

NAVIGATING THE INNOVATION LANDSCAPE: EVOLVING PERSPECTIVES AND STRATEGIES IN STARTUP ECOSYSTEM MAPPING

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ABSTRACT. *This literature review provides an in-depth analysis of the evolving nature of innovation and the critical role of startup ecosystem mapping in understanding and fostering economic growth. Initially, innovation was predominantly viewed through the lens of R&D in manufacturing industries, focusing on technological advancements generated internally by companies with a highly educated workforce. However, definitions have expanded, as the European Communities and OECD highlighted, to include incremental innovations and non-R&D activities, acknowledging the broader spectrum of innovation, especially in low- and middle-income countries. The Global Innovation Index (GII) epitomizes this shift, moving beyond traditional metrics like R&D expenditures to a more nuanced framework with 79 diverse indicators, offering insights into global innovation trends and competitiveness. The review also delves into various definitions and historical examples of startups, illustrating their transition from nascent ventures to established businesses and their enduring impact on innovation. Furthermore, it explores different qualitative and quantitative methods used in ecosystem mapping, its comparative effectiveness, and emerging trends in this field. The practical benefits of ecosystem mapping are emphasized, demonstrating its significance in facilitating connections, driving collaborative innovation, and informing policymaking. This review underscores the necessity for continuous adaptation in measuring and mapping innovation, highlighting their importance in a rapidly evolving technological and economic landscape.*

Keywords: Innovation Ecosystems; Startup Mapping; Economic Growth; Global Innovation Index; Entrepreneurial Dynamics

1. INTRODUCTION

In the ever-evolving landscape of global economics, innovation has emerged as a pivotal force driving growth and competitiveness. Traditionally, innovation was perceived primarily through research and development (R&D) in manufacturing industries, focusing on technological product innovation generated internally by companies with a highly educated workforce [1]. This view has undergone a paradigm shift in recent years, expanding to encompass a broader spectrum that includes incremental advancements and "innovation without research," thereby recognizing the significant role of non-R&D expenditures in technological advancements [1].

The Global Innovation Index (GII), developed by Professor Soumitra Dutta at INSEAD in 2007, stands at the forefront of this transformative perspective. It aims to encapsulate the multifaceted nature of innovation beyond traditional measures, like R&D expenditures and research publication counts, by incorporating a wide array of indicators to reflect the richness of innovation in society better [3, 4].

Simultaneously, the concept of startups has garnered considerable attention. As defined by Wikipedia and highlighted by Forbes in 1976, these fast-growing, entrepreneurial ventures are crucial for meeting market needs through innovative products, processes, or services. Historical examples, such as Ford's Model T and Microsoft, demonstrate the profound impact startups have had on societal and economic transformation [3, 4, 5].

This literature review delves into the dynamic and multifaceted startup and innovation ecosystems. It explores the evolution of innovation as a concept, the methodologies of the GII, the varied definitions and historical perspectives of startups, and the comprehensive approaches to ecosystem mapping. By synthesizing insights from various sources, this review aims to provide a nuanced understanding of how innovation and startup ecosystems are measured, mapped,

and understood, contributing to the broader dialogue on economic growth and innovation policy [6, 7].

2. EVOLUTION OF THE INNOVATION CONCEPT

The concept of innovation has undergone a significant transformation over the past decades. Initially, the focus was predominantly on R&D-based technological product innovation, primarily within manufacturing industries. This approach was characterized by in-house development in companies employing a highly educated workforce [1]. The innovation was seen as a radical breakthrough at the global knowledge frontier, suggesting a dichotomy between leading and lagging countries, where low- or middle-income economies were merely catching up [3, 4].

However, this perspective has broadened remarkably. The European Communities and the OECD define innovation more inclusively as implementing new or significantly improved products, processes, marketing, or organizational methods in business practices. This definition reflects a shift towards recognizing incremental innovations and the concept of "innovation without research," highlighting the importance of non-R&D innovative expenditures in technological advancement. This expanded view acknowledges the evolving nature of innovation in various economic contexts, particularly in low- and middle-income countries, emphasizing their increasing role in global innovation [3, 4, 5]. This evolution marks a pivotal change in understanding innovation, moving beyond traditional boundaries to a more inclusive and comprehensive approach.

3. THE GLOBAL INNOVATION INDEX (GII)

The Global Innovation Index (GII), conceived by Professor Soumitra Dutta at INSEAD in 2007, represents a groundbreaking approach to measuring innovation. It

transcends traditional metrics like R&D spending and research publications, introducing a comprehensive framework that integrates various indicators. With 79 indicators across various sub-pillars, the GII offers a nuanced understanding of global innovation trends and competitiveness, mainly focusing on how emerging markets perform on the world stage [3, 4]. This index plays a crucial role in capturing the complexity of innovation in the contemporary era, offering invaluable insights for policymakers, researchers, and practitioners.

4. STARTUP ECOSYSTEM: DEFINITIONS AND HISTORICAL PERSPECTIVES

The term "startup" encompasses a variety of definitions, often centered around entrepreneurial ventures characterized by rapid growth and innovative solutions. Despite the differing interpretations, a common thread is the focus on fulfilling market needs through novel products, processes, or services. This concept, though modern in terminology, is historically deep-rooted. For instance, the Ford Model T, launched by the then-young Ford Motor Company in 1908, revolutionized transportation with its innovative production techniques and affordability. Similarly, Microsoft, founded in 1975, transformed personal computing with its MS-DOS operating system, bringing technology to the masses [3, 4, 5].

These examples exemplify startups' journey from nascent ventures to established industry leaders, demonstrating their profound impact on innovation and economic growth. As startups mature, they often transition from their initial growth phase to more stable, established entities. While marking the end of their 'startup' phase, this evolution often signifies the beginning of a new era of influence and innovation within their respective industries and beyond.

5. THE INNOVATION ECOSYSTEM

The innovation ecosystem concept provides a holistic framework for understanding the dynamic interplay of actors, activities, and artifacts that drive innovative performance. It transcends the traditional, linear innovation models, recognizing a more complex, interconnected network of relationships and interactions among various stakeholders, including businesses, academia, government, and investors [8], [9]. Within this ecosystem, each component plays a critical role. Businesses, ranging from startups to established corporations, are often at the forefront of innovation, developing new products and services. Universities and research institutions contribute through knowledge creation and talent development. Government policies and funding mechanisms provide essential support and direction. Investors, including venture capitalists and angel investors, fuel the ecosystem with necessary capital. These components interact in a dynamic environment where collaboration and competition coexist, driving the ecosystem's overall innovative capacity and performance [8, 10].

The impact of innovation ecosystems is profound. They facilitate the development and diffusion of new technologies and ideas and significantly contribute to economic growth and societal well-being. Regions with robust innovation ecosystems, like Silicon Valley, demonstrate how these ecosystems can become engines of economic development, job creation, and competitiveness on a global scale.

Moreover, the adaptability and resilience of these ecosystems play a pivotal role in responding to global challenges, such as climate change and health crises, showcasing their critical importance in shaping a sustainable and prosperous future [8, 10].

6. APPROACHES TO ECOSYSTEM MAPPING

Mapping innovation ecosystems is a multifaceted process encompassing qualitative and quantitative methods. Qualitative approaches often involve interviews and case studies, providing in-depth insights into the nuances of ecosystem dynamics [11, 12]. Quantitative methods, on the other hand, utilize surveys, patent data, and business analytics to offer a more data-driven, objective perspective of the innovation landscape [13, 14].

A comparative analysis reveals that while qualitative methods capture ecosystems' contextual and experiential aspects, quantitative approaches offer measurable and scalable insights more effectively. Integrating both methods can provide a more comprehensive understanding of innovation ecosystems.

Emerging trends in ecosystem mapping are leveraging advancements in data analytics and machine learning. These novel methods enable the analysis of large-scale datasets, offering more sophisticated and nuanced views of innovation networks. The use of social network analysis and geographic information systems (GIS) has also become increasingly prevalent, allowing for the visualization and understanding of complex relationships within ecosystems [15, 16]. This evolution in mapping techniques reflects the growing complexity and interconnectedness of innovation ecosystems in the global economy.

7. THE IMPORTANCE OF STARTUP ECOSYSTEM MAPPING

Mapping startup ecosystems is vital for understanding the complex web of interactions and dynamics underpinning innovation and economic growth. By visually and analytically representing the various elements of a startup ecosystem — including startups, investors, support services, and other stakeholders — mapping provides a clear picture of the current landscape. This clarity is crucial for entrepreneurs, investors, and policymakers to identify opportunities, gaps, and areas for growth and intervention.

One of the practical benefits of ecosystem mapping is the facilitation of connections and collaborations. Startups can identify potential partners, mentors, and investors, while investors can discover emerging companies and opportunities for investment. For policymakers and economic developers, these maps are instrumental in understanding the strengths and weaknesses of their local ecosystems, enabling targeted support and resource allocation.

Ecosystem mapping also plays a significant role in fostering innovation and driving economic growth. By highlighting the relationships and networks that facilitate knowledge sharing and resource exchange, maps help to catalyze the kind of collaborative innovation that leads to new products, services, and business models. This collaborative environment is essential for nurturing the agility and adaptability startups need to thrive.

Various initiatives have demonstrated the value of startup ecosystem mapping. For instance, the Global Startup Ecosystem

Report by Startup Genome provides a comprehensive analysis of global startup ecosystems, offering insights into how different regions compare and compete on a global stage [3]. Similarly, Startup Blink's Ecosystem Index offers a global ranking of ecosystems, helping to benchmark performance and progress [4]. These and other initiatives provide valuable data for stakeholders and highlight the interconnected nature of global innovation, emphasizing the need for a holistic understanding of how startup ecosystems contribute to broader economic and social objectives.

In conclusion, startup ecosystem mapping is not just an analytical exercise; it's a critical tool for driving innovation, fostering economic development, and building resilient, dynamic communities equipped to meet the challenges and opportunities of the global economy.

8. CONCLUSION

This literature review has synthesized key findings from diverse sources, offering a comprehensive overview of the evolving nature of innovation and the importance of startup ecosystem mapping. The shift from a narrow, R&D-focused view of innovation to a broader, more inclusive understanding underscores the dynamic nature of technological and economic change. The Global Innovation Index (GII) and various startup ecosystem mappings have emerged as pivotal tools, capturing innovation's multifaceted and interconnected nature across different regions and sectors.

The implications for future research and policymaking are significant. For researchers, the evolving definitions and measurements of innovation present opportunities for exploring new methodologies and theoretical frameworks that can better capture the complexity of innovation processes. On the other hand, policymakers can leverage these insights to design more effective strategies for fostering innovation, particularly in emerging economies where traditional metrics may not fully capture the entrepreneurial dynamism.

In conclusion, the measurement and mapping of innovation remain works in progress, continuously adapting to the changing landscape of technology and global economics. The growing recognition of diverse forms of innovation and the rising importance of startup ecosystems in driving economic growth call for ongoing refinement of tools and approaches. As innovation continues to evolve, so too must our methods for understanding and fostering it, ensuring that they remain relevant and effective in a rapidly changing world.

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