

The Innovation Trap of Small Businesses

Extended Abstract

Small and medium enterprises (SMEs) are widely recognised as central contributors to employment and economic dynamism, yet they often lag behind large firms in the adoption of productivity-enhancing innovations, including digitalisation, process automation, and managerial technologies. A substantial literature attributes this gap to financial frictions, capability limitations, and organisational constraints that are particularly salient in small firms. However, much of the existing work treats these constraints as additive or separable. This paper develops a concise microeconomic framework that explains persistent under-investment in innovation as the outcome of the *interaction* between two complementary constraints: (i) a *financial constraint* associated with fixed innovation costs and limited access to external finance, and (ii) a *managerial time and attention constraint* reflecting the entrepreneur's opportunity cost of allocating scarce time away from core operations toward learning, adoption, and implementation. By modelling these constraints jointly, the paper proposes a parsimonious mechanism for an “innovation trap” in which both low-profitability and high-profitability small firms under-invest in innovation, albeit for different reasons. The framework then motivates a targeted, operational policy tool, an Innovation Agents programme that aims to relax both constraints simultaneously through proactive, publicly anchored advisory and implementation support.

Related literature and motivation

The empirical and conceptual literature consistently documents that SMEs face structural disadvantages in financing growth and innovation. Information asymmetries, limited collateral, short credit histories, and the intangible nature of many innovation investments can generate credit rationing or costly external finance, even when projects appear privately profitable (Beck & Demirgüç-Kunt, 2006; Bakhtiari et al., 2020). In parallel, a separate stream emphasises that small firm owners concentrate multiple roles in a single person, producing chronic time scarcity and attention constraints that limit strategic experimentation, organisational learning, and the capacity to manage change (Hadjimanolis, 1999). These literatures motivate a model in which the innovation decision depends on both finance and managerial bandwidth, and in which the net effect across firms can be inherently non-monotonic.

Non-technical theoretical framework: time allocation and fixed investment

Consider an entrepreneur who allocates a fixed time endowment between routine operations and innovation activities. Innovation requires managerial time for search, learning, experimentation, coordination with vendors, and implementation. Let innovation effort be measured by the time allocated to innovation and let the expected present value of incremental profits generated by innovation be an increasing and concave function of this time input. The concavity captures diminishing marginal returns to additional effort, for example because early learning yields large gains while later refinements yield smaller improvements.

The key economic object is the *shadow price of managerial time*, captured by the operational marginal profit from an hour spent on core activities. When operational profitability is high,

time is more valuable at the margin, so reallocating time to innovation becomes costlier in opportunity-cost terms. Under standard conditions, the entrepreneur's optimal innovation time is decreasing in the shadow price of time. This produces the first channel in the model: at sufficiently high operational profitability, the entrepreneur may rationally choose a corner solution of zero innovation time, because the marginal benefit of innovation cannot compensate for the marginal opportunity cost of time.

Next, introduce a fixed innovation cost, (K), representing capital expenditures and quasi-fixed costs such as software licences, equipment, compliance adjustments, consulting fees, or integration costs. A fixed cost does not generally alter the entrepreneur's optimal *intensity* of innovation time conditional on entry, but it does create a participation threshold: the entrepreneur invests in innovation only if the maximal expected gain from innovation time exceeds (K). This participation condition generates a minimum profitability requirement for innovation to be worthwhile.

Financing constraint and the two-condition decision rule

The model's second constraint concerns the feasibility of financing the fixed cost (K). Consistent with evidence on SME finance constraints, assume that the entrepreneur can allocate only a fraction of operational profits toward financing the fixed cost, whether directly as internal funds or indirectly as security for external credit. This yields a financing feasibility condition, which is more likely to fail at low profitability firms.

Combining the participation condition (time costs of innovation and fixed costs) with the financing condition (innovation is fundable) produces a simple two-condition rule: innovation occurs only when both conditions hold simultaneously. The central implication is a non-linear, inverted-U relationship between operational profitability and innovation investment. At low profitability, innovation is often not financed even if, in principle, innovation could improve future performance. At high profitability, innovation is often not pursued because the shadow price of time becomes too high, making the required managerial effort privately unattractive. Only an intermediate range of profitability supports both feasibility and incentive compatibility.

This mechanism provides a microeconomic foundation for the "innovation trap": a systemic pattern of under-investment that persists not because entrepreneurs are uniformly myopic, but because their optimisation is constrained along two complementary dimensions. Importantly, complementarity implies that single-instrument policies can have muted effects. For example, easing credit constraints may not trigger adoption if entrepreneurs remain time-constrained and cannot execute innovation projects, while expanding advisory information alone may be insufficient if fixed costs remain unfunded.

Periphery amplification: infrastructure and ecosystem gaps

The model also provides a structured way to interpret spatial disparities, particularly in peripheral regions. In weaker ecosystems, infrastructure gaps and thinner local markets can increase both (i) the effective fixed cost (K), for example via higher vendor costs, integration burdens, and limited local service availability, and (ii) the effective time requirement, because search and learning take longer when networks, peers, and support services are less accessible. These channels shift the feasible and attractive region of profitability inward, intensifying under-investment. While the model is general, it aligns with evidence that

peripheral contexts can face compounded disadvantages in innovation-led development and resilience (Bar-El et al., 2024). The result is a place-sensitive form of market failure: geographically mediated frictions increase the likelihood that SMEs remain stuck in a low-adoption equilibrium.

Policy implication: Innovation Agents as a dual-constraint intervention

Given the complementarity of constraints, the paper proposes an applied policy instrument designed to relax both simultaneously: an *innovation agents program* anchored in a public SME-support institution and delivered through proactive outreach. The agent is not merely a generic consultant. The intended role is a neutral, publicly accountable intermediary who reduces managerial time costs by providing hands-on diagnostic, planning, and implementation coordination, while also improving financing feasibility by translating innovation plans into credible budgets, cash-flow projections, and application packages that reduce information frictions with financial providers.

A further implementation concept, developed in the paper, is to connect the program to an academic training track for “innovation economists and consultants,” embedding supervised practicum placements in SMEs. This design aims to scale capacity while controlling quality through standardised training and oversight. Internationally, related models of structured innovation support and knowledge intermediation, including reverse mentoring-based approaches, suggest feasibility and potential benefits in SME contexts (Schwartz et al., 2022). The policy contribution is thus not only the identification of a market failure, but the articulation of an implementable, institutionally anchored tool that maps directly onto the model’s mechanisms.

Contributions

The paper makes three contributions. First, it offers a microeconomic explanation for persistent under-investment in SME innovation that does not rely on a single bottleneck but on the interaction of time and finance constraints. Second, it derives a clear, testable prediction: an inverted-U relationship between profitability and innovation adoption, with distinct mechanisms at the lower and upper tails. Third, it translates the theoretical mechanism into a policy design that is explicitly dual-constraint, place-sensitive, and operationally scalable through an Innovation Agents program.

References

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