Institutional dimensions of scaling technology-based SMEs: the role of governance and regulation

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Institutional dimensions of scaling technology-based SMEs: the role of governance and regulation

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Abstract

Purpose – The purpose of this study is to describe and analyze institutional dimensions to support the scaling of technology-based small and medium-sized enterprises (SMEs).

Design/methodology/approach – A qualitative comparative case study design was used, drawing on institutional theory. Secondary data from government reports, embassy research briefs and public institutional documents were analyzed through cross-case comparison. The approach allowed for the identification of both enabling and constraining institutional mechanisms across diverse national contexts.

Findings – Governance – innovation policies – such as targeted scale-up initiatives, innovation hubs and commercialization support – reduce barriers to market entry, foster innovation and facilitate international expansion. Regulatory environments, particularly tax systems, can either enable scaling through incentives or hinder it through administrative burdens and fiscal disincentives. The comparative analysis shows that institutional alignment, tailored to specific contexts, is critical for technology-based SMEs scaling.

Originality/value – The study integrates institutional theory with comparative evidence on the scaling of small and medium-sized technology-based firms, offering policy recommendations. By bridging theory and practice, the paper provides insights relevant to policymakers, practitioners and scholars, particularly regarding the design of governance and regulatory frameworks that support innovation-driven firms.

Keywords Institutional dimensions, Technology-based firms, SMEs, Scaling, Governance, Regulations

Paper type Research paper

1. Introduction

Major challenges involve predicting which firms are likely to experience future growth, assessing their capabilities, defining what constitutes high growth and analyzing the broader macroeconomic impacts (Coad *et al.*, 2014). Moreover, some high-growth firms experience success only for a short period, complicating the development of effective support policies (Daunfeldt and Halvarsson, 2015). Firms have diverse innovation needs, and different industrial sectors require unique resources to foster growth (Hölzl and Janger, 2013). Institutional research has traditionally centered on the constraints imposed by social structures, often overlooking the processes involved in the emergence and growth of small and medium-sized enterprises (SMEs). In contrast, large firms are often regarded as being particularly strong in the later stages of product development and marketing (Williamson,

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1975). Building on the ideas of Galbraith (1967), the emphasis has traditionally been on the importance of large, powerful corporations in understanding the dynamics of modern market economies. Government initiatives that improve firms' access to international markets can boost product demand, foster business growth and enhance global competitiveness. In addition, institutions play a crucial role in shaping entrepreneurial behavior and driving firm development. Zhao *et al.* (2019) identified key areas for enhancing support programs for high-growth firms, including selecting the "right" firms and demonstrating that support for these firms leads to measurable outcomes, thereby fostering the creation of more scale-ups.

The institutional perspective emphasizes the rules, norms and beliefs that shape organizations and their members, often varying widely across different countries and cultures (North, 1990; North, 1994; Scott, 2008). Understanding what has become institutionalized is critical for advancing entrepreneurship research and practice, as it sheds light on how the institutional environment both supports and limits entrepreneurial activity (Bruton and Ahlstrom, 2003). Entrepreneurs operate within a framework shaped by these institutions, which simultaneously constrain and foster their activities (Bruton *et al.*, 2010). The growing emphasis on the institutional perspective in entrepreneurship research reflects dissatisfaction with theories that focus solely on efficiency, neglecting the impact of social forces on organizational behavior (Barley and Tolbert, 1997). While the importance of conceptualizing the role of institutions in innovation is widely acknowledged (Geels, 2004), systematic research in this area remains sparse. Historically, the intersection of entrepreneurship research and institutional theory has been underexplored, but there is a rising trend of scholars delving into this field (Tolbert *et al.*, 2011). Growth firms play a crucial role in the economy. However, resource limitations of SMEs can act as significant barriers. Coviello *et al.* (2024) described scaling as an organizational process in which managers expand a firm's outputs by restructuring internal operations and mobilizing resources, without a proportional increase in inputs. This approach enables a distinct form of growth. The scale-up phase marks a stage in a firm's development where deliberate efforts are made to expand operations, at which point firms are classified as scale-ups (Coviello *et al.*, 2024).

Research on the influence of institutions and economic policies on entrepreneurship at the national or regional level includes studies such as Kreft and Sobel (2005) for the USA; Ovaska and Sobel (2005) on transition economies; Bjørnskov and Foss (2008) covering 29 countries; McMullen *et al.* (2008) analyzing 37 countries; Bjørnskov and Foss (2013) covering 25 countries and Amoroso *et al.* (2024) across European regions. Manolova *et al.* (2008) explored the institutional impact on entrepreneurship across three different countries, providing valuable insights into how institutional effects may apply in diverse contexts. Similarly, research by Zacharakis *et al.* (2007) examined the relationship between venture capital and institutions in three nations. Such studies strengthen researchers' confidence in the broader applicability of institutional effects.

While classical studies (North, 1990; Scott, 2008) established the theoretical foundations of institutional influence, more recent works have refined these ideas in relation to entrepreneurial ecosystems and innovation governance. For instance, Zahra *et al.* (2014) highlighted the growing interplay between institutional design and entrepreneurial performance, while Balzano *et al.* (2025) and Ahern (2025) pointed to the need for anticipatory and adaptive governance in dynamic innovation environments. The OECD (2022) and European Commission (2024) similarly stressed that well-coordinated institutional frameworks – combining effective governance mechanisms and predictable regulatory systems – are essential for fostering high-growth, innovation-driven firms. Accordingly, this study builds on contemporary institutional theory to explore how

governance and regulation jointly shape the conditions under which technology-based SMEs can scale successfully across diverse national contexts.

Understanding how formal institutional arrangements – particularly governance and regulation – affect the scaling of technology-based SMEs is increasingly central to entrepreneurship research. Recent global disruptions, digital transformation and the policy emphasis on innovation-driven growth have renewed the need for institutional perspectives (Coviello *et al.*, 2024). Although there is increasing interest in bridging institutional theory with entrepreneurship, empirical research linking these areas is still limited. DiMaggio (1988) introduced the concept of the 'institutional entrepreneur' to reintroduce the role of agency into institutional analysis. Institutional entrepreneurs act as agents of change, establishing new systems of meaning by linking the operations of distinct institutions (Garud *et al.*, 2002) and driving transformation within institutional change processes and focusing on "institutional entrepreneurs" (DiMaggio, 1988; Garud *et al.*, 2002; Seo and Creed, 2002; Battilana, 2006; Delmestri, 2006; Leca and Naccache, 2006; Khan *et al.*, 2007; Leca *et al.*, 2008; Schneiberg and Lounsbury, 2008; Fuenfschilling and Truffer, 2016; Salonen, *et al.*, 2024; Xin and Park, 2024).

However, most work remains focused on organizational adaptation to institutional changes rather than how institutions shape entrepreneurial activities and growth dynamics (Kanter *et al.*, 1992; Armenakis and Bedeian, 1999; Benford and Snow, 2000; Fligstein, 2002; Greenwood *et al.*, 2002; Markowitz, 2007; Battilana and D'Aunno, 2009; Hallett and Hawbaker, 2020). Much of the institutional theory also focuses on established organizations rather than the emergence and development of SMEs (Tolbert and Zucker, 1983; Hoffman, 1999; Greenwood and Suddaby, 2006), with less attention given to the creation and development of SMEs. This creates a knowledge gap in understanding how institutional frameworks influence the growth of smaller firms, especially technology-based SMEs. The purpose of this study is to describe and analyze institutional dimensions to support the scaling of technology-based SMEs. Macro-level analysis (multi-country analysis) is crucial for understanding how overarching institutional structures, governance and regulatory issues shape the entrepreneurial environment and the growth of technology-based SMEs. The research question can therefore be expressed as:

RQ1. How are government, regulations and subsidies designed, from an institutional perspective, to foster the growth of technology-based SMEs?

This study includes the countries: the UK, the USA, Brazil, India, China, South Korea and Japan. Comparative studies of institutional frameworks across countries or regions are therefore needed to identify best practices for technology-based SME development. SMEs constitute a cornerstone of economic and social development, accounting for nearly 99% of all businesses in the European Union and employing around 65 million people (European Commission, 2024). Despite the growing policy emphasis on firm scaling, substantial gaps persist in understanding the institutional conditions that enable technology-based SMEs to expand effectively – particularly in comparative, cross-country settings. This study seeks to address these gaps by examining two key formal institutional dimensions – governance and regulation – and their roles in shaping the scaling trajectories of technology-based SMEs. In this study, institutions are defined as the rules, norms and beliefs that shape organizational realities, primarily stemming from formal regulations established by government agencies, legal frameworks and compliance-enforcing laws.

This paper develops an analytical framework that combines governance and regulation as mutually reinforcing drivers of technology-based SME scaling. Drawing on a seven-country comparative case study, the analysis identifies how these institutional dimensions interact

differently in advanced and emerging economies, offering context-specific policy recommendations. By focusing on technology-based firms rather than SMEs in general, the study addresses a research gap and links institutional theory to actionable, measurable policy strategies – bridging the divide between theory and practice while providing insights that can inform both national policy design and firm-level scaling strategies. The novelty lies in systematically contrasting how these dimensions operate across advanced and emerging economies, identifying patterns of institutional complementarity and divergence. Section 2 presents the institutional theory and the two institutional dimensions examined in this study. Section 3 describes the data collection process, while Section 4 presents the empirical findings. Section 5 contains the discussion, and Section 6 provides the conclusions.

2. Literature review

2.1 Institutional theory

Institutions influence economic activities by defining the rules that govern production, exchange and distribution. These institutional dimensions, often termed exogenous triggers, encompass formal structures and norms shaped by regulatory frameworks, government agencies and the cultural and social practices of a society. Weak institutional development can hinder the growth of new firms (Baumol *et al*., 2009), while overly stringent regulations may similarly obstruct their establishment (Soto, 2000). From an economic perspective, institutional theory frames institutions as the "rules of the game" within a society (North, 1990). This perspective categorizes institutions into two types: formal constraints, such as laws, regulations and constitutions and informal constraints, including behavioral norms, conventions and self-regulated codes of conduct. Furthermore, some scholars argue that the interaction between institutions and organizations drives the institutional evolution of an economy (North, 1994).

Institutional pressures can be broadly divided into two categories: those originating from the macro-social environment and those emerging from interorganizational relationships. As a result, institutional researchers have explored external institutions such as regulatory frameworks, government bodies, legal systems, professions and societal norms. These elements, embedded in cultural and social contexts, enforce conformity through established rules, structures and practices (DiMaggio and Powell, 1991). The concept that most effectively encapsulates the process of homogenization is isomorphism. According to Hawley (1968), isomorphism refers to a constraining process that compels one unit within a population to resemble others that are subject to the same environmental conditions. At the population level, this perspective implies that organizational characteristics evolve to align more closely with environmental conditions. The number of organizations within a population is determined by the environment's carrying capacity, and the diversity of organizational forms reflects the diversity of the surrounding environment.

Rules, norms and belief systems are widely acknowledged as fundamental components of institutionalization (DiMaggio and Powell, 1983; Schneiberg and Lounsbury, 2008). Neo-institutional theory posits that organizations align with institutionalized expectations to achieve legitimacy, which stems from society's positive perception of the organization (Scott, 2008). The institutionalization process requires collaboration among government, universities, research institutes, non-governmental organizations and businesses. In addition, government initiatives that assist firms in accessing foreign markets can play a significant role in increase demand for their products. Scholars concur that rules, norms and belief systems are fundamental to the process of institutionalization (DiMaggio and Powell, 1983; Schneiberg and Lounsbury, 2008; Scott, 2008).

Baumol (1996) described the "rules of the game" as the formal and informal institutions that influence the incentives and constraints entrepreneurs encounter within a society. These institutions encompass tax policies, regulations, subsidies, support programs and other policy measures or societal norms that can either promote or limit entrepreneurial activity. Baumol highlights the importance of policymakers actively shaping these institutions to promote productive entrepreneurship. This can be achieved by reducing barriers to business entry, streamlining regulatory processes, providing financial support and subsidies to entrepreneurs and introducing tax incentives to encourage innovation and investment.

2.2 Analytical framework

2.2.1 Institutional dimensions. The focus on governance and regulation is theoretically grounded in the distinction between resource-providing and rule-setting institutions (North, 1990; Scott, 2014). Governance provides legitimacy, coordination and support, while regulation defines the boundaries of entrepreneurial behavior. Together, they form the most influential formal institutional mechanisms affecting SME scaling, making them suitable focal dimensions for comparative analysis. Drawing on institutional theory, this study develops an analytical framework to investigate how governance and regulatory arrangements shape the scaling of SMEs. Two dimensions are of special interest; (i) Governance: innovation policies that provide resources, legitimacy and operational support to technology-based SMEs (e.g. R&D support, funding and mentorship) and (ii) Regulations: such as tax incentives, that influence technology-based SME operational efficiency and growth. A clearer conceptual delineation between governance and regulation is essential in the analytical framework, particularly in the context of emerging and developing economies where regulatory institutions are frequently state-owned or heavily influenced by the public sector (North, 1990; Helmke and Levitsky, 2004). This structural reality often blurs the operational boundaries between governance mechanisms (e.g. strategic direction-setting, policy coordination) and regulatory instruments (e.g. laws, compliance enforcement), leading to functional overlap between government programs and formal regulatory frameworks (Amsden, 2001). The omission of this overlap risks underestimating the hybrid nature of institutional arrangements in such contexts, where the same state actor may design policies, allocate subsidies and enforce regulations.

Institutional resources significantly shape SME internationalization (Jones *et al.*, 2011; Bruton *et al.*, 2010). Institutional networks can positively influence this process (Oparaocha, 2015), and the institutional environment affects SMEs' propensity for international entrepreneurship across different stages (Szyliowicz and Galvin, 2010; Volchek *et al.*, 2013). Universities contribute through R&D and talent, though their direct role for technology-based SMEs is less prominent; thus, this study does not treat them as a primary institutional dimension. Tax burdens, including multiple taxation, can contribute to high SME failure rates (Ojeka, 2011; Fuentelsaz *et al.*, 2018, 2019). Using institutional theory, this study focuses on governance and regulation as formal institutional dimensions, acknowledging that firm growth also depends on endogenous triggers such as strategic operational changes (Jo, 2019; Löfsten *et al.*, 2025).

Institutional dimensions – particularly governance and regulation play a crucial role in shaping the trajectory of scale-ups. A comprehensive literature review on SMEs through the lens of institutional theory underscores how governance structures and regulatory environments influence strategic decisions, innovation and growth paths (Balzano, *et al.*, 2025). In high-tech sectors, innovation policy must navigate the complexity of governance systems; effective coordination, agility and institutional learning (e.g. through anticipatory governance, sandboxes and iterative experimentation) are essential to foster environments

where tech-driven firms can flourish (Ahern, 2025). Comparative policy analyses across OECD countries further reveal how diverse governance models underpin SME support frameworks, bridging institutional coherence with practical mechanisms like innovation funding and regulatory alignment (OECD, 2022). Below, the two core research dimensions of this study are presented:

(1) *Governance – Innovation policies: Dimension*: Governance programs are essential for scaling businesses, providing structural, financial and strategic support, often facilitated through funding initiatives. These opportunities include research grants, business angels and venture capital. Neo-institutional theory highlights that organizations conform to institutionalized expectations to gain societal legitimacy. Innovation policies are critical for strengthening the growth trajectories of technology-based SMEs, as they create demand- and supply-side incentives that foster R&D, commercialization and knowledge transfer. When embedded in coherent governance structures, such policies enhance firms' ability to overcome market failures, attract investment and expand internationally. Countries that align innovation policy with supportive regulatory frameworks tend to achieve more sustainable and inclusive SME development. References: Bruton and Ahlstrom, 2003; Scott, 2008; Baumol *et al*., 2009; Bruton *et al*., 2010; Borrás and Edquist, 2013; Edler and Fagerberg, 2017; Ferrando and Lekpek, 2018; Ferrando *et al*., 2019; Zhao *et al*., 2019; Coad *et al*., 2022; Löfsten, 2024.

(2) *Regulations – Taxes: Dimension*: Lower corporate tax rates and targeted tax reductions (e.g. on key inputs or efficient technologies) encourage entrepreneurship by reducing costs and promoting innovation. Policies encouraging technology adoption or offering tax reductions on specific inputs can drive down production costs, fostering innovation and competitiveness. Tax relief, especially R&D tax credits, supports innovation and helps firms sustain operations. However, its effectiveness varies depending on firm maturity and the design of the policy. References: Baumol, 1996; Soto, 2000; Davidsson and Henrekson, 2002; Bruton *et al*., 2010; Djankov *et al*., 2002, 2010; Bloom and Van Reenen, 2010; Bloom *et al*., 2012; Brown *et al*., 2017; Elert *et al*., 2017; Akcigit *et al*., 2022; Coad *et al*., 2022.

Effective policy design may require adaptiveness and targeting to accommodate the diverse needs of firms at different growth stages. Effective collaboration between interorganizational actors, government bodies and businesses is necessary for fostering innovation and scaling firms. Policymakers need to balance short-term support for struggling firms with long-term incentives that drive productivity and innovation, ensuring sustainable growth across the entrepreneurial landscape. Policy gaps remain regarding effective institutional support for scaling – particularly in how governance and regulation are coordinated. This study addresses that gap by examining these institutional dimensions in cross-country context.

2.2.2 Governance – innovation policies. Established classifications in the literature (Borrás and Edquist, 2013; Edler and Fagerberg, 2017) highlight that innovation policy encompasses a broad mix of supply-side and demand-side measures, including regulatory standards, public procurement and framework conditions for competition. Regulatory instruments can stimulate innovation both directly – by setting performance standards or compliance requirements that encourage technological upgrading – and indirectly, by shaping market incentives and reducing uncertainty (Blind, 2012). Demand-side tools, such as innovation-oriented public procurement, have also been recognized as powerful levers for fostering innovation in targeted sectors (Edler and Georghiou, 2007). By integrating this wider set of regulatory and policy instruments into the analytical framework, the analysis would more

accurately capture the institutional mechanisms that influence technology-based SME growth and better reflect the complex policy environments in which these firms operate.

Davidsson and Henrekson (2002) emphasized the crucial role of institutional arrangements in shaping entrepreneurial activity and firm growth. They noted that institutions significantly impact firm expansion, highlighting how increased governmental barriers hinder growth. Likewise, Coad *et al.* (2014) argued that incorporating institutional factors into analyses of firm growth could help design more effective policies. Institutional factors shaping entrepreneurial efforts include government initiatives aimed at fostering a supportive environment for entrepreneurship and societal perceptions of entrepreneurial activity. The level of entrepreneurship in a society is strongly influenced by regulations and policies that determine the distribution of rewards (Baumol *et al.*, 2009). Governments can improve market efficiency by removing barriers and addressing unfavorable conditions (Ahlstrom and Li, 2010). Neo-institutional theory claims that organizations conform to institutionalized expectations to attain legitimacy, which is based on a positive perception of the organization within society (Scott, 2008). Institutions play a vital role in entrepreneurship research as they shape the behavior of entrepreneurs and small businesses (Brandl and Bullinger, 2009).

The growth of technology-based firms is significantly influenced by the interplay between innovation systems, interorganizational actors such as the OECD and EU and institutional factors (Löfsten, 2024). Innovation systems comprise networks of actors, resources and policies that promote technological progress. Institutional factors – such as legal frameworks, regulations and government policies – define the operational environment for technology-based firms (Löfsten, 2024). High-growth firms have access to various financing opportunities through multiple channels, each supported by different stakeholders (Coad *et al.*, 2022). These include research grants, business angels, venture capital and government initiatives. Ferrando and Lekpek (2018) observed that firms leveraging a combination of financing sources were more likely to invest in R&D and develop new products. In addition, the financing demands of high-growth firms often surpass the capacity of traditional bank loans, highlighting the importance of equity financing (Ferrando *et al.*, 2019).

2.2.3 Regulations – taxes. To effectively build entrepreneurial capacity, small businesses and entrepreneurs must adhere to laws established by government agencies and regulations set by other key organizations that support enterprise development (Bruton *et al.*, 2010). The design of tax policy often relies on one or both of two main approaches. The first involves implementing targeted tax preferences and incentives to foster the establishment and growth of small firms. These measures include reduced corporate income tax rates, special tax exemptions and specific relief programs for small enterprises (Harju *et al.*, 2022). However, to effectively broaden the tax base, policymakers must also prioritize critical goals such as investing in infrastructure, creating jobs, reducing unemployment, expanding productive economic sectors and boosting exports (Baily *et al.*, 2010).

Shirokova and Tsukanova (2013) examined the effects of tax administration and tax rate barriers on SMEs in transitional economies. They concluded that in such economies, both high tax rates and burdensome tax administration significantly hinder the growth and development of SMEs. The greater the tax rates and barriers, the more difficult it becomes for SMEs to expand. Key factors contributing to SMEs' tax noncompliance include high tax rates and complex filing processes. Other challenges, including inefficiencies in tax collection, high administrative costs, excessive time demands on both taxpayers and tax officials, suboptimal tax revenue and misallocation of resources, further impede tax compliance among SMEs.

Tax relief is a policy instrument targeting a country's framework conditions that can be applied to support high-growth, innovative firms. Corporate taxation is a critical area where

entrepreneurs, in particular, seek favorable conditions. However, the effectiveness of lower tax rates in fostering the growth of high-growth firms and scale-ups remains debated in the literature. R&D tax relief, a specific form of tax support, is often highlighted as particularly beneficial for scale-ups, as it enables low-production firms to sustain their operations. However, Bloom *et al.* (2012) argue that R&D tax relief tied to intellectual property rights, such as patents, licenses and copyrights, is more suitable for mature firms due to the lengthy processes required to secure these protections (Brown *et al.*, 2017; Coad *et al.*, 2022). Similarly, Djankov *et al.* (2010) found that higher corporate tax rates significantly deter business entry while also negatively impacting domestic and foreign investments in established firms. Although R&D tax relief can be an effective policy for fostering innovation and enabling firms to adopt new technologies, its success varies. For example, family-owned businesses may use tax relief to sustain operations despite low productivity, allowing such firms to remain viable even if they underperform compared to the average (Bloom and Van Reenen, 2010; Bloom *et al.*, 2012).

Targeted measures like tax reductions on essential inputs and incentives for adopting efficient technologies can effectively lower firms' marginal costs, fostering innovation and cost-efficient production (Elert *et al.*, 2017; Akcigit *et al.*, 2022). Providing grants or R&D tax credits further supports firms in innovating and integrating new technologies, helping to reduce production costs even further. Government initiatives facilitating firms' access to foreign markets can stimulate demand for products, supporting firm growth and increasing global competitiveness. Institutions significantly shape entrepreneurial behavior and firm growth. For instance, regulatory frameworks impact business entry, expansion and overall entrepreneurial capacity. Increased government obstacles are linked to slower firm growth, while policies that simplify regulations or reduce burdens enhance entrepreneurial activity. While R&D tax relief benefits high-growth firms, tying it to intellectual property protections might limit its utility for start-ups due to the long timelines involved. Family-owned businesses may use tax relief to sustain low productivity, highlighting the need for more targeted measures to ensure efficient use of incentives. Grants and R&D tax credits empower firms to innovate and implement cost-effective technologies, promoting long-term economic growth.

3. Method and data

3.1 Qualitative studies

This study adopts a qualitative research design to examine how institutional dimensions – particularly governance and regulation shape the support available for technology-based SMEs seeking to scale up. Qualitative approaches are well-suited for investigating complex, context-dependent institutional arrangements, allowing researchers to capture subtle mechanisms and contextual nuances often missed in quantitative designs (Denzin and Lincoln, 2018). A multiple case study methodology (Yin, 2018) was employed to provide an exploration of seven national contexts, integrating policy frameworks, governance structures and firm-level perspectives. Multiple case studies enhance external validity and enable theoretical generalization through the comparison of heterogeneous institutional environments (Eisenhardt, 1989; Eisenhardt, 1991; Eisenhardt and Graebner, 2007).

Following a comparative qualitative tradition (Ragin, 1989; Stake, 1995), the analysis focused on identifying similarities and differences in institutional mechanisms that influence SME scaling. The study draws on secondary data (see Section 3.3), primarily government reports, embassy research briefs and public institutional documents. The data was thematically coded and analyzed through cross-case pattern matching (Miles and Huberman, 1994), ensuring strong theory–method fit (Eisenhardt, 1991; Gehman *et al.*, 2017).

3.2 Comparative studies

Comparative studies are a well-established method for identifying both commonalities and divergences in institutional structures across contexts, facilitating theory development that accounts for political, economic and cultural variation (Keman and Pennings, 2017; Coccia and Benati, 2018). This is especially valuable for examining technology-based SMEs and scale-ups, whose growth trajectories are shaped by the interplay between governance systems and regulatory frameworks (OECD, 2022; Balzano *et al.*, 2025; Ahern, 2025). This research examines seven countries – UK, USA, Brazil, India, China, South Korea and Japan – selected to represent a spectrum of institutional models from liberal market economies to state-coordinated systems (Hall and Soskice, 2001). The variation allows for the identification of both best practices and institutional complementarities, showing how governance, regulation and innovation policies work in concert – or in conflict – to support scale-ups.

Institutions are defined here as "rules, norms, and beliefs that shape social and economic interactions" (North, 1990; Scott, 2014), encompassing formal arrangements such as legal frameworks, compliance systems and fiscal policies. Comparative institutional analysis helps reveal how differences in governance capacity, regulatory scope and innovation policy design affect the scaling process for technology-based SMEs (Peng *et al.*, 2009; Bruton *et al.*, 2010). This multi-country design follows Eisenhardt's (1991) recommendation for comparative logic to strengthen theory building, and integrates cross-case analysis to capture both within-case richness and between-case analytical leverage (Eisenhardt and Graebner, 2007; Gehman *et al.*, 2017).

3.3 Secondary data

The study is based on secondary data, which offers broad coverage and cost efficiency but requires careful validation to ensure accuracy and reliability (Johnston, 2014). The main limitation of secondary data is that the researcher does not control the original data collection process, making it necessary to verify methods through technical documentation, triangulation and complementary sources (Dale *et al.*, 1988). Secondary sources include public reports, policy briefs, government publications and embassy-generated intelligence on innovation and SME policy. Priority was given to recent material (primarily from 2022) to ensure relevance in the rapidly evolving policy landscape. Case study evidence drawn from secondary data remains a cornerstone of theory development, offering empirical grounding, identifying knowledge gaps and pointing toward future research directions (Eisenhardt, 1989; Dyer and Wilkins, 1991; Siggelkow, 2007; Ridder, 2017; Yin, 2018). The depth and structure of the secondary data varied slightly across countries, reflecting differences in the scope of national reporting and availability of policy documentation.

3.4 Data collection and analyzing the data

The Swedish Agency for Growth Policy Analysis (Growth Analysis) was tasked by the Swedish government to evaluate both domestic and international growth policies. While traditional Swedish and EU strategies focused on start-ups, recent emphasis has shifted toward scale-ups due to their job creation potential. To assess international best practices, Growth Analysis commissioned its Science and Innovation Offices in seven non-EU capitals – London, Washington, Brasília, New Delhi, Beijing, Seoul and Tokyo – to collect data on innovation strategies, financing instruments, policy frameworks, accelerator and incubator programs, fiscal incentives and scaling barriers. Each office produced background report in 2022, which was forwarded to the researcher in original form. The reports, titled *International outlook: policy for knowledge-intensive companies that want*

to scale up, contained unstructured but detailed insights. In analyzing the secondary data, the researcher adopted an abductive approach (Dubois and Gadde, 2002). The process began with a systematic review of the background reports to construct a comprehensive description of the empirical setting (Langley, 1999). The material was then organized into meaningful categories and assigned labels. One study has previously been presented within this project (Löfsten, 2024). This study includes these seven countries, but with a different perspective, and also focus on public reports, stable firms and high-growth firms, policies regarding innovation systems, technology and product life cycles etc. The study proposes a conceptual model for assessing policies aimed at developing firms.

This study employed a multiphase qualitative design to ensure methodological rigor and comparability across seven national cases (Figure 1). The analytical process proceeded through four interrelated phases:

(1) data familiarization of embassy and policy reports;

(2) identification of recurrent institutional themes within each national case;

(3) development of cross-case matrices to identify converging and diverging institutional patterns; and

(4) synthesis through pattern matching between empirical categories and theoretical constructs derived from institutional theory.

The technology-based SMEs operate in innovation-intensive sectors, including high-technology and medium-high technology manufacturing, high-tech knowledge-intensive

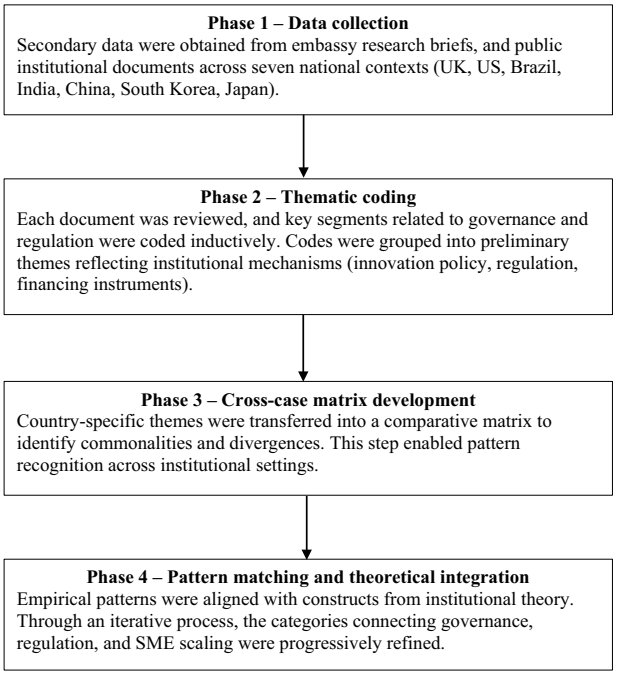

Figure 1. Phases of data collection and data analysis
Source: Author's own work

services and knowledge-intensive market services (European Commission, 2016). While the maturity of technologies could not be assessed in detail, these firms share common features: high R&D intensity, reliance on specialized human capital and innovation-driven business models.

4. Empirical findings

This section is divided into two empirical institutional dimensions: (i) Governance dimension and (ii) regulatory dimension. The current state of seven countries will be briefly presented: UK, USA, Brazil, India, China, South Korea and Japan. The content in this section is mainly based on reports from the seven embassies and their respective Science and Innovation Offices. These countries have different starting points and conditions, vary in size, are located in different parts of the world, but also share certain similarities in the investments being made.

4.1 Governance dimension

In the UK, the primary goal is to encourage private sector investment nationwide, foster an environment conducive to innovation for all businesses and build confidence. Supporting the broader vision of becoming a global innovation hub, the government's plans within four fundamental pillars: unleashing business, people, institutions and places, as well as missions and technologies. The scale-up sector welcomed the new strategy, highlighting collaborations between the private and public sectors, access to funding and the selection of technology sectors. In the UK, both public and private measures exist to promote knowledge-intensive firms in the growth phase, yet there is a noticeable shortage of growth financing. Another initiative, British Patient Capital, focuses on scaling-up firms, particularly in life sciences.

The USA lacks a national program for supporting knowledge-intensive firms that want to scale up, but good access to capital, expertise, risk appetite and research collaboration between universities and industry are crucial for firms aiming to scale up. Only the UK, the USA and South Korea have targeted support programs for scale-ups to facilitate cooperation between the private sector and research institutes, as well as venture capital funds for growth-phase firms. The USA, Brazil, China and South Korea do not have explicit national strategies or goals for supporting the development of scale-ups. Instead, these countries have implemented measures to improve innovation ecosystems and accelerator programs to generally support technology-based SMEs. All seven countries provide substantial financial support to firms at various development stages. The British government also has a special venture capital fund where private actors, along with the government, can invest in high-growth, innovative firms. The aim is to bridge the funding gap from start-up to scale-up in the tech sector. Brazil lacks a national scaling program and significant financial support, but it benefits from plentiful venture capital and established structures for collaboration between private firms and universities. Table 1 illustrates the institutional dimension governance. The empirical data in Table 1 provide comparative insights into how different countries (e.g. the UK, USA, Brazil, India, China, South Korea and Japan) implement scale-up programs. Examples include targeted government initiatives (e.g. UK's Scale-up Program, ARPA model in the USA and K-Unicorn in South Korea), specific legal frameworks (e.g. Marco Legal in Brazil) and financial structures to support start-ups transitioning to scale-ups (e.g. Japan's loan guarantees).

The Ministry of Electronics and IT in India has initiated specific Accelerator Programmes mainly for start-ups. MeitY (Ministry of Electronics and Information Technology) in India has launched the SASACT program to support the electronics/hardware industrial sectors in

Table 1. Institutional dimension: governance – innovation policies

The UK	The USA	Brazil	India	China	South Korea	Japan
Breakthrough is a program where private investors and the UK government co-invest in innovative firms. The scale-up program serves as a specialized growth initiative, reflecting a targeted effort to support firms that are already in the growth phase. Breakthrough and the scale-up program integrate governance and innovation policy. The UK government, through the department for business, energy and industrial strategy, addresses the issue with the start-up loans scheme, aiming to help them scale their operations	National innovation programs: the USA supports scale-ups through multiple programs: Scale-up America: Focuses on supporting regional incubators and accelerators. Build to Scale: Aims at promoting technology-based economic development. The ARPA Model: This program supports innovative research projects and includes a business growth initiatives	Recent government programs are managed by ministries like the Ministry of Science, Technology and Innovation, and the Ministry of Economy. The Marco Legal Start-ups law primarily facilitates attracting capital and achieving growth for start-ups rather than focusing on scaling up	Ministry support and programs: The Ministry of Electronics and IT supports start-ups via the MeitY Start-up Hub, which integrates various ecosystem players. The Scale-up Programme by T-Hub Foundation serves as an accelerator for regional cohorts of 12–15 firms over a year. India has region-based accelerator programs and has significant investment funds distributed across thousands of rounds with public calls. Invest India and Start-up India are crucial in attracting talent and financial support	Government financing programs: China's government rewards incremental expansions in SMEs, with the People's Bank of China guiding financial institutions to increase credit availability. The Ministry of Industry and Information Technology is involved in policy development and digitalization efforts. The China SME Development Fund, launched in 2015, specifically supports SME scaling. The 14th Five-Year Plan includes an SME promotion initiative aimed at supporting one million innovative SMEs	K-Unicorn program: Managed by the KISED agency, this program supports "Baby Unicorns," which are young firms with high growth potential. The ministry of SMEs and start-ups recognizes firms that have demonstrated consistent growth, providing a formal mechanism to highlight successful scale-ups. Korea start-up center aims to create a more start-up-friendly infrastructure. The organization for small and medium enterprises and regional innovation provides loan guarantees from commercial banks for start-ups, highlighting government support for both domestic growth and international expansion	The Japanese government offers a commercialization support program designed for technology-based start-ups, providing assistance to small businesses seeking to scale up. This support is delivered through certified venture capital firms and accelerators. Japan's organization for small and medium enterprises and regional innovation provides loan guarantees for deep-tech start-ups through commercial banks. However, there is no explicit national programs for supporting scale-ups

Source(s): Author's own work

technology-based entrepreneurial initiatives. India operates a scale-up program designed as a region-specific accelerator initiative. Key areas include the Foundation for Innovation and Research in Science and Technology (Start-up Incubation and Innovation Centre, SIIC) at IIT Kanpur; the Society for Innovation & Entrepreneurship (SINE) at IIT Bombay; the Coimbatore Innovation and Business Incubator (Forge Accelerator) in Coimbatore; and the KIIT Technology Business Incubator at KIIT University, Bhubaneswar. In China, the government has implemented targeted policy systems, support programs and development systems to facilitate financing and strengthen the protection of firms' legitimate interests.

The China SME Development Fund, a national investment fund established by the State Council, was created in accordance with the Small and Medium Enterprise Promotion Act. PBoC in China has also encouraged financial institutions to issue special financial bonds for micro and small enterprises and to develop opportunities for smaller loans. A policy development in China has created opportunities for credit loans. One of the pillars of support for technology-based SMEs is to encourage financial institutions to develop financial services and facilitate the market orientation of financial channels for firms. China's SME Promotion Development, there is a fourteenth five-year plan to support technology-based SMEs. In Japan is currently reviewing its criteria for supporting technology-based SMEs and ways to support business growth in various ways. R&D will be given particular priority in policy based on advice from the private sector and firms with fundamental technology and high commercialization potential.

The government in South Korea has introduced several programs to support technically oriented small businesses. In Japan, the current strategies primarily aim to promote start-ups rather than smaller firms looking to scale up their operations. However, there is a growing interest in scale-up businesses, with initiatives where Japanese authorities and public actors can support firms seeking to expand. Enterprises of Korea, FOMEK (formerly the Association of High Potential Enterprises of Korea, AHPEK), support firms that are larger than SMEs. The KISED agency is responsible for relevant programs. South Korea has implemented the Second Venture Boom 2019 and developed concrete programs to identify new potential industrial start-ups by strengthening universities. Japan government has a Commercialization Support Program for technology-based start-ups, which helps small start-ups looking to scale up, with support channeled through certified venture capital firms and accelerators. South Korea and Japan have instead implemented support to improve innovation ecosystems, accelerator programs, to generally support technology-based SMEs.

4.2 Regulatory dimension

The countries have various types of instruments specifically to support scale-ups and technology-based SMEs in general. In the USA, there is relatively abundant venture capital. The primary focus there is on regulations, low taxes and extensive collaboration between firms and universities. South Korea, for instance, has a regulatory exemption in a Sandbox Program. This program includes simplified licensing for temporary permits to facilitate scaling up. South Korea offers numerous tax incentives and exemptions to promote entrepreneurship, including efforts to attract talent and experts. However, regulation is limited (especially regarding competition law), and the country particularly focuses on favorable tax legislation and good access to expertise. In the UK, several major reforms of the regulatory conditions are in place and planned to facilitate businesses that want to scale up. In recent years, a trend has emerged in the USA where firms are moving away from the East and West Coasts due to high taxes and expensive living costs, in favor of states that offer lower taxes and lower living expenses. Texas and Arizona are actively promoting themselves

to attract industries for both new investments and the scaling up of existing operations, and they are increasingly drawing knowledge-intensive firms.

The countries have different sets of instruments to specifically support scale-ups financially and firms in general. All seven countries have provided economic relief to technology-based SMEs in general and particularly to knowledge-intensive firms. These primarily include tax relief (the UK, USA, China, South Korea and Japan), where certain firms with a specific turnover do not face increased taxes, have low taxes and living costs, rewards for innovative environments and permissions for regulatory authorities and pension funds to invest in venture capital funds, efforts to attract talents and experts, guarantees for growth firms with potential losses and tax relief for small firms with R&D and innovative technologies. Regulatory authorities are also permissive, and in some cases, permissions are granted for pension funds, for example, to invest in venture capital funds. Table 2 illustrates the institutional dimensions: regulatory. Table 2 highlights empirical evidence about taxation policies impacting scale-ups and describes UK's 130% tax deduction for IT infrastructure investments, USA's procurement laws that direct federal agencies to work with small domestic businesses, Brazil's taxation threshold limiting scale-ups due to avoidance strategies and China's extensive tax and fee reductions for manufacturing and firm scaling.

Across all cases, common enabling mechanisms include access to funding, R&D tax relief and accelerator programs. However, the degree of institutional coordination and regulatory predictability varies substantially. The UK and South Korea demonstrate coherent governance–regulation alignment, while Brazil and India face institutional fragmentation and tax-related growth constraints. India has taken a significant step by allowing pension funds and insurance firms to invest in Indian venture capital funds. This move aims to increase domestic capital availability, thereby bolstering efforts to scale up businesses, especially in the venture capital space. Japan has introduced several reforms to facilitate scale-ups, such as the Company-Based New Business Exemption Regulatory Reform, aimed at supporting individuals. Business angels can also benefit from favorable tax breaks when investing in and selling scale-ups. The government has implemented various tax regulations specifically targeting technology-based SMEs to address the difficulties they face in attracting talent, higher setup costs and lower productivity and profitability compared to larger companies, and these tax regulations have led firms to be cautious about scaling up, as they prefer to retain the tax benefits by not expanding their operations. In addition, organizations that want to invest in start-ups through certified venture capital firms have the opportunity to deduct a specific amount for tax purposes, and business angels can also receive favorable tax relief on investments in and sales of scale-ups. In Brazil, new firms with an annual turnover of less than 0.83 m US dollars have the opportunity to pay lower taxes, which has led firms, instead of scaling up to reach the critical turnover, to start sister companies through other family members to avoid higher taxation.

In several countries, government bodies and other organizations actively support scaling up through various programs or reforms. This support often includes tax incentives (such as in the UK, USA, China, South Korea and Japan), where businesses that reach a certain level of revenue are not subjected to increased taxes, benefit from low taxes and living costs, and are rewarded for innovative environments. In addition, regulatory authorities and pension funds are sometimes permitted to invest in venture capital funds, with efforts made to attract talent and experts, provide guarantees for growth firms facing potential losses and offer tax breaks for small businesses engaged in R&D and innovative technologies. Several countries focus on improving conditions for high-growth innovative firms by creating a better business climate, facilitating the recruitment of skilled personnel and attracting foreign investments.

Table 2. Institutional dimension: regulations – taxes

The UK	The USA	Brazil	India	China	South Korea	Japan
Employee stock options and corporate tax: The UK government is reviewing employee stock options to promote company growth and stock market listings. Firms with certain taxable profits will not face an increase in corporate tax. Starting in 2023, investments in IT infrastructure are eligible for a 130% tax deduction. In addition, there are tax reliefs for capital gains, and a review of R&D tax credits is underway to possibly include deductions for data and cloud services, aimed at supporting digital sector scale-ups	Geographic concentration and taxation: The USA sees a concentration of Knowledge and Technology Intensive (KTI) production in 15 states, which generate over three-quarters of the total KTI value. States attract scale-ups with low taxes and living costs. Effective competition law, favorable tax legislation, and access to skilled labor are identified as crucial elements for supporting scale-ups. Small business support through procurement laws: Since the late 1980s, USA federal agencies have been required by law to procure at least 23% of their goods and services from small domestic businesses	In Brazil, new firms with an annual turnover of less than 0.83 m US dollars can benefit from lower tax rates. This incentive has prompted businesses to avoid scaling up to surpass the critical turnover threshold. In Brazil, the emphasis is more on regulatory changes for start-ups rather than scale-ups. Notably, relief measures have been introduced to facilitate the start-up of small businesses	In India, companies with outstanding payments owed to 'micro and small' manufacturing vendors will face higher taxes in the assessment year 2024–25. SMEs in India face significant challenges in achieving tax compliance. Frequent updates and intricate rules make it challenging for SMEs to stay informed. Many lack specialized tax professionals and depend on general accountants for guidance	Tax and regulatory support: China has introduced improved tax policies and financing options to support entrepreneurship and innovation. There is also a focus on better intellectual property rights protection and support for "green development." In 2021, China granted approximately $0.05 tr in tax and fee reductions to the manufacturing industry and raised the threshold for taxing SMEs	The country offers a variety of tax incentives and exemptions to promote entrepreneurship and attract talents, including guarantees for potential growth firms facing losses	Tax breaks and reforms for scale-ups: Japan offers tax breaks for small businesses involved in R&D and innovative technology, particularly those with less than $0.75 m in capital. Special venture capital funds and financiers can also receive tax benefits. Reforms like the Company-based New Business Exemption Regulatory Reform support individuals in scaling up businesses, and business angels receive favorable tax breaks for investing in and selling scale-ups

Source(s): Author's own work

However, there are no clear, specific measures that have a significant impact on high-growth innovative firms, although there are general support programs available.

Governance play a critical role in scaling businesses by offering structural, financial and strategic support, often through funding mechanisms. For example, the UK's Breakthrough program reduces financial risks via government and private investor coinvestment, while India's T-Hub Foundation accelerates regional start-ups with mentorship, workspace and networking. Such initiatives connect businesses to innovation hubs, support market expansion and foster product development, particularly for technology-driven firms. International scaling is also facilitated, as seen with South Korea's Korea Start-up Center and Japan's Commercialization Support Program, which reduce operational challenges and enhance credibility. Such institutional endorsements make it easier for businesses to gain stakeholder trust. Programs like the UK's Scale-up Program focus on specific growth stages, offering tailored solutions to scaling challenges and reinforcing structural legitimacy. Governance initiatives often provide mechanisms to scale internationally. These programs provide resources for expanding operations, entering new markets and developing new products, addressing a critical barrier to scaling.

Tax policies, however, can hinder scaling by creating financial and administrative barriers. In Brazil, "threshold avoidance" leads firms to limit growth to evade higher taxes. India's tax rules, including penalties for outstanding payments to small vendors, increase financial pressures and reduce collaboration with smaller suppliers. Complex tax compliance requirements in India and unpredictable regulatory updates in China further burden scale-ups. In contrast, favorable policies like the UK's progressive tax deductions promote scaling, but their absence in other regions may leave firms at a disadvantage. Uneven tax benefits, such as Japan's focus on small R&D firms or state-by-state variability in the USA, create disparities, concentrating scale-ups in more supportive environments while hindering growth elsewhere.

5. Discussion

5.1 Institutional perspectives on technology-based small and medium-sized enterprises

The paper contributes to the institutional literature by empirically mapping cross-country variations in how governance and regulation jointly influence SME scaling. This comparative approach highlights both universal mechanisms and context-specific adaptations, offering a framework that connects descriptive analysis with theory-informed understanding. The findings of this study reinforce that institutional arrangements are central to the scaling of technology-based SMEs. Formal institutions, as conceptualized by North (1990) and further elaborated by Scott (2014), function by reducing uncertainty through rules, norms and enforcement mechanisms that shape entrepreneurial behavior and organizational strategy. Governance structures, regulatory frameworks, emerge as key formal institutional dimensions that directly influence firm growth trajectories. Institutional environments provide both enabling and constraining conditions for entrepreneurial action, as noted by Bruton *et al.* (2010), and these dual effects are evident across the seven countries examined. For example, in the UK, programs such as Breakthrough and the Scale-up Program integrate governance and innovation policy, reducing financial risk through coinvestment and enhancing market access – an approach consistent with OECD (2022) recommendations for targeted high-growth support. In contrast, Brazil illustrates how institutional constraints, particularly tax complexity and "threshold avoidance," can limit scaling despite other supportive measures, echoing findings from Ojeka (2011) and Fuentelsaz *et al.* (2018). Emerging economies such as India and China demonstrate how regulatory uncertainty and administrative burdens can hinder growth even in the presence of

governance initiatives. India's T-Hub Foundation, for instance, offers mentorship and innovation networks, but its impact is tempered by stringent tax rules and compliance requirements. Similarly, China's evolving regulatory landscape creates unpredictability for technology-based SMEs, reinforcing Peng *et al.*'s (2009) argument that institutional transitions require careful sequencing of reforms.

In developed economies like Japan and South Korea, innovation policy is deeply embedded within governance structures. Japan's Commercialization Support Program and South Korea's Korea Start-up Center exemplify the institutional complementarity described by Hall and Soskice (2001), where coherent policy frameworks foster scaling through R&D support, commercialization pathways and international market entry (Adomako et al, 2020). This reflects Edler and Fagerberg's (2017) argument that coordinated innovation policy instruments – spanning supply- and demand-side measures – are essential for sustaining growth in technology-intensive sectors. The evidence demonstrates that the alignment of these dimensions, tailored to specific national contexts, determines whether technology-based SMEs can achieve sustainable scaling.

5.2 Institutional policy dimensions

Governance initiatives, when well-designed, can create legitimacy, enhance resource access and provide structured pathways to scaling. The cases of the UK's Breakthrough Program, India's T-Hub and South Korea's Korea Start-up Center demonstrate how targeted funding, mentorship and innovation networks can address resource constraints and market-entry barriers. This aligns with OECD (2022) findings that comprehensive scale-up programs – combining capital access, skills development and market facilitation – yield better outcomes than isolated measures. As Borrás and Edquist (2013) and Edler and Fagerberg (2017) argued, innovation policy instruments must be embedded within governance frameworks to maximize impact, ensuring that public interventions are coherent and targeted to firm needs.

Empirical studies have explored the connections between institutional logic, institutional theory and firm behavior. Xin and Park (2024) analyzed data from 33 countries and discovered a positive correlation between the presence of large businesses and opportunity-driven entrepreneurship in high-income nations. They further found that, among various institutional factors, only supportive public policies for new firms and favorable social perceptions of entrepreneurs effectively promote opportunity-driven entrepreneurship. In contrast, no institutional factors were found to significantly influence necessity-driven entrepreneurship. Despite this, much empirical research remains concentrated on individual countries. Multi-country analyses like these are essential for determining whether the observed institutional effects are universally relevant or specific to particular countries. However, without multi-country samples and analyses, it is challenging to assess whether these impacts are universal or simply reflect the unique conditions of a specific country's context (Ahlstrom and Li, 2010).

The regulatory dimension has a dual role in SME scaling. Well-structured tax incentives and simplified compliance processes can promote investment and expansion (Blind, 2012). However, in some contexts, excessive complexity and punitive tax regimes act as significant barriers. In Brazil, SMEs often engage in "threshold avoidance," deliberately limiting growth to avoid higher tax burdens – a pattern consistent with Ojeka's (2011) and Fuentelsaz *et al.*'s (2018) findings on the negative growth effects of disproportionate taxation. In India, regulatory compliance remains a costly and time-consuming process, reinforcing the argument that streamlined administrative procedures are critical to enabling scaling in emerging economies. Innovation policy plays a decisive role in scaling technology-based SMEs, particularly when integrated with governance and regulatory strategies. The USA and

Japan provide evidence of how coordinated R&D funding, commercialization programs and technology transfer mechanisms can accelerate firm growth and global competitiveness. As Borrás and Edquist (2013) highlighted the design and combination of policy instruments – both demand- and supply-side – determine innovation system performance. This approach is particularly relevant for scale-up research, where governance, regulation and innovation systems interact dynamically (Balzano, *et al.*, 2025).

5.3 Comparative institutional insights

The synthesis suggests that countries exhibiting a coherent alignment between governance and regulatory systems tend to provide more supportive conditions for the scaling of technology-based SMEs. In contrast, countries with fragmented institutional arrangements face greater challenges due to tax-related constraints and limited policy coordination. These cross-country contrasts support the argument that institutional coherence, rather than the presence of isolated programs, determines the long-term scalability of technology-based firms. Table 3 provides an integrative overview of the institutional themes identified, highlighting both convergence and divergence in governance and regulatory practices.

Institutional alignment between governance and regulatory mechanisms enhances scaling outcomes. In contrast, fragmented or unpredictable regulatory systems constrain firm growth despite supportive governance initiatives. Countries where governance frameworks and regulatory systems are coherent and mutually reinforcing – such as the UK and South Korea – tend to achieve higher scaling capacity. In these contexts, targeted innovation policies, coordinated tax incentives and transparent regulatory procedures reduce uncertainty and provide firms with legitimacy and resource access. In contrast, countries characterized by fragmented or unpredictable institutional environments – such as Brazil and India – face persistent growth constraints. When governance programs and regulatory mechanisms operate in isolation, firms experience policy inconsistencies, administrative burdens and disincentives to expand, such as complex tax structures or regulatory volatility. These conditions discourage long-term investment, limit innovation and weaken the overall institutional support system. Alignment fosters stability, trust and cross-sector coordination, while fragmentation erodes predictability and constrains entrepreneurial dynamism.

Table 3. Cross-country overview

Common enabling mechanisms (all or most countries)	Key institutional differences across countries
Government-backed innovation and scale-up programs	*UK and South Korea:* Strong coordination between governance and regulation; targeted scale-up programs (breakthrough, K-Unicorn)
Access to venture capital and coinvestment schemes	*USA:* Market-driven environment with abundant capital but limited Central coordination
R&D tax credits or fiscal incentives for innovation	*Japan:* Focus on start-up promotion; emerging interest in scale-ups via commercialization programs
Collaboration between universities, firms and government agencies	*China:* State-driven governance and large-scale financial incentives; regulatory unpredictability remains
Policy initiatives linking innovation and entrepreneurship ecosystems	*India:* Strong accelerator ecosystem but heavy tax compliance burden
	Brazil: Institutional fragmentation and “threshold avoidance” due to progressive taxation

Source(s): Author’s own work

The comparative approach used here reflects the logic of institutional complementarity outlined by Hall and Soskice (2001) for cross-context theory building through multiple cases. Developed economies such as the UK and Japan exhibit mature institutional frameworks, where the focus is on incremental refinement and global expansion support. In contrast, emerging economies like Brazil and India require foundational reforms, including regulatory simplification, tax restructuring and capacity-building for innovation systems. Peng *et al.* (2009) emphasized that institutional transitions in such economies require context-specific sequencing of reforms. The study contributes to bridging the gap between theory and practice by linking institutional theory to actionable, context-specific policy recommendations. For developed economies, priorities include fine-tuning innovation ecosystems, expanding international market-access programs and embedding sustainability criteria in scaling policies. For emerging economies, policy should focus on reducing compliance costs, simplifying tax codes and building R&D infrastructure. Measurable indicators – such as scale-up graduation rates, export performance and reductions in regulatory processing times – should be embedded in program design to ensure accountability and adaptive policy learning. Table 4 synthesizes the findings by showing how governance, regulation and innovation interact with institutional theory to shape technology-based SME development.

Governance programs provide legitimacy and resources, regulatory regimes can either enable or constrain growth depending on design and innovation policy acts as a bridge linking institutions to firm-level outcomes. The evidence supports North's (1990) and Scott's (2014) view that institutions reduce uncertainty while also reflecting Bruton

Table 4. Institutional mechanisms and policy implications for technology-based SMEs

Research dimensions	Country cases	Theoretical rationale	Implications
Governance – innovation policies	UK: Breakthrough and scale-up program (coinvestment, market access); India: T-Hub (mentorship, networks); South Korea: Korea start-up center; Japan: Commercialization support program USA and Japan: coordinated R&D funding, commercialization pathways, technology transfer; UK: integration of innovation hubs with governance programs	North (1990) and Scott (2014): institutions reduce uncertainty; Hall and Soskice (2001): institutional complementarity; (Amoroso *et al.*, 2024): targeted high-growth support Borrás and Edquist (2013): instrument choice crucial; Edler and Fagerberg (2017): demand- and supply-side coherence; Zahra *et al.* (2014): contextualization enhances relevance	Tailored governance initiatives enhance legitimacy, provide funding and skills and facilitate internationalization. Policies should integrate mentorship, finance and innovation ecosystems to maximize scaling outcomes Coordinated instruments foster sustainable growth in technology-intensive sectors Indicators (e.g. export growth, scale-up graduation) should measure impact
Regulations – Taxes	Brazil: "threshold avoidance" due to tax burdens; India: complex compliance, penalties; China: regulatory unpredictability; UK: progressive tax deductions; USA/Japan: uneven tax benefits	Bruton *et al.* (2010): institutions both enable and constrain; Ojeka (2011), Fuentelsaz *et al.* (2018, 2019): taxation impacts growth; Blind (2012): regulation affects innovation	Simplified, transparent tax systems promote SME scaling; excessive complexity deters growth. Policy design must balance revenue needs with pro-growth incentives, ensuring predictability and reducing compliance costs

Source(s): Author's own work

et al.'s (2010) argument that they both enable and constrain entrepreneurship. Comparative insights highlight institutional complementarity (Hall and Soskice, 2001) and the need for context-specific sequencing of reforms (Peng *et al.*, 2009).

5.4 Limitations and future research

This study presents several important aspects and limitations related to data and the framework that merit attention:

- The study focuses on institutional dimensions at a macro level but does not account for firm-specific factors such as leadership quality, market strategies or industry differences.
- The comparative analysis may oversimplify country-specific nuances, such as cultural, political and economic factors influencing the effectiveness of institutional policies.
- The study does not account for the evolution of institutional policies over time. Programs that are nascent or under development may yield different results in the long term.
- Global macroeconomic conditions (e.g. economic downturns, geopolitical risks) and their impact on technology-based SMEs are not explicitly addressed in the study.
- While institutional dimensions are critical, the framework may overemphasize their role and underplay the importance of private sector dynamics, market forces and entrepreneurial agency.

However, more research is needed to assess the effectiveness of programs like tax incentives, subsidies and regulatory reforms in supporting technology-based SME growth. While studies often focus on external dimensions such as governance and regulations, internal triggers like strategic decision-making and innovation processes are important. The interaction between institutional constraints and entrepreneurial processes driving technology-based SME growth also requires further investigation. Sector-specific dynamics, such as resource needs and innovation capacities in high-tech versus low-tech industries, are often overlooked.

6. Conclusions

Where governance, regulatory and innovation dimensions work together, scale-ups benefit from a coherent support environment that fosters growth and resilience. Policy design must be tailored both to firm growth stages and to national institutional contexts. In advanced economies, emphasis should be placed on optimizing mature innovation ecosystems and supporting internationalization, while in emerging economies the focus must be on simplifying compliance, reforming tax structures and establishing foundational innovation capacities. Embedding clear performance metrics into policy frameworks is critical for ensuring sustainable impact. By translating institutional alignment into concrete and measurable strategies, governments can create enabling environments in which technology-based SMEs thrive, generate employment, drive innovation and contribute to broader societal and economic development.

Institutional approaches vary significantly across countries: Developed economies (e.g. UK, USA) focus on advanced governance programs and technology-driven initiatives. Emerging economies (e.g. India, Brazil) emphasize foundational infrastructure and regulatory reforms but often lack technology-based SME-specific policies. These variations highlight the importance of tailoring institutional support to the local business environment.

However, institutional challenges can hamper growth: Regulatory inefficiencies, such as complex tax systems in India and threshold avoidance in Brazil, discourage scaling efforts. Inadequate focus on scale-ups (e.g. Japan's lack of dedicated scale-up programs) reflects institutional gaps that limit growth opportunities. The findings validate key tenets of institutional theory where isomorphic tendencies (e.g. adoption of accelerator models across nations) may demonstrate global learning and regulatory and governance structures legitimize firms, mitigating risks and uncertainties in the scaling process.

Governance programs and regulatory policies are critical for technology-based SME scaling. Developed economies prioritize advanced governance, while emerging economies focus on foundational reforms. Key recommendations include:

- targeted governance programs tailored to firm growth stages;
- streamlined tax systems to encourage scaling; and
- enhanced collaboration between government, private sectors and financial institutions.

Governance programs, innovation policy and regulations play crucial roles in enabling firms to overcome growth barriers by providing access to financial resources, mentorship, tax and legitimacy. However, the performance of technology-based SMEs is contingent upon the alignment between institutional support and firm needs at the growth stage.

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