEs.

The study adopts a qualitative multiple case study design based on 13 semi-structured interviews with respondents from SMEs across different industries, including software, biotechnology, manufacturing, hardware, medtech, fintech, ecommerce, and sustainability-related sectors. The data was analysed through thematic analysis and interpreted in relation to threat-rigidity theory and the dynamic capabilities framework.

The findings show that financial constraints do not simply stop innovation. Instead, they reshape how ideas are interpreted, selected, and moved forward. Customer and market input remained important sources of ideas, but firms filtered ideas through repeated demand, willingness to pay, feasibility, available resources, and revenue potential. Financial pressure also narrowed innovation by increasing prioritization and directing attention toward projects with clearer commercial value, lower risk, and stronger strategic fit. Firms responded by reducing scope, delaying larger projects, internalizing work, and reorganizing activities around available resources. Leadership and shared direction helped firms communicate priorities and manage trade-offs under financial pressure.

The study contributes to a process-oriented understanding of SME innovation by showing that financial constraints make innovation more filtered, selective, commercially oriented, and dependent on firms' ability to align limited resources with the ideas most worth pursuing.

Keywords: Financial constraints; SMEs; innovation processes; threat rigidity; dynamic capabilities; thematic analysis; resource constraints; innovation prioritization

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1. Introduction

This chapter introduces the background, research problem, key concepts, research aim, and delimitations of the study.

1.1 Background

Firms depend on innovation to remain competitive and adapt to changing market conditions. Yet innovation is neither linear nor predictable. It unfolds as a cumulative and uncertain process that requires continuous learning, coordination, and sustained resource commitment across multiple stages (Pavitt, 2004; Szutowski, Szulczewska-Remi and Ratajczak 2019). Developing new products or processes is therefore not a single decision, but an ongoing organizational effort that builds over time.

At the same time, firms do not operate under ideal financial conditions. In imperfect capital markets, information asymmetries create a gap between internal and external finance, making firms' investment decisions dependent on available internal funds (Myers & Majluf, 1984; Fazzari, Hubbard and Petersen, 1988). For small and medium-sized enterprises (SMEs), this challenge is particularly pronounced. SMEs often lack collateral, financial track records, and diversified funding sources, which makes them more vulnerable to financial constraints (Bakhtiari, Breunig, Magnani, & Zhang, 2020).

Empirical research shows that financial constraints reduce process innovation in SMEs, especially during periods of economic stress (Madrid-Guijarro, García-Pérez-de-Lema and Van Auken, 2016). Recent evidence further indicates that innovation activity among SMEs has remained at a relatively low level, with high innovation costs and limited access to funding identified as key barriers (KfW Research, 2023). Together, these findings suggest that financial challenges may influence not only how much firms innovate, but also how ideas are filtered, prioritized, and moved through innovation processes within resource-constrained organizations.

1.2 Research problem

Although innovation processes and financial constraints have each been studied extensively, they are rarely examined in direct relation to one another. Research on innovation emphasizes

stage progression, learning dynamics, and resource allocation within firms (Pavitt, 2004; Szutowski et al., 2019). By contrast, research on financial constraints primarily focuses on investment levels, R&D intensity, or overall innovation output (Fazzari et al., 1988; Hubbard, 1998; Madrid-Guijarro et al., 2016).

As a result, we know that constrained firms tend to innovate less, but we know far less about how financial pressure reshapes the internal organization of innovation activities. This gap is particularly relevant for SMEs, where innovation efforts are closely tied to internal cash flow and where interruptions may be harder to absorb (Himmelberg & Petersen, 1994). A clearer understanding of how financial challenges influence the structure and continuity of innovation processes is still missing.

1.3 Key Concepts

Three key concepts are central to this study: innovation processes, financial constraints, and small and medium-sized enterprises (SMEs). These concepts are briefly defined here in order to clarify how they are understood throughout the thesis.

In this study, innovation processes refer to the sequence of interconnected activities through which firms develop and implement new or improved products, services, or processes. These activities involve idea generation, selection, development, testing, and commercialization, but they are not understood as strictly linear. Rather, innovation processes are seen as iterative and uncertain, involving learning, coordination, feedback, and resource allocation across multiple stages (Pavitt, 2004; Szutowski et al., 2019).

Financial constraints are understood as situations in which a firm's investment decisions are limited by restricted access to internal or external financial resources. This means that firms may be unable to pursue otherwise valuable projects because available cash flow, financing conditions, or access to external capital restrict what can realistically be funded. In line with Fazzari et al. (1988), financial constraints are therefore understood as conditions that make investment decisions sensitive to the availability of financial resources.

Finally, SMEs are defined as firms with fewer than 250 employees and an annual turnover not exceeding 50 million euros, in line with the European Commission's definition (European

Commission, 2026). In this study, SMEs are not only understood by their size, but also by their typical resource limitations. Compared to larger firms, SMEs often have fewer financial buffers, less collateral, more limited access to external funding, and greater dependence on internal resources (Bakhtiari et al., 2020). These characteristics make SMEs particularly relevant for examining how financial constraints shape innovation processes.

Together, these concepts provide the foundation for the study. The thesis examines how financial constraints affect the organization, prioritization, and progression of innovation processes within SMEs.

1.4 Research aim and question

This study aims to examine how financial constraints shape innovation processes within SMEs. Rather than concentrating on aggregate innovation outcomes, it adopts a process perspective to explore how financial pressure influences the interpretation, selection, coordination, and progression of innovation activities at the firm level. The study is guided by the following research question:

How do financial constraints shape innovation processes within SMEs?

1.5 Scope and delimitations

This study examines financial challenges without strictly separating between internal and external constraints. The empirical focus is limited to SMEs operating in Sweden and is based on a qualitative multiple case study design. The study does not aim to measure innovation performance or establish statistical generalizations. Instead, it investigates how financial pressure is experienced and how it shapes the organization and progression of innovation processes within firms.

2. Literature Review

This chapter reviews the theoretical and empirical literature relevant to financial constraints, innovation processes, and SMEs.

2.1 Theoretical Frameworks

The following section presents the theoretical frameworks that guide this study. These perspectives provide an analytical lens for examining how financial challenges may shape the organization and progression of innovation processes within SMEs.

2.1.1 Threat rigidity theory

Threat-rigidity theory explains how organizations tend to respond when they perceive a serious threat to their survival or core interests. According to Staw, Sandelands, and Dutton (1981), threatening situations are often associated with conditions such as uncertainty, financial pressure, resource scarcity, and potential loss, which trigger systematic behavioral and structural changes within organizations. Rather than increasing flexibility, organizations under threat frequently narrow their focus and rely more heavily on established routines and familiar responses.

At the organizational level, these responses are reflected in increased centralization of decision-making, tighter control over resources, and greater reliance on formal rules and procedures. Information processing also becomes more restricted, as organizations narrow their attention to a limited set of cues and reduce the range of alternatives considered. While such responses may help restore a sense of order and control in the short term, they also reduce openness to new ideas and alternative solutions (Staw et al., 1981, pp. 515-520).

Importantly, threat-rigidity theory does not suggest that rigid responses are always dysfunctional. In relatively stable environments, increased control and efficiency can help organizations cope with immediate pressure. However, when organizations operate in complex or changing environments, these same responses may become problematic. By limiting experimentation, learning, and flexibility, threat-rigidity can constrain an organization's ability to adapt to new conditions (Staw et al., 1981, pp. 520-523). From this perspective, the theory provides a useful lens for understanding how financial challenges may

reshape innovation processes by narrowing experimentation, reducing risk-taking, and centralizing resource allocation.

2.1.2 Dynamic capabilities

To complement threat-rigidity theory, this study draws on the dynamic capabilities framework. While threat-rigidity theory explains why organizations may become more rigid under pressure, dynamic capabilities provide concepts for understanding how firms may adjust their resources, routines, and processes in changing environments.

Teece, Pisano, and Shuen (1997) define dynamic capabilities as a firm's ability to "integrate, build, and reconfigure internal and external competences" in order to address rapidly changing environments (Teece et al., 1997, p. 516). The framework emphasizes that firm capabilities are shaped by processes, positions, and paths. Processes refer to the way activities are coordinated and carried out within the firm; positions refer to the firm's asset base, including technology, knowledge, customer relationships, financial assets, and external relations; and paths refer to the strategic alternatives available to the firm, shaped by previous investments and accumulated experience (Teece et al., 1997, p. 518).

Organizational processes are central in this framework. Teece et al. (1997) identify three main roles of such processes: coordination/integration, learning, and reconfiguration (Teece et al., 1997, p. 518). Coordination and integration concern how internal and external resources are combined. Learning refers to how repetition, experimentation, and collective problem-solving allow firms to perform tasks better and identify new opportunities over time (Teece et al., 1997, p. 520). Reconfiguration refers to the ability to sense when existing assets or routines need to be adjusted and to carry out internal and external transformation (Teece et al., 1997, pp. 520-521). These concepts make the framework useful for analysing how innovation activities are organized and adjusted when conditions change.

The framework also emphasizes that adaptation is shaped by a firm's existing position and history. Teece et al. (1997) argue that financial assets may have short-term strategic implications, since what a firm can do quickly is often influenced by its cash position and balance sheet. Structural assets are also relevant, as formal and informal organizational structures influence the rate and direction of innovation (Teece et al., 1997, p. 521). In

addition, the framework stresses path dependency: “history matters”, because previous investments and established routines constrain future behaviour (Teece et al., 1997, p. 522).

Eisenhardt and Martin (2000) complement this view by clarifying that dynamic capabilities are not abstract or vague, but consist of identifiable organizational and strategic processes, such as product development, strategic decision-making, knowledge creation, alliancing, and resource allocation (Eisenhardt and Martin, 2000, pp. 1106-1107). This makes the framework more process-oriented and therefore relevant for studying how firms organize innovation activities, allocate resources, and make decisions.

They also argue that dynamic capabilities differ depending on the environment. In moderately dynamic markets, they often take the form of detailed, analytic, and relatively stable routines. In rapidly changing markets, they are more likely to be simple, experiential, iterative, and based on real-time information, prototyping, and quick feedback (Eisenhardt & Martin, 2000, pp. 1111-1113). This distinction shows that adaptation does not always require highly formalized processes; in some contexts, simpler routines may provide enough structure to guide action while preserving flexibility.

Finally, Eisenhardt and Martin (2000) emphasize that dynamic capabilities evolve through learning mechanisms such as repeated practice, codification of experience, mistakes, and pacing (Eisenhardt and Martin, 2000, pp. 1114-1116). Together, Teece et al. (1997) and Eisenhardt and Martin (2000) provide a framework for analysing how firms coordinate activities, learn from experience, reconfigure resources, and rely on existing positions and paths when innovation processes are challenged. The framework does not assume successful adaptation, but offers concepts for examining whether and how such adaptation takes place.

2.1.3 Theoretical integration

Threat-rigidity theory and dynamic capabilities are used together because they capture two different but related organizational responses to financial pressure. Threat-rigidity theory explains how perceived threats may narrow attention, centralize decision-making, reduce experimentation, and increase reliance on established routines (Staw et al., 1981). This is relevant for examining how financial constraints may restrict innovation processes. Dynamic capabilities, by contrast, focus on how firms integrate, build, and reconfigure competences in

changing environments, with adaptation shaped by organizational processes, asset positions, and prior paths (Teece et al., 1997, pp. 516, 518). Eisenhardt and Martin (2000) strengthen this process perspective by showing that dynamic capabilities can be understood through concrete routines such as product development, strategic decision-making, knowledge creation, and resource allocation (Eisenhardt and Martin, 2000, pp. 1106-1107).

Together, the two frameworks allow the study to analyse financial constraints not only as a limiting force, but also as a condition under which firms may reorganize innovation activities. Threat-rigidity theory captures the potential for narrowing and control, while dynamic capabilities capture the potential for adjustment and reconfiguration. This dual lens is therefore well suited to the study's process-oriented research question.

2.2 Review of Empirical Studies

With these theoretical perspectives established, the following section reviews prior research relevant to innovation processes, financial constraints, and SMEs. The purpose is to identify what is currently known and where gaps remain in understanding how financial challenges influence innovation processes.

2.2.1 Innovation process

This section explains how innovation processes are conceptualized in prior research and how they typically unfold within SMEs.

2.2.1.1 Conceptualizing innovation processes

Innovation processes can be understood as a set of overlapping and interconnected activities through which firms explore and exploit opportunities for new or improved products, processes, systems, or services by aligning advances in technical knowledge with changes in market demand (Pavitt, 2004, pp. 88-89). Rather than unfolding as a strictly linear sequence of stages, innovation processes are inherently uncertain and contingent. Firms engage in learning through experimentation and iterative adjustment, as neither technical performance nor commercial success can be fully predicted in advance (Pavitt, 2004, pp. 88, 100-101).

At the firm level, these processes can be analytically divided into three closely related sub-processes: the generation of scientific and technological knowledge, the transformation of that knowledge into working artifacts, and the continuous alignment of these artifacts with

organizational practices and market demand (Pavitt, 2004, pp. 88-89, 101-102). Importantly, these sub-processes tend to overlap and occur concurrently rather than sequentially, highlighting the dynamic and path-dependent nature of innovation (Pavitt, 2004, pp. 107-109).

In contrast to this more fluid and non-linear view, Szutowski et al. (2019) conceptualize the innovation process as a structured six-stage sequence progressing from idea generation to production and commercialization (Szutowski et al., 2019, pp. 284-285). Their model comprises idea generation, idea selection, research, development, testing, and production, with each stage involving specific actors and decision points (Szutowski et al., 2019, pp. 285-286). While presented as sequential, the authors emphasize that innovation performance depends not only on progressing through these stages, but also on how the process is designed and managed. In particular, they highlight the importance of pre-preparation, reproducibility, information sharing, and control mechanisms (Szutowski, 2019, pp. 290-292).

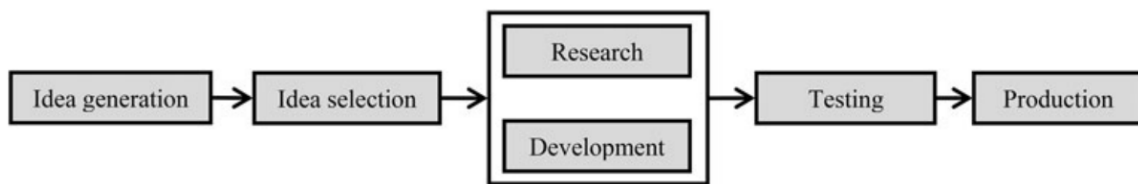


Figure 1: Innovation process (Szutowski et al., 2019, p. 285).

Moreover, Szutowski et al. (2019) emphasize the role of interactions within and between stages. They distinguish between outcome interactions, resource interactions, and external cooperation, demonstrating that these interactions influence innovation performance. Resource interactions are especially critical during research and development, where the allocation of resources and decision-making authority shape whether innovation projects continue and how they evolve (Szutowski et al., 2019, pp. 293-295).

Beyond Pavitt (2004) and Szutowski et al. (2019), two further frameworks are used in previous research. The first is the stage-gate model, originally introduced by Cooper (1990) and refined in later versions. At its core, the model is a structured way of moving a project from idea to launch: the work is split into fixed stages, and between each stage the project must pass a gate before it can continue. In its updated form there are five stages: scoping,

building the business case, development, testing and validation, and launch with a gate after each one. At a gate, the project is checked against set criteria and then approved, killed, held, or returned for revision (Cooper, 1990, p. 46; Cooper, 2008, p. 215). The stage-gate model is more structured than the preceding frameworks, though Cooper (2008, pp. 222-225) notes it can be scaled down for projects of different size and risk.

A different view is offered by Jensen, Johnson, Lorenz, and Lundvall (2007), who distinguish between two modes of innovation based on how knowledge is created and used. The Science-Technology-Innovation (STI) mode is based on the production and application of codified scientific and technical knowledge, typically through formal R&D activities and collaboration with universities and research institutes (Jensen et al., 2007, pp. 682-683). The doing-using-interacting (DUI) mode, by contrast, draws on informal and experience-based learning that emerges through everyday work, problem-solving, and interaction with customers, suppliers, and employees (Jensen et al., 2007, pp. 683-684). In the DUI mode, innovation is rarely organized as a separate function and is instead embedded in regular operations.

Together, these perspectives present innovation as both an uncertain, evolving process of learning and a structured movement through connected stages, where design, coordination, and the way resources are allocated shape the outcome at every point. Pavitt (2004) and Szutowski et al. (2019) capture both of these aspects and form the main analytical framework for innovation processes. Stage-gate and STI/DUI are kept as supporting perspectives: Stage-Gate highlights the value of structure and discipline, while the DUI mode helps explain how ideas emerge in firms without formal R&D. How these patterns play out within SMEs, where formal structures are often absent and resources limited, is the focus of the following section.

2.2.1.2 Innovation processes within SMEs

Building on the framework above, this section examines how innovation processes unfold within SMEs. SMEs combine distinctive advantages with structural constraints. As Lui, Ozdemir, Jackson, Shinkle, and Walker (2025, p. 918) summarize, their small size enables agility and quick decisions, and their closeness to the market supports rapid diffusion and near-market development; at the same time, they lack the financial resources, organizational capabilities, and economies of scale of large firms. Despite these constraints, SMEs often

sustain innovation by adapting and applying existing capabilities to customer needs (Forsman, 2011, p. 740).

Recent empirical work confirms this. Lui et al. (2025, p. 918) find that the innovation process in SMEs is best described not as a linear sequence of stages but as a set of managerial activities that run concurrently and develop as the work unfolds. They identify ten activities which are listening, searching, problematizing, challenging, choosing, steering, inspiring, communicating, resourcing, and tracking that are carried out in parallel rather than in sequence (Lui et al., 2025, pp. 924-928). Beyond these, they describe a distinctive dynamic capability they call reflecting, in which managers look inward to turn internal pressure points and operational problems into opportunities for innovation (Lui et al., 2025, pp. 928-930). They also emphasize a strong reliance on employee involvement to manage the tensions arising from pursuing conflicting activities simultaneously, a phenomenon they term contextual ambidexterity (Lui et al., 2025, pp. 930-932).

Forsman (2011) offers a complementary view through the innovation capacity of small enterprises defined as the continuous improvement of the capabilities and resources a firm possesses to develop new products that meet market needs (Szeto, 2000, as cited in Forsman, 2011, p. 740). This capacity rests on three components: R&D investment, innovation capabilities, and external input through networking (Forsman, 2011, p. 743). Empirically, small enterprises develop a broad range of innovation types, product, service, process, method and mode of action (Forsman, 2011, pp. 744-745). However, the dominant sources differ by sector: manufacturing firms rely mainly on R&D investment and capabilities, while service and lower-technology firms rely more on capabilities and external networking, with formal R&D playing a limited role (Forsman, 2011, p. 748).

Taken together, these perspectives suggest that innovation in SMEs operates through concurrent activities, informal routines, owner-manager involvement, and continuous learning loops drawing on both internal capabilities and external interactions. This pattern aligns with the path-dependent and dynamic view of innovation captured by Pavitt (2004) and Szutowski et al. (2019), while also reflecting the informal, experience-based learning emphasized in the DUI mode (Jensen et al., 2007). Because these processes depend heavily on internal cash flow and on the sustained engagement of a small number of people, they are structurally more exposed to financial pressure than the formalized innovation processes of large firms.

2.2.2 Financial constraints

This section defines financial constraints, discusses their possible effects, and explains why SMEs are particularly exposed to them.

2.2.2.1 Conceptualizing financial constraints

Financial constraints arise from a basic imperfection in capital markets: a firm's managers usually know more about its real value than outside investors do. Myers and Majluf (1984, p. 189) build their analysis on exactly this assumption that managers have information that investors lack. This gap changes how a firm can raise money. When a firm tries to raise external capital, rational investors suspect it may be doing so because it cannot fund the project from inside, so they offer worse terms to avoid overpaying for a firm that might be overvalued (Myers and Majluf, 1984, pp. 194-196). Because managers expect this discount, they avoid outside finance when they can and lean on internal funds, or "financial slack," instead (Myers and Majluf, 1984, p. 195). This produces a clear order of preference: firms use retained earnings first, borrow if internal funds run short, and issue new equity only as a last resort (Myers and Majluf, 1984, p. 187). This ordering is not a matter of taste but a rational reaction to the cost gap that imperfect information creates between firms and investors.

This cost gap is what creates financial constraints. Fazzari et al. (1988, p. 142) define a constrained firm as one for which internal and external finance are not perfect substitutes: the gap between the two is large enough that the firm's investment depends on how much internal money it has. An unconstrained firm invests whenever a project is worth it and finances it however is easiest. A constrained firm, by contrast, invests according to its cash flow; it cuts or delays good projects simply because internal funds fall short and outside finance is too costly or unavailable (Fazzari et al., 1988, pp. 142-143). The constraint breaks the link between what a firm could profitably do and what it actually does.

These constraints have real and well-documented effects. Hubbard (1998, pp. 196-198) shows that information problems open a gap between the cost of internal and external funds, and that this gap grows as a firm's net worth and collateral shrink, leaving firms with few internal resources to underinvest. Reviewing studies across many countries and firm types, he finds the same pattern repeatedly: imperfect capital markets lead constrained firms to systematically underinvest, and the effect is strongest for younger firms, smaller firms, and

those with less collateral (Hubbard, 1998, p. 206). These firms do not just grow more slowly; they pass up profitable projects, react less flexibly to opportunities than their unconstrained rivals, and stay more vulnerable to swings in their own cash flow. Financial constraints, then, are not a rare problem but a built-in feature of imperfect capital markets, with lasting and measurable effects on how firms invest and grow.

2.2.2.2 The duality of financial constraints

The literature on financial constraints has traditionally emphasized their detrimental effects on firm-level innovation. Restricted access to internal and external financing reduces the resources available for research and development, slows the development of new products, and limits firms' capacity to sustain innovation across cycles of investment (Fazzari et al., 1988; Madrid-Guijarro et al., 2016, pp. 86-89). While well supported, this view presents financial constraints primarily as a barrier to be overcome.

More recent research challenges this one-sided framing by demonstrating that financial constraints can also stimulate productive organizational responses. Hoegl, Gibbert, and Mazursky (2008, pp. 1382-1383) argue that severe financial constraints in innovation projects can act as a creative trigger, forcing teams to abandon conventional solutions and engage in more imaginative problem-solving. The theoretical foundation for these productive effects is most clearly developed in Baker and Nelson's (2005, pp. 333-334) concept of entrepreneurial bricolage, which refers to the practice of making do with the resources at hand by recombining existing materials, skills, and tools to address new problems. Rather than treating limited resources as an obstacle to be removed, bricoleur firms approach constraints as a starting point for creative recombination (Baker and Nelson 2005, pp. 354-356). Senyard, Baker, Steffens, and Davidsson (2014, pp. 211-213) provide empirical support for this perspective by showing that resource-constrained new firms can achieve innovativeness through bricolage, suggesting that resource limitation is not necessarily an obstacle to innovation but may operate as a pathway to it.

Whether financial constraints lead predominantly to detrimental or productive outcomes, therefore, depends on several moderating conditions. Hoegl et al. (2008, pp. 1387-1389) develop this argument at the team level, proposing that the relationship between financial constraints and innovation performance is shaped by the way teams approach their work, in particular through bounded creativity, the use of domain-relevant skills, engaging project

objectives, team cohesion, and team potency. The authors caution that these moderators have a ceiling, past a certain severity, and the team process can no longer offset the constraint (Hoegl et al., 2008, p. 1389). This study positions itself within this duality. Rather than assuming that financial constraints simply reduce or stimulate innovation, the analysis examines how financial pressure shapes the organization and progression of innovation processes in SMEs, with particular attention to how detrimental and productive effects coexist within the same firm.

2.2.2.3 Financial constraints within SME

Financial constraints do not affect all firms equally. Bakhtiari et al. (2020, p. 509) show that SMEs are structurally more exposed than large firms for two compounding reasons: they typically lack the tangible assets that lenders require as collateral, and they have no established financial track record to ease investor uncertainty about their creditworthiness. These features leave SMEs most exposed to the information asymmetry described by Myers and Majluf (1984): they are the firms outsiders know least about, and thus the firms for which the wedge between internal and external finance is widest. Large firms, by contrast, have accumulated the collateral, credit histories, and lender relationships that narrow this wedge over time. SMEs, particularly young ones, begin from a structural disadvantage that does not resolve on its own (Myers and Majluf, 1984).

This disadvantage extends across the major financing channels open to SMEs. In a systematic review, Romero Alvarez, Salas-Navarro, Martínez and Zamora-Musa (2025) examine how bank credit, venture capital, public subsidies, and emerging alternatives such as crowdfunding function for SMEs in practice, and find that each fits them unevenly. Bank credit, the most studied channel, supports innovation only for firms that have already adopted new processes or technologies, remaining largely inaccessible to SMEs not yet engaged in R&D (Romero Alvarez et al., 2025, pp. 539). Venture capital is critical for high-tech sectors and high-growth startups, but by design, reaches only a narrow subset of firms (Romero Alvarez et al., 2025, pp. 542-543). Public funding through grants, subsidies, and tax credits can support innovation, but its effectiveness varies markedly by country, sector, and how it is combined with other sources (Romero Alvarez et al., 2025, pp. 540-541). SMEs are thus not without options; rather, each option carries conditions or costs that large firms, with their established positions and financial histories, are far better placed to meet. The result is a

narrower, more fragile financing base that leaves SMEs dependent on internal resources and exposed once those are depleted.

The constraint is not, however, insurmountable. Chiappini et al. (2022) identify certification as one of the most effective means by which SMEs can improve their access to external finance. In their study of French SMEs, public innovation subsidies do more than provide direct funding; they act as quality signals to private lenders. By selecting a firm for support, a government agency implicitly vouches for its viability, reducing the information asymmetry that would otherwise make lenders cautious. Banks respond by extending more credit, especially to young and micro-firms (under seven years old) that face the steepest credibility barriers (Chiappini et al., 2022, pp. 10-11). The implication is that what blocks SMEs from external finance is often not risk itself but their inability to communicate quality credibly to investors who cannot assess it independently. Mechanisms that narrow this credibility gap, such as public endorsement, established networks, and reputation building, can therefore relax the constraint meaningfully.

Even when the constraint eases, however, its effects are not uniform. Drawing on 23,575 Chinese SMEs, Cui, Cheng and You (2024, pp. 3-4) find that financing constraints are associated with reduced patent investment, a measure of a firm's commitment to innovation, yet that family involvement and entrepreneurial orientation are both linked to lower constraints and higher patent investment. Internal organizational characteristics can therefore partly offset the inhibiting effect of restricted external finance, showing that the impact of financial constraints is not deterministic but depends on firm-level factors as much as on market conditions.

How a firm responds to constrained resources, which activities it prioritizes or abandons, therefore depends on its own capabilities and strategic dispositions. This makes the interaction between financial constraints and the innovation process itself the natural focus of what follows.

2.2.3 The intersection between financial constraints and innovation processes

The two preceding sections have each told part of a larger story. Innovation processes are cumulative, uncertain, and deeply dependent on sustained organizational learning and resource commitment across multiple stages (Pavitt, 2004, pp. 88-89). Financial constraints, on the other hand, emerge when the gap between what a firm can fund internally and what it

can access externally becomes wide enough to distort its investment decisions (Fazzari et al., 1988).

Empirical evidence supports the view that financial constraints do not merely reduce overall investment levels, but have direct negative effects on product and process innovation in SMEs, particularly during periods of economic crisis (Madrid-Guijarro et al., 2016). This suggests that financial pressure can systematically restrict firms' ability to sustain innovation-related activities, reinforcing the need to understand how such constraints affect the dynamics of innovation processes.

2.2.3.1 Which stages of the innovation process are most disrupted by financial constraints

The starting point for understanding this is recognizing what makes innovation processes different from most other firm activities. Pavitt (2004, pp. 100-101) argues that innovation does not unfold as a series of independent steps that can be stopped and restarted without cost. Instead, it is a path-dependent process in which learning builds on itself: what a firm discovers in one stage shapes what becomes possible in the next (Pavitt, 2004, pp. 100-101). This means that when financial constraints force a firm to interrupt an ongoing innovation process, the loss is not simply a matter of delayed progress. The organizational knowledge generated through earlier stages, the experimentation, the failed attempts, the refined understanding of what works, has a risk of being lost entirely. Cohen and Levinthal (1990) add an important dimension to this argument by showing that a firm's capacity to learn and apply new knowledge depends on prior investment in learning-intensive activities. Financial constraints that cut into this investment do not just slow down current innovation efforts; they gradually erode the organizational capability that makes future innovation possible in the first place. The damage, in other words, tends to compound over time rather than simply accumulate.

Through the stage model proposed by Szutowski et al. (2019, pp. 285-286), it becomes clearer where financial constraints are likely to cause the most disruption. Szutowski et al. (2019, p. 285) describe production as the stage that is the most time and resource-intensive stage, while idea generation and selection are positioned as primarily creative and evaluative activities. Building on this distinction, the early stages can plausibly continue under tighter resource conditions, whereas the later stages create a real vulnerability when funds are constrained. The research, development, and testing stages require sustained resource

commitment to move an idea toward implementation. Brown, Fazzari, and Petersen (2009) provide direct evidence of this dependence by showing that, for young high-tech firms in the United States, shifts in the supply of internal cash flow and external equity finance account for roughly three-quarters of the aggregate rise and fall in R&D between 1994 and 2004. R&D activity in resource-constrained, knowledge-intensive firms is therefore tightly coupled to the availability of finance, which means that when funding becomes scarce, the stages requiring the heaviest investment are the first to contract. Savignac (2008) reinforces this picture from a different angle. Using a direct, survey-based measure of financial constraints on French manufacturing firms, the author finds that the probability of engaging in innovative activities is reduced by more than 20 percent for constrained firms, after correcting for endogeneity and selection. Financial constraints, in other words, do not just slow innovation; they significantly reduce the likelihood that a firm undertakes it at all.

2.2.3.2 Financial constraints and innovation processes in SMEs

For SMEs, this dynamic carries particularly serious consequences. As the preceding section established, SMEs already operate with the widest gap between internal and external finance, largely because they lack the collateral and financial track record that would give lenders confidence (Bakhtiari et al., 2020). When internal funds are reduced, whether through periods of economic stress or internal financial pressure tied to firm growth, SMEs have very little ability to compensate through external financing, leaving ongoing innovation processes exposed. Based on a panel of 179 small high-tech firms, Himmelberg and Petersen (1994) document a strong, statistically robust link between a firm's R&D spending and its available internal funds, concluding that for such firms the pace of technology acquisition through R&D is set primarily by internal finance. Czarnitzki and Hottenrott (2011) provide further evidence on this dependence. Using a representative sample of German firms, they show that internal financial constraints have a stronger effect on R&D investment than on ordinary capital investment, and that external financing constraints become increasingly binding as firm size decreases. R&D activity in smaller firms is therefore both more sensitive to internal cash flow and more exposed to external financing barriers than other types of investment, which means that any disruption to the firm's financial position translates more directly into a reduction in innovation activity than it would for a larger firm.

What makes this particularly damaging for SMEs is not just the interruption itself, but what happens afterward. Large firms facing financial constraints can often draw on slack

resources, established credit relationships, or diversified revenue streams to bridge temporary funding gaps and research innovation processes without losing the organizational knowledge built up in earlier stages. SMEs rarely have these options available to them. Once an innovation process is interrupted, the team that was working on it may be reassigned or lost entirely, the organizational routines that supported the project dissolve, and the momentum that carried the process through its early stages is difficult to rebuild. The result is that what begins as a temporary interruption frequently becomes a permanent abandonment, not because the project lost its strategic value, but because the conditions that made it viable no longer exist.

Cui et al. (2024) offer a partial counterpoint to this picture. Their findings suggest that certain SME-level characteristics, particularly family involvement and an entrepreneurial orientation, enable some firms to mobilize internal resources more creatively when external funding is unavailable, partially compensating for the constraint through alternative means. This matters because it shows that the impact of financial constraints on innovation processes is not entirely deterministic. Firms with strong internal cohesion and a strategic disposition toward innovation may find ways to sustain at least parts of the process even under constrained conditions, for instance, by focusing available resources on the less capital-intensive stages while pausing more expensive activities. However, this adaptive capacity has clear limits. It may allow firms to preserve the early stages of an innovation process, but it is unlikely to substitute for the sustained resource commitment that development and testing require. For most SMEs, financial constraints during a growth-related crisis do not just slow down innovation; they structurally narrow what kind of innovation remains possible.

2.2.4 Leadership in constrained innovation

Prior research suggests that leadership plays an important role in how firms organize innovation when resources are limited. Johnson, Bicen and Zhu (2023) argue that firms can develop lean innovation capability, which enables them to innovate with fewer resources by learning from market feedback and leveraging resource limitations. A key part of this capability is mission-oriented leadership, which helps firms maintain focus, translate innovation strategy into clear goals, and guide resource allocation under constraint (Johnson et al., 2023, pp. 2, 4, 6). Chung, Zhang and Wu (2025) add that SME leaders are important because firms must balance exploration and exploitation, two types of innovation that require

different resources and create allocation tensions. Leadership ambidexterity can therefore help SMEs coordinate and integrate resources across competing innovation demands (Chung et al., 2025, pp. 227-230). Dung, Binh and Minh (2026) further support this view by conceptualizing strategic leadership as involving strategic visioning, resource alignment and enabling organizational adaptation in SMEs (Dung et al., 2026, p. 872). Their resource orchestration perspective shows that leadership helps structure attention, align resources and translate team-level interpretation into action under conditions of resource scarcity and relational complexity (Dung et al., 2026, pp. 876-879, 885).

Together, these studies suggest that leadership can influence how firms prioritize, coordinate and sustain innovation when resources are scarce. This is relevant for the present study because it provides a basis for analysing leadership and shared direction as mechanisms that support alignment, focus and difficult trade-offs under financial pressure.

2.2.5 Research gap

Innovation processes are cumulative, path-dependent, and resource-intensive: they develop through connected stages, where progress at each stage depends on the learning and resources built up in the one before (Pavitt, 2004; Szutowski et al., 2019). Financial constraints limit a firm's capacity to invest, because external finance becomes more costly than internal funds, a problem that hits SMEs hardest, as they often lack collateral and a financial track record (Fazzari et al., 1988; Bakhtiari et al., 2020). A growing body of work links the two, showing that financial constraints lower the likelihood of innovating (Savignac, 2008), reduce R&D spending in smaller firms (Czarnitzki & Hottenrott, 2011), interrupt R&D continuity (Brown et al., 2009), and weaken process innovation during downturns (Madrid-Guijarro et al., 2016). However, this work mostly measures innovation as an outcome, whether a firm innovates, how much it spends, or what it produces, rather than how financial pressure reshapes the innovation process itself. We therefore know that financial constraints reduce innovation, but much less about how they reorganise it inside SMEs, where processes are usually informal and dependent on internal cash flow (Lui et al., 2025). This study addresses that gap by examining how internal financial pressure shapes the structure and development of innovation activities at the firm level.

3. Methodology

This chapter explains the research design, data collection, sampling strategy, data analysis, ethical considerations, and quality criteria used in the study.

3.1 Research Philosophy and Approach

This section outlines the philosophical and analytical foundations of the study. By clarifying the epistemological stance and research approach, it establishes the logic guiding the overall research design.

3.1.1 Interpretivist philosophy

This study adopts an *interpretivist* research philosophy. Interpretivism argues that the social sciences require a different logic of inquiry than the natural sciences, as social reality is constituted through action and meaning making (Bell, Bryman & Harley, 2021, pp. 31-32). Rather than seeking objective explanations of behaviour, interpretivism is concerned with understanding social action from the perspective of those involved (Bell et al., 2022, p. 31). Since internal financial constraints and innovation processes are experienced and interpreted by managers and employees, this study aims to understand how actors make sense of financial pressure and how these interpretations shape innovation practices. In line with the interpretivist tradition, emphasis is therefore placed on understanding the “how” and “why” of social action and organisational processes (Bell et al., 2022, p. 31). Building on the view that knowledge is socially constructed, this study acknowledges that theoretical contributions are developed through interpreting empirical insights in relation to existing research (Locke & Golden-Biddle, 1997).

3.1.2 Abductive approach

This study adopts an *abductive* research approach. Abduction is increasingly used in business research as a way of overcoming the limitations of purely deductive or inductive reasoning (Bell et al., 2022, p. 25). While deductive research involves testing hypotheses derived from a priori theory, and inductive research seeks to build theory directly from data, abductive reasoning begins with a puzzle or tension that existing theory cannot fully explain (Bell et al., 2022, p. 25).

In this study, the puzzle concerns how financial pressure influences organizational processes within SMEs, which is an area where prior research has largely focused on innovation outcomes rather than underlying processes. Abduction allows for an iterative movement between empirical observations and existing theoretical frameworks, in a process between data and literature. Rather than testing predefined hypotheses, the study engages in a dialogical process between theory and empirical material, remaining open to surprising findings while using existing theory to interpret and refine emerging explanations (Bell et al., 2022, p. 25). In this way, abductive reasoning enables the identification of the most plausible explanations for how financial pressure influences innovation practices in context. In line with abductive reasoning, emerging patterns are continuously compared with existing theoretical perspectives. This allows the study not only to identify empirical regularities, but also to refine and extend prior conceptual understandings (Locke & Golden-Biddle, 1997).

3.2 Research Design

Building on the philosophical positioning, this section presents the overall research design and explains how the study is structured to address the research aim.

3.2.1 Qualitative research

A *qualitative* method was chosen because the study aims to understand how internal financial constraints are experienced, interpreted, and acted upon by managers within SMEs. Since social phenomena are shaped by the meanings individuals attribute to their situations, it is necessary to approach the research from the perspective of those involved rather than through externally imposed categories (Bell et al., 2022, p. 367). Organizational processes under financial pressure cannot be fully understood without considering the contextual and subjective interpretations that guide decision-making. A qualitative approach therefore enables access to participants' own understandings and provides the contextual depth required to examine processual organisational phenomena (Bell et al., 2022, pp. 367-368).

3.2.2 Multiple case study design

We chose a *multiple case study* design because it allows us to study each SME in depth and understand what happens within its specific context. A case study focuses on examining a bounded setting, such as an organisation, in a detailed way (Bell et al., 2022, pp. 63-64). By including several SME:s, we can explore the same phenomenon across different organisations

and select cases expected to provide relevant and information rich insights. Studying multiple cases also enables *cross-case comparison*, making it possible to identify similarities and differences in how innovation processes are shaped under financial constraints across organisational contexts. Consistent with theory building case research, each case is treated as a distinct analytical unit, following replication logic across cases (Eisenhardt & Graebner, 2007). Examining multiple SMEs strengthens the robustness of emerging insights through systematic comparison rather than relying on a single organizational account.

3.2.3 Unit analysis

The level of analysis in this study is the organizational level. More specifically, the unit of analysis is innovation processes within SMEs under conditions of financial constraints. Although data was collected from individual respondents, the analytical focus is not on individual perceptions as such, but on how innovation processes are organized, prioritized, and adapted within each firm.

As emphasized by Bell et al. (2022, p. 71), it is important to clearly define the level of analysis to avoid drawing conclusions about organizations based solely on individual data. In this study, each respondent was selected because of their organizational role and insight into strategic decision-making, innovation activities, and financial constraints. The respondents are therefore treated as knowledgeable informants about their respective firms, while the analytical focus remains on organizational processes.

3.3 Data Collection Methods

Having outlined the research design, this section describes how empirical data was collected and why the chosen methods are appropriate for examining the phenomenon.

3.3.1 Semi-structured interviews

Semi-structured interviews were chosen as the primary data collection method, as they allow for both structure and flexibility in exploring complex organisational processes. A semi-structured interview typically involves the use of an interview guide with predetermined questions, while allowing the interviewer to vary the order of questions and ask follow-up questions in response to significant or unexpected answers (Bell et al., 2022, p. 211). As the topic involves context specific organisational processes, it is important that respondents are

given space to explain their experiences in their own words. A semi-structured format allows the interviewer to ask follow-up questions, clarify answers, and explore issues that arise during the conversation. At the same time, the interview guide ensures that all key topics related to the research question are covered in each interview. The full interview guide used to structure the conversations, including all questions asked across the 13 interviews, can be found in Appendix 1.

Table 1 provides an overview of the conducted interviews. It includes anonymised information about each respondent's organisational role, the associated industry, firm size, interview mode, and duration. Since the study follows a multiple case study design with one respondent representing each SME, each respondent corresponds to one organizational case. Respondents and firms are anonymised using case labels from Firm A to Firm M. The final empirical material consists of 13 semi-structured interviews, representing approximately 10 hours of interview data.

Case	Organizational role	Industry	Employees	Interview mode	Duration
Firm A	Managing director	Manufacturing	72	Online	45 min
Firm B	Chief business officer	Biotech	10	In person	30 min
Firm C	Founder & CEO	Software	3	Online	60 min
Firm D	CO-founder & CEO	Logistic/Technology	25	Online	40 min
Firm E	Founder/Product Lead	Software Startup	2-3	Online	40 min
Firm F	Former CEO/Co-founder	Sustainability SaaS	200	Online	45 min
Firm G	CTO	Logistic/Technology	23	Online	45 min
Firm H	Head of Special Projects	Hardware	55	Online	50 min
Firm I	CEO/Founder	MedTech	50	Online	45 min
Firm J	Head of Sales & Operation	Manufacturing	5	Online	40 min
Firm K	Management Consultant	FinTech	50	Online	60 min
Firm L	Co-Founder/COO	Ecommerce	3-4	In person	40 min
Firm M	Founder/Business Lead	DeepTech/Biotechnology	4	In person	60 min

Table 1: Overview of the conducted interviews.

3.4 Sampling Strategy

This section explains how cases and participants were selected, outlining the criteria and logic underlying the sampling decisions.

3.4.1 Purposive sampling

A *purposive sampling* strategy was adopted, as this approach involves selecting units directly in relation to the aims of the study (Bell et al., 2022, p. 389). Rather than sampling randomly, purposive sampling enables the strategic selection of organizations and individuals who can provide meaningful insights. In qualitative research, sampling is guided by the need to access information-rich cases and a range of relevant perspectives. Accordingly, both cases and participants were selected based on predefined criteria. As a non-probability approach, purposive sampling does not aim for statistical generalization but for in-depth understanding of the phenomenon (Bell et al., 2022, p. 390). In line with theory-building case research, cases are selected for theoretical relevance rather than statistical representativeness (Eisenhardt & Graebner, 2007). The aim is therefore to illuminate patterns and develop conceptual understanding, rather than to generalize to a broader population.

3.4.2 Case selection

The study targets SMEs in Sweden, defined in line with the EU threshold of fewer than 250 employees (European Commission, 2026). To ensure relevance to the research question, firms were eligible if they had engaged in innovation-related activities during the last 12-24 months and had experienced financial pressure affecting resource availability, such as liquidity limitations, budget constraints, reduced funding, or difficulties allocating resources to innovation activities.

A total of 13 SMEs were included in the study. While no strict industry restrictions were applied, the case selection aimed to focus on knowledge-intensive and innovation-oriented firms where innovation constituted an important part of the organization's activities. This was important because the study examines innovation processes rather than general business operations. The final sample includes firms from manufacturing, biotechnology, software, logistics technology, sustainability SaaS, hardware, medtech, fintech, ecommerce, and deeptech/biotechnology. Although the firms operate in different sectors, they share a common

orientation toward developing, improving, or commercializing products, services, technologies, or processes.

This variation enabled comparison across different types of SMEs while maintaining a shared focus on innovation activities under financial constraints. The cases were recruited through personal networks and outreach on LinkedIn. Firms were selected based on their relevance to the research aim rather than statistical representativeness, in line with the logic of purposive sampling and qualitative case study research.

3.4.3 Participant selection

One respondent was interviewed from each firm. Participants were selected based on their organizational role and their involvement in strategic decision-making, innovation-related activities, or resource allocation. The study primarily targeted founders, CEOs, managing directors, CTOs, product leads, business leads, and other senior employees with direct insight into how innovation processes are organized and affected by financial constraints.

Respondents were required to have sufficient knowledge of the firm's innovation activities and to have been involved in the organization during a period of financial pressure. This ensured that they could reflect on how financial constraints influenced prioritization, development, commercialization, and organizational adaptation. Since each firm was represented by one respondent, the study relies on knowledgeable informants rather than multiple internal perspectives within each organization.

3.4.4 Variation and case logic

The study explores patterns in how SMEs adapt their innovation processes under limited financial resources by identifying recurring tendencies as well as differences across organizational contexts. Variation across cases was allowed in terms of sector, firm size, organizational maturity, and type of innovation activity. At the same time, all selected firms shared core characteristics: they were SMEs, engaged in innovation-related activities, and had experienced financial pressure affecting resource availability.

This combination of shared selection criteria and contextual variation enabled cross-case comparison. The purpose was not to generalize statistically to all SMEs, but to develop a

deeper understanding of how financial constraints shape innovation processes across different SME contexts. By comparing cases from different industries, the study was able to identify patterns that appeared across firms as well as sector-specific differences in how financial constraints affected innovation

3.5 Data Analysis Methods

The following section describes how the collected data will be analysed, detailing the analytical strategy and procedures used to identify patterns across cases.

3.5.1 Thematic analysis

The interview data was analysed using *thematic analysis* following Braun and Clarke (2006). Thematic analysis was chosen because it is a flexible qualitative method for identifying, analysing, and reporting patterns or themes within a dataset (Braun & Clarke, 2006, p. 79). This approach was considered suitable for the study because the aim was to identify recurring patterns in how financial constraints shape innovation processes across multiple SMEs.

The analysis followed Braun and Clarke's six-phase process. First, the researchers familiarised themselves with the data by reading and re-reading the interview transcripts and noting initial ideas. Second, initial codes were generated by identifying meaningful segments of text related to the research question. Third, codes were grouped into candidate themes based on recurring patterns across the interviews. Fourth, the candidate themes were reviewed in relation to both the coded extracts and the full dataset. Fifth, themes were defined and named in order to clarify the specific meaning and scope of each theme. Finally, the findings were written up by selecting relevant extracts and connecting the themes to the research question and theoretical framework (Braun & Clarke, 2006, pp. 87-93).

The analysis was primarily semantic, as it focused on the explicit meanings expressed by respondents in relation to innovation processes, financial constraints, prioritization, and organizational adaptation. However, the analysis also involved interpretation by connecting these patterns to the theoretical framework. Braun and Clarke (2006, pp. 83-84) distinguish between inductive and theoretical thematic analysis, as well as between semantic and latent levels of analysis. In this study, themes were developed through close engagement with the

empirical material, while the interpretation of these themes was informed by existing theory on innovation processes, threat-rigidity, and dynamic capabilities.

3.5.2 Coding process

Following transcription, the interviews were systematically coded to identify meaningful segments of text related to the research question. The coding process began with repeated reading of the transcripts in order to become familiar with the material. During this stage, initial notes were made regarding recurring ideas, expressions, and patterns connected to financial constraints and innovation processes.

The initial coding focused on segments of text related to customer-driven innovation, idea generation, idea selection, prioritization, R&D, development, commercialization, decision-making, efficiency, leadership, and organizational adaptation. In line with Braun and Clarke (2006, p. 88), coding was conducted across the full dataset in order to give each interview systematic attention and to avoid basing themes on isolated examples. After the initial coding, related codes were grouped into candidate themes. These candidate themes were then reviewed and refined by checking whether they were internally coherent and clearly distinct from each other. Braun and Clarke (2006, pp. 91-92) emphasize that themes should be reviewed both in relation to the coded extracts and the dataset as a whole. Following this logic, the themes were revised until they provided a coherent representation of the main patterns in the interview material.

The final themes were defined and named based on their analytical focus. The resulting thematic structure was used to organize the findings and to support the subsequent analysis in relation to the theoretical framework.

3.5.3 Cross-case analysis

The analysis involved both case-level familiarisation and cross-case comparison. First, each interview was examined individually to understand how financial constraints shaped innovation processes within that specific firm. This helped preserve the contextual characteristics of each case, including industry, firm size, and type of innovation activity.

In the second stage, the cases were compared across the full dataset. The purpose of this cross-case comparison was to identify recurring patterns, similarities, and differences in how

SMEs experienced and responded to financial constraints. This comparison enabled the development of themes that were not limited to a single firm but reflected broader patterns across the empirical material.

3.6 Ethical Considerations

Ethical considerations were addressed throughout the research process. Participation in the study was voluntary, and all respondents were informed about the purpose of the research, the use of the data, and their right to withdraw at any time without consequences. Informed consent was obtained prior to each interview.

To ensure confidentiality, both organizations and respondents were anonymised. Firms are referred to using neutral identifiers from Firm A to Firm M. No identifying details that could reveal the identity of participants or organizations are disclosed.

Given the potentially sensitive nature of discussing internal financial pressure, care was taken to avoid requesting confidential financial information. Interviews focused on experiences and organizational practices rather than specific financial figures. All interview recordings and transcripts are stored securely and accessible only to the researchers, in accordance with applicable data protection guidelines.

3.7 Quality Criteria

Finally, this section explains how the quality and trustworthiness of the study are ensured in line with qualitative research standards.

3.7.1 Credibility

Credibility refers to the plausibility and trustworthiness of the findings (Bell et al., 2022, p. 363). To enhance credibility, the study follows established qualitative research practices and bases its interpretations closely on the empirical material. The use of semi-structured interviews allowed respondents to describe their experiences in their own words, while follow-up questions enabled clarification and deeper exploration of relevant issues.

Credibility was also strengthened through cross-case comparison. By examining whether similar patterns appeared across multiple firms, the study was able to identify recurring

themes rather than relying on isolated examples. The thematic analysis followed Braun and Clarke's six-phase process, which supported systematic movement from familiarisation and coding to theme development and reporting (Braun & Clarke, 2006, pp. 87-93). In addition, relevant interview extracts were used in the findings chapter to demonstrate how the themes were grounded in the data.

Since the study includes one respondent per firm, it does not provide multiple internal perspectives within each organization. This is acknowledged as a methodological limitation. However, respondents were selected because of their strategic roles and knowledge of innovation-related activities, making them appropriate informants for the purpose of the study.

3.7.2 Dependability

Dependability concerns the transparency and consistency of the research process (Bell et al., 2022, p. 365). To ensure dependability, the study documents each stage of the research process, including case selection, participant selection, interview procedures, transcription, coding, theme development, and cross-case comparison. The use of Braun and Clarke's thematic analysis supported a systematic and transparent analytical process. Their approach emphasizes that themes should be developed through repeated engagement with the data, systematic coding, reviewing of themes, and clear definition of final themes (Braun & Clarke, 2006, pp. 87-93). Maintaining records of coding decisions and theme development helped ensure traceability from empirical material to analytical conclusions.

3.7.3 Confirmability

Confirmability refers to the extent to which findings are grounded in the data rather than shaped by researcher bias (Bell et al., 2022, pp. 365-366). In this study, confirmability was supported by systematically linking interpretations to the interview material through coding, theme development, and the use of illustrative extracts in the findings chapter.

The thematic analysis was conducted through repeated movement between the transcripts, initial codes, candidate themes, and final themes. Braun and Clarke (2006, p. 96) emphasize that good thematic analysis requires coherence between the data, the analytical claims, and the reported themes. In line with this, themes were reviewed against both coded extracts and the full dataset to ensure that they accurately reflected recurring patterns in the material.

The abductive research approach also supported confirmability by allowing empirical patterns to be interpreted in relation to existing theoretical perspectives without forcing the data into predetermined categories. By clearly linking empirical findings to theory, the study makes explicit how interpretations were constructed.

3.7.4 Transferability

Transferability relates to the extent to which findings may be applicable in other contexts (Bell et al., 2022, p. 365). Rather than claiming statistical generalizability, the study provides contextual detail about the selected SMEs, including industry, firm size, respondent role, and interview duration. This enables readers to assess the potential relevance of the findings to other organizational settings.

The inclusion of SMEs from different industries strengthens transferability by showing how financial constraints shape innovation processes across varied contexts. However, the findings should be understood as analytically transferable rather than universally generalizable. The aim is to provide insights that may be relevant to similar SMEs experiencing financial constraints, rather than to make claims about all SMEs.

4. Empirical Findings

This chapter presents the empirical findings from the thematic analysis of the interview material. The findings are organized thematically and illustrated with selected interview extracts. The purpose is to present the main patterns across the cases before they are analysed and discussed in the following chapter. An overview of the thematic analysis structure is provided in Appendix 2.

4.1 Customer input and financial filtering

A central finding across the interviews was that innovation in SMEs was strongly connected to customer needs, market feedback, and practical problems identified through everyday business activities. Respondents rarely described innovation as a purely internal or isolated process. Instead, ideas were often generated through interaction with customers, observations of operational problems, sales discussions, technological possibilities, or repeated user requests. However, these inputs did not move directly into development. Because resources were limited, firms had to assess whether customer needs represented recurring problems, commercial value, and a feasible use of time, money, and development capacity. In this sense, financial constraints did not prevent ideas from emerging, but influenced which customer- and market-driven ideas were considered worth pursuing.

Customer feedback was therefore treated as input rather than instruction. Several firms emphasized that they had to distinguish between isolated customer wishes and broader customer needs. A single request did not necessarily justify development. Instead, repeated demand helped firms assess whether an idea reflected a problem worth solving. Firm C described this filtering logic clearly:

“If a customer comes and they ask you for a feature every week. Are you going to build that feature? Yes. And why is that? Because there is demand for it. There is a problem that repeats itself.” (Firm C)

This shows that customer input functioned as an important source of ideas, but that ideas needed to be validated before resources were allocated to them. Repeated demand, broader customer relevance, and willingness to pay helped firms judge whether an idea had enough commercial value to justify development. At the same time, firms also considered whether

the idea fitted the product, whether it was feasible, and whether it would use limited resources in a reasonable way.

The financial filtering of customer and market input was especially visible in Firm D. The respondent explained that limited financial resources affected the firm's ability to hire and therefore shaped which ideas could be prioritized:

“We cannot hire a lot of people if we don't have the money to pay a salary. So... we need to prioritize a lot. We need to maintain focus on what is most critical for our clients and... what is most critical in terms of revenue generation.” (Firm D)

This indicates that financial constraints influenced the early interpretation of customer needs. Firms did not only ask whether an idea solved a customer problem, but also whether it was critical for clients, connected to revenue generation, and realistic given available resources. A similar logic appeared in Firm G, where customer problems were assessed by identifying “where are the big pains” and “where is the money,” since these were the areas where customers were most likely to purchase or subscribe. Firm L also described prioritization as “money based,” explaining that ideas expected to bring additional revenue were prioritized.

Overall, this theme shows that innovation in the studied SMEs was customer-driven, but not passively customer-led. Customer and market interaction created innovation input, while financial constraints shaped which ideas could realistically move forward. Ideas were filtered through repeated demand, willingness to pay, product focus, feasibility, available resources, and revenue potential.

4.2 Financial narrowing of innovation

The strongest finding across the interviews was that financial constraints did not generally eliminate innovation, but compressed it around fewer and more carefully selected projects. Ideas continued to exist, but fewer ideas were selected, developed, tested, or commercialized. In this sense, financial pressure mainly affected the movement from idea to execution.

Several respondents emphasized that idea generation itself was not the stage most directly affected. Firm A stated that “idea generation still continues” and described it as “the least

affected” part of the innovation process. Similarly, Firm D explained that as “more and more ideas” entered the organization, the challenge became the firm’s “ability to sort and prioritize.” This indicates that the central issue was not a lack of creativity, but a lack of resources to pursue all possible ideas.

Financial constraints therefore became most visible in idea selection and project prioritization. Firms increasingly prioritized projects with clearer payback, lower risk, faster implementation, stronger customer relevance, or stronger strategic fit. Firm A summarized the effect as mainly affecting “the idea selection side,” since the firm “cannot choose everything they want.” This reinforces the finding that the central issue was not the absence of ideas, but the limited ability to move all ideas forward. The same respondent described this shift as a preference for “quick wins,” explaining that the firm could not be certain that it would have the resources required for longer projects:

“Because we cannot be sure that we will have the resources to do a long project that will pay back a lot. But we know that, okay, in the next six months we can do these two small projects that will get us something.” (Firm A)

This prioritization logic appeared across both smaller startups and more established SMEs. In smaller firms, financial constraints made founder time, development time, and fundraising time critical. In larger SMEs, prioritization was more often linked to business cases, payback periods, management approval, and resource allocation across departments. Across cases, financial pressure made firms more disciplined and selective about which ideas were allowed to move forward.

The compression of innovation became even more visible in later stages of the innovation process. While early-stage ideation could often continue through customer interaction, internal discussion, and practical problem-solving, later stages required more concrete resources. R&D, testing, production, and commercialization often depended on staff capacity, technical expertise, equipment, external consultants, laboratories, production capacity, or market launch resources. This was especially clear in biotech, deeptech, software, hardware, and manufacturing-related firms. Firm B described biotechnology as particularly resource-intensive:

“Biotech is very resource heavy... you have to do actual big experiments in actual physical fermenters... that equipment is super expensive. It’s not like you can buy a laptop and start hacking away.” (Firm B)

For Firm B, financial constraints slowed down technical work because the company could not buy all the equipment it needed or outsource as much research as it otherwise would have done. Instead, the firm had to work more slowly, do more internally, and carry out activities sequentially rather than in parallel. Firm M described a similar pattern, identifying R&D as the most constrained part of the process.

In software and technology-based firms, the constraint appeared less through physical equipment and more through development capacity. Firm D explained that financial pressure forced the company to halt a larger development effort, rethink the roadmap, and move toward smaller releases:

“We are doing a bit smaller projects, bringing smaller chunks of code into the software each release instead of these bigger leaps.” (Firm D)

Firm E also showed how financial constraints shaped development focus. The firm had initially considered both a software product and a hardware wearable, but the hardware part was postponed because it was too expensive to pursue alongside the software product. This illustrates how financial constraints did not only delay projects, but also narrowed the scope of what type of innovation was realistic.

Testing was more context-dependent. In some firms, especially those operating in regulated or quality-sensitive industries, testing could not be reduced. Firm A explained that the company had to test the same amount because of certification, quality standards, and customer acceptance requirements. In these cases, financial constraints did not remove testing, but increased the pressure to make sure that testing was efficient and that resources were not wasted on poorly selected projects.

Commercialization was also affected when bringing an innovation to market required marketing, stock, customer outreach, or launch-related investment. Firm J described commercialization as the most difficult part of the process:

“I think it’s the commercialization... just to do the marketing and say that we have a new product and buy it to our warehouses and so on. That’s the most difficult part.” (Firm J)

Firm L described a similar pattern, where a planned pop-up store had to be scaled down because the original idea required too much money and human capital. The project was not completely abandoned, but it had to be reduced to fit the firm’s available resources.

Firms responded to these constraints by changing how innovation was organized and managed. Several described stricter decision-making, more careful resource allocation, and a stronger focus on efficiency. Firm A explained that the formal process itself did not change, but that financial pressure made the firm “more rigorous” in applying it and led it to choose quick wins over larger long-term projects. The same respondent described this as learning to “get more out of the same resources” (Firm A), suggesting that the response was not necessarily a new innovation process, but a more disciplined use of existing resources

Other firms responded by internalizing work, reducing scope, slowing down development, or sequencing activities more carefully. Firm B explained that instead of outsourcing more research to external laboratories, the company had to do more itself because external research organizations were too expensive. Firm D described a similar shift toward focus, smaller releases, and a clearer understanding of what was core to the business.

Overall, this theme shows that financial constraints acted as a selective compression mechanism. They narrowed the number of projects that could move forward, increased the importance of commercial and strategic criteria, and made later, resource-intensive stages more vulnerable. At the same time, firms did not simply stop innovating. They adapted by reducing scope, delaying larger projects, doing more internally, slowing down development, and focusing on projects that could be justified under limited financial conditions.

4.3 Leadership and alignment

A third theme concerns the role of leadership, communication, and shared vision in helping firms maintain direction under financial pressure. Respondents described financial constraints as creating stress, uncertainty, and difficult trade-offs, particularly when firms had to delay

projects, reduce scope, or focus on fewer innovation activities. In this context, leadership did not remove the financial constraint itself, but helped firms manage its organizational consequences.

Several respondents emphasized the importance of communication and transparency. Firm A described financial pressure as creating tension and “difficult conversations,” especially because creative and technical employees were restricted in what they could do. The respondent emphasized that employees were more willing to accept constraints when they understood the situation and felt included in the process:

“People are quite resilient, as long as you keep them informed and as long as you keep them close to you on the journey. Communication, communication, it is absolutely key.” (Firm A)

A similar pattern appeared in Firm D, where financial pressure had led to downsizing and a need to rethink the roadmap. The respondent of Firm D explained that transparency had been part of the company’s way of working from the beginning, and that this helped the remaining team take on the challenge of restructuring and continuing with fewer resources. Rather than describing leadership as top-down control, the respondent from Firm D emphasized openness, shared responsibility, and the ability to work together around difficult decisions.

Shared vision also helped firms prioritize when resources were limited. In several cases, respondents described vision as a way of keeping innovation efforts focused despite financial pressure. Firm C explained that the company’s ambition to become number one in its industry meant that it had “no other choice than to adapt, learn, innovate.” Firm B similarly described “culture and drive” as important for continuing innovation with limited resources, while Firm D connected resilience to a shared ambition of becoming a leading firm within its niche.

These examples show that leadership and shared vision supported innovation by creating alignment around what mattered most. When firms could not pursue all ideas or projects, shared direction helped them decide which activities should be protected, delayed, reduced, or abandoned. This was particularly important in SMEs, where innovation often depends on a small number of people and where financial pressure can quickly affect motivation, collaboration, and focus.

Overall, this theme shows that leadership and shared vision functioned as mechanisms of alignment under financial constraints. They did not compensate for missing financial resources, but they helped firms maintain commitment, communicate trade-offs, and preserve direction when innovation activities had to be narrowed or reorganized.

4.4 Summary of findings

The thematic analysis generated three main findings. First, innovation ideas in the studied SMEs often emerged through customer feedback, market signals, operational problems, and repeated user requests. However, customer input was not automatically turned into innovation projects. Instead, ideas were filtered through repeated demand, feasibility, willingness to pay, available resources, product focus, and revenue potential.

Second, financial constraints compressed innovation around fewer and more carefully selected projects. Rather than eliminating innovation altogether, financial pressure made firms more selective and increased the importance of commercial value, payback, risk, implementation speed, and resource availability. Later stages of the innovation process, such as R&D, testing, production, and commercialization, were more vulnerable because they required greater financial and organizational resources.

Third, leadership and shared vision helped firms maintain alignment under financial pressure. Communication, transparency, culture, and shared direction supported firms in managing difficult trade-offs when innovation activities had to be delayed, reduced, or reorganized. Overall, the findings suggest that financial constraints did not simply stop innovation in SMEs, but reshaped how innovation ideas were generated, selected, organized, and sustained.

5. Analysis and Discussion

This chapter analyses and discusses the empirical findings in relation to the theoretical framework and prior research.

5.1 Financial constraints: harmful or helpful?

The findings suggest that financial constraints had a dual effect on innovation processes within the studied SMEs. On one hand, financial pressure clearly restricted what firms could do. It limited the number of projects that could be pursued, increased the need for prioritization, and made firms more cautious about long-term or uncertain innovation activities. This was visible in the findings through stricter idea selection, stronger focus on revenue potential, delayed projects, scaled-down development, and reduced ability to pursue resource-intensive activities.

This restrictive effect can be understood through threat-rigidity theory. Staw et al. (1981) argue that organizations under threat tend to narrow attention, reduce the range of alternatives considered, increase control, and rely more strongly on familiar or safer responses. The empirical findings reflect this logic. Under financial pressure, firms became more selective and focused on projects that were easier to justify commercially. Ideas with uncertain payback, high development costs, or long time horizons were more likely to be postponed or reduced in scope. In this sense, financial constraints restricted exploratory innovation by narrowing what firms perceived as realistic or acceptable to pursue.

However, the findings also show that financial constraints were not only harmful. In several cases, financial pressure forced firms to become more disciplined in how they evaluated ideas and allocated resources. Rather than pursuing many loosely defined opportunities, firms had to ask which projects were most relevant for customers, most feasible with available resources, and most likely to generate commercial value. This created a sharper connection between innovation and strategic priorities.

This does not mean that financial constraints should be understood as beneficial in themselves. A lack of money, staff, equipment, or development capacity still limited what firms could achieve. Rather, the findings suggest that financial constraints can have

disciplining effects when firms have enough organizational capacity to respond constructively. This interpretation is supported by Johnson et al. (2023) concept of lean innovation capability, which describes how some firms innovate with fewer resources by focusing on core customer needs, learning from market feedback, and using resource limitations more deliberately. Their argument helps explain why resource constraints may sometimes increase focus, but only when firms are able to organize innovation around clear priorities and avoid wasting scarce resources.

The dynamic capabilities framework further helps explain this duality. Teece et al. (1997) define dynamic capabilities as the ability to integrate, build, and reconfigure internal and external competences in changing environments. In this study, some firms showed adaptive responses by reducing project scope, doing more internally, slowing down development, using existing resources more carefully, or reorganizing innovation activities around what was financially possible. These responses suggest that financial pressure did not automatically lead to reduced innovation. In some cases, it triggered reconfiguration (Teece et al., 1997).

However, this adaptive response had clear limits. Reorganizing resources could help firms preserve parts of the innovation process, but it did not replace missing funding, staff, equipment, or development capacity. Financial constraints could therefore sharpen prioritization and increase efficiency, but they could also narrow the innovation process too much when firms lacked the resources needed to continue development, testing, production, or commercialization.

Overall, financial constraints should be understood as a double-edged condition. They were harmful because they restricted experimentation, delayed projects, and made firms focus more strongly on short-term feasibility. Yet they could also be helpful in a narrower sense by forcing discipline, focus, and more careful resource allocation. The key analytical point is therefore not that financial constraints are either beneficial or harmful, but that they create pressure that can lead to both rigidity and adaptation. Whether the outcome becomes mainly restrictive or adaptive depends on how firms are able to organize, prioritize, and reconfigure innovation activities under financial pressure.

5.2 How financial constraints reshape the innovation process

The findings show that financial constraints reshaped the innovation process by affecting how ideas moved from input to execution. The main effect was not that ideas disappeared, but that the process became more filtered, selective, and resource-conscious. Rather than affecting each stage in the same way, financial pressure became most visible at transition points: when customer and market input had to be evaluated, when ideas had to be selected, and when projects required a clearer commitment of resources.

First, financial constraints shaped how firms interpreted customer and market input. Ideas often emerged through customer feedback, repeated user requests, market signals, and operational problems. However, these inputs did not automatically become innovation projects. Firms had to assess whether an idea represented repeated demand, commercial value, strategic fit, and a feasible use of limited resources. This means that financial constraints influenced the innovation process before formal project selection, by shaping how firms judged which ideas were worth developing further. The origin of these ideas through customer interaction, market feedback, and everyday problem-solving reflects the doing-using-interacting (DUI) mode of innovation (Jensen et al., 2007).

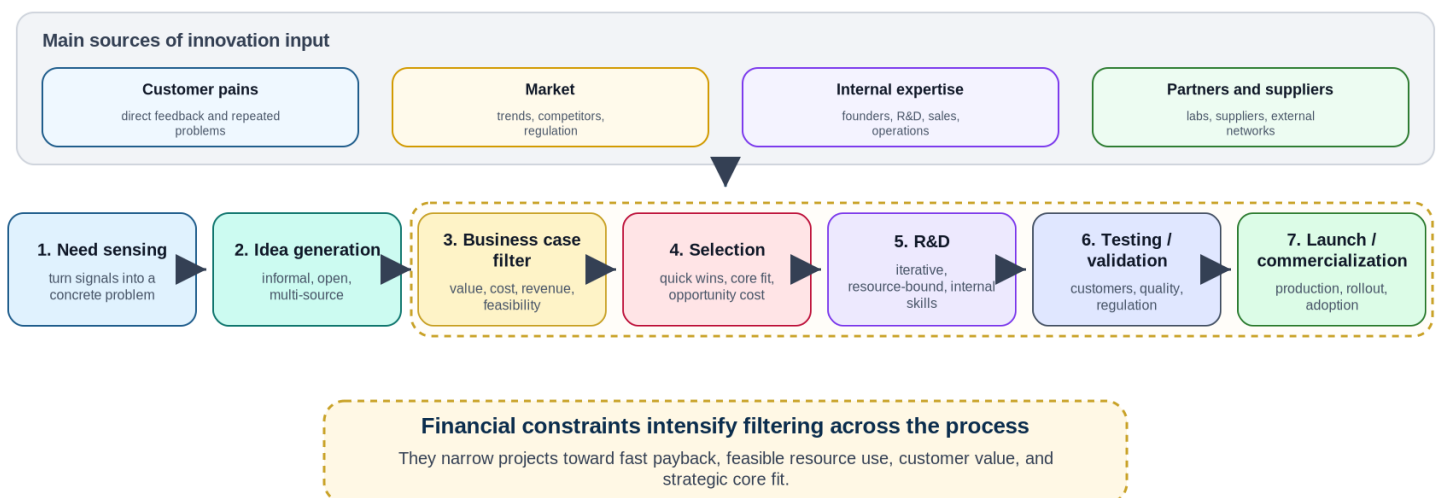


Figure 2. Empirically derived innovation process in financially constrained SMEs.

Source: Authors' own elaboration based on interview data.

Note: The figure illustrates the dominant pattern identified across cases. It should not be read as a strictly linear process, but as a simplified representation of how customer and market input moves through strategic and financial filters before entering later innovation stages.

Figure 2 illustrates this process. Customer and market interaction created innovation input, but financial and strategic filters determined whether ideas moved forward, were delayed, scaled down, or abandoned. The figure highlights progression as the key issue: ideas could exist, but they had to pass stronger financial and strategic filters before receiving resources. This adds to the innovation process literature by showing that movement between stages is shaped not only by technical uncertainty and market feedback, but also by firms' available financial and organizational capacity (Pavitt, 2004; Szutowski et al., 2019).

The clearest pressure point was the transition from idea generation to idea selection. Idea generation often remained active, but idea selection became more restrictive. Firms prioritized projects with clearer payback, lower risk, faster implementation, stronger customer relevance, or better strategic fit. This can be linked to threat-rigidity theory, as Staw et al. (1981) argue that organizations under pressure tend to narrow attention and reduce the range of alternatives considered. In this study, that narrowing was visible not as a lack of ideas, but as a stricter threshold for moving ideas forward.

Financial constraints also shaped later stages of the process, but the relevant point is not simply that these stages were more resource-intensive. Rather, later stages created stronger commitment problems. Once firms moved into technical development, testing, production, or commercialization, they had to commit people, time, money, external expertise, or launch-related resources. Financial constraints therefore made firms more cautious about allowing weakly justified ideas to enter these stages in the first place. In some cases, testing could not be reduced because of quality or regulatory requirements. This made early selection more important, since firms had limited room to correct poor prioritization later in the process.

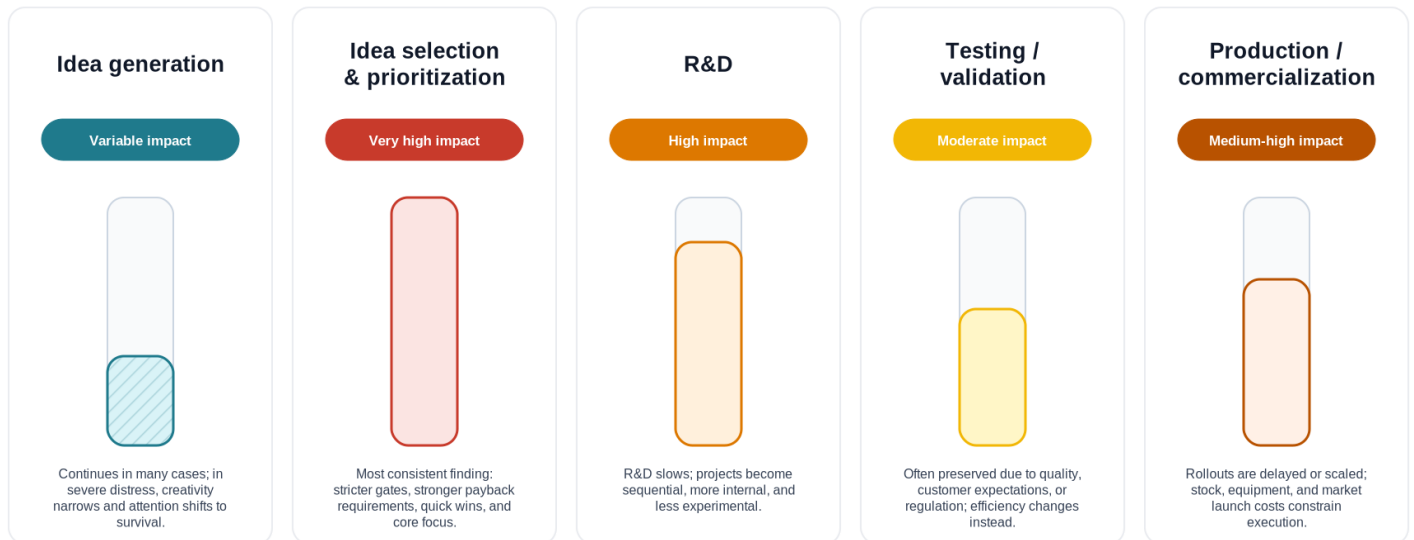


Figure 3. Relative impact of financial constraints across innovation process stages.

Source: Authors' own elaboration based on cross-case thematic analysis.

Note: The figure represents qualitative patterns across cases, not statistical measurement. Impact levels reflect the relative strength of recurring themes in the interview material.

Figure 3 summarizes the uneven impact of financial constraints across the innovation process. The main pattern is that financial pressure constrained progression rather than ideation itself. Ideas could still be generated, but fewer could be selected, developed, tested, produced, or commercialized.

Dynamic capabilities are relevant here only to explain the adaptive side of this process. Teece et al. (1997) emphasize reconfiguration of resources and routines, while Eisenhardt and Martin (2000) describe dynamic capabilities as concrete processes such as product development, strategic decision-making, and resource allocation. In the studied SMEs, this was visible in practical adjustments: firms reduced scope, postponed larger projects, used existing resources more carefully, moved activities into sequence rather than running them in parallel, internalized work instead of outsourcing, and focused on smaller releases.

Overall, financial constraints reshaped SME innovation by changing the movement through the process. Innovation became less open-ended and more dependent on financial filtering, prioritization, and feasible resource use. The main contribution of this finding is therefore processual: financial constraints did not simply reduce innovation activity, but changed how

ideas progressed, where they were stopped, and how firms reorganized the activities that could still move forward.

5.3 Leadership and alignment under pressure

The findings show that leadership and shared direction shaped how SMEs handled the organizational consequences of financial constraints. Financial pressure created trade-offs about which innovation activities should continue, be delayed, reduced, or abandoned. In this context, leadership functioned as an alignment mechanism. It helped translate financial pressure into shared priorities and made difficult decisions more understandable within the organization.

This connects to dynamic capabilities, but only in a specific sense. Teece et al. (1997) emphasize coordination and reconfiguration as central to adaptation, while Eisenhardt and Martin (2000) describe dynamic capabilities as concrete processes such as strategic decision-making and resource allocation. In the studied SMEs, leadership supported these processes by helping firms coordinate scarce resources around fewer and clearer priorities.

Prior research on constrained innovation supports this interpretation. Johnson et al. (2023) argue that mission-oriented leadership helps firms innovate with fewer resources by maintaining focus on the core mission and guiding resource allocation under constraint (Johnson et al., 2023, pp. 2, 4, 6). This aligns with the findings, where shared vision helped firms decide which innovation activities were central and prioritized. Chung et al. (2025) add that SMEs often face tensions between exploratory and exploitative innovation, since these activities require different resources and create allocation challenges (Chung et al., 2025, pp. 227-230). This is relevant because financial pressure intensified similar trade-offs in the studied firms: they had to balance short-term feasibility with longer-term innovation ambitions. Dung et al. (2026) further describe strategic leadership in SMEs as involving strategic visioning, resource alignment, and organizational adaptation (Dung et al., 2026, pp. 872, 876-879), which supports the view that leadership helps structure attention and align resources under scarcity.

However, leadership should not be overstated. It did not remove the material limitations created by financial constraints. Firms still faced shortages of money, time, staff, equipment,

and development capacity. Leadership helped firms communicate priorities and maintain direction, but it could not fully compensate for missing resources. If leadership becomes only stricter control, it may also reinforce the narrowing tendencies described by threat-rigidity theory (Staw et al., 1981), rather than support adaptation.

Overall, leadership helped firms keep innovation work focused when financial pressure forced difficult choices. By communicating priorities and creating shared direction, leaders made it clearer which projects should continue, which should wait, and how limited resources should be used. In this sense, leadership supported adaptation by aligning people and resources, rather than by removing the financial constraint.

5.4 Additional observation: firm size and process formalization

A smaller cross-case observation concerns the relationship between firm size and the formalization of innovation processes. The findings do not suggest that smaller SMEs lack innovation processes. Rather, they suggest that innovation processes take different forms depending on firm size and coordination complexity. In micro firms, innovation was often handled through direct communication, founder involvement, and informal decision-making. These firms still had ways of generating, evaluating, and developing ideas, but the process was usually embedded in everyday work rather than described as a formal procedure.

As firm size increased, innovation processes became more visible and structured. In the small-firm category, respondents described clearer routines such as product discovery, feasibility assessment, customer-driven problem definition, and prioritization. This was especially visible in firms around 20-25 employees, where informal coordination was still important but no longer sufficient on its own. In medium-sized firms, the process was more likely to involve formal stages, cross-functional coordination, gate reviews, and clearer decision points.



Figure 4: Firm size and innovation process formalization

Source: Authors' own elaboration based on interview data.

Note: The figure illustrates a qualitative cross-case pattern, not a statistical relationship.

Figure 4 summarizes this pattern. Firm size did not determine whether innovation processes existed, but it influenced how explicit and formalized they became. Smaller firms tended to rely on flexible and informal routines, while larger SMEs required more structured processes to coordinate people, functions, and resource allocation. This connects to Eisenhardt and Martin's (2000) view of dynamic capabilities as concrete routines and decision processes: adaptation may appear as informal routines in micro firms and as more formalized processes in larger SMEs.

5.5 Implications, limitation and future research

This section summarizes the theoretical and practical implications of the study before outlining its main limitations and suggestions for future research.

5.5.1 Theoretical implications

This study contributes to a process-oriented understanding of financial constraints and innovation in SMEs. Rather than treating financial constraints only as a factor that reduces innovation output or R&D investment, the study shows how such constraints shape the

internal progression of innovation activities. The findings suggest that financial pressure affects innovation through filtering, selection, prioritization, and resource commitment. This adds nuance to prior research by showing that ideas may continue to emerge, while the ability to move them through the innovation process becomes more constrained.

The study also contributes by combining threat-rigidity theory and dynamic capabilities. Threat-rigidity theory helps explain why financial pressure narrows attention, strengthens control, and pushes firms toward safer and more commercially justified projects (Staw et al., 1981). Dynamic capabilities help explain how firms may respond by reorganizing resources, routines, and decision processes (Teece et al., 1997; Eisenhardt and Martin, 2000). The findings therefore suggest that rigidity and adaptation are not separate outcomes, but can coexist within the same innovation process.

Finally, the study adds to SME innovation research by showing that innovation processes in SMEs may be informal, customer-driven, and flexible, but still structured enough to be shaped by financial constraints. This supports a view of SME innovation as processual, resource-sensitive, and dependent on both prioritization and organizational alignment.

5.5.2 Practical implications

For SME managers, the findings suggest that financial pressure should be managed as a process issue, not only as a funding issue. Managers should identify where financial constraints create the strongest pressure in their innovation process. In some firms, this may occur during idea selection; in others, it may appear in development, testing, production, or commercialization.

The findings also suggest that clear selection criteria are important under financial pressure. When resources are limited, firms benefit from evaluating innovation ideas according to customer relevance, repeated demand, feasibility, strategic fit, revenue potential, and resource requirements. This can help prevent scarce resources from being spread across too many weakly justified projects.

At the same time, managers should be cautious about becoming too short-term oriented. Prioritizing quick wins may be necessary, but if firms only pursue projects with immediate

payback, they risk weakening longer-term innovation capacity. Finally, leadership and communication matter. When innovation activities must be delayed, reduced, or abandoned, clear communication can help maintain alignment and reduce uncertainty within the organization.

5.5.3 Limitation and future research

This study has several limitations. First, it is based on 13 semi-structured interviews and does not aim for statistical generalization. The findings provide analytical insight into how financial constraints shape innovation processes, but they cannot establish how common these patterns are across all SMEs.

Second, the sample may be affected by a form of survivorship or continuation bias. Most of the firms included in the study were still operating at the time of the interviews and had managed to continue their activities despite financial constraints. Although one case involved a firm that did not survive in its original form, the respondent had continued entrepreneurial activity by starting another company. This means that the findings may still overrepresent actors who were able to continue, adapt, or reconfigure their activities after financial pressure. As a result, the study may present a somewhat more adaptive view of financial constraints than a sample including more firms that had fully exited the market, discontinued innovation activities, or were unable to recover from financial pressure.

Third, each firm is represented by one respondent. Although the respondents were selected because of their insight into innovation-related activities and financial constraints, this limits the ability to capture internal differences within each firm. Future research could include multiple respondents from the same organization, such as founders, managers, R&D staff, sales employees, and finance representatives.

Fourth, the sample includes firms from several industries. This variation strengthens the cross-case perspective, but it limits the ability to make detailed industry-specific claims. Future studies could compare specific sectors, such as software, biotech, manufacturing, or hardware-based SMEs, to examine whether financial constraints affect innovation stages differently across industries.

Finally, this study captures perceptions and experiences at one point in time. Longitudinal research would be valuable to examine how innovation processes change before, during, and after periods of financial pressure. Such research could show whether short-term prioritization becomes a permanent pattern, or whether firms return to more exploratory innovation when financial conditions improve. Future research could also include more cases of firms that fully exited the market, abandoned innovation activities, or failed to recover from financial constraints, in order to better understand when financial pressure leads to breakdown rather than adaptation.

6. Conclusion

This thesis set out to answer the research question: How do financial constraints shape innovation processes within SMEs? Based on a thematic analysis of 13 semi-structured interviews with SMEs across different industries, the study concludes that financial constraints do not simply stop innovation. Instead, they reshape how innovation ideas are interpreted, selected, organized, and moved through the innovation process.

The first conclusion is that financial constraints shape innovation already at the early stage where customer and market input is evaluated. Innovation ideas often emerged through customer feedback, repeated user requests, market signals, and practical problems. However, these inputs did not automatically become innovation projects. Firms filtered ideas through repeated demand, willingness to pay, product focus, feasibility, available resources, and revenue potential. This shows that financial pressure influences not only later investment decisions, but also the early judgement of which ideas are worth pursuing.

The second conclusion is that financial constraints narrow innovation. The findings show that idea generation often remained active, but fewer ideas were able to move forward. Financial pressure made firms prioritize projects with clearer commercial value, faster implementation, lower risk, and stronger strategic fit. Later stages of the innovation process, such as R&D, testing, production, and commercialization, were more vulnerable because they required stronger commitments of money, time, people, and external resources. As a result, firms delayed projects, reduced scope, internalized work, slowed down development, or focused on smaller and more feasible innovation activities.

The third conclusion is that leadership and alignment matter under financial pressure. Leadership did not remove the material limitations created by financial constraints, but it helped firms manage the organizational consequences. By communicating priorities, creating shared direction, and making trade-offs understandable, leaders helped firms maintain focus when innovation activities had to be narrowed or reorganized.

Overall, the study shows that financial constraints create both restriction and adaptation. They restrict innovation by narrowing attention, increasing selectivity, and making firms more cautious about uncertain or resource-intensive projects. At the same time, they can also force

discipline, focus, and reconfiguration when firms are able to organize their resources around clearer priorities. The central contribution of this thesis is therefore a process-oriented understanding of financial constraints: rather than only reducing innovation output, financial constraints shape how innovation progresses inside SMEs.

A smaller additional finding was that firm size influenced the degree of process formalization. Smaller SMEs often relied on informal and founder-driven routines, while larger SMEs tended to have more explicit processes, decision points, and coordination mechanisms. This does not mean that small SMEs lack innovation processes, but rather that these processes appear in different forms depending on organizational complexity.

Taken together, the thesis contributes to a more nuanced understanding of innovation under financial pressure. Financial constraints make SME innovation more filtered, selective, commercially oriented, and dependent on the firm's ability to align people, priorities, and resources under pressure.

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Appendices

Appendix 1: Interview guide

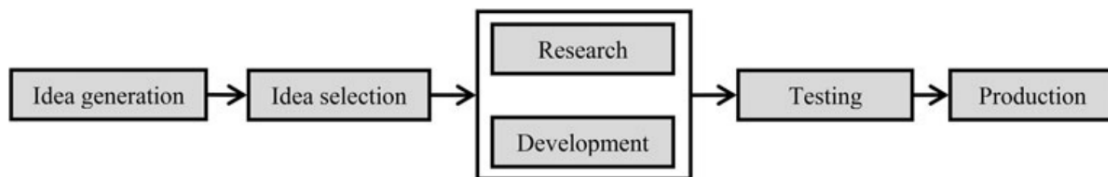
Background and role

Descriptive: What is the sector your company is operating in? What are the main products and/or services that you are providing? How many employees are working in your company?

1. Could you briefly describe your role in the organization and how you are involved in innovation-related activities?
2. How important is innovation from a scale to 1 to 10 for your organization's strategy and operations?

Innovation processes

Explain this chart of a typical innovation process



3. How are new ideas for products, services, or processes typically generated in your organization?
- 4.a. Do you already have an innovation process established within the company? If yes, how do you operate?
- 4.b. If not, could you describe the typical process from an initial idea to a developed product or service?
(Prompt if needed: idea generation, development, testing, commercialization)
5. How are decisions made about which innovation projects to pursue or prioritize?
6. Who is typically involved in decision-making regarding innovation projects?

Financial constraints

7. Has your organization experienced periods of financial challenges in recent years?
8. How did these financial constraints arise or become visible in the organization?
(better to ask for a specific constraint)
(Prompt: reduced revenues, limited funding, cash flow issues)

Impact on innovation processes

9. In what ways did financial constraints affect (the specific activity X) in your organization?
 - 9a. idea generation
 - 9b. idea selection
 - 9c. r&d
 - 9d. testing
 - 9e. production
10. Did financial pressure influence how innovation projects were prioritized or selected?
11. Were there any innovation projects delayed, scaled down, or abandoned due to financial constraints?
12. Which stages of the innovation process were most affected by financial constraints?
(Prompt: idea stage, development, testing, commercialization)

Organizational responses and adaptation

13. Did financial pressure change how decisions about innovation were made in the organization?

(Prompt: centralization, stricter approvals, fewer actors involved)

14. How did the organization adapt its innovation processes or practices in response to financial constraints?

(Prompt: collaboration, reprioritization, efficiency, new processes)

15. Looking back, what factors helped your organization continue or adapt innovation despite financial constraints?

Appendix 2: Table A1. Thematic analysis structure

Theme	Initial codes	Empirical meaning	Representative cases
Customer input and financial filtering	Customer feedback; repeated demand; willingness to pay; product focus; feasibility; revenue potential; available resources	Ideas often emerged from customer and market interaction, but were filtered through commercial relevance, feasibility, and resource availability before moving forward.	Firm C; Firm D; Firm G; Firm L
Financial narrowing of innovation	Prioritisation; quick wins; payback; delayed projects; R&D limits; commercialization costs; doing more with less	Financial constraints narrowed innovation toward fewer, more feasible, and commercially justified projects.	Firm A; Firm B; Firm D; Firm E; Firm G; Firm J; Firm L; Firm M
Leadership and alignment	Communication; transparency; shared vision; culture; motivation; difficult trade-offs	Leadership and shared vision helped firms maintain direction and commitment when innovation had to be narrowed or reorganized.	Firm A; Firm B; Firm C; Firm D; Firm F; Firm H; Firm I

Note: The table summarizes the final thematic structure used to organize the empirical findings.