
REPORT

The Genesis of Global Technology Ecosystems and a Strategy for Puglia

A comparative analysis of world models and a proposal to make Puglia a global technology hub

Bari, 11 July 2026

1. Premise and purpose

PugliaTechs APS is a social promotion association, a Third Sector entity registered with the RUNTS, that works for the growth of Puglia's technological and entrepreneurial ecosystem through activities of aggregation, peer learning, internationalisation and the development of digital community tools. Consistent with this mission, the Association promotes a structured dialogue with regional and national institutions on the policies capable of turning Puglia into a technology hub of global relevance.

This document stems from a precise question: how do successful technology ecosystems actually come into being around the world? Public rhetoric tends to explain their origin with single factors (the great university, the tax incentive, the public fund), but academic research and empirical evidence tell a more nuanced and, above all, recurring story. Identifying these recurring patterns makes it possible to move from imitative and fragmented policies to a coherent strategy, calibrated on the territory's real assets.

The aim of this report is twofold: first, to present in a concise but rigorous form the most relevant theoretical models and international case studies; second, to offer institutions a shared analytical basis from which to build a strategy specific to Puglia. The document is designed to be published and discussed publicly, as an open contribution by the Association to the debate on regional development.

2. Methodology and sources

The analysis unfolds in three steps. First, it recalls the main theoretical frameworks on the genesis of entrepreneurial ecosystems, from the founding literature of the 1990s to the most recent quantitative indices. Second, it examines nine international ecosystems, chosen for their geographic, model and maturity-stage diversity: Silicon Valley as the reference, New York, London, Singapore, Seoul, Tel Aviv, Lisbon, Estonia with Tallinn, and the Nordic hub of Stockholm and Helsinki. For each, it isolates the original trigger, the role of the State, access to capital, the talent base, the specialisation and the factor that truly accelerated its growth.

From the cross-comparison it finally extracts a matrix of recurring patterns, which is applied to the situation in Puglia to identify assets, gaps and levers for intervention. The quantitative information cited comes from public sources (industry reports, academic literature, development agencies and specialised press) updated to mid-2026 and should be understood as orders of magnitude in support of the argument, not as certified data.

3. What makes a technology ecosystem emerge: the theoretical frameworks

3.1 Saxenian: networks, mobility and brain circulation

The founding study remains “Regional Advantage” (1994) by AnnaLee Saxenian, which compares Silicon Valley with the Route 128 area near Boston. With comparable universities and public investment, Silicon Valley prevails thanks to decentralised and collaborative networks, high labour mobility and a culture that favours knowledge exchange and the creation of spin-offs. The competitive advantage lies not in the individual firms but in the social fabric that connects them. In the later “The New Argonauts” (2006) Saxenian introduces the concept of “brain circulation”: the technology diasporas of India and China, after an initial phase of brain drain, become bridges that bring competences, capital and relationships back to their territories of origin. It is a decisive point for regions that today suffer the emigration of qualified young people.

3.2 Isenberg: the six domains of the ecosystem

Daniel Isenberg (Harvard Business Review, 2010) argues that every ecosystem is unique but all are composed of six interdependent domains: public policy, finance, culture, supports and infrastructure, human capital and markets. The operational lesson is that there is no single decisive lever: acting on one domain alone, isolated from the others, produces modest results.

3.3 Feld: the entrepreneur-led community

In “Startup Communities” (2012) Brad Feld formulates the “Boulder Thesis”: an ecosystem thrives if it is led by entrepreneurs themselves (not by institutions or universities, which are their allies), if it adopts a long-term horizon (at least twenty years), if it is radically inclusive towards anyone who wishes to take part, and if it generates activities with real and continuous engagement, not mere occasional conferences.

3.4 Startup Genome: connectedness as a predictor

Startup Genome’s research quantifies what the theories describe. Local and global connectedness is among the strongest predictors of growth: a one-point increase in the local connectedness index is associated with growth in the ecosystem’s value estimated at around 15%, and the most globally connected ecosystems grow faster because they draw on a worldwide fabric of ideas, talent and capital. Other recurring factors of scale-up trajectories are stock-option plans, the presence of experienced advisors, founder motivation and a global-market orientation from the very start.

3.5 Endeavor: the multiplier effect and scale-up “mafias”

Endeavor’s analysis of more than fifty markets highlights the “multiplier effect”: a few high-impact founders (the “big bubbles”) generate, by reinvesting capital, time and relationships, dozens of new firms. Three or four of these protagonists are enough to ignite an ecosystem. The phenomenon is visible everywhere, from the PayPal Mafia in Silicon Valley to the networks of former Rappi employees in Latin America or of Peak in Turkey. The strategic consequence is clear: cultivating and retaining a few local champions is worth more than a thousand scattered interventions.

3.6 Porter and Smart Specialisation

Upstream, Michael Porter’s cluster theory explains why the geographic concentration of related firms generates competitive advantage. On this basis the European Union has built its Smart Specialisation strategies (S3), which invite each region to concentrate resources on the domains in which it holds a distinctive advantage, rather than chasing every fashionable technology.

3.7 The anchor-tenant hypothesis and multinational spillovers

A specific line of research, from the anchor-tenant hypothesis of Agrawal and Cockburn to the more recent literature on multinational spillovers (Small Business Economics, 2025), shows that the subsidiaries of large firms and of foreign scale-ups, in particular their research and development centres, can act as the anchor of an entrepreneurial ecosystem. The mechanism is not the mere creation of jobs: the foreign subsidiary trains human capital to global standards, introduces advanced managerial and technological practices, generates demand for local suppliers and, above all, produces over time spin-offs and new founders who leave the parent company to start their own ventures. The research identifies several spillover channels (labour mobility, supplier links, universities and clients, imitation, acquisitions) through which the rooted presence of a multinational strengthens the technological foundations of the territory and its capacity to incubate new firms. It is the other face of the brain circulation described by Saxenian: here it is global talent that enters the territory, instead of local talent returning to it.

4. Nine ecosystems compared

4.1 Silicon Valley (reference)

It emerged from the meeting of university research (Stanford), public demand (defence and the space programme), the availability of venture capital and a unique culture of mobility and tolerance for failure. It remains the benchmark, but it is not a model that can be replicated in full: it is more useful as a catalogue of the factors that recur elsewhere in different combinations.

4.2 New York: from capital and existing sectors

“Silicon Alley” emerged in the 1990s not from a public plan but from the convergence of assets already present: Wall Street capital seeking new opportunities, advertising, media and publishing industries seeking digitalisation, real estate made cheap by the recession and abundant creative talent. Venture capital investment in the area rose from around 400 million dollars in 1996 to 2.6 billion in 1999. The lesson: an ecosystem can emerge by grafting digital onto a territory’s pre-existing strong sectors.

4.3 London: public initiative and fintech specialisation

Around 2008-2010 the Old Street cluster (“Silicon Roundabout”) was supported by a public initiative (“Tech City”), flanked by tax breaks for startups and investors and a favourable regulator. London specialised in fintech, where proximity to the City and an open regulatory environment generated over two thousand firms and champions such as Monzo, Starling and Revolut. Key factors: international openness of talent and a well-identified vertical sector.

4.4 Singapore: the State as architect

Singapore is the most markedly State-led case. The Economic Development Board structures incentives, the BLOCK71 initiative (born from the National University of Singapore) creates a very high physical density of startups and accelerators, and the country positions itself as a gateway to South-East Asia, capturing over 70% of the area’s venture capital. Recently the bet is on deep tech. The lesson: the State can be an effective architect if it builds infrastructure, density and connections to the market, without substituting itself for the firm.

4.5 Seoul: planned cluster and conglomerates

Pangyo Techno Valley, launched in 2011, concentrates over 1,800 firms and generates a significant share of provincial GDP. The model combines public planning (technology zones, tax incentives, regulatory sandboxes for autonomous vehicles, drones, fintech, AI) and conglomerates (Samsung,

Naver, Kakao, Nexon) that invest in and acquire startups, creating an environment rich in exits. Strong specialisations in gaming, AI and deep tech.

4.6 Tel Aviv: military talent and smart capital

Israel fuses two levers. The first is an extraordinary talent pipeline, fed by the military technology units (Unit 8200 has generated founders of Check Point, CyberArk, Palo Alto Networks, Wiz). The second is the Yozma programme (1993): public funds that co-invest with foreign venture capital to create a venture capital industry from scratch, later progressively privatised. Not the State that finances startups directly, but the State that builds the conditions for private capital to arrive and stay.

4.7 Lisbon: quality of life as a lever of attraction

Lisbon grows by betting on the attraction of international talent and human capital: the arrival of the Web Summit in 2016, visas dedicated to entrepreneurs and startups, a competitive cost of living, high quality of life and a broad supply of English-speaking technical talent. It has become one of the world capitals of remote work and digital nomads, with startup value growing more than twentyfold in eight years. The lesson for Mediterranean territories: climate, cost and lifestyle, if accompanied by policies and events, become economic factors.

4.8 Estonia and Tallinn: the digital State and the Skype “mafia”

Estonia demonstrates that digital simplicity is a competitive advantage. Digital identity for 99% of citizens, fully online public services, electronic signature with full legal value and the e-Residency programme that allows anyone to open and run a European company remotely. On the talent side, the sale of Skype (2005) generated the “Estonian mafia” of founders and early employees who reinvested in the territory, giving rise to unicorns such as Wise, Bolt and Pipedrive. The result: the highest number of unicorns per capita in Europe.

4.9 Stockholm and Helsinki: the unicorn factory

Sweden, with about ten million inhabitants, has produced over forty unicorns. The mechanism is the recycling of talent and capital: former employees of Spotify, Klarna and King found new firms (from Klarna alone around eighty startups have been born) and reinvest as business angels. Added to this are excellent education, widespread technological literacy and, given the small size of the domestic market, a global orientation from day one. Helsinki replicates the model around Supercell and Wolt and the Slush event, among the most important technology gatherings in Europe.

5. The recurring patterns

From the comparison it emerges that successful ecosystems, though born in very different contexts, share a narrow set of ingredients. None possesses them all to the highest degree, but all combine a majority of them. The following table summarises the patterns and illustrates them with the most representative cases.

Pattern	Description	Examples
Anchor institution	One or more universities or large firms that generate research, talent and first demand.	Stanford, NUS, KAIST, Tel Aviv University
Talent density and circulation	Concentration of skills fed by return and attraction, not only by local training.	Diasporas (Saxenian), Lisbon, London

Pattern	Description	Examples
Patient capital and co-investment	Venture capital present and a State that co-invests with private players without replacing them.	Yozma (Israel), Swedish funds, Temasek
Catalyst State	Infrastructure, density, sandboxes and simplification, not central planning.	Singapore, Seoul, Estonia
Big bubbles and mafias	A few high-impact founders who reinvest and generate dozens of firms.	Skype (Estonia), Klarna and Spotify (Sweden), PayPal
Foreign anchors	Subsidiaries and R&D centres of multinationals and foreign scale-ups that train talent and generate spin-offs.	R&D centres in Israel, RHQs in Singapore, FDI in Dublin, Skype in Estonia
Vertical specialisation	Concentration on the domains of distinctive advantage (S3 logic).	Fintech in London, cyber in Tel Aviv, gaming in Seoul
Global connectedness and language	International openness, use of English, links with other hubs.	Startup Genome, Estonia, Nordics
Physical density	Places that concentrate firms and people in little space.	BLOCK71, Silicon Roundabout, Pangyo
Events as a flywheel	Large events that attract capital, talent and attention.	Web Summit (Lisbon), Slush (Helsinki)
Risk culture and global ambition	Tolerance for failure and orientation to the world market from day one.	Silicon Valley, Nordics, Israel
Regulatory and digital simplicity	Setting up and running a company quickly and digitally.	Estonia e-Residency
Quality of life and cost	Liveability and competitive costs as factors of economic attraction.	Lisbon, and the Mediterranean potential

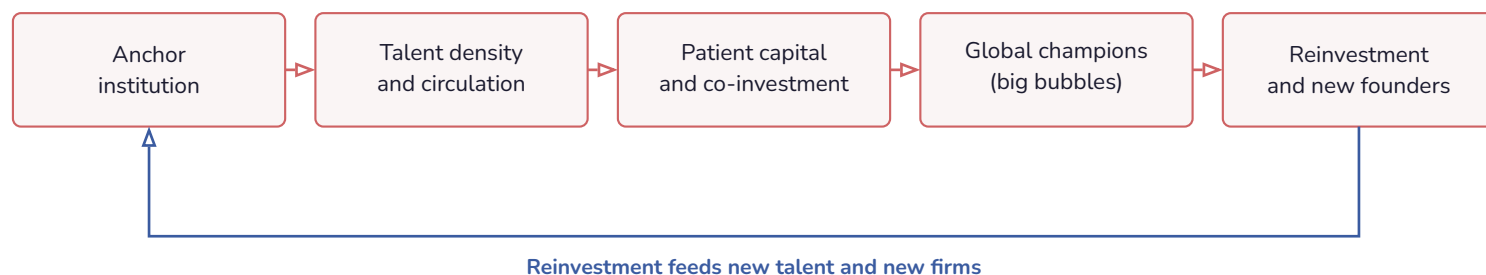


Figure 1: The recurring ingredients feed one another: a flywheel that reinforces itself.

Three cross-cutting observations. First, the role of the State is almost always present but rarely dirigiste: the best models (Yozma, Singapore, Estonia) see the public sector build conditions, infrastructure and co-investment, leaving the lead to the firm. Second, the human factor prevails over the financial factor: talent that circulates and a few champions that reinvest count more than the mere availability of capital. Third, in a significant share of cases the initial trigger comes not from indigenous

firms but from the establishment of foreign subsidiaries: a pattern so recurring that it deserves dedicated treatment, in the section that follows.

6. Foreign anchors: subsidiaries of multinationals and scale-ups

Several ecosystems were born not from indigenous firms but were triggered by the establishment of branches of multinationals and foreign scale-ups. It is a powerful but double-edged lever, which is worth understanding in its mechanisms before turning it into policy.

6.1 Israel: research centres as a founder nursery

The clearest case is Israel. Over five hundred research and development centres of multinationals (Intel, Microsoft, Google, Amazon, NVIDIA, Apple) operate in the country, and Intel is among the largest private employers. These centres do not perform marginal functions but frontier research, and act as a nursery: Israeli staff acquire world-class experience at home and then found firms applying the practices learned in the giants. The reverse path is also frequent, in which multinationals acquire local startups and convert them into research centres, retaining founders and teams in the territory (in 2024 multinationals accounted for about 69% of the value of merger and acquisition operations).

6.2 Estonia: a foreign anchor at the origin

The Estonian ecosystem too, often told as indigenous, has a foreign origin. Skype was founded by a Swede and a Dane, with a company registered in Luxembourg but with the engineering team in Tallinn: in effect a foreign development centre. It is from that nucleus, and from the subsequent acquisitions by eBay (2005) and Microsoft (2011), that the “mafia” of former employees at the origin of Wise, Bolt and hundreds of other firms was born. The foreign anchor left a legacy of skills, capital and entrepreneurial models.

6.3 Ireland and Singapore: headquarters as a magnet

Dublin has attracted over eighteen hundred global firms and the EMEA headquarters of Apple, Google, Meta, LinkedIn and TikTok, thanks to competitive taxation, the English language, EU membership and qualified talent. Singapore hosts about 46% of the Asian regional headquarters of multinationals alongside over four thousand startups, with the Economic Development Board working with the tech giants to develop talent. In both cases the foreign presence has built skills, an induced supply chain and international credibility.

6.4 The other side of the coin

The lever presents two documented risks. The first is talent inversion: where foreign branches offer pay 30-50% higher, as in the global capability (so-called captive) centres of Bangalore, local startups struggle to compete for the best skills and the indigenous fabric can be smothered. The second is dependence on foreign investment: a territory that hosts many branches but does not generate its own entrepreneurial fabric remains exposed to the decisions of the parent companies and does not retain the value produced. The employment dimension deserves an honest distinction too: a low-cost back office can reduce unemployment in the short term, which is not a merit to dismiss, but it does not build an ecosystem, because it neither trains founders, nor transfers frontier skills, nor generates spin-offs. For the genesis of a technology hub what matters is the quality of the functions located there, not the mere number of jobs. The lesson is precise: foreign branches are useful if they perform high-value functions (research and development, engineering) connected to the territory and if they feed spin-offs and mobility, not if they merely serve as low-cost back offices.

6.5 Low-value captives: the lesson of IT consulting centres

At the opposite end from the Israeli research centres there is a variant of the foreign lever that generates very little value for the ecosystem, and it is a widespread, well-documented practice. Many IT consulting and services multinationals and the captive centres of large enterprises, the so-called Global Capability Centres, open subsidiaries chiefly for cost arbitrage: in India alone more than 2,100 such centres employ around 2.4 million people, born to capture savings of 40-70% relative to Western markets. Where the mandate stays pure back office or mere staff augmentation (the “body shop” model), the centre hires thousands of engineers but produces little ecosystem value: it does not train founders, does not generate frontier intellectual property, does not feed spin-offs, and it can even impoverish local service firms by out-bidding them for talent (the double penalty observed in India, where captives drain both work and people from indigenous services firms). This must be kept distinct from scale-ups that open a foreign site to preserve their own quality level, as well as from the high-value research centres of the Israeli model.

The discriminant, in other words, is not the investor’s flag but the site’s mandate: the same group can plant a back office that leaves nothing behind or an engineering centre that triggers spin-offs. Tellingly, the Indian captive sector itself is climbing the value chain, to the point that some Fortune 500 companies now generate more than a quarter of their patents from Indian centres. For Puglia the consequence is clear: attracting establishments is useful, but chasing the number of jobs in a low-cost back office is a shortcut that reduces unemployment in the immediate term without building an ecosystem.

7. Corporate structure and access to capital: the Delaware flip

A recurring pattern, less visible but decisive, concerns not people or firms but their corporate structure. In almost all ecosystems oriented to global growth, startups adopt a dual structure: a parent company incorporated abroad, typically a Delaware C-Corporation in the United States, which wholly owns the local operating company, where research, development and employees remain. The operation by which a startup born elsewhere reincorporates under a US parent is known as the “Delaware flip”.

Its spread has a precise reason: US venture capital funds, which remain the world’s main source of venture capital, prefer (and can often invest only in) companies under Delaware law, for the predictability of the legal framework, the tax treatment of capital gains and the ease of structuring rounds, stock-option plans and exits. For an Israeli startup aiming at US institutional capital, reincorporation in Delaware is in effect a prerequisite: it is not imposed by law, it is imposed by the investor ecosystem. The same logic applies to many Nordic, Baltic and Indian startups.

Delaware is not, however, the only destination of the flip, nor has it always been. In the mid-2000s London played an analogous role for different reasons: the London Stock Exchange’s AIM market, with lighter listing requirements, attracted numerous foreign technology companies (many Israeli) seeking access to public markets, while English commercial law offered a framework familiar to international investors. There the driver was not US-style private venture capital but access to a listing and to a global financial centre. It is an alternative destination that confirms the underlying logic: the choice of jurisdiction follows, case by case, where capital and liquidity are.

Today the same logic is producing a new and mirror-image phenomenon, this time internal to the United States: the so-called Texas flip, part of a broader movement known as DExit, the exit from Delaware. A growing number of firms, including Tesla and SpaceX, has reincorporated the parent in Texas (or Nevada), driven by three factors: the perceived unpredictability of Delaware’s Court of Chancery (emblematically, the 2024 voiding of Elon Musk’s compensation package), the burden of Delaware’s franchise tax and the wish to anchor the company where its operations actually are. Texas has

encouraged the movement by establishing in 2024 a dedicated Business Court for corporate disputes, with appointed and highly specialised judges, and by passing in 2025 the SB 29 law, which codifies the business judgment rule, raises the thresholds for derivative actions and allows the forum and jury waiver for internal litigation to be fixed. Completing the picture, in July 2026 the Texas Stock Exchange (TXSE) began trading, backed by large institutional investors, aiming to offer a capital market alternative to New York, just as London once offered an alternative listing. Delaware reacted with its own reform (SB 21, 2025), but the pace of reincorporations has not slowed significantly. For Puglia the signal is indirect but instructive: competition between jurisdictions to attract legal headquarters is now an open and contested market, in which the predictability of rules, the quality of specialised courts, taxation and access to liquidity all count, exactly the levers on which Italy and Europe must act if they want to reduce the incentive for the outbound flip.

The structure, however, has a substance constraint: if the US parent has few people and all research remains in the foreign subsidiary, tax authorities contest the allocation of profits between the entities. It works only with real economic substance, transfer-pricing discipline and the handling of non-trivial cross-border obligations (in the United States, for example, Form 5472, with severe penalties for omission).

Finally, there is a counter-movement that, for territories, is the most important signal: the “reverse flip”, the return of the parent to the country of origin. India is experiencing it on a large scale. Groww completed its return in March 2024, bearing a tax charge of about 160 million dollars, PhonePe paid about one billion to move its headquarters from Singapore to India in 2023, and the government introduced an accelerated reverse-merger procedure (90-120 days) to facilitate returns. The driver is the maturation of the domestic market: when growth capital and a stock exchange capable of hosting listings exist (in 2024 thirteen technology companies listed in India, including Swiggy and Ola Electric), firms no longer need to domicile abroad.

The lesson for Puglia and for Italy is twofold. First: the flip is not fought with bans, it is a rational response to where capital and exits are; as long as growth capital and capital markets remain elsewhere, the best Italian startups will continue to move their holding abroad, with a loss of value and tax revenue for the territory. Second: the real lever is not to retain firms by law but to reduce the incentive to leave, by building local growth capital, an attractive capital market and simple redomiciliation rules. It is largely a national and European competence, but it is a theme on which an ambitious region can and must press.

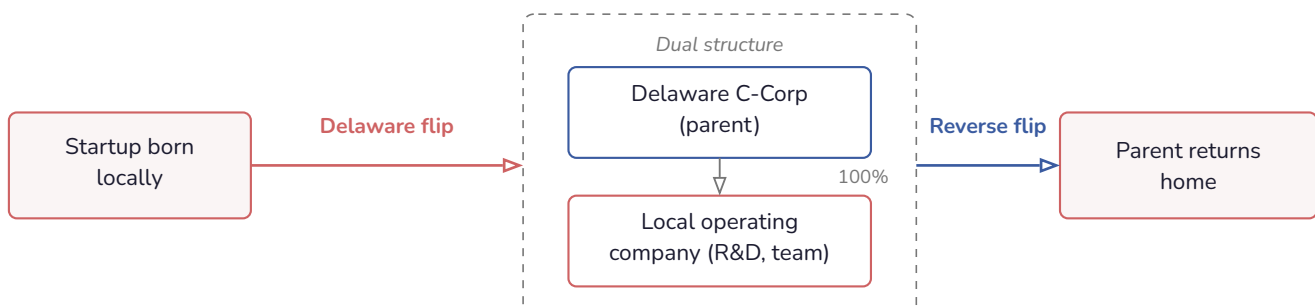


Figure 2: From the local startup to the dual structure (parent in Delaware) and to the possible return of the parent once the domestic market matures.

8. What scale-ups need and the comparison with the Italian and regional framework

The previous sections have shown that establishing abroad is not a whim but a rational response to concrete needs of firms in the scaling phase. To open a useful dialogue with institutions it is worth reversing the perspective: what, exactly, does a scale-up look for when it opens a subsidiary or moves its parent company across borders, and how much of this is the Italian and regional framework able to offer today? This section lines up the recurring needs and compares them with the current legislation and incentives, to identify the levers on which public debate can act.

Scale-up need	Current Italian and regional framework	Lever for institutional debate
Growth capital (series B and beyond)	Italian venture capital reached about 5.9 billion euro in 2025, but net of the extraordinary Bending Spoons operation it falls to around 1.7 billion; growth capital remains scarce and CDP Venture Capital acts as a fund of funds. In Puglia the instruments (Equity Puglia, TecnoNidi, PIA) cover mainly the early stages.	Strengthen public-private co-investment at the late stage (Yozma model) and attract international funds with dedicated regional vehicles.
Certainty of investment instruments	The legal system does not offer instruments fully equivalent to Anglo-Saxon convertibles and SAFEs, and setting up an S.r.l. requires a notarial deed: this pushes those seeking international capital towards the Delaware C-Corporation.	Standardise investment instruments recognised globally and support, at European level, the 28th company-law regime ("EU Inc."), designed for a pan-European company that can be incorporated online.
Equity compensation (stock options)	Article 27 of Decree-Law 179/2012 already exempts from taxation the stock options granted to employees by innovative startups and SMEs, taxing only the capital gain on sale: it is a competitive asset, but little known and limited to the perimeter of innovative firms.	Enhance and publicise the instrument, simplify its use and broaden its scope, to make it an effective advantage in the competition for talent.
Taxation and investment incentives	Law 193/2024 raised to 65% the personal income-tax (IRPEF) deduction for investments in innovative startups held for at least three years and introduced a tax credit for incubators, but it abolished the 50% deduction for innovative SMEs under the de minimis regime, reducing the incentive precisely on firms in the scaling phase.	Restore and stabilise the incentives aimed at innovative SMEs and flank them with regional co-investment instruments.
Redomiciliation and corporate mobility	Legislative Decrees 19/2023 and 88/2025 transposed the European rules on cross-border transformations, mergers and divisions and on the transfer of the registered office (art. 2510-bis of the Civil Code), improving the framework; yet procedural	Simplify and reduce the tax cost of redomiciliation to Italy, to make return feasible when the domestic market matures, on the model of the Indian accelerated procedure.

Scale-up need	Current Italian and regional framework	Lever for institutional debate
	and tax complexities remain that make repatriating the parent company costly.	
Capital market and exits	Euronext Growth Milan offers a listing for SMEs, but depth, liquidity and the number of technology listings remain far from the American and Asian markets; the scarcity of exits fuels the transfer of holdings abroad.	Support, at national and European level, deeper capital markets and the Capital Markets Union, a condition for capital and exits to remain in Europe.

The comparison delivers a clear message to institutions. Italy already has some competitive instruments (the tax exemption on stock options, the transposition of cross-border corporate mobility, a national fund of funds), but it suffers precise gaps in growth capital, in the certainty of investment instruments and in the depth of the capital market: precisely the factors that push scale-ups to establish elsewhere. Many of these levers are national and European competences, but the Region can act on what falls to it (co-investment, attraction of funds, simplification and instruments dedicated to firms in the scaling phase) and can become an advocate, before the Government and the European institutions, of the reforms that reduce the incentive to carry value and tax revenue across borders. It is on this concrete ground that PugliaTechs proposes to open the public debate.

9. Puglia today: assets and gaps

Measured against the patterns, Puglia presents a significant endowment of assets and some clear gaps. On the asset side: around 574 innovative startups, equal to almost 5% of the national figure; three universities plus the Polytechnic of Bari; an Aerospace Technology District worth about 1.5 billion euro that brings together universities, research centres and large firms such as Leonardo and Avio Aero; the Grottaglie spaceport designated for suborbital flights, an almost unique infrastructural asset in Europe; rooted ICT firms such as Exprivia and Network Contacts; regional financial instruments (TecnoNidi, Equity Puglia, PIA); a competitive quality of life and cost in a Mediterranean key; and an internationally minded community such as PugliaTechs.

An often underestimated asset is the presence of foreign anchors already rooted: Avio Aero, part of the US group GE Aerospace, is a multinational subsidiary that operates in the territory with high-level engineering functions, exactly the type of establishment that elsewhere has triggered spillovers and spin-offs. The gap here is not the absence of the anchor but the weakness of the channels that turn its presence into new local firms.

A further asset, under stress today but strategic, is the manufacturing base of precision mechanics and components, largely tied to the automotive supply chain. This fabric is going through the structural crisis affecting the whole European components sector, with one supplier in four expecting negative margins in 2026 and Italian vehicle production at a 25-year low, and it is seeking new horizons of reconversion. It is at once a fragility and an opportunity: the machining, materials and quality-system skills that supply chain holds are exactly those demanded by advanced robotics, autonomous systems and space manufacturing.

On the gap side: scarce venture capital and few exits, with the consequent difficulty of retaining firms in the scaling phase; a persistent brain drain, which deprives the territory of precisely its qualified talent; the absence of a sufficient number of “big bubbles” and of the related reinvestment mafias; few research centres of foreign firms and still weak spin-off channels; the tendency of the most ambitious startups to

move their holding abroad (Delaware) to raise capital, with a loss of value and tax revenue; still limited global connectedness; a critical mass and physical density lower than those of mature hubs; and a risk culture to be strengthened. The following table crosses the patterns with the situation in Puglia.

Pattern	Asset in Puglia	Gap to close
Anchor institution	Polytechnic and three universities, aerospace DTA, Leonardo, Avio Aero.	Technology transfer and spin-offs still limited.
Talent and circulation	Qualified graduates, Puglia diaspora worldwide.	Brain drain without return mechanisms.
Capital and co-investment	Equity Puglia, TecnoNidi, PIA.	Little private venture capital, few exits.
Domicile of capital	Public first-capital instruments.	Holdings moved to Delaware to grow; growth capital and an attractive exchange are missing.
Catalyst State	Active regional instruments, spaceport.	Sandboxes and digital simplification missing.
Big bubbles and mafias	Some consolidated ICT firms.	Few global champions that reinvest.
Foreign anchors	Avio Aero (GE group), aerospace establishments.	Few foreign R&D centres and weak spin-off channels.
Specialisation	Aerospace, space economy, robotics and autonomous systems, agritech, energy; precision-mechanics supply chain to reconvert.	Strategic focus still dispersed.
Global connectedness	International network of PugliaTechs.	Structural links with other hubs to be built.
Quality of life	Climate, cost, Mediterranean liveability.	Not yet translated into talent attraction.

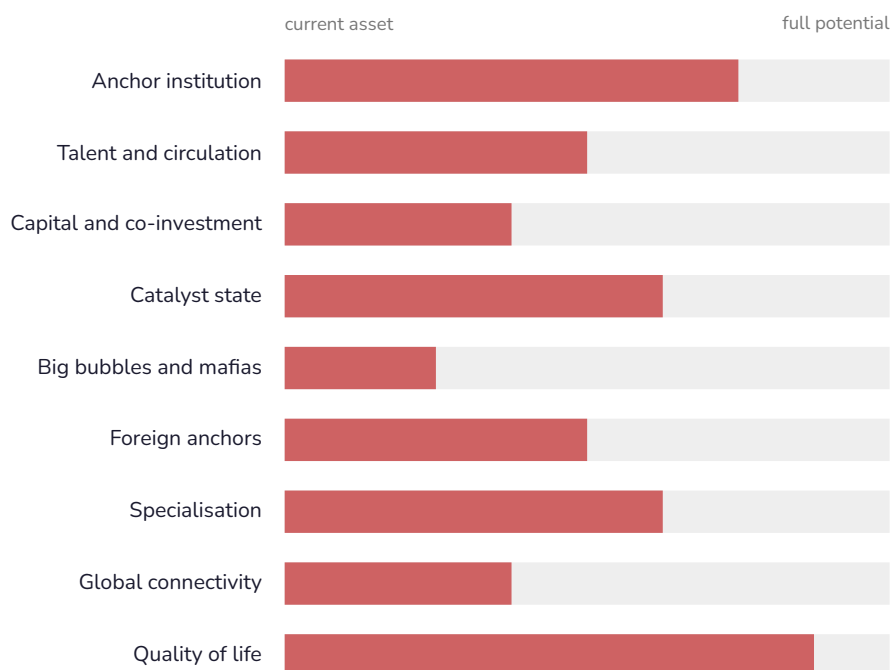


Figure 3: Qualitative reading of Puglia's endowment by pattern: the filled part shows the asset already in place, the light part the gap to close.

10. A strategy for Puglia as a global technology hub

The reading of the patterns suggests a strategy that does not chase every model but builds on the factors where Puglia has a potential advantage. Ten lines are proposed.

10.1 Specialise on the verticals of strength

Apply the logic of Smart Specialisation by concentrating resources on a few distinctive domains: aerospace, the space economy and autonomous systems (with Grottaglie as a unique asset), advanced robotics and additive manufacturing, agritech and technologies for agri-food, energy and the transition, and the cross-cutting enabling technologies such as artificial intelligence and cybersecurity. Better to be recognisable in three fields than mediocre in ten.

10.2 Turn the brain drain into circulation

This is the lever most consistent with PugliaTechs' mission and with Saxenian's lesson. Build a structured network of the Puglia and Mediterranean diaspora worldwide, with return programmes, international mentorship and the attraction of professionals and foreign firms that choose Puglia as a base. Quality of life, on the Lisbon model, becomes here a concrete competitive factor.

10.3 Capital: co-invest with private players and retain the domicile

Strengthen the existing instruments in the direction of the Yozma model: public funds that co-invest with private venture capital, national and foreign, to attract capital and skills rather than replace the market. Long-term objective: to bring funds and investors to the territory, not merely to disburse grants. Linked to this is the issue of the domicile of capital: as long as growth capital and capital markets remain abroad, the best startups will continue to move their holding to Delaware. The lever is not to ban the flip but to reduce its incentive, supporting the development of local growth capital and pressing, at national and European level, for more attractive capital markets and redomiciliation rules.

10.4 A catalyst State, not a dirigiste one

Adopt instruments of simplification and experimentation: regulatory sandboxes for drones, advanced air mobility and space (leveraging Grottaglie), fast digital procedures to set up and run firms on the Estonian model, incentives targeted at density.

10.5 Cultivate and retain the champions

Since three or four big bubbles are enough to ignite an ecosystem, the priority is to support the few firms in the scaling phase, favour their exits that can be reinvested in the territory and bring back founders of Puglia origin who have succeeded elsewhere, with programmes inspired by Endeavor's experience.

10.6 Attract high-value foreign research centres

Treat the attraction of foreign subsidiaries as a deliberate policy, on the model of Singapore's Economic Development Board and Ireland's IDA agency, but with two non-negotiable conditions learned from the mistakes of others. First condition: target high-value functions (research and development, engineering) connected to the universities and the Aerospace District, not low-cost back offices. Second condition: build from the outset the channels that turn foreign presence into local firms, favouring staff mobility, spin-offs and links with the territory's suppliers, to avoid the talent-inversion trap seen in Bangalore. Avio Aero and the aerospace establishments already present are the natural starting point.

10.7 Physical density and events as a flywheel

Concentrate firms, talent and services in high-density places (hubs in Bari and Grottaglie on the BLOCK71 model) and build a major annual international event, in English, capable of attracting capital and attention as Web Summit and Slush have done for Lisbon and Helsinki. PugliaTechs' activities, including the PugliaTechs Talks format, are a first seed of this.

10.8 Open data to govern the ecosystem

Equip the Region with an observatory of the technology ecosystem based on open and aggregated data (firms, talent, flows, returns), as a shared knowledge infrastructure to steer policies in a measurable way.

10.9 Attract deep-tech scale-ups and reconvert manufacturing

Alongside research centres, Puglia should deliberately aim to attract deep-tech scale-ups in the domains of advanced robotics, autonomous systems and space, not low-cost back-office branches. These are firms that by nature perform high-value functions, and here they find a rare substrate: the Aerospace Technology District, the Grottaglie spaceport, the Avio Aero establishment, firms such as Roboze in additive manufacturing of high-performance polymers, and the ESA BIC in Brindisi, the only European Space Agency incubator in the Mezzogiorno. To this appeal is added a specific industrial lever: the regional supply chain of precision mechanics and components, in difficulty today because it is tied to a contracting automotive sector, offers a natural reconversion path. Reorienting those small and medium enterprises from automotive components to manufacturing for robotics, autonomous systems and space makes it possible to retain skills and skilled jobs and, at the same time, to build frontier capability. It is the operational translation of this report's core thesis: what matters is the quality of the functions located there, not the mere number of jobs.

10.10 Physical AI as a cross-cutting industrial thesis

Physical AI, meaning artificial intelligence embodied in machines that sense and act in the real world (autonomous robots, drones, uncrewed vehicles and vessels, cyber-physical systems), is the frontier where software meets manufacturing. It is also the specialisation most consistent with Puglia's

endowment, because it grafts frontier algorithmic skills onto an existing industrial base instead of building one from scratch. Five verticals lend themselves naturally.

- **Agriculture.** Puglia is among Europe's leading agricultural regions (olive growing, viticulture, the cereal farming of the Capitanata): autonomous field robotics, sensing and AI for precision agriculture make it possible to respond to crises such as Xylella and to labour shortages, turning a traditional sector into a testbed for physical AI.
- **Blue economy.** Around eight hundred kilometres of coastline and the ports of Taranto, Brindisi and Bari make the maritime domain a strategic asset: autonomous surface and underwater systems for surveillance, inspection of port and offshore energy infrastructure, security and environmental monitoring.
- **Energy and transition.** The Brindisi energy hub and the region's renewables vocation (photovoltaic, wind, offshore potential) open space for autonomous robots to inspect and maintain plants, grids and parks, a physical-AI-intensive domain.
- **Space.** The Grottaglie spaceport, the Aerospace Technology District and the ESA BIC in Brindisi place Puglia on the frontier of autonomous systems for space: robotic swarms, satellites and uncrewed platforms.
- **Defence and dual use.** The structural growth of European defence spending and the presence of assets such as the Amendola air base, hub of the Air Force's remotely piloted aircraft, and the regional aerospace establishments offer a natural dual-use outlet for the autonomous systems developed in the other verticals, with technological-sovereignty constraints that reward the local supply chain.

The common thread is twofold. On one side, physical AI makes it possible to reconvert existing industries, from the precision mechanics today dependent on a contracting automotive sector to shipbuilding and agri-industry, steering their skills and plants towards robotics, drones and autonomous systems. On the other, it makes Puglia attractive to foreign firms seeking to establish research and development centres and plants in these domains, because here they find at once the industrial substrate, the enabling infrastructure (Grottaglie, the ports, the energy hubs) and real testbeds. It is the operational synthesis of the strategy: not a low-cost back office, but high-value functions anchored to a physical advantage that other territories cannot easily replicate.

11. The role of PugliaTechs

PugliaTechs can act as a neutral aggregator of the ecosystem, placing itself at the service of institutions and private actors on three functions consistent with its mission. First, internationalisation: events in English and networks that connect firms and people abroad, a concrete engine of brain circulation and a privileged channel to accompany the establishment of foreign firms in the territory. Second, the digital community platform: an open matchmaking tool between young people, mentors and organisations, and an open-data observatory. Third, ecosystem events as a place of aggregation and attraction. In this capacity the Association proposes itself as an interlocutor of the institutions for the design and implementation of the strategy outlined here.

At PugliaTechs we call this transformation, the reconversion of existing industry and the birth of new high-value supply chains founded on knowledge, technology and talent, the new Renaissance of Puglia. It is an internal definition that captures the underlying ambition of our work: to bring the region back to a leading role, as it was in its history, not through nostalgia but through innovation. The new Renaissance is not a project addressed to Apulians alone: the goal is to make Puglia a global technology hub, able both to give young Apulians a reason to stay or to return and to attract talent, researchers and companies from all over the world that choose the region as a base to grow. Like the great ecosystems

examined here, a new Renaissance is built on openness and on the international circulation of people and capital, not on closure.

12. Conclusions and operational recommendations

Technology ecosystems are not born by decree or by imitation, but from the patient combination of a few recurring ingredients: an anchor institution, talent that circulates, capital that co-invests, a State that enables, a few champions that reinvest, the trigger of high-value foreign anchors, a recognisable specialisation, global connectedness, density and a risk culture. Puglia possesses a significant share of these ingredients and suffers from precise and addressable gaps.

To the institutions, eight operational recommendations are proposed: (1) adopt a specialisation strategy on a few verticals, starting from aerospace, the space economy, robotics and autonomous systems; (2) establish a structured brain-circulation programme with the Puglia diaspora; (3) evolve the financial instruments towards co-investment with private capital; (4) introduce regulatory sandboxes and digital business simplification; (5) attract high-value research and development centres of foreign firms, connected to the universities and oriented to generating spin-offs, avoiding the trap of low-cost back offices; (6) support the development of local growth capital and press, at national and European level, to reduce the incentive to move the holding abroad (the Delaware flip); (7) invest in physical density and in a major annual international event; (8) bet on physical AI (autonomous robotics, drones, cyber-physical systems) as a cross-cutting industrial thesis across agriculture, the blue economy, energy, space and defence, to reconvert the regional precision-mechanics supply chain from the crisis-hit automotive sector and to attract foreign firms that establish research centres and plants there. PugliaTechs APS makes its network and its skills available to build, together with the institutions, this path.

13. References and sources

The sources listed below constitute the analytical basis of the document. The quantitative data cited in the text are to be understood as orders of magnitude in support of the argument, drawn from public sources updated to mid-2026.

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Document prepared by PugliaTechs APS as an open contribution to the public debate on the development of the regional technology ecosystem. The quantitative data cited derive from public sources (academic literature, industry reports, development agencies and specialised press) updated to mid-2026 and are to be understood as orders of magnitude in support of the analysis.

Policy Research Division

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