RELISE

ENTREPRENEURIAL ECOSSYSTEM IN INDIA: CHALLENGES AND OPPORTUNITIES[1]

ECOSSISTEMA EMPREENDEDOR NA ÍNDIA: DESAFIOS E OPORTUNIDADES

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ABSTRACT

The entrepreneurial ecosystem in India stands out as one of the most dynamic and complex in the world, driven by a combination of cultural, economic, and governmental factors. According to the Global Entrepreneurship Monitor (GEM, 2022), India leads globally in the number of potential entrepreneurs, with over 115 million people aspiring to start their own businesses within three years. This phenomenon is not merely a reflection of India's vast population but also highlights the country's unique socio-economic landscape, marked by rapid urbanization, a youthful demographic, and a mix of traditional and modern entrepreneurial practices. India's entrepreneurial ecosystem is shaped by its historical and cultural context, including the legacy of the caste system, religious influences, and post-colonial economic policies. The ecosystem's future growth hinges on addressing these issues while leveraging India's strengths, including its large technical workforce and digital infrastructure like *IndiaStack*, which has revolutionized financial inclusion. In conclusion, India's entrepreneurial ecosystem is a testament to its potential and resilience. While it faces structural and cultural challenges, the collaborative efforts of the government, private sector, and academia are paving the way for sustainable growth, positioning India as a global leader in innovation and entrepreneurship. Further research and targeted policies will be crucial to unlocking the full potential of this vibrant ecosystem.

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RESUMO

O ecossistema empreendedor da Índia destaca-se como um dos mais dinâmicos e complexos do mundo, impulsionado por uma combinação de fatores culturais, econômicos e governamentais. Segundo o Global Entrepreneurship Monitor (GEM, 2022), o país lidera globalmente em número de potenciais empreendedores, com mais de 115 milhões de pessoas aspirando a abrir seus próprios negócios em até três anos. Esse fenômeno não reflete apenas a vasta população indiana, mas também evidencia um cenário socioeconômico singular, marcado por rápida urbanização, uma demografia jovem e uma mistura de práticas empreendedoras tradicionais e modernas. O ecossistema indiano é moldado por seu contexto histórico e cultural, incluindo o legado do sistema de castas, influências religiosas e políticas econômicas pós-coloniais. Apesar de desafios como deficiências em infraestrutura, obstáculos regulatórios e disparidades de gênero, o país avançou significativamente no fomento à inovação e às startups. Embora enfrente desafios estruturais e culturais, os esforços colaborativos do governo, setor privado e academia estão pavimentando o caminho para um crescimento sustentável, posicionando a Índia como líder global em inovação e empreendedorismo. Pesquisas adicionais e políticas direcionadas serão cruciais para desbloquear todo o potencial desse ecossistema vibrante.

Palavras-chave: Índia, ecossistemas empreendedores, Nova Delhi

"He who sees inaction in action, and action in inaction, is wise among men."
Excerpt from the Indian epic poem Mahabharata

CONTEXTUALIZATION

The Global Entrepreneurship Monitor (GEM) - which has been researching entrepreneurship in over 100 countries for more than 20 years - reported in its 2022 survey that Brazil ranks second worldwide in terms of the absolute population of potential entrepreneurs, behind only India at the top of the list. In Brazil, this represented more than 50 million people, while in the Asian country the figure corresponded to over 115 million individuals. When GEM refers to "potential entrepreneurs," it means the number of inhabitants in each country who aspire to own a business within a three-year timeframe (GEM, 2022).

At first glance, one might think: of course, India ranks first, since it became the most populous country in the world in 2023 (UN, 2023). However, when it comes to entrepreneurship, it is important to note that the subject is filled with complexity and diversity (Gimenez, Ferreira & Ramos, 2010), where “defining the entrepreneur is a perpetual challenge, given the wide variety of perspectives used to study the phenomenon” (Filion, 1999, p. 18); or even “a word (entrepreneur) that can mean everything and nothing (...) which alludes to various points without effectively arriving at any of them” (Walker, 1989, p. 164). This is without mentioning India’s 1,428 billion inhabitants, situated within the characteristics of a nation that is simultaneously millennia-old in cultural terms and newly born in emancipatory perspective.

Although India is the cradle of Hindu civilization, dating back 3,000 years before Christ, it only achieved independence from its colonizer, England, in the 1950s. In this context, one figure stands out globally: Mahatma Gandhi, who fought for the country’s independence.

Over the course of centuries, Hinduism, the caste system, Buddhism, internal conflicts tied to politics and religion, as well as external disputes - especially with Pakistan and the Kashmir region - along with the development of

the economy, science and technology, and stark social inequality, have shaped this unique country. Its uniqueness lies not only in the obvious fact that every nation is unique, but in something beyond that. On one hand, there are its geographical features, and on the other, its cultural curiosities. Thus, Chart 1 synthesizes some of these Indian characteristics.

Chart 1 – Indian Characteristics

Natural Geography	Borders the Indian Ocean and six nations; home to the Himalayas, the Ganges River, and a Tropical Monsoon climate with seasonal winds that can exceed 100 km/h; parliamentary republic.
Human Geography	Majority of the population lives in rural areas; religious diversity (predominantly Hindu); multiple languages (Hindi, English, and native languages); HDI 0.645 – medium; young population, high annual fertility rate, and declining infant mortality since 1990.
Economic Geography	Capital: New Delhi; largest city: Mumbai; GDP concentrated in tertiary activities, while the majority of the workforce remains in the primary sector; one of the world's largest GDPs, but with low per capita income; currency: Indian Rupee; fifth-largest economy worldwide; main productive sectors: software, food, chemical, pharmaceutical. High inequality, despite poverty reduction and low social mobility; infrastructure issues (sewage, drinking water, waste, and disposal).
General Curiosities	Some claim the country has six seasons: spring, summer, monsoon, autumn, prevernal, and winter—while others consider three: hot, cold, and rainy; Bangalore is known as the "Indian Silicon Valley" for its technology production; home to one of the world's largest film industries, Bollywood; Taj Mahal, one of the most important architectural works in the world; second-largest road network globally, with notable waterways and railways as well; cow as a sacred animal and the Bengal tiger as the national animal. Birthplace of Yoga, chai (spiced tea), and the world's largest epic poem (*Mahabharata*, with around 200,000 verses).

Source: prepared by the authors, 2024.

This set of characteristics, while they may initially appear disconnected from the topic of entrepreneurial ecosystems, are indeed interlinked. Their connections align with aspects highlighted by Lopes (2016), who demonstrated the influence of certain religions on the economic behavior of Indians, with a direct impact on national entrepreneurship. Added to this is the demographic weight of India's young population in need of employment, which creates the challenge of generating around 10 to 15 million new jobs per year, as well as improving professional training - both for those who already possess

qualifications and for those who remain below the level generally required by organizations (Lopes, 2016).

Still following Lopes' (2016) study, it was observed that, on the one hand, there is relative ease in obtaining credit, while on the other, factors such as taxes, business registration and insolvency procedures, contract enforcement, and infrastructure aspects - such as building and electricity permits - left the Asian country with poor performance indicators. The study concludes that the need for public policies, institutional strengthening, lack of qualifications, the influence of certain religions that discourage entrepreneurial activity, and infrastructure shortages are essential issues to be addressed when studying entrepreneurship in India (LOPES, 2016).

In the time span between 2016 and 2024, the world went through a global pandemic and is now experiencing two conflicts with worldwide repercussions (Russia - Ukraine and Palestinians - Israelis in the Gaza Strip). As a result, it can be inferred that much of the landscape - not only in each region of the globe but also globally - has been shaken. Nevertheless, it may also be said, speaking in general terms, that the essence inherent to each people remains deeply embedded in their way of life. Thus, many of the difficulties - in this case, those related to entrepreneurship in general - remain; some may be mitigated, while others have worsened. But regardless of everything, India's diverse, ambiguous, and complex character persists, as it does in other countries.

Research focusing on African nations (STAM, 2023), South American countries (CALISPA; AGUILAR; AGUIAR; POZO; BARRIGA; SAYA; MARTINEZ, 2023), and even some emerging nations (LOPEZ, 2023), has highlighted findings on the need for the involvement of multiple components linked to local development and the provision of systemic conditions tailored to local needs, characteristics, and capabilities, underscoring the importance of

networks and their interrelations. Considering these regions of the planet alongside Lopes' (2016) findings, it can be inferred that these so-called "developing" areas or nations share certain common needs with regard to their entrepreneurial ecosystems, which will be the subject of the next section.

ENTREPRENEURIAL ECOSYSTEMS IN INDIA

To map common needs among these developing countries, it is necessary to examine whether entrepreneurial ecosystems (EE) exist in India and, if so, what their characteristics are.

The research was initially guided by a search for "open access" publications from the past five years - 2019 to 2024 - on Google Scholar, CAPES Journals, and Scielo databases, which would provide an overview of the entrepreneurial ecosystem(s) mapped in India. Gradually, the timeframe was expanded, since many articles employed the expression "entrepreneurial ecosystem" without adhering to the academically constructed definition, instead being "limited" to addressing startup ecosystems or those defined by territory, for example.

The findings of this research begin with a study that examines the role of policies in India's entrepreneurial ecosystem (SONKAR & SARKAR, 2021), which also provides insights into the understanding and application of the entrepreneurial ecosystem concept in the country. Six major Indian states are considered, based on their Gross Domestic Product (GDP): Maharashtra \capital Bangalore, Delhi, West Bengal, Karnataka, Tamil Nadu, and Andhra Pradesh. In this case, economic importance determines the locations to be studied, not necessarily the actual existence of an entrepreneurial ecosystem. In other words, the research is triggered by the states' economic relevance.

A differentiated EE model is proposed, tailored mainly to the Indian economy: "it is a combination of different factors organized together in a

relevant environment. All these factors interact with each other to support the growth and birth of new companies in a specific area, mainly innovative companies" (SONKAR & SARKAR, 2021, p. 2). These factors include: I. government and policies; II. suppliers; III. competitors; IV. global and domestic markets; V. digitalization; VI. technology; VII. technical and professional training; VIII. educational institutions as drivers; IX. mentors, advisors, and support systems; X. culture; XI. caste and religion; XII. funding and finance; XIII. entrepreneurial policies and structure.

Continuing in the same study, and according to information from the Department of Industrial Policy and Promotion, India's entrepreneurial ecosystem, together with that of New Delhi, is composed of nine factors, both internal and external: I. government policy; II. regulatory framework and infrastructure; III. funding and finance; IV. culture; V. mentors, advisors, and support systems; VI. universities as catalysts; VII. education and training; VIII. human capital and workforce; IX. local and global markets.

In other words, *"no state possesses all thirteen internal and external factors of the entrepreneurial ecosystem"* (SONKAR & SARKAR, 2021, p. 6).

The GEDI (Global Entrepreneurship and Development Institute) is a research organization focused on entrepreneurship, economic development, and prosperity. Founded by scholars from renowned universities, its main contribution is the GEI Index, which measures the quality of entrepreneurial ecosystems globally and provides an interactive data explorer that allows users to visualize the results of the Global Entrepreneurship Index (GEI) and how different countries allocate resources to foster entrepreneurship. According to the Institute, the GEI was created to evaluate each country's entrepreneurial ecosystem individually. Regarding India, the data are presented in Chart 2.

Chart 2 – India's Global Entrepreneurship Index (GEI)

	PILLARS		INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity Perception	0,29	Market Aglomeration	0,39	Opportunity Recognition	0,59
	Startup-sSkills	0,16	Tertiary Education	0,37	Skill Perception	0,43
	Risk acceptance	0,39	Business Risk	0,44	Risk Perception	0,68
	Networking	0,11	Internet Use	0,24	Know Entrepreneurs	0,47
	Cultural Support	0,18	Corruption	0,42	Career Status	0,32
	Entrepreneurial Attitudes					20,37
Entrepreneurial Abilities	Opportunity Startup	0,32	Economic Freedom	0,49	Opportunity Motivation	0,55
	Technology Absortion	0,03	Tech absortion	0,34	Tecnology Level	0,12
	Human Capital	0,23	Staff Training	0,47	Educational Level	0,38
	Competititon	0,65	Market Dominance	0,53	Competitors	1,00
	Entrepreneurial Abilities					25,30
Entrepreneurial Aspirations	Product Innovation	0,74	Technology Transfer	0,55	New Product	0,90
	Process Inovation	0,59	Gross Domestic Expenditure on Research and Development	0,57	New Tech	1,00
	High Growth	0,20	Business Strategyo	0,70	Gazelle	0,28
	Internacionalization	0,28	Globalization	0,52	Export	0,47
	Risk Capital		Depth of Capital Market	0,87	Informal Investiment	0,29
	Entrepreneurial Aspirations					31,82
	GEI	25,83	Institutional	0,49	Individual	0,53

Fonte: http://thegedi.org/tool/

Given the initial overview of the elements and configuration of entrepreneurial ecosystems in India, it is important to highlight some cities that have been the subject of academic studies which, among other aspects, mention the existence of an entrepreneurial ecosystem (EE), namely: Punjab and Kutch.

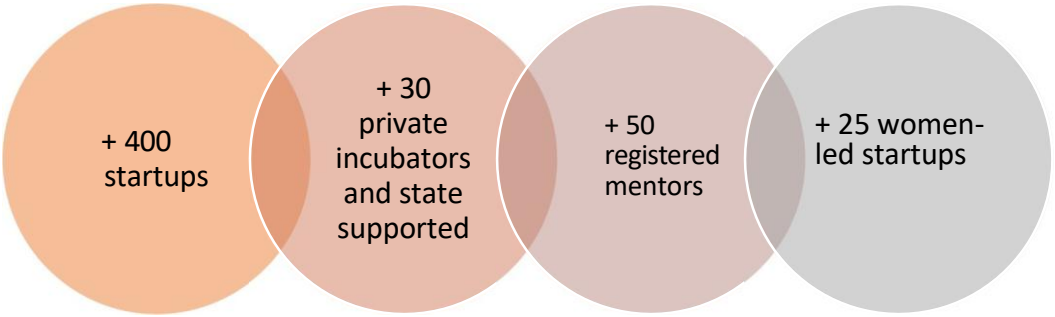
Punjab

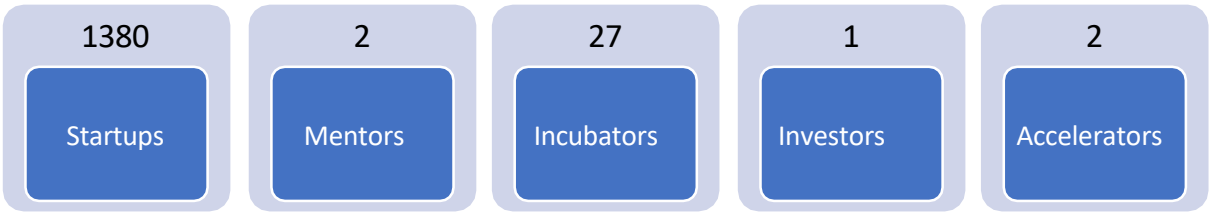
We begin with Punjab, located in northern India, whose growth and transformation occurred through the Green Revolution, earning it the title of "India's breadbasket." Based on agriculture, Punjab's entrepreneurial

ecosystem was considered emerging in 2016, with the following key components identified: market, human capital, finance, education/training, and policy (SANDHU; SCOTT; GIBB; HUSSAIN; AKOORIE; SINHA, 2017). Although it has a recognized economic development index and one of the highest rates of female entrepreneurs in India, women face significant gender discrimination, which materializes in limited access to formal sources of financing, forcing them to rely on informal ones, such as family (SANDHU; SCOTT; GIBB; HUSSAIN; AKOORIE; SINHA, 2017).

The *States' Startup Ranking 2021 – Punjab*, published in 2022 with 2021 data by the Department for Promotion of Industry and Internal Trade (DPIIT) of the Ministry of Commerce and Industry of the Government of India, highlights that the state identified startups and entrepreneurship as fundamental pillars for economic growth and launched the *Startup Punjab* program so that its actions would converge with those of the central government in fostering the development of startup and innovation ecosystems. According to the 2021 report, Punjab had:

Chart 3 – Data Collected in the States' Startup Ranking 2021 for Punjab



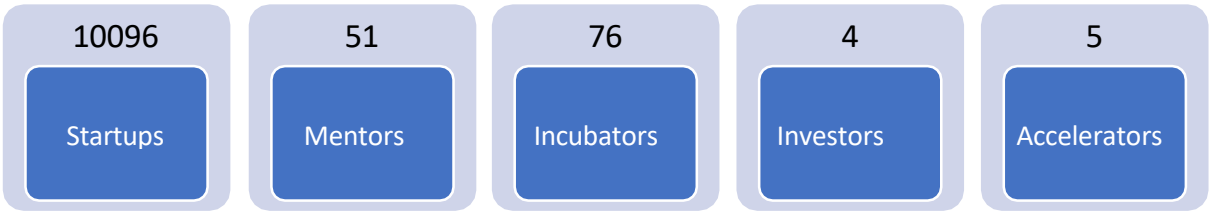


Source: prepared by the authors, based on https://www.startupindia.gov.in/digital-map/mapsid=5f48ce592a9bb065cdf9fb38&state=Punjab
. Accessed on 07/03/2024.

Kutch

According to Pathak and Mukherjee (2021), Kutch, the capital of the state of Gujarat, has an active presence of social entrepreneurship related to community-based handicraft production, with the following key actors standing out: social entrepreneurs and artisans, social enterprises, educational institutions, support institutions, and local community groups. They highlight the significant challenge of maintaining traditional craftsmanship while adapting to modern market demands. In this context, educational institutions play a vital role by providing training and skill development to artisans. At present, social entrepreneurship mainly emerges due to government interest, with encouragement not coming from financing or educational support, but rather from ease of access. The entrepreneurial ecosystem of Kutch is identified as a pillar of local economic development and the preservation of cultural identity.

Chart 4 – Digital map of the Startup India portal – Gurjarat, capital of Kutch



Source: prepared by the authors, based on. https://www.startupindia.gov.in/digital-map/maps?id=5f48ce592a9bb065cdf9fb28&state=Gujarat. Accessed on 03/07/2024.

Having reported the findings on Punjab and Kutch, it is imperative, given the number of articles available, to address India's prominent role in the startup ecosystem scenario.

STARTUPS ECOSYSTEM

Brief history

Regarding the startup ecosystem, Gonzalo, Federico, Parthasarathy, and Kantis (2022) point out that from 1990 to the early 2000s, there was a strong export orientation, with the software industry growing exponentially due to US demand. Also in the 1990s, the Indian economy opened up following deregulation, and foreign multinationals established operations in the country, fostering competition and encouraging Indian companies to compete alongside their foreign competitors. Technology parks and export incentive policies were decisive during this period (KRISHNAN, 2010).

Deregulation in the early 1990s was responsible for the opening of the Indian economy. Foreign multinational corporations (MNCs) from all sectors established operations in the country, leading to increased competition and allowing domestic companies to catch up with their foreign competitors (KRISHNAN, 2010). In the 2000s, some startups were founded, but the ecosystem showed a certain level of immaturity, as it had few active investors and support organizations, such as incubators and accelerators, were limited (DONGRE and DESHPANDE, 2021).

Features and results

The Department for Promotion of Industry and Internal Trade (DPIIT), part of the Ministry of Commerce and Industry of the Government of India, publishes on a dedicated website the "States' Startup Ranking," which is an

"annual capacity-building exercise created and disseminated by DPIIT that assesses all states and Union Territories of India on their efforts to build an ecosystem conducive to startup growth. [...] The objective is to assess the Indian startup landscape through the lens of state policy intervention and identify state practices that accelerate the growth and development of the ecosystem. The ranking has led each state to have dedicated startup policies and, through annual rankings, tracks the evolution of these policies and the states' overall efforts in building ecosystems." (https://www.startupindia.gov.in/srf/#resultPage)

The Startup India portal points out that only companies that meet the requirements to be considered startups are eligible to participate in the program, namely: a) company age - must not exceed 10 years; b) company type - private limited company or registered partnership firm or limited liability company; c) annual revenue - not exceeding USD 12 million; d) original entity - the company must not have been formed by the division or reconstruction of an existing business; e) innovative and scalable - must have a plan for developing or improving a product, process or service and/or a scalable business model with high potential for wealth and job creation (https://www.startupindia.gov.in/content/sih/en/startupgov/startup_recognition_page.html).

The Consulate General of Brazil in Mumbai, in 2023, states that "the universe of Indian startups is heterogeneous and ranges from precarious micro-enterprises to sophisticated technology companies with market values in the billions of dollars. Disruptive innovation in the Indian ecosystem is led by entrepreneurs with access to international capital markets and the US ecosystem, often through the numerous international incubator offices and venture capital funds in the country, notably in Bangalore, Mumbai, and New Delhi. [...] Indian startups are increasing the sophistication of their intellectual

property, with the growing presence of unique products and solutions. The target consumer is no longer restricted to the Indian audience, and a growing number of startups in India are now being created to serve the global market."

> [...] The startup ecosystem is now shifting toward B2B business models, which have deep tech and intellectual property-driven innovation as their core drivers. Beyond the current unicorns, Indian startups have been diversifying into sectors such as B2B[5], health tech, robotics, fintech, etc." (Mumbai and Bangalore Innovation Ecosystem Mapping, p. 64.)

According to the latest "States' Startup Ranking – National Report," published in 2024 with 2022 data, India has the 3rd largest startup ecosystem in the world and continues to grow, ranking 2nd in quality of innovation and 9th in terms of funding for startups and scaleups. The number of startups has grown 120% and their coverage has increased sixfold in the last seven years, with a presence in over 670 districts nationwide, with nearly 50% of startups based in Tier 2 and Tier 3 cities[6].

Chart 5 – Growth in the number of recognized startups
Fonte: States' startup ranking – National Report

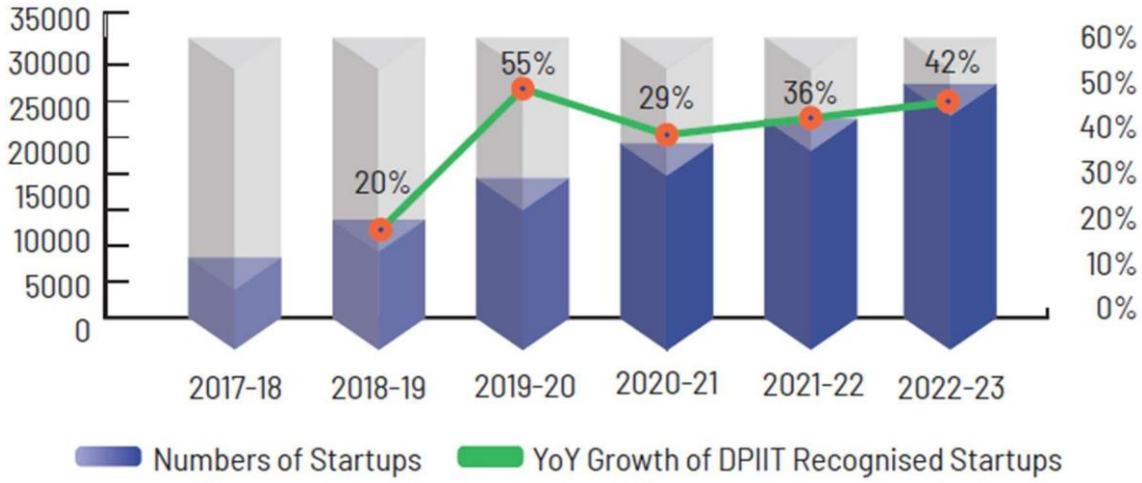
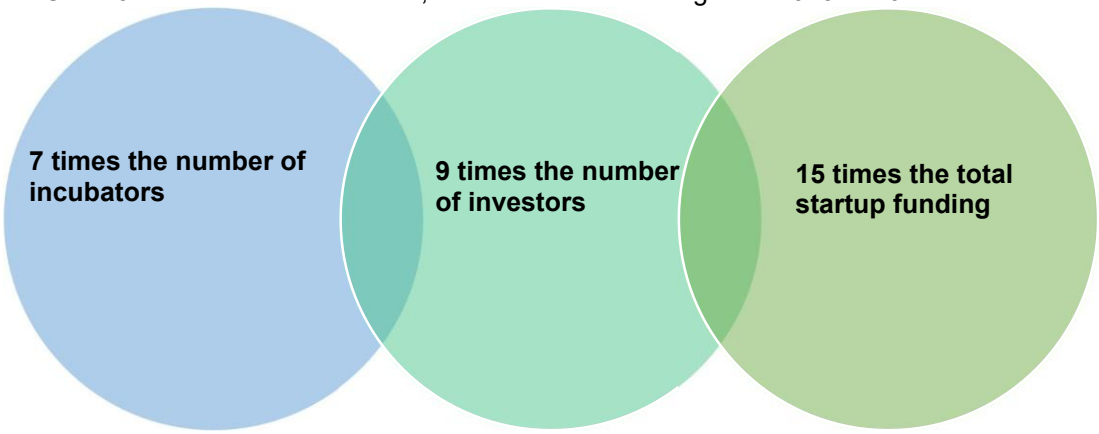


Chart 1 : Growth of DPIIT Startup Recognition

[5] services to another company, rather than to individual consumers.

[6] Classification of centres (tier-wise) Population of India (Census 2001) Tier-1: 100,000 and above; Tier-2: 50,000 to 99,999; Tier-3: 20,000 to 49,999; Tier-4: 10,000 to 19,999; Tier-5: 5,000 to 9,999; Tier-6: Less than 5,000 (Source: https://en.wikipedia.org/wiki/Classification_of_Indian_cities)

Chart 6 – Increase in incubators, investors and financing from 2015 to 2022



Source: Authors based on 'States' startup ranking – National Report'

The Consulate General of Brazil in Mumbai continues to indicate that India is home to more than 75,000 startups, with an estimated investment of USD 120 billion, since 2014, of which USD 38.5 billion in 2021 alone. "Among these companies, 106 have a market value exceeding USD 1 billion (unicorn), which places India as the third largest holder of unicorns in the world. It adds that in December 2023, India had a total of 112 unicorns with a total valuation of approximately INR 30L Cr3[7] and in 2021, 45 unicorns were "born" with a total valuation of 8.5L Cr and in 2022 there were 22 unicorns with a valuation of INR 2.5 Cr." (CONSULATE GENERAL OF BRAZIL IN MUMBAI, 2023, p. 3 and 8).

Still on the subject of Indian unicorns, it is important to know that: "they are not the result of the numerous network of national incubators. (Mapping of

[7] In the context of India, the expression "~INR 30L Cr" refers to a large amount of Indian Rupees (INR). Here's the breakdown of what that means: **INR:** Refers to the Indian Rupee, the official currency of India. **L:** Stands for "lakh," which is a unit of measurement in the Indian numeral system, equal to 100,000 (one hundred thousand). **Cr:** Stands for "crore," another unit of measurement in the Indian numeral system, equal to 10,000,000 (ten million). Therefore, "30L Cr" can be broken down as follows: 1. **30L:** "30 lakh," which is 30 times 100,000 (30 * 100,000), which equals 3,000,000 (three million). 2. **Cr:** One "crore" is 10,000,000 (ten million). So, "30L Cr" means: - 30 lakh crores, that is: - 30 * 100,000 * 10,000,000 - 30 * 1,000,000,000 (30 billion) - Resulting in 3,000,000,000,000 (three trillion) Indian Rupees. (Source: GPT Chat, accessed on 05/29/2024.).

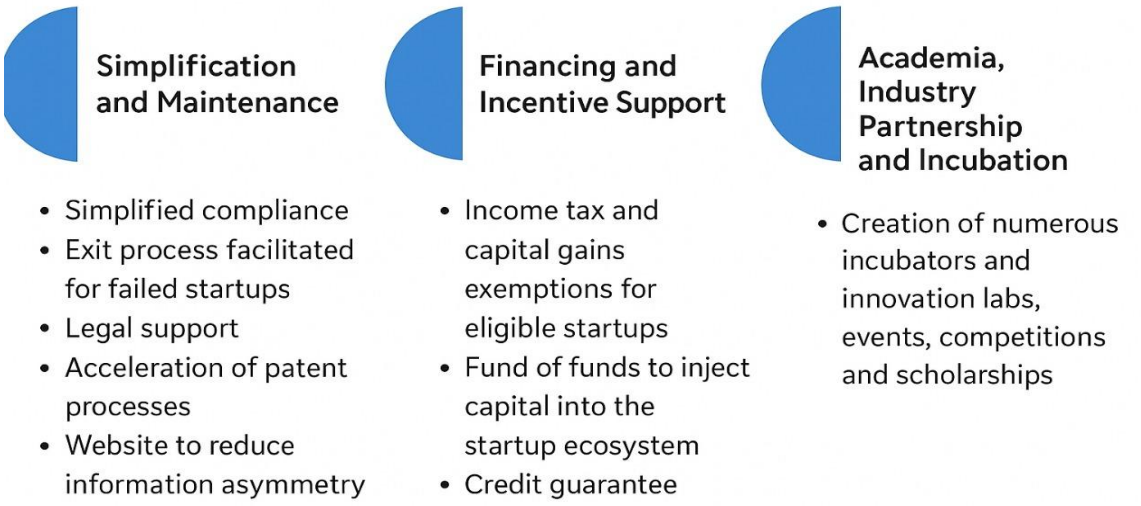
Innovation Ecosystems Abroad: Mumbai and Bangalore. Mumbai: Consulate General of Brazil in Mumbai, p. 33)

Startups participating in domestic accelerator programs, many of which are the result of federal and state government programs, have not yet managed to produce economically viable companies. This is evident in the low level of capitalization of these companies. Available data indicate that, in 2019, only 7 of the 100 most highly funded startups (in the category of up to USD 1 billion in market value) went through these programs, and that only 12% of the companies that benefited from seed investment[8] up to that year had benefited from these programs. These data exclude Indian offices of foreign funds, incubators, and accelerators. (Innovation Ecosystem Mappings Abroad: Mumbai and Bangalore. Mumbai: Consulate General of Brazil in Mumbai, p. 33).

The importance of private actors in building the Indian startup ecosystem is also recognized in the "States' Startup Ranking 2022 - National Report," which lists the following as impactful activities: financing, mentoring, networking, and innovation opportunities for emerging entrepreneurs. However, the government claims a leading role in fostering startups by defining the direction of growth through the design of effective policies, such as networking, training and mentoring, and entrepreneurship outreach campaigns throughout the country. It highlights the aforementioned Startup India program, launched on January 16, 2016, as a central initiative. It consists of 19 action items based on three pillars:

[8] Seed investment (or seed capital) is a type of initial funding that a startup or new company receives to help it take its first steps into the market. This type of investment typically occurs in the early stages of a company, when it is still developing its products, services, or business model, and may not yet have significant revenue or established customers.

Chart 7 – Pillars and respective promotion actions of Startup India



Source: Authors based on ‘States’ startup ranking – National Report’

The Consulate General of Brazil in Mumbai highlights the prominent role of the Indian government in "investing in research and development in India, accounting for approximately 60% of the total, according to the Reserve Bank of India (RBI). These resources are also channeled into the Indian innovation ecosystem, which benefits directly and indirectly from public resources invested in research. Various observers and analysts consider the supply of skilled labor to be the main factor in the growth of the country's information technology sector. Its concentration in the city of Bangalore is primarily due to the city's mostly public higher education institutions, which produce a large number of qualified engineers.

The presence of the Indian federal and state governments in the innovation ecosystem, however, is not limited to undergraduate programs; there is a broad network of institutions and initiatives dedicated to the system, notably

in the states of Karnataka and Bangalore. The lines of action of state programs include direct financial support, tax incentives, operational support, and exemptions from regulatory frameworks (see, for example, the Information Technology Act). Karnataka Innovation Authority, 2020)". (Mumbai and Bangalore Innovation Ecosystem Mapping, 2023, p. 10).

Additionally, the Consulate General of Brazil in Mumbai states that to understand public policies and corporate innovation strategies being adopted by public and private institutions, including startups, it is essential to be aware of the existence of 'IndiaStack': "a scalable architecture that aims to accelerate the adoption of digital practices and products in India. Since its introduction, more than 1.2 billion Indians have received their biometric identification - Aadhaar - and have been enrolled in the Universal Identification (UiD) project." (Mapping the Innovation Ecosystem of Mumbai and Bangalore, 2023, p. 23)

The Brazilian international representation in Mumbai expands its analysis and shares that entrepreneurs evaluate the effectiveness of these government programs heterogeneously. A survey conducted by INC 42, the leading media outlet for the sector in India, revealed that 57% of Indian startup founders are skeptical of public institutions in the innovation ecosystem, and 49% expressed that sudden regulatory changes negatively affect the ecosystem. However, 58% are optimistic about regulatory policies for the sector." (Mumbai and Bangalore Innovation Ecosystem Mapping, 2023, p. 11).

The Indian central government believes that startups have a multifaceted impact on society, introducing innovative solutions, creating large-scale jobs, and contributing to economic growth. It points out that young people are driving innovation, entrepreneurship, and diversity, which will play key roles in making the "Indian startup ecosystem the largest in the world" (p. 9). It adds that the country is fostering female entrepreneurship through the development of networks, communities, and partnerships. In this regard, there has been a

4% increase in the number of startups led by women in the last five years, and approximately 49% of companies recognized by the DPIIT have at least one woman as a "director" (States' startup ranking 2022 – National Report, p. 9).

According to the Consulate General of Brazil in Mumbai, it is estimated that by 2025 the number of startups will reach 100,000, and that these companies will employ 3.6 million people. If this projection is confirmed, India could become the second-largest holder of such companies in the world, behind only the US. It also reports that the "Indian innovation ecosystem has approximately 520 accelerators and incubators, 500 institutional investors, and 2,000 active investors" and emphasizes that "Indian capital represents only 10% of investments in the sector. The vast majority of innovation investment in India originates from large technology companies and US venture capital funds. Other developed economies also actively invest in the ecosystem, albeit on a scale that cannot be compared to the US presence." (CONSULATE GENERAL OF BRAZIL IN MUMBAI, 2023, p. 8.)

Briefly addressing the cultural characteristics that impact the entrepreneurship landscape and, consequently, entrepreneurial ecosystems, it is worth mentioning the reported low tolerance for failure in India, which negatively impacts entrepreneurship, a sector prone to failure (JHA, 2018). In this regard, in the Entrepreneurial Behavior and Attitudes Panel, the fear of failure rate, according to the self-perception menu, is 62.82%, while the regional (Asia and Oceania) and global averages are, respectively, 46.04% and 44.63% (GEM, 2023).

Sonkar and Sarkar (2021) also point to caste and religion as external factors in the development of the entrepreneurial ecosystem and their support for entrepreneurship, as they determine the occupations that people can pursue, in addition to determining the type/size of the company. Having shared general data

on the Indian startup ecosystem, it is important to analyze the leading states in this scenario: Bangalore, Mumbai, and Delhi.

Bangalore and Mumbai

In India, Bangalore is emerging as the leading hub for technology startups (DONGRE and DESHPANDE, 2021), consistently attracting global interest (SUBRAHMANYA, 2015). The state of Karnataka (capital Bangalore) accounts for approximately 35% of the country's startups (SONKAR and SARKAR, 2021).

Initially influenced by state policies since India's independence, in the 1970s and 1980s, initiatives such as the development of a national computer and the construction of Electronic City established Bangalore's role as a central hub for the electronics and IT industry. This period also saw the entry of private companies and the arrival of multinationals, establishing a solid foundation for technological growth (GONZALO; FEDERICO; PARTHASARATHY; KANTIS, 2022).

A survey conducted between August 2015 and October 2016 using the Delphi method with 34 experts revealed that although Bangalore has several higher education institutions focused on science and engineering, their integration with industry and their impact on generating technology entrepreneurship are limited. Innovation and technology transfer activities to industry are negligible. One example of this is the Indian Institute of Science in Bangalore, which, despite being one of the most globally recognized research universities, "was responsible for only 32 patent applications, making it the only institution among the top 10 Indian patent applicants from institutes and universities in 2013–2014, with a total number of patent applications of 42,951 (Government of India, 2014)" (HILLEMANE, 2020, p. 1182). Add to this data that from 2009-2016 approximately 79% of the patents granted to inventors in India

went to individuals working in outsourced research and development centers, called Global Capability Centers (GCCs) that are established by multinationals such as IBM, Google, Intel and Microsoft (EMBAIXADA DO BRASIL EM NOVA DELHI, 2022).

Furthermore, universities are not yet active participants in the early stage market for startups' technology products. The creation of government-supported technology business incubators at universities, including in Bangalore, is a recent initiative. Therefore, educational institutions need to significantly develop their supporting and promoting role in the startup ecosystem (HILLEMANE, 2020, p. 1182).

The same study indicates that the level of market support for technology startups—early adopters, stability, and growth—was still in its infancy. Although the general population has higher technological literacy than the national average, the overall market for technology startups is still seen as moderate and expanding, despite being the country's leading startup city. Finally, the availability and quality of technology and business mentors to guide and support technology startups are considered insufficient, although they are increasing. The paper concludes that the dynamics of the Bangalore ecosystem are predominantly characterized by the rapid proliferation of "emerging technology startups," followed by several "stable operating startups," but there are few "successful and mature startups." Consequently, the Bangalore ecosystem can be considered "developing" and described as "moderately mature" (HILLEMANE, 2020, p. 1168).

From another perspective, the last decade has seen a veritable boom, with an increase in the number of startups and the strengthening of a dynamic Bangalore ecosystem, supported by growing domestic demand and deeper participation from multinational companies. (GONZALO; FEDERICO; PARTHASARATHY; KANTIS, 2022).

Furthermore, several multinational companies have R&D labs in Bangalore (ABB, Airbus, Bosch, Boeing, GE, Google, and Microsoft), contributing to its leading role in innovation in India. In addition, a wide range of heavy and light industries, as well as services, are located in Bangalore. These include electronics, aerospace, pharmaceuticals, biotechnology, automobiles, banking and finance, mining, steel, and cement. The city has not only maintained its appeal as India's IT hub but also solidified its reputation globally. (GONZALO; FEDERICO; PARTHASARATHY; KANTIS, 2022).

Expanding the analysis, the Consulate General of Brazil in Mumbai chose Bangalore—in addition to Mumbai itself—as a study site for mapping innovation-promoting environments abroad. As the material itself points out, "Itamaraty, through its network of Science, Technology, and Innovation Sectors (SECTECs) in embassies and consulates around the world, has privileged capabilities to collect information, identify opportunities, and conduct analyses on the innovation-promoting environments in which they operate," making it possible to contribute "to the internationalization strategy of startups and other Brazilian innovation agents." (Innovation Ecosystem Mappings Abroad: Mumbai and Bangalore. Mumbai: Consulate General of Brazil in Mumbai, 2023, p. 4).

Chart 8 – Jurisdiction of the Brazilian Consulate in Mumbai

Maharashtra capital Mumbai	is the economic and financial hub, accounting for 14% of India's GDP and the most important among the 28 states;	In 2021, the two states together "boasted a GDP of approximately USD 640 billion, greater than that of Sweden (USD 630 billion), Belgium (USD 594 billion), and Argentina (USD 487 billion), to name a few of Brazil's priority partners." In addition to attracting "innovative initiatives in digital commerce, biotechnology, health technology and pharmaceuticals, fintechs, artificial intelligence, and the aerospace sector." (p. 6)
Karnataka capital Bangalore	is a center of science, technology, and innovation, accounting for 9% of the country's GDP and ranking third in importance;	
Goa	with a strong Portuguese influence, works to attract startups and develop an innovation ecosystem in the state.	

Source: Prepared by the authors, based on Innovation Ecosystem Mappings Abroad: Mumbai and Bangalore. Mumbai: Consulate General of Brazil in Mumbai, 2023

The Brazilian study also points out that the country's ST&I sectors as a whole, and those of Mararashtra (Mumbai), Karnataka (Bangalore), and Goa in particular, benefit from abundant resources from the federal and state governments and massive contributions from accelerators, incubators, and international venture capital funds, primarily from the United States. It emphasizes that "the secret to Maharashtra and Karnataka's surprising development in ST&I lies in local universities, such as IIT Mumbai and Bangalore University," which provide "graduates" for industries and the entire Indian innovation ecosystem and are the origin of the country's more than 75,000 startups. It reports that many graduates from these universities enter graduate programs at leading centers of excellence worldwide and end up becoming responsible for creating startups—"about 40% of startups in the United States are led by Indians"—and become directors of multinationals: "Alphabet (Google), Microsoft, Chanel, Adobe, IBM, Micron Technology, Palo Alto Networks, and Mastercard." Such is the importance of the states under the Consulate's jurisdiction that the agency "will have a Science, Technology, and Innovation Sector (SECTEC) starting in 2023" (CONSULATE GENERAL OF BRAZIL IN MUMBAI, 2023, p. 7).

Still on the subject of universities, the Brazilian Embassy in New Delhi assesses that India has the 3rd largest "technical workforce" and ranks 8th in the world in terms of the number of annual graduates in STI fields (Embassy of Brazil in New Delhi, 2022). According to 2020 figures obtained from the University Grants Commission, the country has 950 public and private universities and ranks 3rd in the world in the number of peer-reviewed scientific and engineering articles published.

Turning again to Bangalore, the Brazilian Consulate estimates that the city concentrates "approximately 40% of the Indian innovation ecosystem, hosting 50% of unicorns, and has the largest number of venture capital firm

offices in the country (surpassing cities like Delhi and Mumbai). The city is also the main destination for innovation investments in India, having received approximately USD 21 billion in 2021 (half of India's total)."

The "Global Startup Ecosystem Report," published in May 2022, listed Bangalore as the 5th largest city in the world for venture capital in the first half of 2022 (the top four were: San Francisco/Bay Area, New York, London, and Boston), having received USD 7.5 billion in venture capital between January and May 2022. By early 2023, the city had recorded venture investments totaling USD 10.2 billion in 2022 (again, about half of the total invested in India).

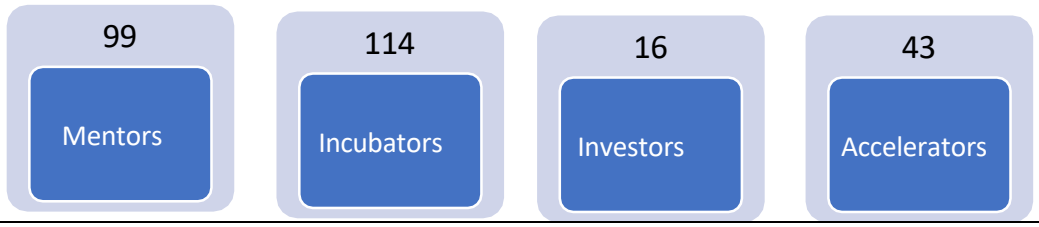
The city's technological prominence has led to the establishment of 450 research labs and offices for leading multinational companies (400 of the 500 companies listed on the "Fortune 500" operate offices in the city). Additionally, the rapid development of Bangalore's innovation ecosystem is reflected in the composition of its labor market. The city, with 11 million inhabitants, currently has 200,000 expatriate professionals, a high number by Indian standards. It is estimated that there are 100,000 PhDs, 300,000 semiconductor engineers (chip design), 15,000 aeronautical engineers, and 30,000 mechanical engineers. Economic and demographic growth, however, has created challenges for the city's precarious urban infrastructure, which has not kept pace with the city's development. (CONSULATE GENERAL OF BRAZIL IN MUMBAI, 2023, p. 9).

Continuing the analysis, this time regarding Bangalore's challenges, it is pointed out that the city is embedded in India's disparate structural reality, such as social and caste-based segregation (GONZALO; FEDERICO; PARTHASARATHY; KANTIS, 2022). Another aspect highlighted is the low rate of corporate exits in the Bangalore ecosystem, whether through acquisitions or IPOs (Initial Public Offerings). Entrepreneurs and venture capitalists need successful exits to profit and reinvest in new startups, which is challenged by liquidity shortages and rare exits (JHA, 2018).

The Consulate General of Brazil in Mumbai lists Indian startups with IPOs: Nykaa – e-commerce retail; CarTrade – sale of various types of vehicles and services; Tracxn Technologies – artificial intelligence; DroneAcharya – research, survey, and data processing with drones and pilot training for unmanned vehicles; Nazara – Gaming and Sports Media. (Mapping the Innovation Ecosystem of Mumbai and Bangalore, pp. 78-81.)

Finally, the digital map of the Startup India portal indicates that the state of Karnataka, whose capital is Bangalore, currently has the contents in chart 9.

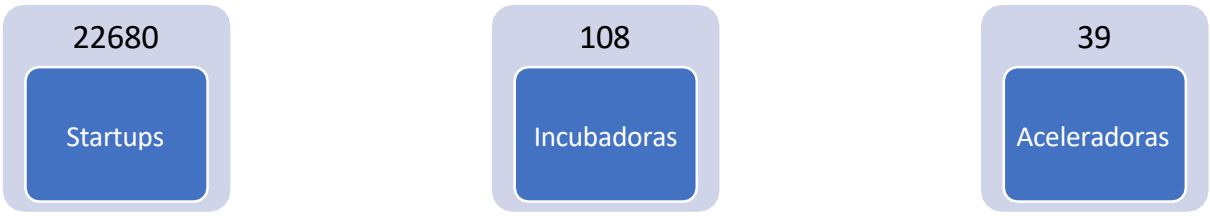
Chart 9 – Karnataka's Numbers in Startup India



Source: Prepared by the authors, based on https://www.startupindia.gov.in/digital-map/maps?id=5f48ce592a9bb065cdf9fb31&state=Maharashtra. Accessed on July 3, 2024.

The digital map of the Startup India portal, applied to the state of Maharashtra, whose capital is Mumbai, currently contains what is described in chart 10.

Chart 10 – Maharashtra's Numbers in Startup India



Source: Prepared by the authors, based on https://www.startupindia.gov.in/digital-map/maps?id=5f48ce592a9bb065cdf9fb31&state=Maharashtra. Accessed on July 3, 2024.

Mumbai and fintechs

India has the third-largest fintech ecosystem in the world (Chavan, 2022). A paper discussing the role of fintechs points out that "India's financial geography, reshaped by fintech, is now structured around the complementarity between the current financial center (Mumbai) and the new technical capabilities and investment networks found in emerging financial centers as finance becomes increasingly digitized (Bangalore and New Delhi)." (MIGOZZI, URBAN, WÓJCIK, 2023, p. 11).

The Brazilian Embassy in Delhi and the surrounding region points out that Mumbai is known as the "financial capital of India" and has emerged over the last decade as India's third-largest startup hub, after Bangalore and Delhi, with a focus on fintech, e-commerce, and enterprise technology. Migozzi, Urban and Wójcik (2023) indicate the proactive and prominent role of the central State in supporting fintech, which “should be conceptualized as a ‘Technology-FinState’ ecosystem” (MIGOZZI, URBAN, WÓJCIK, 2023, p. 12).

The Brazilian Consulate in Mumbai clarifies that "Maharashtra was the first state in the country to announce a specific policy for the fintech sector. The main objective of the policy is to finance startups in the sector through: I - support for operating expenses (including rent and construction of coworking spaces); II - funding for software testing ("sandbox"); III - and contributions to the Global FinTech Hub. The sum of these guidelines aims to form a USD 2 billion fund for fintechs over a period of 3 years. The Mumbai FinTech Hub was established to implement the policy and can help establish Smart FinTech Centers in the main cities of the state." Kaur, Ahmad, Hari and Kattumuri (2024) state that government actions, such as the creation of the Mumbai Fintech Hub, Vizag Fintech Valley and Gujarat International Finance TecCity (GIFT City), as well as the implementation of several incubator centers aligned with strategic reforms in the financial economy, including demonetization and the application

of the Goods and Services Tax (GST) regime, together with the emergence of the Covid-19 pandemic, have driven the rapid integration of Fintech processes.

In information that aligns with the country's fintech framework, as reported above, the Brazilian Consulate in Mumbai indicates that IndiaStack, mentioned above, appears to have enabled the more efficient opening of more than 500 million bank accounts for citizens previously excluded from the formal banking system. These bank accounts were opened with the aim of facilitating citizens' access to formal credit and the direct transfer of government benefits and subsidies. The rapid adoption of the digital platform has fueled the rapid growth of digital transactions, explaining the commercial success achieved by companies such as PayTM and Phone Be (the latter, owned by Walmart, raised USD 350 million in an investment round completed in January 2023) (CONSULATE GENERAL OF BRAZIL IN MUMBAI, 2023).

A report from the Brazilian Consulate in Mumbai adds that,

> Additional infrastructure layers are being built on IndiaStack. For example, 'HealthStack' aims to enable India's flagship health insurance scheme to reach 300 million citizens, and 'Digital Sky' focuses on authorizing flight plans for drones and small planes. The prospect of millions of new consumers for a myriad of digital services and products presents significant commercial opportunities and is being explored by Indian entrepreneurs (CONSULATE GENERAL OF BRAZIL IN MUMBAI, 2023, p. 24).Migozzi, Urban e Wójcik (2023)

Migozzi, Urban, and Wójcik (2023) point out that the Indian fintech ecosystem appears to be entering a phase of consolidation. The gap between Bangalore, New Delhi, Mumbai, and other cities is likely to widen, further challenging the country's already uneven spatial economy. Furthermore, Indian financial startups are advancing in the country's demonetization process and becoming a vehicle for regional integration with Asian investors, establishing institutional collaborations with Singapore, involving the Reserve Bank of India. In this regard, India contrasts (MIGOZZI, URBAN, WÓJCIK, 2023) with the

limited cross-border integration that characterizes the fintech industry throughout South America (IOANNOU, WÓJCIK, 2022).

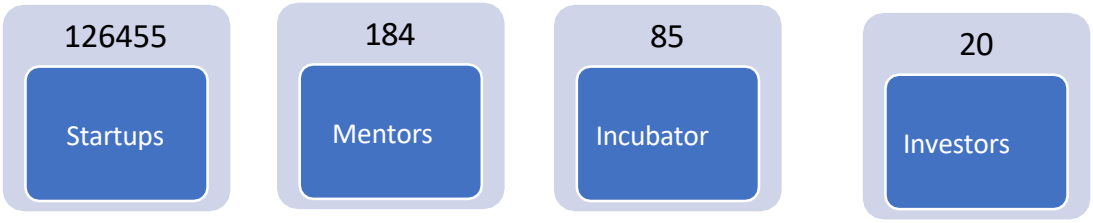
Startup Ecosystem in Delhi

The "States' Startup Ranking 2022 – Delhi," published in 2024 with 2022 data by the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India, indicates that the city has implemented a startup growth policy to foster an ecosystem conducive to an innovation-based economy and foster the entrepreneurial spirit through robust government support.

The goal is to encourage, facilitate, and support 15,000 startups by 2030, focusing on educational technology, healthcare, tourism, transportation and logistics, automotive, business-to-citizen connectivity, etc. The main incentives include: a) 50% rental reimbursement; b) reimbursement subsidies for patent, trademark, copyright, and industrial design registrations; c) reimbursement of exhibition booth costs; d) scholarships for outstanding students.

The digital map on the Startup India portal indicates that Delhi currently has what is shown in chart 11.

Chart 11 – Delhi Numbers in Startup India



Fonte: elaborado pelos autores, baseado em https://www.startupindia.gov.in/digital-map/maps?id=5f48ce592a9bb065cdf9fb26&state=Delhi. Acesso em 03/07/2024.

According to a report from the Brazilian Embassy in Delhi and surrounding areas, the city has surpassed Bangalore to become India's startup

capital, with the creation of over 5,000 startups between April 2019 and December 2021. It continues to indicate that the startup ecosystem is strengthened by the presence of companies with easy access to foreign investors, government agencies, and seed funding. Furthermore, there are leading educational and research institutions and a skilled workforce, with a focus on information technology services, e-commerce, business process outsourcing, and design. Delhi's fintechs received the most funding between 2014 and 2020, as shown in Table 1.

Table 1 – Business sectors of startups that received the most investment from 2014 to 2020

Fintechs	20.6%
E-commerce	17.6%
Traveltechs	15.2%
Cleantechs	15.1%
Serviço ao consumidor	11.4%
Consumer service	5.9%
Other	14.1%

Source: Authors based on a report from the Brazilian Embassy in Delhi and surrounding areas

FINAL CONSIDERATIONS

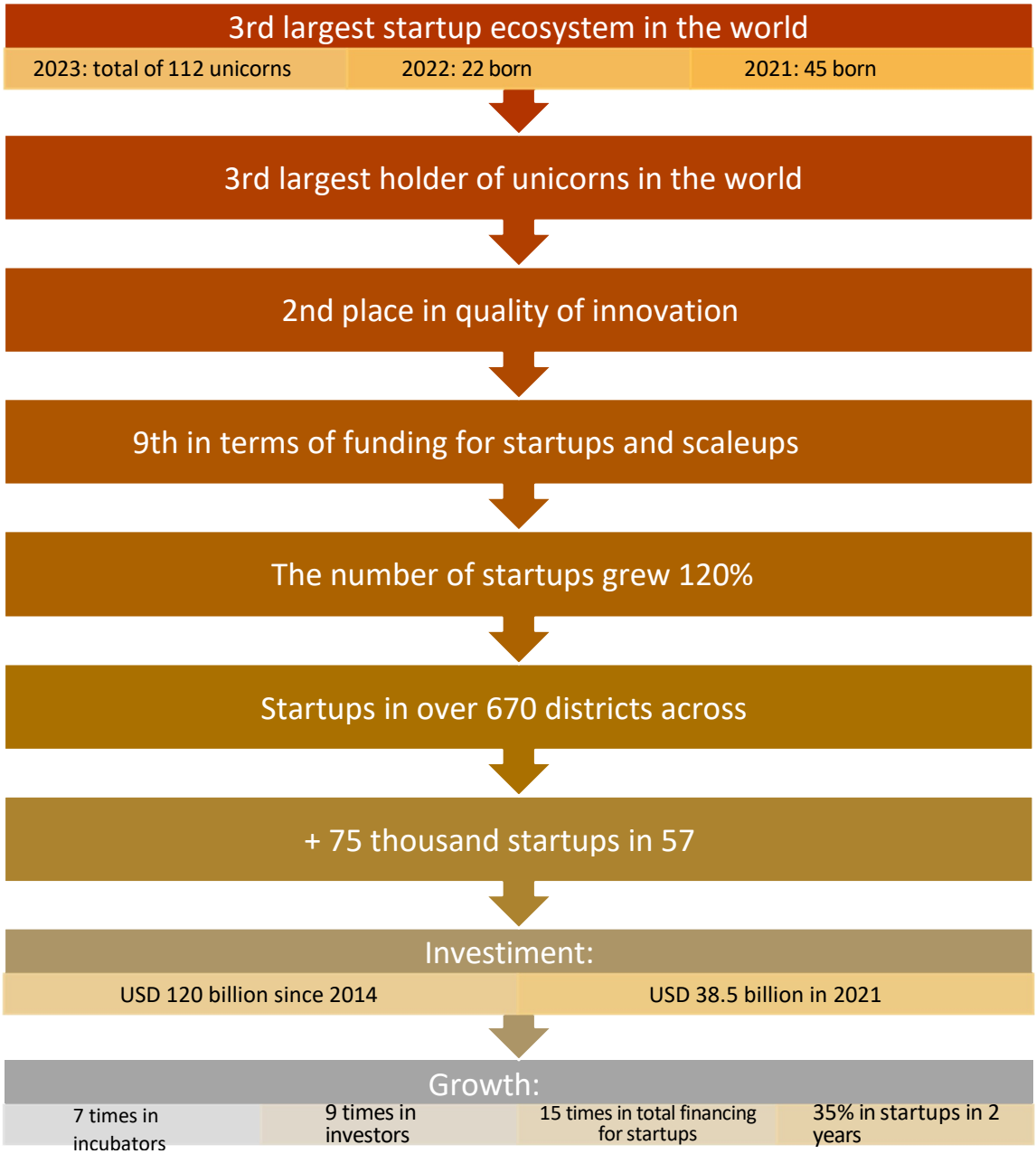
Based on everything discussed, regarding EE in the Asian country, some points are worth highlighting, listed below:

- Strong indication that India's entrepreneurial ecosystem(s) lack consistent mapping, considering the definition coined in the "West";
- Very strong government involvement with startups;
- Similar to Brazil in terms of regional and interstate inequalities, we see many studies on places that concentrate significant entrepreneurial activity, such as São Paulo and SP;
- What can be researched since there is no consistent mapping of EE: The Invest India website is the national investment promotion and business facilitation agency of the Indian government and provides information and support for foreign and domestic investors interested in investing in the country. The website offers resources such as investment guides, regulatory support,

government policies, and information on 23 sectors (which can be researched): 1. Automotive: vehicle manufacturing, auto parts, and components; 2. Biotechnology: research and development in biotechnology; 3. Chemicals and petrochemicals; 4. Electronics and hardware technology; 5. Renewable energy: solar, wind, hydropower, and other clean sources; 6. Engineering and design; 7. Pharmaceutical: production of drugs and pharmaceuticals; 8. Finance and insurance; 9. Infrastructure: transportation, energy, sanitation, and construction. 10. Manufacturing: various industrial sectors; 11. Mining and metals production; 12. Health and wellness: health care and related services; 13. Information technology (IT): software development, IT services; 14. Telecommunications and consumer electronics; 15. Textiles and apparel; 16. Tourism and hospitality; 17. Aerospace and defense; 18. Education and training: including schools, universities, and vocational training; 19. Logistics and transportation; 20. Retail and e-commerce; 21. Entertainment and media: film, music, television, advertising, and digital media; 22. Construction; 23. Environment and sustainability: green technologies, waste management, and environmental conservation.

It is also worth highlighting the consolidation of some figures, described in Chart 12.

Chart 12 – Consolidation of data obtained from the research



Fonte: os autores com base nos dados obtidos na pesquisa para o artigo

Finally, India, like several other nations in the global South, has proven to be a fertile ground for the study, research, analysis, and development of EE. As a giant nation in many ways, it has strengths in certain regions regarding

ecosystems, but requires many areas of improvement or even the birth of new actions to realize its full potential. In this regard, the role of scientific academia is essential to equip local and national governments, as well as various institutions and organizations, and entrepreneurs with analyses of phenomena and public policies for this country, which is vital to its region and continent, as well as the BRICS.

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