



Innovation Ecosystems to Drive Productivity

Hakan Erten

Productivity ***Insights***

Vol. 4–2

Asian Productivity Organization



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PRODUCTIVITY INSIGHTS Vol. 4-2
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Hakan Erten wrote this publication.

First edition published in Japan
by the Asian Productivity Organization
1-24-1 Hongo, Bunkyo-ku
Tokyo 113-0033, Japan
www.apo-tokyo.org

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PREFACE

The P-Insights, short for “Productivity Insights,” is an extension of the Productivity Talk (P-Talk) series, which is a flagship program under the APO Secretariat’s digital information initiative. Born out of both necessity and creativity under the prolonged COVID-19 pandemic, the interactive, livestreamed P-Talks bring practitioners, experts, policymakers, and ordinary citizens from all walks of life with a passion for productivity to share their experience, views, and practical tips on productivity improvement.

With speakers from every corner of the world, the P-Talks effectively convey productivity information to APO member countries and beyond. However, it was recognized that many of the P-Talk speakers had much more to offer beyond the 60-minute presentations and Q&A sessions that are the hallmarks of the series. To take full advantage of their broad knowledge and expertise, some were invited to elaborate on their P-Talks, resulting in this publication. It is hoped that the P-Insights will give readers a deeper understanding of the practices and applications of productivity as they are evolving during the pandemic and being adapted to meet different needs in the anticipated new normal.

INTRODUCTION

Innovation ecosystems play a crucial role in fostering innovation, collaboration, and economic growth. They provide a supportive environment where various stakeholders, including startups, established companies, researchers, investors, and government entities, come together to promote and accelerate the development and adoption of innovative ideas, technologies, solutions, and products.

This report on innovation ecosystems focuses on the conceptual definition of innovation systems, their theoretical and practical effects on boosting productivity, key elements of innovation ecosystems, examples of successful innovation ecosystems throughout the world, potential contributions of academia to knowledge creation and diffusion, potential contributions of corporations for commercializing existing knowledge, and the role of government in both facilitating the efficient operations of innovation ecosystems and developing appropriate policies to resolve innovation–productivity paradox phenomena.

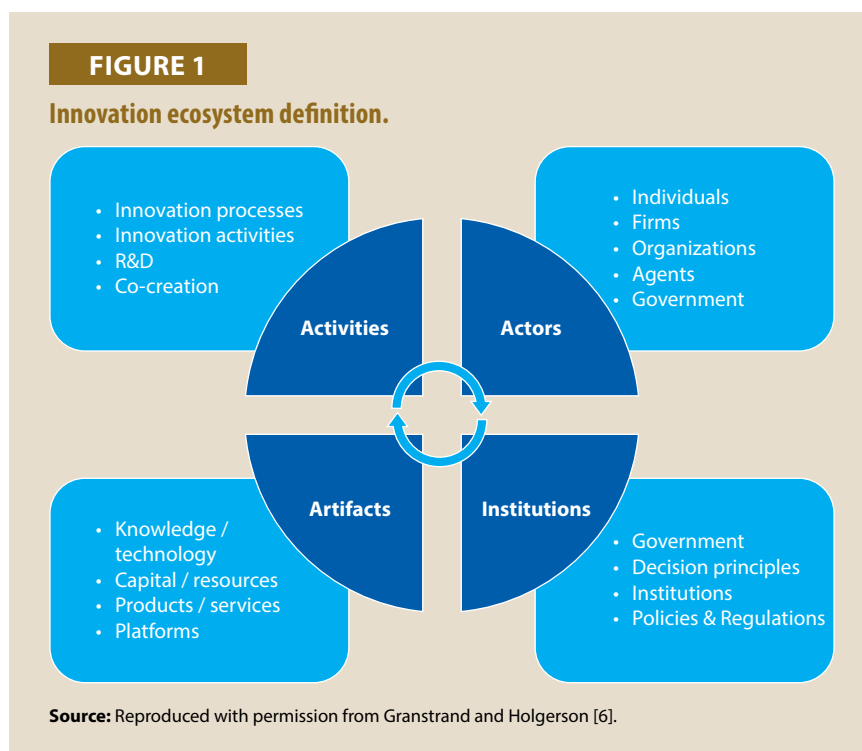
We start with the conceptual definition of innovation ecosystems. Before elaborating on the innovation ecosystem concept, several definitions of innovation systems presented in the literature are reviewed. An innovation system is defined as all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations [1]. This definition can include national, regional, sectoral, or corporate (formed around one or several leading corporations) contexts:

- National innovation system: All aspects of the national economic structure and institutional setup affecting learning as well as searching and exploring, e.g., production system, marketing system, and finance system as subsystems where learning occurs [2].
- Regional innovation system: The institutional infrastructure supporting innovation within the production structure of a region [3].
- Sectoral innovation system: The system (group) of firms active in developing and making a sector's products and in generating and

utilizing a sector's technologies, related through processes of interaction and cooperation in artifact-technology development and through processes of competition and selection in innovative and market activities [4].

- Corporate innovation system: The set of actors, activities, resources, and institutions and casual interrelations important for the innovative performance of a corporation or groups of collaborating companies and other actors (e.g., universities, institutes, agencies) [5].

In biology, an ecosystem is defined as all organisms and the physical environment with which they interact. Organisms and their physical environment constitute a biological ecosystem. Similarly, an innovation ecosystem refers to an evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors (Figure 1).



The main stakeholders of an innovation ecosystem are actors. These actors conduct innovative activities, and artifacts (technologies or products and services) are the subject matter or means of these innovations. In an innovation ecosystem, the actors, activities, and artifacts interact and evolve together. Institutional setups affect and surround the actors, activities, and artifacts in a broader way. Actors consist of individuals, firms, organizations, agents, and governments. Activities might be innovation processes, innovation activities, R&D, or co-creation. Artifacts might include knowledge and technology, capital and resources, products and services, and platforms. Institutions might include government, decision principles, institutions, and policies and regulations governing the operations of innovation ecosystems. The key aspect transforming an innovation system to an ecosystem is the evolving set of relations within all parts of the system.

This article is organized as follows. Section 2 explains the innovation–productivity nexus by both giving practical explanations and theoretical foundations. Section 3 discusses the key elements of successful innovation ecosystems and provides information on three successful innovation ecosystems. Section 4 examines the roles of academia, corporations, and public policy for enhancing the quality of innovation by addressing the innovation–productivity paradox. Finally, section 5 gives conclusions.

INNOVATION–PRODUCTIVITY NEXUS

Channels Transforming Innovation to Productivity

Economic theory suggests a strong role for innovation in boosting productivity. We list five important channels through which innovation boosts productivity and then provide two theoretical explanations of the innovation–productivity nexus.

Collaboration and knowledge sharing: Innovation ecosystems bring together diverse stakeholders such as entrepreneurs, researchers, investors, government agencies, and academic institutions. By fostering collaboration and knowledge sharing among these stakeholders, innovation ecosystems enable the exchange of ideas, expertise, and resources. This collaborative environment helps to accelerate the development and implementation of new technologies, processes, and business models, leading to increased productivity.

Access to resources: Innovation ecosystems provide access to a wide range of resources that are essential for driving innovation and productivity. These resources can include funding, infrastructure, research facilities, mentorship, talent pools, and specialized expertise. By connecting innovators with the necessary resources, innovation ecosystems create an enabling environment for them to experiment, iterate, and scale their ideas, ultimately boosting productivity.

Risk mitigation: Innovation inherently involves risk-taking, as not all ideas or ventures will succeed. Innovation ecosystems help to mitigate these risks by providing a supportive environment where failure is viewed as a learning experience rather than a setback. By reducing the fear of failure, innovation ecosystems encourage experimentation and enable more productive outcomes.

Talent development and retention: Innovation ecosystems attract and nurture talent by offering opportunities for learning, growth, and collaboration. By bringing together entrepreneurs, researchers, and skilled professionals, these ecosystems create a dynamic environment where individuals can exchange

knowledge, develop new skills, and find meaningful employment. Access to a diverse talent pool enhances the capacity for innovation and increases productivity by ensuring that the right expertise is available to address complex challenges.

Market access and commercialization: Innovation ecosystems provide pathways for bringing innovative ideas and products to market. By facilitating market access and commercialization, innovation ecosystems help to translate ideas into tangible products and services, driving economic growth and productivity.

Overall, innovation ecosystems foster a collaborative, supportive environment that accelerates the pace of innovation, reduces barriers to entry, and enhances productivity by leveraging the collective expertise, resources, and networks of diverse stakeholders.

Endogenous Growth Theory

Economic theory also suggests that innovation is among the main drivers of productivity. Endogenous growth theory is an economic framework that seeks to explain the long-term economic growth of countries by focusing on internal factors rather than external influences. It originated in the 1980s as a response to the limitations of the neoclassical growth theory, which primarily attributed economic growth to exogenous factors such as technological progress or changes in population size.

Endogenous growth theory argues that factors such as human capital accumulation, R&D, innovation, and technological change are endogenously determined within the economic system and can be influenced by policy choices. In other words, it suggests that economic growth is not solely driven by exogenous shocks but can be actively fostered through intentional actions.

According to endogenous growth theory, technological change (parameter A of the production function) is endogenous. Investments in R&D, innovation, and knowledge creation can foster technological progress (in technical terms, increase A). Knowledge generated by one firm or individual can benefit others and contribute to overall economic growth (spillovers). Innovation and productivity are closely related, generally assumed to be in a linear way (in most technical model formations).

Evolutionary Growth Theory

Evolutionary growth theory is an alternative approach to understanding economic growth and development. It draws inspiration from evolutionary biology and applies evolutionary concepts to the study of economic systems. Evolutionary growth theory acknowledges that economic systems are characterized by ongoing change, rather than static equilibrium. It recognizes that economies are subject to continuous processes of innovation, adaptation, and selection.

Technological change occurs through processes such as R&D, learning by doing, and knowledge spillovers. Heterogeneity allows for experimentation and selection, leading to the emergence of more productive practices and technologies. Successful innovations and practices can generate positive feedback loops, leading to further growth and diffusion. Feedback mechanisms can reinforce certain patterns of development or trigger changes in the economic system. Radical technological innovation is by no means linear and proportional, nor are its effects seen in a short period.

INNOVATION ECOSYSTEMS

Key Elements of Innovation Ecosystems

A successful innovation ecosystem comprises several key elements that foster creativity, collaboration, and growth. While specific components may vary depending on the context, some fundamental elements commonly associated with thriving innovation ecosystems are listed below.

R&D Institutions: Strong R&D institutions, such as universities, research centers, and laboratories, play a crucial role in driving innovation. These institutions conduct cutting-edge research, promote knowledge creation, and provide a talent pool of researchers and experts.

Skilled Workforce: A skilled, diverse workforce is essential for innovation. Access to a talented pool of individuals with expertise in various fields enables the generation of ideas, interdisciplinary collaboration, and the development of innovative solutions.

Collaboration and Networking: Collaboration is a vital aspect of successful innovation ecosystems. Opportunities for interaction, networking, and knowledge exchange among academia, industry, startups, entrepreneurs, and investors facilitate the sharing of ideas, resources, and expertise. Incubators, accelerators, co-working spaces, and industry-specific clusters can provide platforms for collaboration.

Access to Capital: Adequate access to capital is crucial to support innovation and entrepreneurship. This includes investment from venture capitalists, angel investors, and government funding programs specifically designed to support startups and innovative ventures.

Supportive Policy Environment: A favorable policy environment is necessary to encourage and support innovation. This includes policies that promote R&D, protect intellectual property rights, offer tax incentives for innovation-related investments, and streamline regulatory processes for startups.

Infrastructure and Resources: A robust physical and digital infrastructure is essential to enable innovation. This includes access to reliable internet connectivity, advanced technologies, research facilities, incubation centers, and prototyping facilities.

Market Access and Demand: An innovation ecosystem needs access to domestic and global markets to commercialize and scale innovative products or services. Connecting innovators with potential customers, industry partners, and distribution channels helps validate ideas, gather feedback, and facilitate market entry. A strong demand for innovative solutions encourages further development and growth.

Culture of Innovation: A culture that values and promotes innovation is a key element of successful innovation ecosystems. This includes encouraging risk-taking, embracing failure as a learning opportunity, fostering a collaborative mindset, and celebrating entrepreneurship.

Government Support and Initiatives: Government support through policies, funding programs, and initiatives can significantly contribute to the success of an innovation ecosystem. This includes investments in R&D, creation of innovation hubs, development of entrepreneurship programs, and support for startups through incubation and acceleration initiatives.

Access to Information and Knowledge Sharing: Open access to information, data, and research findings is crucial for innovation. Platforms that facilitate knowledge sharing, open-source collaborations, and the dissemination of research findings contribute to the growth and advancement of the ecosystem.

These key elements, when combined and nurtured, help create a vibrant, thriving innovation ecosystem that fosters creativity, collaboration, and successful development and implementation of innovative ideas.

Successful Innovation Ecosystem Examples

There are several successful innovation ecosystems around the world that have fostered significant technological advances, entrepreneurial activities, and economic growth. Information on three selected innovation ecosystems is summarized below.

Silicon Valley

Silicon Valley is a world-famous innovation ecosystem in and around Santa Clara Valley in California (Figure 2). Silicon Valley is widely regarded as the global epicenter of technology and innovation. It is home to numerous high-tech companies, startups, venture capital firms, research institutions, and talented individuals. It has cultivated an exceptional innovation ecosystem that has given rise to some of the world's most influential technology companies.

This ecosystem hosts a population of around 3 million, with 1.6 million jobs. Average annual earnings are amazingly high. As a major talent center, the region attracts both domestic and international migration. When we include San Francisco in the Silicon Valley area, although the region constitutes only 1.2% of the land area of California, the population in the region constitutes nearly 10%, its GDP share is 19%, and around 82% of unicorn and decacorn companies in California originate from this region.

FIGURE 2

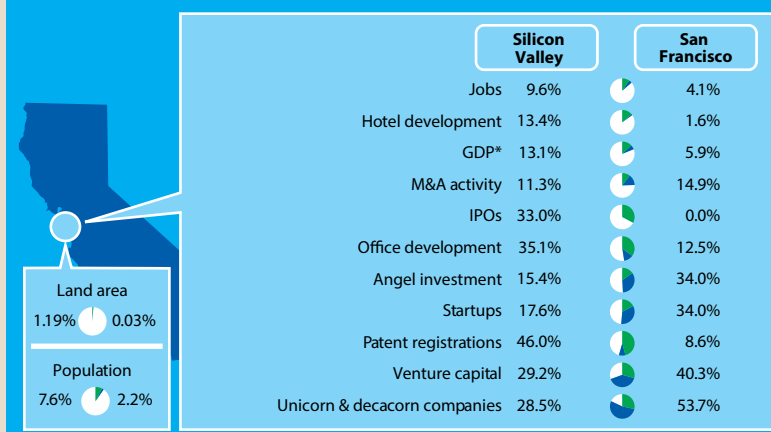
Silicon Valley Innovation Ecosystem.



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The Region's Share of California's Economic Drivers



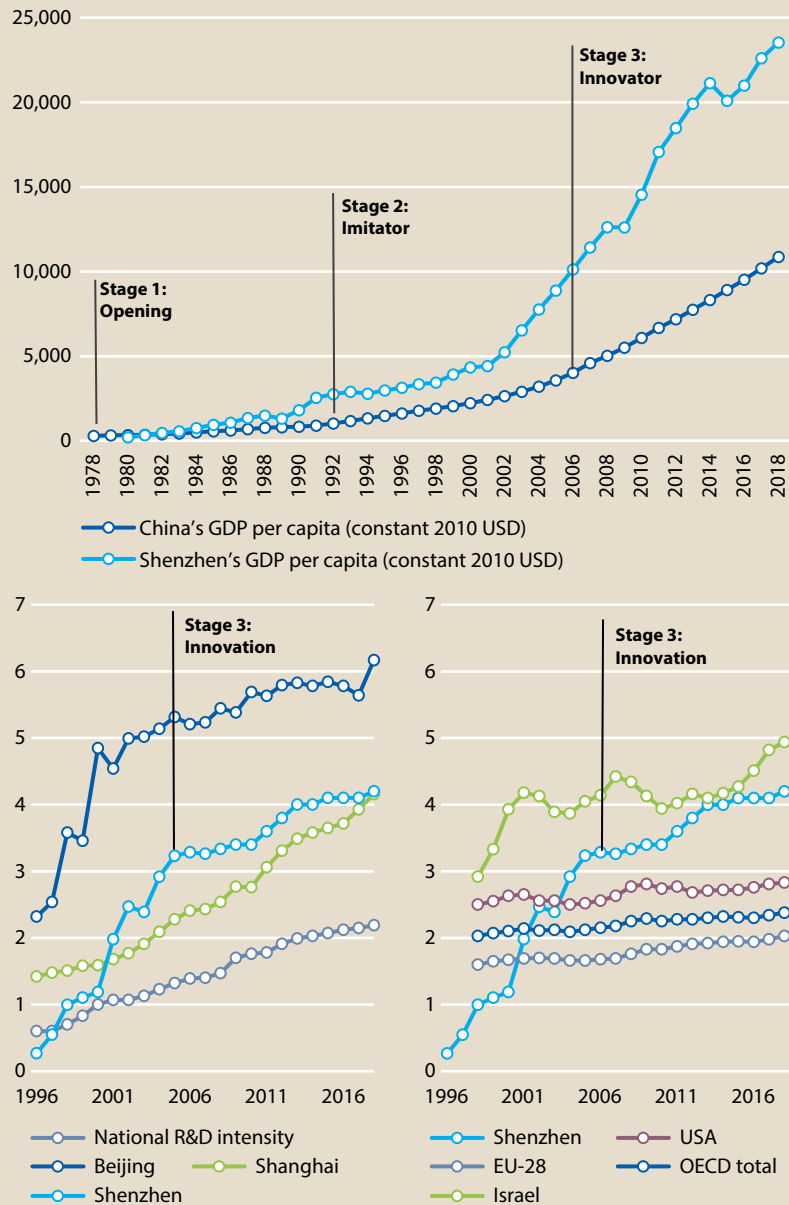
Source: Reproduced with permission from 2023 Silicon Valley Index (<https://jointventure.org/images/stories/pdf/index2023.pdf>) [7].

The Shenzhen Innovation Ecosystem

The Shenzhen innovation ecosystem is a dynamic, rapidly growing hub for technology and innovation located in Guangdong province, PR China. Over the past few decades, Shenzhen has transformed from a small fishing village into a global powerhouse known for its thriving tech industry. In the last two decades, Shenzhen's GDP per capita reached 2.5 times the overall GDP per capita in PR China. Its R&D spending with respect to its GDP reached the 4% level, higher than the level of many developed countries and OECD members (Figure 3).

Shenzhen has earned the reputation as the "Silicon Valley of Hardware" due to its strong focus on hardware manufacturing and assembly. The city is home to numerous electronics and hardware companies, ranging from small startups to large-scale manufacturers. Shenzhen's extensive supply chain networks, specialized manufacturing zones, and proximity to component suppliers have made it a preferred location for innovators in the hardware space.

Shenzhen has a vibrant entrepreneurial culture that encourages innovation and risk-taking. The city provides a supportive environment for startups, with a

FIGURE 3
Shenzhen innovation ecosystem.


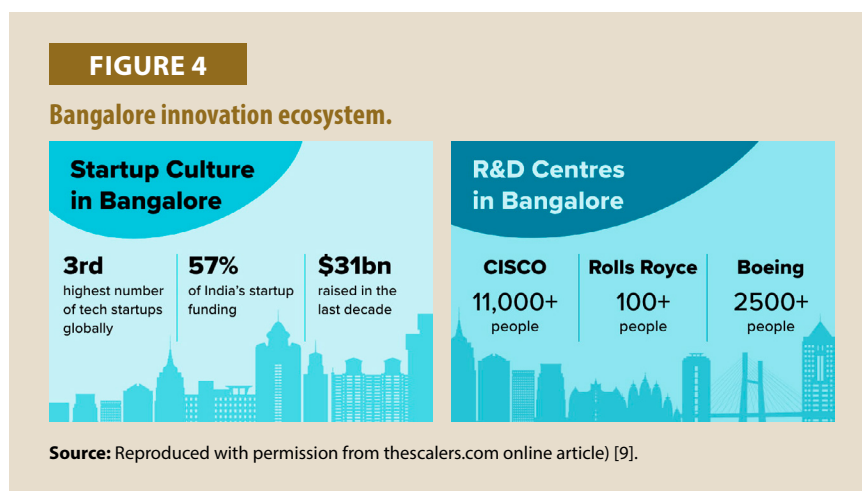
Source: Reproduced with permission from Yin et al. [8].

plethora of resources, funding opportunities, and incubation programs available. Shenzhen fosters a spirit of rapid prototyping and iteration, enabling startups to quickly bring their ideas to market.

Bangalore Innovation Ecosystem

The Bangalore innovation ecosystem, also known as the “Silicon Valley of India,” is a thriving hub for technology, innovation, and entrepreneurship. Located in the state of Karnataka, Bangalore has emerged as a major global destination for IT and technology companies.

Bangalore is renowned for its thriving IT industry. It is home to numerous multinational corporations, technology giants, startups, and research institutions. The city’s IT sector encompasses software development, IT services, R&D, and emerging technologies like AI, machine learning, and blockchain (Figure 4).



Bangalore has a vibrant startup culture, fueled by a young, ambitious talent pool. The city has seen the rise of numerous successful startups across various domains, including e-commerce, fintech, health-tech, and ed-tech. The presence of startup incubators, accelerators, and co-working spaces provides crucial support to early-stage ventures.

Bangalore boasts a strong educational infrastructure, including prestigious universities, research institutes, and technical colleges. Institutions such as the

Indian Institute of Science (IISc), Indian Institute of Management (IIM), and numerous engineering colleges attract talented individuals from across the country. These institutions play a vital role in fostering research, innovation, and entrepreneurship.

ENHANCING THE QUALITY OF INNOVATION

Contribution of Academia

Academia plays a vital role in contributing to innovation ecosystems and enhancing the quality of innovation. Several ways in which academia can actively contribute to innovation are listed below.

R&D: Academic institutions are renowned for their research capabilities. They contribute to innovation ecosystems by conducting cutting-edge research, exploring new technologies, and advancing knowledge in various fields. Through R&D activities, academia generates new ideas, technologies, and solutions that can be commercialized and contribute to the development of innovative products and services.

Technology Transfer: Academia can facilitate the transfer of technology and knowledge from the research environment to industry. Technology transfer offices or innovation departments within universities help bridge the gap between academia and the business world. They facilitate collaborations, licensing agreements, and spin-off companies, allowing the commercialization of academic research outcomes and supporting the growth of startups.

Entrepreneurship Education and Support: Academic institutions can provide entrepreneurship education and support programs that equip students with the skills and knowledge needed to start their own ventures. By offering courses, workshops, and mentorship programs, academia nurtures an entrepreneurial mindset, encourages innovative thinking, and helps students develop the practical skills required to bring their ideas to market.

Collaborative Research Partnerships: Academia can engage in collaborative research partnerships with industry, government agencies, and other research institutions. These partnerships facilitate knowledge exchange, leverage resources, and tackle complex challenges.

Training and Talent Development: Academic institutions play a critical role in training the next generation of innovators, researchers, and entrepreneurs. They provide education and training programs that cultivate the necessary skills, knowledge, and expertise in emerging fields. By nurturing a skilled workforce, academia contributes to the availability of talent in innovation ecosystems and supports the growth of industries reliant on innovation.

Thought Leadership and Policy Advocacy: Academia can contribute to innovation ecosystems through thought leadership and policy advocacy. Researchers and experts from academic institutions can offer insights and expertise on emerging technologies, market trends, and policy issues. They can inform policymakers, industry leaders, and the public on the importance of innovation, advocate for supportive policies, and contribute to the shaping of a conducive environment for innovation and entrepreneurship.

Innovation and Technology Hubs: Academic institutions can establish innovation and technology hubs within their campuses, creating physical spaces that encourage collaboration, knowledge exchange, and entrepreneurial activities. These hubs serve as platforms for startups, researchers, and industry partners to interact, share ideas, and co-create innovative solutions. They foster a culture of innovation and provide a supportive ecosystem for entrepreneurship.

Corporations for Commercializing Knowledge

Corporations play a crucial role in commercializing the knowledge and technologies produced by innovation ecosystems. Some key roles that corporations can fulfill in this process are listed below.

Technology Adoption and Integration: Corporations can play a significant role in adopting and integrating new technologies and knowledge generated within innovation ecosystems. They have the resources, market reach, and industry expertise to assess the feasibility and commercial potential of emerging technologies.

Research Collaboration and Partnerships: Corporations can collaborate with academic institutions, research organizations, and startups within innovation ecosystems to develop and commercialize knowledge and technologies.

Through research partnerships, corporations can access cutting-edge research, tap into specialized expertise, and co-create innovative solutions. Such collaborations can help bridge the gap between academia and industry, accelerate the commercialization process, and ensure that research outcomes are relevant and applicable to real-world challenges.

Funding and Investment: Corporations can provide funding and investment support to startups, entrepreneurs, and research projects within innovation ecosystems. Through venture capital funds, corporate accelerators, and strategic investments, corporations can fuel the growth of promising ventures and support the commercialization of innovative ideas and technologies. By providing capital and resources, corporations contribute to the development and scalability of startups, which in turn stimulates the overall innovation ecosystem.

Market Access and Distribution: Corporations possess established distribution networks, customer relationships, and market knowledge. They can provide startups and emerging companies with valuable access to markets, helping them reach a broader customer base and accelerate the commercialization process.

Intellectual Property Management: Corporations can contribute to the commercialization of knowledge by managing intellectual property rights. They have the expertise and resources to navigate the complexities of intellectual property protection, licensing, and commercialization.

Scaling and Manufacturing: Corporations often have the infrastructure, manufacturing capabilities, and supply chain networks required for large-scale production and distribution. By leveraging their operational capabilities, corporations enable the efficient commercialization and widespread adoption of innovations.

Market Validation and Customer Insights: Corporations can provide valuable market validation and insights to startups and entrepreneurs. They have deep knowledge of customer preferences, market trends, and industry demands. By engaging with startups and providing feedback, corporations contribute to the refinement and customization of innovative solutions, increasing their market fit and commercial success.

Role of Public Policy

Public policy plays a crucial role in promoting and nurturing an innovation ecosystem. Some key conventionally accepted roles of public policy in promoting an innovation ecosystem are listed below.

Intellectual Property Protection: Robust intellectual property protection laws and regulations are essential for encouraging innovation. Public policy can ensure that patents, copyrights, trademarks, and trade secrets are adequately protected, giving innovators the confidence to invest in R&D and reap the rewards of their inventions.

Funding and Financial Incentives: Public policy can establish funding mechanisms and financial incentives to support innovation. This includes grants, loans, tax credits, and subsidies that encourage R&D and commercialization of new ideas. Governments can also establish venture capital funds or investment programs targeting innovative startups and high-growth enterprises.

R&D Investment: Public policy can prioritize and increase public investment in R&D activities. Governments can allocate resources to scientific research institutions, universities, and public–private partnerships that drive innovation.

Regulatory Frameworks: Public policy should establish regulatory frameworks that balance innovation with safety, security, and ethical considerations. Streamlining bureaucratic processes and reducing regulatory burdens can facilitate innovation and the adoption of new technologies.

Education and Skill Development: Public policy can support initiatives to enhance education and skill development in science, technology, engineering, and mathematics (STEM) fields. Encouraging the integration of innovation and entrepreneurship into educational curricula equips future generations with the skills and mindset necessary to drive innovation.

Collaboration and Networking: Public policy can promote collaboration and networking among stakeholders in the innovation ecosystem. Establishing innovation clusters, science parks, and incubation centers fosters interaction between researchers, entrepreneurs, investors, and industry experts. Public–private partnerships and industry–academia collaborations can facilitate knowledge exchanges and accelerate innovation.

Access to Markets and Procurement: Public policy can create opportunities for startups and innovative enterprises to access public procurement contracts and markets. Simplifying procurement processes and setting aside a portion of public contracts for innovative solutions can create a market for innovative products and services, supporting their commercialization and growth.

International Cooperation: Public policy can facilitate international cooperation and collaboration in innovation. Bilateral and multilateral agreements can promote cross-border research collaboration, technology transfer, and the exchange of best practices.

Entrepreneurial Ecosystem Support: Public policy can provide support services tailored to entrepreneurs and startups. This includes business incubators, accelerators, mentorship programs, and access to finance and networks. Public-private partnerships can help provide resources and guidance to navigate the challenges faced by startups and promote their growth.

Evaluation and Impact Assessment: Public policy should include mechanisms to evaluate the effectiveness and impact of innovation-focused initiatives. Regular assessment of policies and programs helps identify areas for improvement, optimize resource allocation, and ensure that public investments are generating desired outcomes.

Innovation–Productivity Paradox

The innovation–productivity paradox refers to the phenomenon where the expected increase in productivity resulting from investments in IT and innovation does not materialize as anticipated. The innovation–productivity paradox might be observed due to the time lag between technological innovations and their impact on productivity and economic growth. This suggests that despite significant investments in innovation and technology, there may not be an immediate increase in productivity.

The paradox emerged in the 1980s and 1990s when businesses started to invest heavily in computer-based IT. According to traditional economic theories, such investments should have led to substantial productivity gains due to the automation of tasks, improved communication, and enhanced information processing. However, in many cases, the expected productivity improvements did not materialize, or the gains were far lower than anticipated.

The paradox was first highlighted by economist Robert Solow in 1987 when he observed that computer technology was everywhere except in the productivity statistics. Since then, the paradox has been a subject of research and discussion among economists and policymakers. Some factors that might have led to the observed paradox were listed in the literature as follows.

Adjustment and Learning Costs: The adoption and integration of new technologies often require significant investments and adjustments in organizational processes, employee training, and infrastructure. These adjustments and learning costs can delay the realization of productivity gains, as it takes time for firms to fully understand and exploit the potential of new technologies.

Complementary Investments: Technological innovations are often accompanied by the need for complementary investments, such as changes in business processes, new organizational structures, and workforce skills. If these complementary investments are not made or are delayed, the full benefits of the technological innovations may not be realized, leading to a productivity gap.

Implementation Challenges: The successful implementation of new technologies requires not only technical capabilities but also changes in work practices and management strategies. Organizations may face challenges in effectively implementing and integrating new technologies into their operations, leading to delays in productivity improvements.

Measurement Issues: Traditional productivity measures, such as GDP per hour worked, may not capture the full impact of innovation, especially in sectors where the benefits are difficult to quantify.

Time Lags and Disruptions: It often takes time for the benefits of technological innovations to propagate through the economy and result in productivity gains. Additionally, the adoption of new technologies can lead to temporary disruptions and adjustments in the labor market, which can initially impact productivity negatively before positive effects emerge.

The innovation–productivity paradox requires resetting the public policy approach to innovation and moving beyond the conventionally accepted policy options. Policy must be developed based on the findings in the region

encountering the paradox. Depending on the factors contributing to the paradox, some possible policy alternatives to remedy the adverse effects of paradox are listed below.

Identify the Paradox: Empirical identification of the paradox in a region constitutes a significant step in diagnosing the underlying regional causes.

Enhance Evolutionary-inspired Initiatives: Exaptation-oriented (identifying a latent function in an already existing artifact) research could be used to stimulate regional productivity in all types of regions.

Enhance Entrepreneurial Potential of Universities: This would increase productivity growth by facilitating the emergence and diffusion of more resilient business models.

Remove Obstacles Impeding Knowledge Transfer among Actors: This would reduce diffusion lags in the innovation process.

Maintain Higher R&D Investment Levels: This is required to maintain high rates of productivity growth in case of the paradox.

Encourage Firms to Combine Different Knowledge Bases and Modes of Innovation: This would improve the productivity of both firms and regions.

Enable Access to Prevailing Knowledge Bases and Modes of Innovation: This would lead to more even dispersion of innovative capability and opportunity among regional firms.

Support Intrapreneurship in Regionally Embedded Superstar Firms: This would lead to productivity spillovers through diffusion of more efficient business and production practices.

Encourage Participation in Global Value Chains: This would create positive multiplier effects.

Address Issues of Organizational Thinness in Peripheral and Less-developed Regions: This would help regions to narrow innovation and productivity gaps with more innovative, productive regions.

Tackle Fragmentation Problems: This would attenuate the innovation–productivity nexus by bringing closer a set of geographically close but cognitively distant regional actors.

Facilitate the Diversification and Renewal of Highly Specialized Regions: This would not only prevent negative lock-ins but also facilitate the exploration of new, more productive yet resilient paths of regional growth.

Encourage Demand-oriented Regional Innovation Initiatives (e.g., Public Procurement for Innovation): This would be used to stimulate interactions among regional firms and support organizations as well as for boosting the innovative capability of peripheral regions.

CONCLUSION

Innovation ecosystems play a crucial role in fostering innovation, collaboration, and economic growth. Both economic theory and practical observations suggest a strong role for innovation in boosting productivity. Innovation ecosystems foster a collaborative, supportive environment that accelerates the pace of innovation, reduces barriers to entry, and enhances productivity by leveraging the collective expertise, resources, and networks of diverse stakeholders. There are several successful innovation ecosystems around the world which have fostered significant technological advances, entrepreneurial activities, and economic growth. Each ecosystem has its unique characteristics and strengths, driven by a combination of factors such as talent, education, access to capital, supportive policies, infrastructure, and collaborative networks.

Academia and corporations have important potential roles to support the development of new ideas and transform them into marketable products within innovation ecosystems. Public policy, especially in the presence of the innovation–productivity paradox, is crucial to keep innovation ecosystems productive and to enhance the quality of innovation.

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