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Systematic Review of Technology Incubation, Value Chain and Scaling: Emerging Trends in Distribution and Logistics

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Abstract

Purpose: This study conducts a bibliometric analysis and systematic review of literature in the Scopus database (up to May 2025) on the relationship between technological incubation, value chains, and startup scaling. It explores how these processes affect distribution systems, logistics, and trade flows, enabling startups to access markets and accelerate growth. **Research design, data and methodology:** The study applies a descriptive documentary method, identifying key terms related to innovation, value generation, and business expansion. Bibliometric data exported from Scopus were analyzed using the Bibliometrix R package and VOSviewer. **Results:** The review identified 152 publications between 1997 and 2025. The United States (30), United Kingdom (24), Italy (12), Australia (11), and Germany (11) contributed 37% of the output. Thematic and co-occurrence analyses revealed seven research clusters, with core terms such as "value creation," "ecosystem," "entrepreneur," and "distribution," and emerging keywords like "supply chain," and "business models" indicate a strategic shift toward studying how incubation and logistics integration enhance startup competitiveness and global value chain participation. **Conclusions:** Findings highlight that successful incubation requires embedding startups in networks that include logistics providers and trade actors. Strategic policy support for tech incubation and distribution capacity—seen in regions like China and Taiwan—can drive globally competitive industrial clusters.

Keywords: Technological Incubation, Value Chain, Scaling, Logistics, Distribution, Systematic Review.

JEL Classification Code: L16, O32, O33, Q55, R11

1. Introduction

Over the past several decades, the settings where ideas are produced have undergone notable change. Driven by the appearance and founding of new companies among ever more complex technological developments, this can be seen as a basic change. Changes in strategic viewpoints, harmony across the value chain, and technological developments all help to explain this growth. These things are often studied separately, but when you look at them all together, you can see how important they are. These factors not only work synergistically but also help us to know more about how startup settings change and how entrepreneurs manage uncertainty in the larger context (Ravichandran & Dixit, 2024). Still, even though they have similar ideas, academic study has tended to split them. This has led to policy models

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that, while they mean well, don't always take into account how they are interacting in a structured way.

As things change, logistics, transportation networks, warehousing, and trade facilitation have become very important for startups to be able to handle the early stages of growth (Aryee & Hansen, 2022). Incubation isn't just about helping people think of new products and get better at what they do. It's also about giving businesses access to logistics infrastructure that is flexible and works well. When new businesses can't find reliable ways to get their products to customers, they often have trouble getting into the market, keeping track of their inventory, and filling customer orders. These problems are even worse in industries that move quickly or depend on just-in-time delivery. Adding trade and logistics strategies to incubation models can have a big effect on how long it takes to get to market (Wagner, 2021), how many customers can reached, and how strong the supply chain is.

Take incubation, for instance. These days, incubation systems like accelerators and science parks are more than just temporary places for new ideas to stay alive (Su et al., 2018). They are also places where knowledge is shared, credibility is built, and strategies are aligned. These places no longer just welcome creativity; they now plan it. As innovation cycles get shorter and market conditions change very quickly, the incubator's job has changed. Offering office space and sporadic mentoring is no longer enough; today's incubators have to match their internal logics with more general ecosystemic dynamics, therefore raising still underexplored issues regarding the developing governance systems needed to preserve coherence across entrepreneurial value chains (Mikhailov et al., 2024).

Simultaneously, global value chains (GVCs) have emerged as both opportunity and constraint. They enable high-potential startups to integrate into wider economic architectures, granting access to markets, technologies, and collaborative platforms. Yet, this integration is neither automatic nor evenly distributed. The conditions that enable or inhibit GVC participation are often entangled with institutional capacity, sectoral maturity, and what might be called "ecosystem permeability." Startups in early incubation face a harsh reality: well-established companies with capital advantage and deep-rooted networks control these chains, leaving newer entrants to struggle with high entry hurdles and low negotiating power (Kansheba et al., 2024). One should emphasize again that a value chain's very existence does not ensure inclusion.

The third pillar—scaling—often ends up being treated as the ultimate proof of entrepreneurial maturity. But to reduce it to a simple spike in revenue or a ballooning headcount is, frankly, to miss the forest for the trees. Scaling is, in many respects, a far more layered and temperamental affair. It touches on governance realignments, tweaks in operational infrastructure, shifts in strategic focus, and—quite crucially—the ability to learn and adapt on the go (Felzensztein & Bagheri, 2024). In high-tech contexts especially, the process can be chaotic, like steering a car while building the engine. Firms are under pressure to iterate fast, yet they can't afford to be brittle; without the scaffolding of internal cohesion, rapid growth risks implosion. So, if there's anything the literature underscores, it's that successful scaling is not a question of good fortune, nor is it a smooth, linear progression. It is about navigating the fine, and often messy, line between flexibility and organizational resilience.

What's interesting lately—and arguably long overdue—is how recent academic discussions are starting to move away from isolated analyses of growth, innovation, or value chains. Instead, there's a growing push to treat these elements as part of an interconnected puzzle. A kind of living ecosystem, if you will, where each piece feeds back into the others. Ibeh et al. (2025), for example, argue that startups with more robust post-incubation outcomes tend to emerge from incubators that intentionally design their support systems around the broader value chain—not just the individual firm. That insight might seem intuitive, but it carries weight: early integration into supply networks can enhance a firm's absorptive capacity, paving the way for more sustainable scaling (Tang et al., 2019).

It's worth pausing here to reflect. These findings—though not groundbreaking on their own—gain strength when viewed together. There's an old tendency in both research and policy to separate the "why" from the "how," to isolate causes like nodes in a flowchart. But the reality on the ground rarely plays out so neatly. Instead, what's becoming increasingly apparent is the need to investigate these dynamics as overlapping and mutually reinforcing. In practice, failing to do so might mean missing the very mechanisms that allow startups not just to grow, but to scale wisely.

Furthermore, distribution dynamics play a pivotal role in the broader configuration of value chains and the feasibility of scaling. Logistics capabilities—such as cold chains, last-mile delivery solutions, or cross-border trade interoperability—are increasingly seen as competitive enablers, particularly for startups attempting to scale beyond local markets (Shayganmehr et al., 2024). The ability of a startup to pay for shipping, follow customs rules, and work with trade intermediaries is often what makes it possible for it to grow from an idea to a real business. These distribution skills are more than just operational problems; they are strategic assets that affect how happy customers are, how confident investors are, and how likely it is that the company will go global. This means that research into incubation models needs to look at the legal and physical ways that value is delivered, not just how it is made (Tang et al., 2021).

When this link is observed through the lens of emerging countries, where weak institutions and uneven infrastructure often make the effects of business failure even worse, it becomes even more important. A study by Mikhailov et al. (2024) on a different topic emphasizes the need of micro-governance systems for development networks. This suggests that simpler decision-making at the local neighborhood level leads more flexibility. Kansheba et al. (2024) also offer strong proof that a configurational approach combining formal management with informal teamwork is the best way to connect value chains by using integrated knowledge systems to involve people all around the world. There is a growing agreement that strict policy templates do not travel well.

Add to this the quickening impact of digital technologies, the paradigms brought by Industry 4.0, and the rising demands to integrate sustainability and circularity into corporate models; the image becomes even more complicated. Startups nowadays are expected to not only grow but also grow sensibly. This demands that incubators revise their support logic, that value chains become more inclusive, and that entrepreneurs recalibrate their growth imperatives beyond profit maximization alone (Jha et al., 2022). In the wake of the COVID-19 pandemic, such pressures have only intensified, revealing both the brittleness and the adaptability of innovation systems worldwide.

Given the multifaceted nature of this domain, there is a clear rationale for moving toward synthetic frameworks that account for the interdependencies at play. Yet, as of this writing, comprehensive empirical treatments that map the interactions between incubation, value chains, scaling, and distribution systems remain limited. Prior research often treats these elements in isolation, overlooking how logistics infrastructures and consumption values jointly condition entrepreneurial outcomes. This study addresses that gap.

Accordingly, we adopt a dual-method approach—combining bibliometric analysis with a systematic literature review—to identify dominant scholarly clusters, evolving theoretical paradigms, and underexplored intersections. The aim is twofold: first, to chart the intellectual landscape of the field by identifying influential texts, citation trajectories, and key thematic constellations; and second, to qualitatively synthesize how incubation, value chains, and scaling strategies manifest across sectors, geographies, and institutional settings. This combination captures both the evolution of academic discourse and the practical mechanisms shaping entrepreneurial ecosystems.

The unique contribution of this article lies in integrating logistics and distribution as critical components of incubation effectiveness and scalability. We argue that emerging consumption values—such as speed, ethical sourcing, and traceability—are not just market preferences but strategic variables shaping access to value chains and scalability potential. By reintegrating fragmented streams of thought into a cohesive analytical framework, this study offers novel theoretical insights and practical implications for policymakers, incubator designers, and entrepreneurs alike—especially in resource-constrained environments marked by volatility and latent potential.

2. Theoretical Framework

2.1. Technology Incubation

In today's entrepreneurial landscape, technology has taken center stage—especially in fields driven by relentless innovation and a constant need to adapt to evolving consumer values. These values, it should be noted, are no longer limited to product quality or price points. They now include things like speed, openness, ethical sourcing, and sustainability. In this changing landscape, incubation has changed in a quiet way. It used to be just about giving startups office desks and mentoring sessions, but now it's a strategic framework that lets them build logistics skills, distribution readiness, and even market entry strategies right into their early development DNA.

It's interesting that the ecosystem around innovation has become more complex and layered, almost baroque. As Ravichandran and Dixit (2024) point out, a wide range of support systems, such as accelerators, university-linked hubs, science parks, and invention centers, now act as adaptive intermediaries. These entities lower the threshold for market participation by offering not only hard assets like seed funding and lab access, but also soft infrastructure: networks, strategic alliances, and institutional trust. Su et al. (2018), drawing on empirical work in China, go a step further. They talk about hybrid models that mix digital platforms with physical labs and collaborative spaces. This mix encourages both flexibility and experimentation, especially in crowded innovation corridors.

The talk has also turned in on itself. Instead of just listing what incubators do, researchers are starting to look into how these systems really work. Mikhailov et al. (2024), for example, studied micro-governance in depth. Their results show that the whole network gets stronger when power is shared among mentors, founders, and institutional partners. When each actor in the ecosystem does well, it builds trust, makes it easier to get funding, and gives the ecosystem more credibility. Theodoraki et al. (2022) also write about the interesting idea of "co-opetition." It might seem strange, but when competitors work together, whether in the same incubator or across connected hubs, they can share more information and be more adaptable.

Tang et al. (2019) add a time element and shift the focus to incubators that are part of longer value chains. Their case study of Chinese innovation networks shows that incubators that are clearly connected to both upstream research and downstream market integration get better, longer-lasting results. An incubator isn't just a place to start a business; it's also a part of a huge network of logistics and manufacturing that can help startups go from idea to market without losing speed.

When you look at all of these contributions together, you can see a bigger trend. Incubation systems are no longer separate units. They're becoming strategically embedded platforms that are linked to supply chains, value flows, and market rhythms. Even though scholars are paying a lot of attention to governance models and institutional frameworks, one part of the puzzle that hasn't been studied enough is motivation.

What's notably missing is a deeper look at how motivational drivers—think sustainability goals, time-to-market pressures, or commitments to ethical distribution—shape the success or failure of these incubation models. Do these values alter how startups scale? Do they affect the logistics hurdles they're prepared (or ill-prepared) to face? These questions remain, for the most part, unanswered. And that's a gap worth closing, especially now, when distribution agility and ethical alignment aren't just desirable—they're fast becoming non-negotiable in many sectors.

2.2. Value Chain

A lot of the old writing about value chains has been about how companies and regions work together to make and move things around. This is like a dance of who makes what, where, and how it moves. That being said, newer points of view have started to broaden the focus to include not just established players but also how startups—who often have limited resources and are trying to figure out how to navigate these complicated, multilayered chains—might find their way in. One such contribution comes from Kansheba et al. (2024), who argue that successful integration into global value chains (GVCs) hinges on access to what they call "enabling infrastructure": a triad of up-to-date technologies, institutional support, and a coherent strategic direction. They stress that you shouldn't assume that this kind of integration is common or easy, because it's not. Instead, it comes about through a kind of ecosystemic collaboration, where different sectors work together, share their skills, and sometimes build something that is stronger than the sum of its parts. This is a very important point in fields that are growing quickly and are full of new ideas, where being able to change your mind is important and relying on other people is often the only way to stay alive.

Reis et al. (2022) say that the Singaporean government keeps a close eye on the meat industry and the changes that are happening in global value chains and local business networks. Companies that work in places that not only allow but also encourage experimentation, thanks to innovation networks and clear rules, are much better at using global supply chains to make money over the long term. They stress how important it is to get along with people, no matter where they are. People think that personal relationships are just as important as work relationships when it comes to sharing technology and best practices. These tips are useful for new businesses that want to get into tough fields like food safety or agritech, where rules are strict and making a mistake can cost a lot of money.

Berg and Mitra (2022) look at Korean high-tech social projects from a wider socio-technical point of view. Their research points to a strange path: instead of copying the big players, smaller companies can find their own niche by following moral and environmental values. These companies can get to parts of the value chain that most businesses can't because they use clear, eco-friendly models. These are niche markets, but they are becoming more valuable as more people want to buy brands that have a story and a purpose.

Aljaaidi (2025) talks about how supply chains work in Saudi Arabia and makes it clear that companies don't always do better when they change their logistics strategies. It's interesting that the focus is not just on how well things work, but also on the governance mechanisms, which are the internal rules, feedback loops, and decision-making structures that control how value moves through the system. This means that by improving their logistics, startups can get better at competing in even the most difficult fields.

When you look at all of these different studies together, they show how startups might move through—and sometimes change—the landscape of modern value chains. There's an underlying thread connecting them: consumer values like speed, visibility, and ethical sourcing are not just post-sale preferences; they are upstream variables that shape access, credibility, and integration into distribution-intensive ecosystems. And yet, one area remains comparatively under-theorized: how exactly these shifting values interact with incubation and scaling mechanisms. This lack is especially noticeable because logistics infrastructure is not the same in all areas. Fixing this conceptual blind spot could help us understand how startups manage to not only survive, but also open up markets that were previously out of reach by including logistical know-how in their early plans.

2.3. Technology Scaling

Scaling—often hailed as a hallmark of entrepreneurial success—has evolved into something far more layered than

the straightforward leap from small beginnings to big revenues. In both well-established economies and those still forging their industrial paths, the notion of scaling now carries connotations that stretch beyond raw growth. People are starting to see it less as a straight line and more as a kind of adaptive maneuvering: a negotiation with institutional barriers, uneven infrastructure, and quickly changing consumer expectations.

Felzensztein and Bagheri (2024) make this point even more clear when they look at startups that are on the edge, either geographically or structurally. These businesses often don't have access to strong formal systems, so they have to come up with their own ways to grow. What comes out is a patchwork of regional partnerships, flexible public-sector support, and small-scale innovation—tools that help entrepreneurs fill in the gaps in the system. It's interesting to note that logistics comes up as a kind of hidden framework in these models. The optimization of distribution infrastructure is a key factor in enabling sustainable growth without skyrocketing costs. This can be done through better transportation solutions, more flexible last-mile delivery setups, or the use of digital warehousing.

At the same time, Ibeh et al. (2025) point to the healthcare sector in emerging markets as a good place for what they call "platform-oriented scaling." Digital platforms not only provide services here, but they also help to coordinate customer needs, the flow of goods, and data-driven responsiveness. These systems aren't just about making things run more smoothly; they also reflect changing consumer values, like being able to get things when you need them, trusting that they will be delivered, and being able to reach remote or underserved areas. Putting together logistics and consumption values becomes a way to compete.

Audretsch et al. (2023) give a wider view by saying that long-term success, especially in high-tech businesses, depends on a multidimensional alignment. In this view, growth isn't just about speed; it's also about coordinating capital, know-how, market intelligence, and logistical flexibility. What's more, they frame this orchestration as contingent on external shifts: regulatory changes, demographic pressures, and of course, technological disruption. Growth becomes less a finish line and more a capacity to adapt in real time.

Expanding this discussion into the environmental realm, Klofsten et al. (2024) introduce the idea of "circular scaling." This concept reframes expansion around the logics of sustainability. Through methods like reverse logistics, localized resource loops, and pared-down packaging systems, startups embedded in circular economy frameworks are demonstrating that growth need not be extractive or exclusionary. Instead, it can be restorative, responding not only to market demand but also to ecological limits.

All of this points to a big change: scaling is no longer just a result; it's a skill that comes from a mix of economic drive, practical infrastructure, and values-based alignment. As consumers become more concerned with ethical sourcing, real-time access, and carbon footprints, the startup that does best is the one that grows not only faster but also smarter and, most importantly, in line with the world it lives in.

2.4. Logistics, Distribution and Trade Implications

Logistics, trade, and distribution systems are things that are often overlooked in early-stage venture talks, but they are now very important for both how startups grow and whether they grow at all. These infrastructures are no longer just background support; they are now at the center of strategies for incubation and scaling. "Distribution readiness" used to be a competitive advantage for a business, but now it's more like a basic requirement for survival in many fields. It means being able to manage stock levels, meet delivery deadlines, and deal with the red tape of exporting.

Tang et al. (2019) say that incubators that are directly connected to longer innovation chains tend to do better when it comes to commercialization. Why? They don't just give you advice or space to work; they also help with product development, logistics integration, and getting into the market. So perhaps the real measure of an incubation model isn't just how well it mentors entrepreneurs or sparks innovation, but also how deeply it's embedded in the logistical networks that make distribution feasible in the first place.

Today's startups are navigating a landscape defined by digital inventory dashboards, algorithmically controlled warehouses, and international trade systems that can shift overnight. In this setting, the ecosystem's logistical maturity—like last-mile delivery capabilities, customs predictability, and real-time freight tracking—can have a big impact on a startup's costs and how quickly it can get to market. Reis et al. (2022) and Berg & Mitra (2022) both show how important this is. Firms that are part of transparent, ethically managed distribution networks don't just perform better—they also tap into a growing class of consumers who care where their goods come from, how they're shipped, and whether that entire process is accountable. In a sense, supply chains are becoming part of the product.

Now, from a conceptual angle, what's striking here is the moderating role logistics plays in the transition from incubation to scaling. It's not just about growth anymore; it's about how that growth is structured, paced, and sustained.

Logistical scalability—the capacity to grow a distribution footprint without exploding complexity or cost—is emerging as a decisive factor. Felzensztein and Bagheri (2024) say that startups in areas with few resources rely heavily on digital logistics tools to get around gaps in infrastructure. Klofsten et al. (2024) build on that by introducing "circular scaling," a model that includes environmental goals directly into logistics through local resource loops, reverse supply flows, and practices that minimize waste. It's not a stretch to say that such models offer a preview of how future-ready scaling might look.

What this all points to is a shift in how startup potential should be evaluated. Logistics and distribution aren't secondary concerns anymore; they are embedded indicators of scalability, alignment with consumer values, and ecosystem maturity. A venture's ability to plug into ethical, fast, and flexible distribution chains says as much about its future as its pitch deck does. The present analysis, then, contributes to the broader conversation by reframing logistical infrastructure—not merely as an operational concern, but as a conceptual lens for rethinking how incubation ecosystems translate raw entrepreneurial energy into ventures capable of scaling beyond their local context.

It's true that more research is needed, especially in places where the logistics landscape is still broken or uneven, like in many developing economies. These environments are very hard to work in, but they might also be good places for new ideas to grow, because of the limits they put on people. That's something that needs to be looked at in more detail.

2.5. Theoretical Model: a Complex Adaptive Systems Approach to Literature Synthesis

Given the methodological orientation of this research—anchored in systematic review, bibliometric analysis, and thematic mapping—this study adopts a Complex Adaptive Systems (CAS) framework to interpret the identified knowledge patterns and conceptual interlinkages. The use of tools such as Bibliometrix (R), Excel, and VOSviewer enabled the detection of thematic clusters, keyword co-occurrences, and structural centrality of concepts such as "entrepreneurial ecosystem," "value creation," and "supply chain." These analytical structures resonate with the CAS model, which conceptualizes innovation ecosystems as evolving networks of diverse, interdependent agents that adapt over time through feedback loops, selection pressures, and resource recombination (Cao and Shi, 2021; Pigola et al., 2025).

By aligning CAS theory with bibliometric visualization, this research frames incubation systems, value chain integration, and scaling pathways not as linear sequences but as co-evolving components within a dynamic entrepreneurial ecosystem. The thematic clusters revealed in Figures 6 through 8—such as those relating to logistics, sustainability, and digital distribution—are interpreted as manifestations of adaptive behavior within the system. For instance, the emergence of "logistics" and "supply chains" alongside "innovation" and "entrepreneurship" reflects an ecosystem's shift toward integration of trade infrastructure as a strategic dimension of startup support (Ramakrishna et al., 2025; Aryee and Hansen, 2022).

This systems-oriented interpretation is reinforced by the presence of high-centrality but low-density themes (e.g., "entrepreneurial ecosystem," "value creation") on the thematic map (Figure 8), suggesting foundational yet still developing fields. CAS helps explain this imbalance as a signal of ongoing structural evolution rather than conceptual weakness. In this sense, bibliometric centrality is treated analogously to a system's attractor basin—areas of high interaction that channel adaptive behavior across the network (Alvarado, 2016; Barik and Jena, 2021).

Supplementing the CAS framework, the Resource-Based View (RBV) adds granularity by providing a firm-level lens on how startups accumulate and deploy strategic resources such as distribution capabilities, digital platforms, and institutional legitimacy. The work of Audretsch et al. (2023) and Aggarwal and Kashiramka (2025) supports this interpretation, emphasizing that entrepreneurial performance emerges from the orchestration of tangible and intangible assets within competitive environments.

Finally, Actor-Network Theory (ANT) is employed to conceptually capture the hybrid nature of the ecosystems mapped in this review. ANT emphasizes that agency within entrepreneurial systems does not reside solely in human actors but is distributed across sociotechnical networks that include digital supply chains, trade regulations, infrastructure nodes, and platform technologies. Insights from Azima et al. (2025) and Shayganmehr et al. (2024) align with this view, particularly in their attention to logistics systems, soft infrastructure, and cross-sectoral connectivity as drivers of entrepreneurial navigation through regulatory, cultural, and technological layers.

This triadic theoretical model—CAS for ecosystemic interpretation, RBV for firm-level strategic resource mapping, and ANT for socio-technical integration—offers a robust scaffold for interpreting bibliometric findings. It ensures that the literature review is not merely descriptive but analytically coherent, linking visual patterns in the data with systemic dynamics, actor relationships, and strategic imperatives. By combining structured review methods (e.g., PRISMA protocol, Page et al., 2021) with theory-driven interpretation, this study provides a foundation for both academic inquiry and actionable insight into the evolving architecture of technology incubation and value chain integration.

3. Research Methods and Materials

This study employed a systematic review methodology guided by the PRISMA 2020 framework (Page et al., 2021), ensuring methodological transparency, replicability, and rigor. The literature review focused on understanding the intersection between technology incubation, value chains, and scaling mechanisms within entrepreneurial ecosystems.

3.1. Database and Search Strategy

The Scopus database was selected for its broad disciplinary coverage and indexing quality. The search encompassed all publications up to May 2025, using a set of standardized keywords designed to capture the conceptual landscape of technology incubation and value chain integration. Table 1 outlines the keyword descriptors applied.

Table 1: Keyword Standardization.

Variable	Descriptor
Technology Incubation	"Technological Incubation", "Startup incubator", "Entrepreneurial ecosystem", "Technological entrepreneurship", "Emerging companies"
Value Chain	"Supply chain", "Value creation", "Competitive advantage"

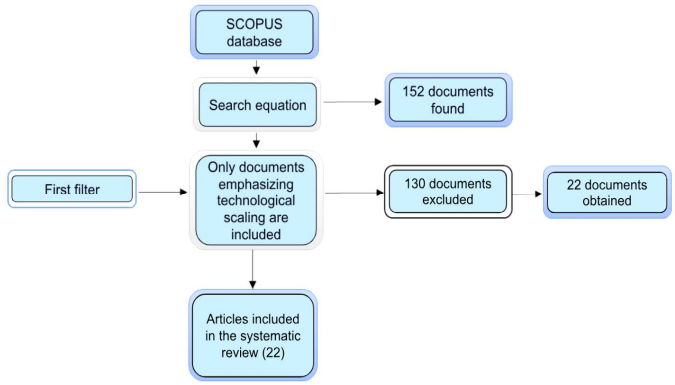
Source: Ramírez et al. (2025).

The search strategy implemented was structured using the following equation: "(TITLE-ABS-KEY("Technology Incubation") OR TITLE-ABS-KEY("Technological Incubation") OR TITLE-ABS-KEY("Startup incubator") OR TITLE-ABS-KEY("Entrepreneurial ecosystem") OR TITLE-ABS-KEY("Technological entrepreneurship") OR TITLE-ABS-KEY("Emerging companies")) AND (TITLE-ABS-KEY("Value Chain") OR TITLE-ABS-KEY("Supply chain") OR TITLE-ABS-KEY("Value creation") OR TITLE-ABS-KEY("Competitive advantage"))".

This query yielded 152 initial records published between 1997 and 2025. The selection aimed to capture literature that reflects how technological incubators drive value chain optimization and influence the scalability of startups, with subtle inclusion of logistics-related themes through descriptors such as "supply chain" and "competitive advantage".

3.2. Screening and Inclusion Criteria

Following PRISMA guidelines, documents were screened through title, abstract, and full-text review. Studies were excluded if they did not address interactions between technological incubation and value chain mechanisms, or if they were duplicates, editorials, or lacked peer review. After the screening process, twenty two documents were retained for in-depth synthesis. Figure 1 presents the PRISMA flow diagram.



Source: Ramírez et al. (2025).

Figure 1: Matrix Prisma,

3.3. Data Analysis Approach

In the data analysis process, a two-stage strategy was implemented to ensure a comprehensive understanding of the literature. The first stage involved a bibliometric analysis, where data were exported in CSV format from Scopus and analyzed using Excel, the Bibliometrix package in R, and VOSviewer. These tools facilitated both performance analysis—such as identifying publication trends and citation metrics—and science mapping, which included exploring patterns of co-authorship and the co-occurrence of keywords. The goal of this stage was to uncover the main patterns of publication, the intellectual structure of the field, and key thematic areas (Donthu et al., 2021; Cobo et al., 2011).

The second stage consisted of a thematic synthesis aimed at interpreting the qualitative findings from the twenty two studies selected for in-depth review. Each article was coded using a structured matrix, and themes were identified inductively based on three analytical dimensions aligned with the theoretical framework: technology incubation mechanisms, value chain integration strategies, and scalability through logistics. The process began with open coding to identify initial concepts, followed by axial coding to group similar ideas and uncover overarching themes. Common themes such as "digital platforms," "governance mechanisms," "infrastructure gaps," and "distribution agility" were central in this analysis. These thematic findings were then compared with the visual representations generated through bibliometric tools, providing triangulated insights that strengthened the reliability of the conclusions.

3.4. Integrative Synthesis Strategy

In constructing the search strategy, particular attention was paid to capturing the growing relevance of logistics-

related themes in the entrepreneurial and innovation literature. Terms such as "supply chain" and "competitive advantage" were deliberately included to subtly reflect concerns around trade efficiency, product movement, and scalable distribution. These terms, commonly used in business and management discourse, point to a deeper recognition that logistical systems—such as digital supply chains, trade facilitation mechanisms, and transportation infrastructure—are critical enablers of incubation and value creation.

The bibliometric analysis drew on data exported from the Scopus database in CSV format and was processed using specialized tools including Excel, the Bibliometrix package in R, and VOSviewer. These tools facilitated the identification of publication patterns, relational structures, and thematic concentrations within the academic literature (Donthu et al., 2021). Notably, VOSviewer enabled the visualization of thematic clusters that revealed recurring concerns with distribution networks, supply-side efficiency, and logistical innovation. The presence of these clusters reinforces the notion that the scalability and sustainability of technology-driven startups are strongly tied to how well they integrate into and optimize broader distribution and value chain systems.

To further deepen the analysis, an integrative synthesis strategy was applied that combined the bibliometric and thematic results within a narrative framework grounded in the study's conceptual model. This hybrid approach—merging quantitative science mapping with qualitative thematic clustering—offered a more robust interpretation of the literature. It illuminated how incubation systems evolve, adapt, and scale through strategic engagement with value chain processes and logistics innovation. Special emphasis was placed on understanding the adaptive functions of distribution infrastructure and trade systems in supporting entrepreneurial expansion, particularly in emerging markets (Ramakrishna et al., 2025; Aryee & Hansen, 2022). This integrative view underscores the multidimensional interplay between technology, logistics, and entrepreneurial growth, as revealed through both macro-level bibliometric trends and micro-level thematic insights.

4. Results

Based on the indicators explained, the number of published articles, the most productive authors, the temporal evolution of the sources, as well as the institutions and countries with the greatest scientific contribution in the area were evaluated. A summary of the general characteristics of the selected documents is presented in Table 2.

Table 2: Main Information of the Data Obtained from Scopus.

MAIN INFORMATION ABOUT DATA	
Timespan	1997:2025
Sources (Journals, Books, etc)	121
Documents	152
Average years from publication	4,49
Average citations per documents	26,24
Average citations per year per doc	3,73
References	9070
DOCUMENT TYPES	
article	98
book	5
book chapter	19
conference paper	21
conference review	2
review	7
DOCUMENT CONTENTS	
Keywords Plus (ID)	368
Author's Keywords (DE)	518
AUTHORS	
Authors	391
Author Appearances	421
Authors of single-authored documents	25
Authors of multi-authored documents	366
AUTHORS COLLABORATION	
Single-authored documents	26
Documents per Author	0,389
Authors per Document	2,57
Co-Authors per Documents	2,77
Collaboration Index	2,95

Source: Ramírez et al. (2025).

Covering the years 1997 to 2025, Table 2 summarizes the key features of the 152 examined papers. Of this group, 64% are articles in scientific journals, 14% are conference papers, 12% are book chapters, and the other 10% are various other publications.

The goal of a bibliometric output analysis was to find out how many papers were important to the study and how they changed over time. This study was based on three important bibliometric measures: the reference rate, the publication impact factor, and the trends of interaction between authors and institutions. All of these showed how important and shaped study is in the area (Hicks et al., 2015).

4.1. Laws of Bibliometric Productivity

Since they provide data on the number of publications and the influence produced by research, activity indicators are crucial to track the quantitative expansion of scientific production. Lotka's Law, in this context, defines the distribution of author productivity as a small group of researchers generates most of the works while the bulk

publishes little output (Barik and Jena, 2021). This law lets us see the uneven dynamics in the creation of knowledge inside a discipline.

Since most of the writers (365, or 93%) have only made one contribution, Table 3 clearly demonstrates the use of Lotka's Law. On the other hand, 23 authors (5.9%) have published two works, while only 2 authors (0.5%) have three contributions. Finally, only one author (0.3%) has published four articles. This pattern reveals that the majority of publications come from researchers with occasional or temporary participation in the study area, reflecting a limited concentration of constant scientific production within the field.

Table 3: Lotka's Law

Written documents	No. of Authors	Ratio of authors
1	365	0,934
2	23	0,059
3	2	0,005
4	1	0,003

Source: Ramírez et al. (2025).

Bradford's Law describes how the production of scientific articles in a specific area is very unevenly distributed among journals: a small core group of publications concentrates the majority of relevant work, while a large number of journals contain only a few significant articles. This principle is useful to identify the most important and productive sources within a discipline (Alvarado, 2016). Table 4 shows the practical application of this law, where 34.21% of the articles are grouped in the first 21 journals, which make up the primary or core zone according to Bradford, and which represent the main sources of scientific production on the topic analyzed.

Within the main core of journals, the first five stand out especially, concentrating 38% of the total publications in zone 1. As shown in Figure 2, these journals are: Small Business Economics, Sustainability (Switzerland), International Journal of Entrepreneurial Behavior and Research, Chinese Management Studies and International Small Business Journal: Researching Entrepreneurship.

This pattern of bibliographic concentration is aligned with what is described by Bradford's Law, which states that a small number of sources brings together the majority of significant scientific production. This allows the most influential and specialized publications within the field of study to be identified more clearly (Manterola et al., 2024).

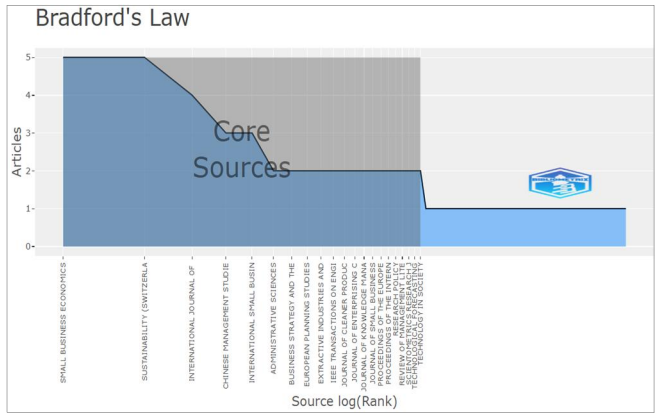
Table 4: Bradford's Law

Zone	No. Journals	No. Titles	Percentages
Zone 1	21	52	34,21%
Zone 2	50	50	32,89%
Zone 3	50	50	32,89%

Source: Ramírez et al. (2025).

An article published in the journal Small Business Economics proposes a comprehensive and weighted framework to assess the health and performance of entrepreneurial ecosystems in emerging economies, such as India, identifying key factors such as the availability of financing, infrastructure, entrepreneurial culture and education, and highlighting innovation as a crucial mediator (Cao and Shi, 2021).

Following the previous line, another publication studies the combination of corporate entrepreneurship (CE) and supply chain management (SCM) strategies significantly improves the performance of manufacturing companies (Aljaaidi, 2025). The study demonstrates that specific dimensions of CE, such as innovation and the creation of new businesses, together with effective SCM strategies, contribute in a complementary way to operational efficiency and competitive advantage. Another article addresses the key challenges that mature entrepreneurial ecosystems face in aligning around a new value proposition based on the circular economy, including a lack of shared understanding of the concept, diverse circular value creation strategies, insufficient support for new circular companies and little interaction between specialists and generalists (Manninen et al., 2018).

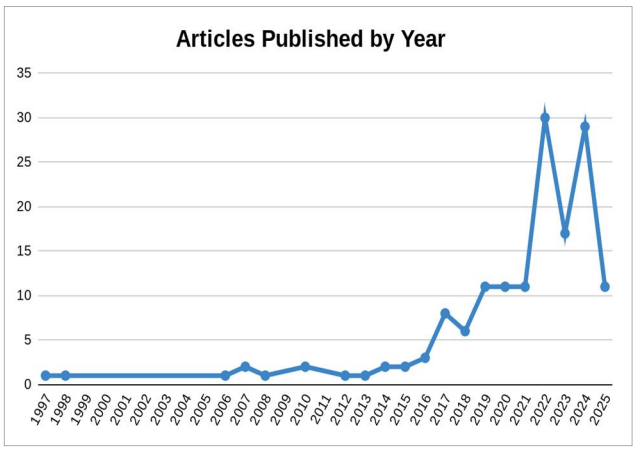


Source: Ramírez et al. (2025).

Figure 2: Bradford's Law

4.2. Bibliometric Indicators

Figure 3 highlights the years 2021 (N=11), 2022 (N=30), 2023 (N=17), 2024 (N=29) and the period after 2025 (N=11) as periods of notable increase in publications on the research topic. These years account for 64% of the total scientific production in this field, evidencing an upward trend that reached its highest point in 2022, the year with the highest number of articles published.

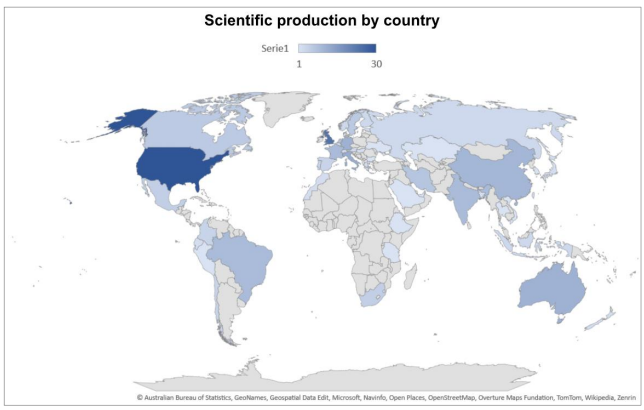


Source: Ramírez et al. (2025).

Figure 3: Annual Scientific Production

A geospatial analysis was carried out with the objective of identifying the countries with the greatest contribution to the development of the topic investigated. Figure 4 shows a map in which the intensity of the blue color indicates the volume of publications: the greater the intensity, the greater the number of contributions. The United States (N=30), the United Kingdom (N=24), Italy (N=12), Australia (N=11) and Germany (N=11) stand out, which together represent 37% of the total documents published in this field. It should be noted that, due to the collaborative nature of many investigations, several countries participate in the same publication, which is why the analysis included a total of 235 documents.

This type of geographic analysis is key to understanding the global distribution of scientific knowledge and the dynamics of international cooperation, as well as to detect regions with high academic productivity and strategic areas for strengthening research networks (Chinchilla-Rodríguez et al., 2009).



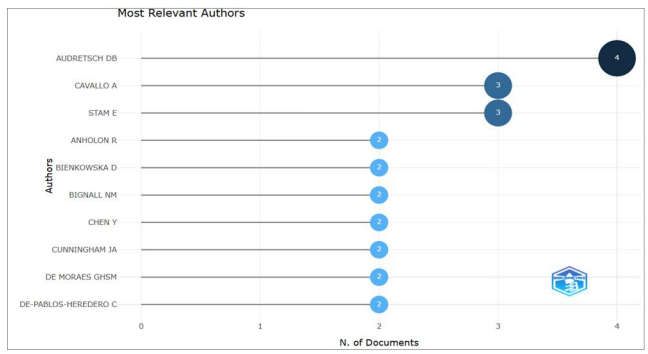
Source: Ramírez et al. (2025).

Figure 4: Scientific Production by Country,

Articles published in the United States focus on value creation, studying the different configurations of the entrepreneurial ecosystem. These configurations vary depending on the input and output structure, geographic scope, improvement process, and forward and backward participation in the chain; and how these drive various activities in global value chains, offering a more precise understanding of how these ecosystems support the development and dynamics of these chains worldwide (Audretsch et al., 2023).

In this same sense, collaboration within entrepreneurial ecosystems is built through a multilevel process, where individual actions and positions (microlevel) influence collective results (mesolevel) that, in turn, support the collaborative roles of institutions such as universities (macrolevel). Furthermore, the study highlights how technological integration can strengthen these positions and roles, facilitating the creation of value and the formation of networks that sustain the entrepreneurial ecosystem (Audretsch et al., 2023). The production per author is relatively low compared to the total number of articles published. As seen in Figure 5, the maximum number of publications per author is four articles.

The most notable author with this productivity is Audretsch D.B. Co-authored, he explores the co-opetition strategy (combination of cooperation and competition) within entrepreneurial ecosystems that significantly improves the performance of business incubators. Furthermore, the entrepreneurial ecosystem acts as a moderator that enhances the relationship between the incubator's strategy and its performance (Theodoraki et al., 2022). In this same sense, another article he co-authored emphasizes that although capital, infrastructure and resources are essential, the success of these ecosystems depends largely on how they are mobilized through leadership, governance and institutions, with a special emphasis on the individual agency of entrepreneurs to generate value and community cohesion (O'Connor et al., 2018).



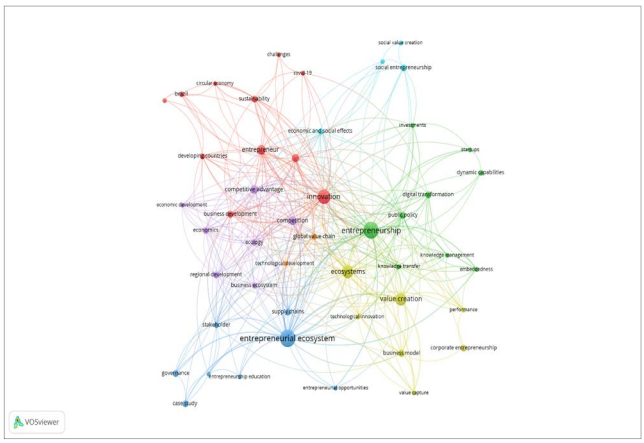
Source: Ramírez et al. (2025).

Figure 5: Most Relevant Authors,

4.3. Analysis of Relationships and Co-occurrences

An analysis of relationships and co-occurrences was carried out using the VOSviewer software, establishing a minimum threshold of three occurrences for the keywords. Of a total of 802 terms identified, only 50 met this criterion, which is reflected in Figure 6, where seven thematic clusters are distinguished. In Figure 7, relevant keywords are highlighted such as: ecosystems, entrepreneur, innovation, competition, value creation, sustainable development and competitive advantage. This analysis facilitates the visualization of the main thematic areas and conceptual connections within the corpus studied, allowing the identification of the predominant research trends and foci in the field (Cobo et al., 2011).

Some terms that often go together, like "supply chains," "commerce," and "business models," also suggest that there is a growing interest in the distribution side of entrepreneurial ecosystems. These terms may not be the most important ones in the current bibliometric density, but their presence suggests that logistics, trade efficiency, and distribution channels are becoming important strategic elements in the larger context of innovation and value creation.



Source: Ramírez et al. (2025).

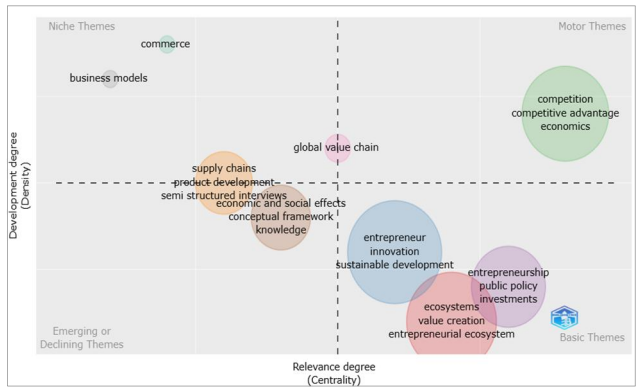
Figure 6: Keyword Co-occurrence

To capture dominant themes and emerging trends in the literature, a keyword co-occurrence analysis was conducted using VOSviewer, setting a threshold of three occurrences. From the initial 802 terms extracted, 50 met this minimum criterion. Figure 6 reveals seven keyword clusters that encapsulate the main conceptual domains in the field: entrepreneurship, innovation, value creation, ecosystems, competition, public policy, and distribution systems.

Source: Ramírez et al. (2025).

Figure 7: Keywords

The keyword network suggests a core-periphery structure. Central and highly connected terms such as “ecosystems,” “entrepreneur,” “innovation,” and “value creation” (see Figure 7) indicate robust thematic cores. Meanwhile, terms like “supply chains,” “commerce,” and “business models,” while less dominant, are strategically significant. Their co-occurrence with core innovation terms suggests a shifting research interest toward how physical infrastructure, logistics, and distribution pathways intersect with startup development and market integration.



Source: Ramírez et al. (2025).

Figure 8: Thematic Map

The graphic showed in Figure 8 further supports the previous interpretations. Thematic mapping plots “competition,” “competitive advantage,” and “economics” in the motor quadrant—signaling highly developed, high-relevance research fronts. In contrast, “ecosystems,” “value creation,” and “entrepreneurial ecosystem” appear as foundational yet underdeveloped topics, flagged as ‘basic themes.’ Notably, “supply chains” and “product development” occupy a liminal space, suggesting either emergent or declining interest. We interpret them as emergent themes, given their rising relevance in post-COVID entrepreneurial logistics and globalized production.

This visual analysis points to a theoretical and empirical opening: how logistics capabilities (e.g., digital inventory, last-mile delivery, export infrastructure) shape incubation effectiveness and firm scalability. The relatively low density of these themes indicates both a research gap and a future agenda—one that aligns with rising global interest in sustainable distribution, circular economies, and ethical value chains.

This study advances the field by empirically validating what many practitioners intuitively understand: that incubation success depends not only on mentorship and seed funding, but increasingly on operational elements such as logistics readiness, distribution network access, and digital trade facilitation. The visual data—especially Figures 6 through 8—reinforce this by showing that while these themes are conceptually connected to core innovation terms, they remain underdeveloped in the literature.

One notable finding is that "ecosystems" and "entrepreneurial ecosystem," despite being central to the innovation discourse, are still categorized as 'basic themes' in the thematic map (Figure 8), suggesting their conceptual breadth but insufficient analytical depth. This reinforces the importance of embedding these terms within more actionable frameworks—such as how ecosystems integrate logistics hubs, port connectivity, or regional trade corridors.

4.4. Systematic Analysis

The systematic review presented focuses on the analysis of twenty two studies that explore the interrelationship between technological incubation, the value chain and scaling in the context of entrepreneurship and innovation. Through this study, we seek to understand how technological incubation processes, integrated into a value chain, facilitate the development and scaling of new companies, promoting the creation of added value and the consolidation of productive and technological capabilities. This review offers a comprehensive vision of how incubation, understood as a process that accompanies the entrepreneur from pre-incubation to post-incubation, is linked to the value chain to enhance the competitiveness and sustainability of projects in innovation ecosystems.

Table 5: Systematic Analysis of Aarticles.

Title	Reference	Magazine	Strategy	Form of technological scaling	Emerging Trend
Investigating the influence of sustainable and smart supply chain practices on the entrepreneurial ecosystem of startup projects	(Ramakrishna et al., 2025)	Journal of project management	Integration of sustainable and digital practices in the supply chain	Progressive implementation of smart technologies (IoT, AI) in the supply chain	Sustainability and digitalization in supply chain
Sustainable competitive advantage under digital transformation: an eco-strategy perspective	(Du et al., 2025)	Chinese Management Studies	Eco-strategy for competitive advantage in digital environments	Scaling through gradual adoption of green and digital technologies	Sustainable digital transformation
Navigating a gendered ecosystem: the role of entrepreneurial capital in the business strategies of single-owner women farmers	(Azima et al., 2025)	Agriculture and Human Values	Accessible technologies for agriculture	Scaling through training and access to agricultural technology	Gender inclusion and technology in agropreneurship
Orchestration in Mature Entrepreneurial Ecosystems Towards a Circular Economy: A Dynamic Capabilities Approach	(Kanda et al., 2025)	Business Strategy and the Environment	Coordination of dynamic capabilities for circular economy	Scaling by integrating circular practices and clean technologies	Circular economy and dynamic capabilities
Unveiling the Dynamics of Entrepreneurial Ecosystems in an Emerging Economy: A Delphi and MCDM Approach	(Aggarwal and Kashiramka, 2025)	Thunderbird International Business Review	Identification and prioritization of key factors using Delphi and MCDM methods	Scaling based on multi-criteria analysis for technological decision-making	Entrepreneurial ecosystems in emerging economies
Dynamic Configurations of Entrepreneurial Ecosystem Elements for Blended Value Creation	(Pelegrini et al., 2025)	Sustainable Development	Dynamic configuration of ecosystem elements for mixed value	Flexible scaling of technologies according to ecosystem needs	Mixed value creation (economic, social, environmental)
Corporate entrepreneurship, supply chain management strategies and performance in the setting of Saudi Arabia: Empirical investigation	(Aljaaidi, 2025)	Journal of project management	Corporate entrepreneurship and supply chain optimization	Scaling through digitalization of logistic processes. Integration of ERP and blockchain	Corporate entrepreneurship and digitalization in supply chain

Title	Reference	Magazine	Strategy	Form of technological scaling	Emerging Trend
Entrepreneurial ecosystems and blended value creation: a configurational view	(Prado et al., 2025)	Journal of Entrepreneurship and Public Policy	Configurational approach for mixed value creation	Adaptive scaling of technological solutions. Inclusive technologies	Shared value and ecosystem configurations. Interactions between public policies and entrepreneurship
Entrepreneurial ecosystems as spatial mosaics: drivers of value creation across geographical spaces	(Pigola et al., 2025)	Small Business Economics	Differentiated strategies, location-based solutions. Territorialization of value	Regional scaling of technologies and business models	Spatial ecosystems and territorial value
Connectedness of entrepreneurial ecosystems: the impact of VC financing mobility on startup valuations	(Wirtz and Berre, 2025)	Small Business Economics	Venture capital mobility as a driver of connectivity	Scaling by attracting investment and networking. Crowdfunding platforms	Financial mobility and startup valorization
Start-ups within entrepreneurial ecosystems: Transition towards a circular economy	(Klofsten et al., 2024)	International Small Business Journal: Researching Entrepreneurship	Integration of circular business models in startups; collaboration with ecosystem actors	Stepping up through strategic alliances and adoption of clean technologies	Circular economy, sustainability in startups
Innovation Reefs (I-Reef): Innovation Ecosystems Focused on Regional Sustainable Development	(Lima et al., 2024)	Sustainability (Switzerland)	Innovation ecosystems for sustainable regional development	Scaling through innovation hubs and clusters	Regional innovation and sustainability
Perspectives on Necessity-Driven Immigrant Entrepreneurship: Interactions with Entrepreneurial Ecosystems through the Lens of Dynamic Capabilities	(Chen and Chen, 2024)	Societies	Empowering dynamic capabilities in migrant entrepreneurship	Scaling by adapting and transferring knowledge. Low-cost/frugal technologies	Inclusion of migrants in the entrepreneurial ecosystem
Patterns of Technological Entrepreneurship and Their Determinants: Evidence from Technology-Based Manufacturing Firms in China	(Liu et al., 2024)	Entrepreneurship Research Journal	Identification of patterns and determining factors in technological entrepreneurship	Scaling by adopting advanced manufacturing technologies. Automation and AI	Technological entrepreneurship and advanced manufacturing
Business model innovation in circular start-ups: Overcoming barriers in the circular plastics economy	(Lit et al., 2024)	International Small Business Journal	Business model innovation in circular startups	Scaling through alliances and recycling technologies. Advanced recycling and bioplastics	Circular economy and innovative business models
Queen Ndlovu: opening the throttle on her drone business	(Urban and Townsend, 2023)	Emerald Emerging Markets Case Studies	Innovation in drone services; focus on emerging markets and customization	Stepping up through diversification of services and formation of collaboration networks	Drones in emerging markets, technological inclusion
The interplay of entrepreneurial ecosystems and global value chains: Insights from the cultivated meat entrepreneurial ecosystem of Singapore	(Reis et al., 2022)	Technology in Society	Integration to the global value ecosystem; public-private collaboration	Stepping by insertion into global value chains and technology transfer	Cultured meat, food biotechnology
Good Tech and Social Good: Value Creation by Korean Social and High-Tech Oriented Start-Ups	(Berg and Mitra, 2022)	Journal of Entrepreneurship and Innovation in Emerging Economies	Combination of advanced technology with social impact; alliances with NGOs and public sector	Scaling through technological platforms and social networks	Social technology, innovation with purpose

Title	Reference	Magazine	Strategy	Form of technological scaling	Emerging Trend
The business model of Do-It-Yourself (DIY) laboratories – A triple-layered perspective	(You et al., 2020)	Technological Forecasting and Social Change	DIY laboratory models; co-creation and open access	Staggering for replicability and expansion of community laboratories	DIY laboratories, democratization of innovation
Governments as partners: The role of alliances in U.S. cleantech startup innovation	(Doblinger et al., 2019)	Research Policy	Public-private alliances for innovation in cleantech; government financing	Staggering through institutional support and access to state resources	Cleantech, government-startups collaboration
Managing resources and innovation inside the industry (Industrial) 4.0 Revolution: The role of Supply Chain	(Fiorini et al., 2019)	Synergies	Digitization and automation of the supply chain; IoT integration	Stepping by adoption of 4.0 technologies and process optimization	Industry 4.0, digitization of the value chain
University innovation and entrepreneurship ecosystem for engineering education: A multi-case study of entrepreneurship education in China	(Zhang et al., 2017)	ASEE Annual Conference and Exposition, Conference Proceedings	University innovation ecosystems; training and mentoring for entrepreneurs	Scaling through university incubators and spin-offs	Entrepreneurial education, university incubation

Source: Ramírez et al. (2025).

The analysis of the selected articles highlights the importance of the interrelationship between technological incubation, the value chain, and scaling in the consolidation of innovation ecosystems. Several studies highlight that the integration of circular and sustainable business models in startups, as well as collaboration with key ecosystem players, are fundamental strategies for driving growth and competitiveness (Klofsten et al., 2024; Reis et al., 2022; Lit et al., 2024; Kanda et al., 2025). In particular, business model innovation within circular startups has proven effective in overcoming barriers in circular plastic economies, promoting sustainability through business design (Lit et al., 2024). Likewise, the diversification of services and the formation of collaborative networks allow technology companies, such as those dedicated to drones or DIY laboratories, to scale their operations and adapt to emerging markets (Urban and Townsend, 2023; You et al., 2020; Pelegrini et al., 2025; Prado et al., 2025).

These networks, when strategically configured, generate hybrid value (economic, social, and environmental), demonstrating that successful entrepreneurial ecosystems are characterized by high connectivity and structural adaptability (Pelegrini et al., 2025; Prado et al., 2025). For example, connectivity within entrepreneurial ecosystems and the mobility of venture capital have been shown to be key factors in the valorization and expansion of startups, especially in contexts where geography and networking directly influence growth opportunities. Evidence also shows that integration into global value chains and technology transfer are effective mechanisms for scaling up, especially in innovative sectors such as food biotechnology (Reis et al., 2022; Ramakrishna et al., 2025). In this sense, the implementation of smart and sustainable supply chain practices improves the competitiveness of entrepreneurial projects by integrating emerging technologies from an early stage (Ramakrishna et al., 2025).

Furthermore, the combination of advanced technology with social impact and collaboration between startups, NGOs, and the public sector enhance value creation and purposeful innovation (Berg & Mitra, 2022; Azima et al., 2025; Chen & Chen, 2024). Recent studies also highlight the need to address gender, migration, and need factors in the creation of inclusive ecosystems, highlighting the role of venture capital in traditionally marginalized populations (Azima et al., 2025; Chen & Chen, 2024). The dynamic configuration of ecosystem elements and the strengthening of entrepreneurial capacities, especially in contexts of migration or vulnerability, are essential to generating mixed value and responding to current social and environmental challenges.

The role of public-private partnerships and institutional support is crucial for the development and scaling of cleantech startups, facilitating access to resources and markets (Doblinger et al., 2019; Lima et al., 2024; Kanda et al., 2025). These partnerships are strengthened by regional innovation ecosystems, such as the I-Reefs model, which integrates local actors to promote sustainable development (Lima et al., 2024). Regional innovation ecosystems and corporate entrepreneurship, supported by institutional policies and resources, contribute significantly to the sustainable development and competitiveness of technology startups.

Furthermore, supply chain digitalization and the adoption of Industry 4.0 technologies represent emerging trends that optimize processes and strengthen competitiveness (Fiorini et al., 2019; Du et al., 2025; Aljaaidi, 2025). Eco-digital strategies not only improve business performance but also align with the principles of sustainability and organizational transformation (Du et al., 2025). Similarly, the implementation of supply chain management strategies in contexts such as Saudi Arabia has demonstrated a positive impact on corporate performance

(Aljaaidi, 2025). The integration of sustainable and digital practices in the supply chain, as well as the adoption of eco-strategies under digital transformation, are determining factors for achieving competitive advantages in globalized markets.

Finally, the formation of university innovation ecosystems and the promotion of state support policies contribute significantly to the development of entrepreneurial capabilities and the creation of technological clusters, as observed in the cases of China and Taiwan (Zhang et al., 2017; Liu et al., 2024; Aggarwal & Kashiramka, 2025). The dynamic configuration of ecosystems in emerging economies requires multi-criteria approaches and the active participation of different actors to guide strategic decision-making (Aggarwal & Kashiramka, 2025).

Taken together, these findings underscore that successful technological incubation and scaling depends on strategic coordination between actors, integration into value chains, and the adoption of emerging innovation trends (Pigola et al., 2025; Wirtz & Berre, 2025). Strategic coordination between stakeholders, integration into value chains, and the adoption of emerging innovation trends are thus consolidated as key elements for success in technological incubation and the scaling of innovative ventures.

5. Discussion and Implications

This study, through a mixed-method approach combining systematic review and bibliometric analysis, uncovers the layered interactions among technological incubation, value chains, scaling strategies, and distribution infrastructure. The analysis of 152 documents from the Scopus database reveals an accelerating academic interest in entrepreneurial ecosystems, particularly in how startups maneuver through complex pathways from ideation to global market presence.

A key novel finding is the central—but often underappreciated—role that distribution and logistics systems play in determining the success of incubation and scaling. While previous research has emphasized institutional support, mentorship, and financial access, our results show that infrastructural readiness—customs facilitation, digital inventory, last-mile logistics—is equally critical. Startups that scale successfully tend to operate within incubators embedded in strong logistical ecosystems. This insight challenges traditional assumptions that view distribution as a post-scaling concern; instead, we show it is formative from the incubation stage onward.

Another distinctive contribution involves clarifying the moderating effect of evolving consumption values—such as sustainability, delivery speed, and traceability—on the effectiveness of scaling models. As shown by Berg and Mitra (2022) and Klofsten et al. (2024), these values are not just market signals; they actively shape supply chain design and influence which startups gain traction in global value chains. Our study is among the first to synthesize how these demand-side shifts interact with incubation strategies, thereby extending current knowledge in consumer-driven innovation and omni-channel scaling.

The pronounced authorial dispersion, as evidenced by Lotka's Law, further suggests that this is a field in intellectual flux—still coalescing around shared frameworks. While this fragmentation may initially appear as a limitation, it underscores the opportunity for convergence and cross-pollination among scholars from innovation studies, logistics, entrepreneurship, and policy design. The Collaboration Index of 2.95 is promising, but also highlights the need for deeper institutional partnerships—especially bridging research from the Global South, where infrastructural asymmetries offer unique insights.

Temporally, the surge in research output between 2021 and 2024 appears linked to the COVID-19 crisis, which acted as a stress test for both startups and incubation models. The pandemic catalyzed digital adaptation, reshaped consumer expectations, and exposed gaps in distribution systems—thus serving as a natural experiment that accelerated theoretical development in this space.

Conceptually, our co-occurrence and thematic mapping analysis shows a pivot toward systems-level thinking, with terms like "ecosystem," "value creation," and "co-creation" becoming more central. Simultaneously, emerging but under-theorized areas like "supply chains," "product development," and "commerce" highlight where future research should be directed. These peripheral but promising concepts point to overlooked dimensions of value creation—namely, how goods flow, how technologies scale geographically, and how socio-environmental contexts reshape entrepreneurial behavior.

Our qualitative synthesis of twenty two high-impact studies deepens this analysis, showing that successful incubation involves orchestrated cooperation across multiple scales: from local logistics providers and regional value chains to global trade platforms. Distribution, therefore, is not merely an output channel—it is a core structuring element of scaling. As Audretsch et al. (2023) suggest, firm performance depends on multilevel cooperation, and our results extend that claim by showing how distribution networks enable or constrain that cooperation.

The study also responds to current calls for more inclusive and sustainability-aligned incubation models. Insights from Urban and Townsend (2023) and Berg and Mitra (2022) reveal that startups in underserved or resource-

constrained settings are not just surviving but innovating with purpose. These cases invert the traditional resource-deficit narrative by showing that contextual agility—combined with ethical and logistical alignment—can produce scalable, socially embedded value propositions.

Finally, it can be affirmed that incubation must evolve beyond a transactional support function. In an increasingly digital, decentralized, and sustainability-oriented global economy, incubation must become a transformative infrastructure—anchoring startups within value chains that are economically viable, environmentally responsible, and logistically agile. This calls for a redefinition of incubation from a mere site of mentorship and funding to a systems integrator of distribution, compliance, and value realization.

For policymakers, this entails embedding logistics and digital infrastructure into national innovation frameworks. Actionable steps include the creation of "Incubation-Logistics Integration Zones" within existing industrial parks or export-processing zones, where startups receive bundled access to prototyping labs, customs processing units, bonded warehousing, and last-mile delivery services. Public agencies could also establish national registries of logistics-enabled incubators and provide tiered financial incentives tied to market-entry milestones such as export readiness or e-commerce integration.

Incubator managers, in turn, should prioritize logistics-readiness as a core operational dimension. Rather than treating warehousing, fulfillment, and distribution partnerships as downstream concerns, these should be baked into the early design of incubation programs. Concrete measures may include: (1) co-developing distribution playbooks with logistics providers, (2) creating API-based integrations with e-commerce and inventory systems for startup clients, and (3) embedding trade compliance workshops within incubation curricula.

This study contributes a novel insight by linking the evolving consumption values—such as speed, transparency, and ethical sourcing—to startup success through the lens of logistics. Incubation centers that internalize these expectations by facilitating rapid prototyping, ethical certification processes, and scalable delivery mechanisms can not only elevate individual firms but also catalyze regional competitiveness.

Value distribution, then, should no longer be treated as a passive outcome but as a strategic input. Startups that can demonstrate efficient and transparent delivery models are more likely to attract investment, retain customers, and survive post-incubation. Incubation centers should therefore track and report key logistics performance indicators (e.g., time-to-market, fulfillment accuracy, export success rate) alongside traditional metrics like funding raised or jobs created.

In sum, this review calls for a next-generation incubation model—one that merges digital enablement, logistical capability, and policy alignment into a unified architecture for entrepreneurial scaling. Future research should focus on comparative case studies of logistics-integrated incubators, particularly in emerging economies, to determine how infrastructural asymmetries constrain or enable inclusive innovation. This represents not only a scholarly frontier but a pressing development agenda.

6. Suggestions for Future Research and Limitations

Though this bibliometric and systematic review draws a rather strong picture of present scholarly conversation on technological incubation, value chain integration, and the scaling of startups, it does not come without its blind spots—some clear, others more subtle. These constraints, therefore, are not only shortcomings; they also suggest interesting avenues for future study, where the field could strengthen its roots and spread its influence in significant ways.

One way to think about this is to consider how trade networks, logistics, and distribution infrastructure affect how well incubation models work. For a startup to be successful in the long run, it needs to be able to get raw materials, ship products, and run global supply chains as it grows. But a lot of the time, incubation research doesn't look at these operational parts, which can make or break whether early-stage businesses can successfully enter domestic or international markets. Finding out whether or not incubators offer support for shipping logistics, distribution partnerships, or trade facilitation could show big holes in how things are done now and open up new ways for everyone to grow.

First off, the data source offers a significant limitation. The whole review is based on articles listed in Scopus, a platform often praised for its breadth and rigor. Still, as many in the research community secretly admit, Scopus can be somewhat of a gatekeeper. It doesn't always include emerging journals, practice-based publications, or the so-called "grey literature" that often carries the most contextually grounded insights—especially in regions like Latin America, Southeast Asia, or sub-Saharan Africa. These areas, often overlooked, tend to incubate their own unique models: hybrid value chains, informal innovation hubs, grassroots accelerators. It's plausible that some of the most original experimentation in incubation is happening right there, below the radar of global indexing systems.

A second limitation—one more structural in nature—concerns the fragmentation of scholarly authorship. The application of classic bibliometric tools (Lotka's Law, Bradford's Law) revealed a curious landscape: plenty of one-off contributions but few recurring names or tightly-knit

research clusters. This trend might show that things aren't always the same, but it also shows that the topic is interesting to people from many fields. If there aren't more unified study goals or shared conceptual baselines, theoretical growth might happen in small chunks. It gets harder to make models that can be used across industries or locations, as well as to do comparison studies or come up with standard measures.

A third worry that might be more useful is that the last group of the systematic review didn't have a lot of different themes. Even though the twenty two pieces that met the requirements talked about important topics like the cyclical economy, digital change, and public-private relationships, many important things were missing. The informal economy barely registered; gender inclusion, climate resilience, and fairness in entrepreneurship were all but absent. This is not to imply those aspects are unimportant—far from it—but they have not yet been methodically included into the mainstream incubation literature. Many of the included studies were case-specific and descriptive, lacking experimental or longitudinal methods that would enable stronger causal inferences.

So where to go from here? For starters, diversifying data sources seems an obvious, yet underutilized, step. Complementing Scopus with Web of Science, Dimensions, or even Google Scholar could broaden the reach. More importantly, including regional repositories such as RedALyC and SciELO could help rebalance the conversation by bringing in voices and perspectives that too often remain peripheral. These platforms frequently publish work rooted in local knowledge systems, which is invaluable when studying models that don’t fit neatly into Euro-American frameworks.

There’s also a strong argument to be made for expanding the empirical focus toward underrepresented contexts—places where institutional fragility, informal economies, or resource scarcity are the norm. Studying how startups scale or incubate under such conditions isn’t just an academic curiosity; it can shed light on alternative mechanisms of resilience and innovation. One suspects that in these settings, incubation is less about seed capital or polished mentorship programs and more about community ties, resource improvisation, or hybrid governance.

Theoretically, the field could gain from a stronger conceptual anchoring. Much of the present literature seems ad hoc—useful maybe, but not especially integrative. Including concepts such as the Resource-Based View, Actor-Network Theory, or even Complex Adaptive Systems could provide more precise lenses for comparison. Admittedly, these are not fresh ideas, but in terms of incubation research they are still mostly underused.

The intricate interactions between actors inside incubation ecosystems also merit more investigation. Startups are not isolated; their destinies are linked to those of investors, governments, universities, civil society organizations, and even rivals. Knowing how these people work together—or against one another—could offer more in-depth analysis of how ecosystems stabilize, change, or collapse. All three institutional logics, power imbalances, and value conflicts merit closer examination.

Another significant disparity is temporal. What follows incubation? Little longitudinal data tracks companies beyond the "graduation" stage. But this is exactly where important issues are: Which incubation strategies really promote sustainable development? Which ones create jobs, inspire innovation, or drive regional development? Tracking results over time—maybe over five or ten years—would help to separate short-term momentum from long-term influence.

The effect of new technologies also calls for more focus. AI, blockchain, and biotech are not only changing goods; they are also challenging the fundamental logic of how startups grow and scale. Likewise, megatrends such demographic changes, climate change, and inequality are testing the foundations of many incubation programs. Future research should, ideally, grapple with these intersections. Incubation, in this light, must be seen not just as a tool for economic development, but as a potential lever for societal transformation.

Methodologically, mixed approaches may be the most fruitful going forward. Network analysis and structural equation modeling can uncover macro-patterns, but they’re even more powerful when paired with interviews, field observations, or participatory research. Disciplinary silos need to be broken. Collaboration across business, engineering, public policy, and the social sciences could yield insights that are not only more nuanced but also more actionable.

Lastly, the policy dimension warrants a more proactive and targeted emphasis. Future research should not only interrogate how regulatory frameworks and national innovation strategies shape incubation outcomes but also explore the mechanisms through which policy translates into ecosystem-level impact. Comparative analyses—such as those contrasting the coordinated policy approaches of Nordic nations with the fragmented landscapes of Andean countries—could illuminate what institutional variables (e.g., multi-level governance, decentralized funding, export incentives) have the greatest leverage on startup success.

From a policy design standpoint, governments should embed logistics and trade infrastructure into their innovation agendas. Policymakers are encouraged to treat transportation networks, customs efficiency, digital inventory systems, and cross-border e-commerce platforms as integral to incubation success—not merely supportive back-end functions. Public investment in regional logistics

hubs, export certification centers within incubators, or partnerships with national postal and freight services could mitigate the bottlenecks currently faced by startups in underserved regions.

For example, a targeted recommendation would be to fund embedded "logistics nodes" within incubators—physical or virtual units that provide customs support, packaging and fulfillment services, and real-time distribution analytics. Governments could also offer tiered logistics subsidies for early-stage firms that meet export-readiness criteria, encouraging them to formalize and scale.

Incubator managers, particularly those operating in non-metropolitan areas, should prioritize partnerships with regional transportation networks, third-party logistics providers (3PLs), and digital supply chain platforms. These collaborations can be used to create bundled services that reduce last-mile delivery costs, improve inventory turnover, and enhance startup credibility with investors and customers alike. Practical interventions could include: (1) onboarding regional courier partners into the incubation network, (2) providing access to bulk-rate shipping accounts, and (3) integrating startup dashboards with existing ERP and inventory platforms to track logistics performance.

Additionally, there is a need for granular research into the role of logistics-oriented public-private partnerships (PPPs) in emerging market incubation. Empirical work could examine how co-financed freight corridors, bonded warehouses, or regional fulfillment centers alter the scaling trajectories of startups. Understanding these dynamics is essential for designing next-generation incubators that are not only innovation-friendly but also commercially viable in constrained environments. By reframing incubation as a logistics-anchored and distribution-enabled process, future research and policy can move toward more inclusive, scalable, and regionally adaptive entrepreneurship ecosystems.

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