

Venture-based technology transfer at large research organizations: the case of CERN Venture Connect



Linn Kretzschmar: CERN

Han Dols: CERN

Abstract

CERN's mandate to disseminate technologies beyond high-energy physics has long included engaging start-ups as a pathway for knowledge transfer. This early approach was built on a decentralized network of national incubation partners channeling inbound requests. While this model expanded reach and national engagement, it also brought to the surface challenges common in science-based venture creation, particularly timelines that did not always match start-up decision horizons. With an average annual intake of 3.9 start-ups over 10 years, throughput remained modest, highlighting a central challenge in technology dissemination: namely, when engagement volumes are low and early-stage failure rates high, the probability of producing enough ventures to successfully carry technology to industry is limited.

To address these limitations, CERN Venture Connect was launched in 2023 to improve start-up engagement and strengthen venture pathways for technology dissemination. The programme introduces five shifts: (i) a curated portfolio of founder-friendly, licence-ready technologies, (ii) prototypes for rapid test access to shorten technology-venture matching; (iii) standard agreements that bridge institutional requirements with lean start-up timelines; (iv) an ecosystem model with external partners complementing CERN's technical support; and (v) structured access to world-class talent. Ecosystem-building and participation in industry-relevant events act as multipliers, with leads increasingly sourced through conferences, a website and partner referrals. Early results show higher velocity and output (6.5 start-ups on average during the first two years), with expectations of further acceleration, including through stronger support for CERN personnel spin-out ambitions.

Despite substantial progress, a structural gap remains between the operating realities of major research organizations and start-ups. Beyond differing prioritization and misaligned timelines, support mechanisms responsive to start-up needs are required without compromising research priorities by streamlining founder-facing processes; ensuring appropriate recognition and support for staff contributing to these activities alongside their scientific responsibilities; translating research outcomes into application-oriented value propositions; and strengthening the visibility of CERN as a start-up enabler.

1. Introduction

A recurring bottleneck in innovation systems is the conversion of research outputs into socioeconomic impact. Research organizations produce scientific knowledge, technical inventions, prototypes, methods, software, and highly skilled people, yet these assets do not automatically move beyond science into practical use (European Organization for Nuclear Research, 2026). Governments and institutions need knowledge-transfer mechanisms that support commercialization through channels such as licensing, partnerships and spin-off companies (OECD, 2013).

CERN is an important case in this context: dissemination is embedded in its institutional purpose. The CERN Convention states that the Organisation's results "shall be published or otherwise made generally available," making the circulation of knowledge part of CERN's founding mandate (see Art. II in CERN Council, 1953). The obligation to create socioeconomic impact has been operationalized through knowledge-transfer activities designed to move the technological and human capital developed at CERN into uses beyond high-energy physics (CERN Knowledge Transfer, n.d.-a). Recent strategic guidance reinforces this orientation. The 2025 update of the European Strategy for Particle Physics emphasizes that technologies developed in particle physics have significant potential for high-impact societal applications and that knowledge and technology transfer should be further developed across the particle physics ecosystem (European Strategy Group, 2025).

Within this knowledge-transfer agenda, start-ups and spin-outs deserve particular attention. Where technologies are early-stage, highly specialized or not yet legible to incumbent markets, new ventures serve as translational vehicles: absorbing technical uncertainty, refining applications and building the market interface needed to carry research-derived technologies towards adoption.

The central question is how major research organizations can engage with ventures, so as to increase societal impact through venture throughput without compromising their core research mission. Against this background, this paper analyses the evolution of entrepreneurial engagement at CERN, tracing the development from a decentralized approach to the establishment of CERN Venture Connect (CVC), the programme through which this activity is currently operationalized.

2. Context and baseline

CERN's initial approach to venture-based technology transfer centered on the CERN Business Incubation Centre (BIC) network, established in 2012 by the CERN Knowledge Transfer Group. Rather than build a centralized founder-support structure, CERN collaborated with national incubation partners for start-up scouting, selection and first-line support, allowing engagement to take place within local entrepreneurial ecosystems where finance, services and networks are more readily mobilized (OECD, 2013; Ziakis *et al.*, 2022). BIC partners provided office space and business support locally, while CERN granted access to relevant technologies (Nilsen and Anelli, 2016).

This decentralized architecture offered wide geographical reach across Member States and access to established incubators' business development capabilities, without requiring CERN to build venture-support infrastructure in-house. Over the course of 11 years, the BIC network expanded to 10 national centers and incubated 43 start-ups (an average of 3.9 per year) across fields ranging from application-specific integrated circuit (ASIC) production and drug discovery to cryo-electron microscopy (CERN Knowledge Transfer, 2022). This demonstrated both the breadth of CERN technology's commercial applicability and the genuine interest of Member States in leveraging it for economic benefit. At the same time, experience with the model surfaced three structural challenges that motivated the shift to a new programme architecture.

2.1 Technology matching

One challenge concerned the complexity of matching start-ups with relevant CERN technologies. With a broad and technically sophisticated portfolio spanning multiple domains, identifying the right CERN technology for a given venture application proved time-intensive for all parties. It involved start-ups needing to define their technical needs – often requiring iteration together with the CERN Knowledge Transfer team – before the relevant expertise or technology could be identified and feasibility assessed. This placed demands on early-stage ventures, typically operating under resource and time constraints, and on CERN staff (Rocha and Grilli, 2024). In deep-tech settings, such search and matching costs are a recognized design challenge (Kask and Linton, 2025; Erntell *et al.*, 2024), pointing to the need for a more streamlined, founder-facing approach to technology presentation that shortens the path from initial interest to meaningful engagement.

2.2 Start-up pipeline

A second challenge concerned pipeline fragility. The BIC model engaged ventures across different stages, with a notable share at the very early stages of development. This configuration had a clear rationale: early-stage ventures are more open to incorporating emerging technologies as their value propositions are still forming (Leatherbee and Katila, 2020; Hampel *et al.*, 2020). However, this also exposed the programme to structural risks – ventures frequently revise business models in ways that can alter the relevance of a given technology, and fewer than half of newly born enterprises remain active after five years (Eurostat, 2021). For any technology-transfer channel dependent on venture survival, sufficient volume is thus needed to absorb such attrition (Calvino *et al.*, 2016). Sustaining such a volume calls for access conditions calibrated to the realities of early-stage ventures. The BIC admission process involved elaborate applications, business-plan presentations and reporting obligations (CERN Knowledge Transfer, n.d.-b). Designed to ensure quality and accountability across a geographically distributed network, this was more closely aligned with research-institutional norms than with the speed and flexibility demands of early-stage ventures. A related consideration was that many BIC partners were research institutes less directly embedded in market-oriented environments, limiting their capacity to source and accelerate commercially viable ventures. Together, these factors pointed to the need for entry pathways that were more accessible and a deeper integration with venture-oriented ecosystem partners.

2.3 Internal founder pathways

Spin-offs are a key commercialization mechanism for research organizations, because successful technology transfer often requires the direct involvement of inventors, specifically when tacit knowledge is central to the value of the technology in question (WIPO, 2011; Guimón and Paunov, 2019). While CERN's Knowledge Transfer Group was carried out activities to promote entrepreneurial awareness internally, the BIC network was designed specifically to support those ventures outside CERN seeking to leverage CERN technologies. Supporting spin-off pathways requires systematic intervention across the full entrepreneurial journey: from building awareness and motivation among researchers; to structured venture-building support in addressing skills gaps in areas such as market validation and fundraising; to streamlined IP licensing pathways that allow researchers to act on commercial ambitions without undue procedural burden. The importance of such inward facing activities was formally addressed with the publication of CERN's policy on supporting employees seeking to exploit CERN technologies in 2018 (CERN Knowledge Transfer, 2018), and has been a fundamental consideration in the creation of the CVC Programme.

The BIC model represented a critical first step. It established CERN's first structured venture pathway, demonstrated the commercial applicability of CERN technologies across a wide range of sectors, and evidenced strong interest from Member States in leveraging CERN's knowledge base for economic benefit. The above-mentioned challenges, common to venture-based deep-tech dissemination at the frontier of scientific research, were reflected in the BIC model as it matured. Insights gained both from what worked well and where the model faced limitations informed the design of CVC, which was launched at the end of 2023.

3. CERN Venture Connect Programme: the five strategic shifts

CERN Venture Connect introduces a set of changes to improve the speed, usability and scalability of venture-based technology transfer. The programme builds on five elements of how founders engage with CERN and its technologies: how technologies are presented; how technical fit is assessed; how agreements are concluded; how support is activated beyond CERN; and how ventures access specialized talent. Collectively, these elements, alongside more than 60 external partners covering funding, lab space, legal advice and incubation, constitute a structured support pathway for deep-tech ventures from pre-seed to scale-up stage.

3.1 Curated technology portfolio

CERN Venture Connect addresses the technology matching challenge, by offering a curated portfolio selected specifically for venture-facing dissemination. Currently comprising nine

technologies, including microelectronics, laser systems, software and cooling devices,¹ the portfolio focuses on technologies that have reached a relatively advanced level of maturity within CERN's operational context (typically technology readiness level (TRL) 7–9), allowing a transfer suitable for early-stage venture timelines. The programme prioritizes those technologies that act as enablers, that is, components that strengthen or differentiate an existing product, rather than standalone assets around which an entirely new venture must be built. Furthermore, CVC technologies come with readily available expert support to reduce the translation gap between laboratory capability and venture application, which is particularly important in deep-tech settings where tacit knowledge is critical to successful transfer (WIPO, 2011). The curation lowers the cognitive burden of portfolio screening, accelerates adoption, and allows founders to focus resources on core product development while leveraging CERN technologies for specific technical challenges or differentiation. The portfolio also enables targeted engagement formats, such as the Deep-Tech Talks series, through which technical features and application fields are communicated to external audiences.

3.2 Rapid-access prototypes

Access to prototypes for testing and validation allows technical fit to be assessed in practice, rather than through technical descriptions. Selected hardware, such as laser systems or evaluation boards, can be loaned for a limited period under simple material transfer arrangements, allowing start-ups and partners to move quickly from abstract interest to practical evaluation. Such an initiative shifts the matching and selection phases upstream, often before formal enrolment, thereby reducing inefficiencies both for the venture concerned and CERN by front loading. Allowing external actors to experiment with prototypes can surface use-cases not evident from within the original research environment, as deep domain expertise can create blind spots around downstream applications in unfamiliar sectors.

3.3 Standardized agreements

Pre-defined contractual structures designed specifically for venture contexts substantially shorten the path from technology identification to formal access, while at the same time satisfying CERN's governance, legal consistency and public-interest obligations as an intergovernmental organization.

The standard terms have been deliberately calibrated to align institutional requirements with early-stage venture realities. Rather than taking equity, CERN applies a 2 percent royalty on revenue generated using the licensed technology, with no payments due until a company reaches CHF (Swiss francs) 1 million in annual sales, excluding investment or funding rounds. License agreements run for 10 years, are worldwide in scope, non-exclusive and limited to a specific application field. Royalties are reinvested into sustaining technical support for participating ventures and increasing the TRL of portfolio technologies. This structure serves to eliminate liquidity pressure during the pre-revenue phase, aligns CERN's return with actual commercial traction, and avoids negotiations over hypothetical valuations at stages where such projections carry limited practical relevance. While standardized terms cover most CVC transfer cases, the programme retains flexibility for those ventures or technologies that do not fit the standard profile.

3.4 Ecosystem approach

Rather than operating as a standalone incubation function, CVC positions CERN as an orchestrator embedded within a broader innovation ecosystem. External partners, including venture capital firms, accelerators and national innovation agencies, complement CERN's technical expertise with market-facing competencies, connecting ventures with existing start-up support infrastructures within CERN (Associated) Member States and enabling more direct value creation within national innovation ecosystems.

The ecosystem model serves three purposes. First, for those ventures within the CVC portfolio, the programme facilitates warm introductions to investors and industry partners that carry the weight of CERN's scientific endorsement and thereby reduce any perceived risk for external

1 Full list accessible via <https://ventureconnect.cern>.

stakeholders. Practitioner data suggest that companies with a warm introduction to a venture capital firm have a substantially higher probability of reaching an investment committee than cold inbound approaches (Richardson, 2020). Second, the partner network functions as a sourcing and pre-vetting funnel: partner-referred start-up leads for the CVC arrive with a degree of maturity and financial backing that improves pipeline quality and conversion rates. Third, the partner network provides expert input and mentorship for CERN personnel, addressing the well-documented gap between scientific training and the entrepreneurial competences required for venture development (Hayter *et al.*, 2025).

3.5 Talent access

CERN trains large numbers of highly skilled scientists, engineers and technical specialists, with many of them subsequently moving into industry. Without structured pathways, however, this talent pool remains only loosely connected to ventures where talent quality and team composition are critical factors affecting investment decisions (Esen *et al.*, 2023).

CERN Venture Connect addresses this issue, by linking ventures more systematically to CERN-related talent through the CERN Alumni Network (CAN), which was established in 2017 and has grown to nearly 12,000 active members across more than 100 countries (CERN, 2025). Built around supporting career transitions from academia to industry, the CAN fosters connections among former and current CERN personnel across sectors globally and promotes job opportunities on its platform. This gives CVC companies access to individuals with the technical depth needed within complex deep-tech innovation settings, thereby treating talent as part of the dissemination infrastructure, rather than an external labor market matter.

Together, these five strategic elements constitute an integrated architecture in which each component reinforces the others, creating a scalable support pathway for deep-tech ventures for internal and external ventures from pre-seed to scale-up stages. Given that CVC was only launched in October 2023, any evaluation remains preliminary; nonetheless, the early performance indicators discussed next in section 4 point to encouraging initial traction.

4. Early results and performance signals

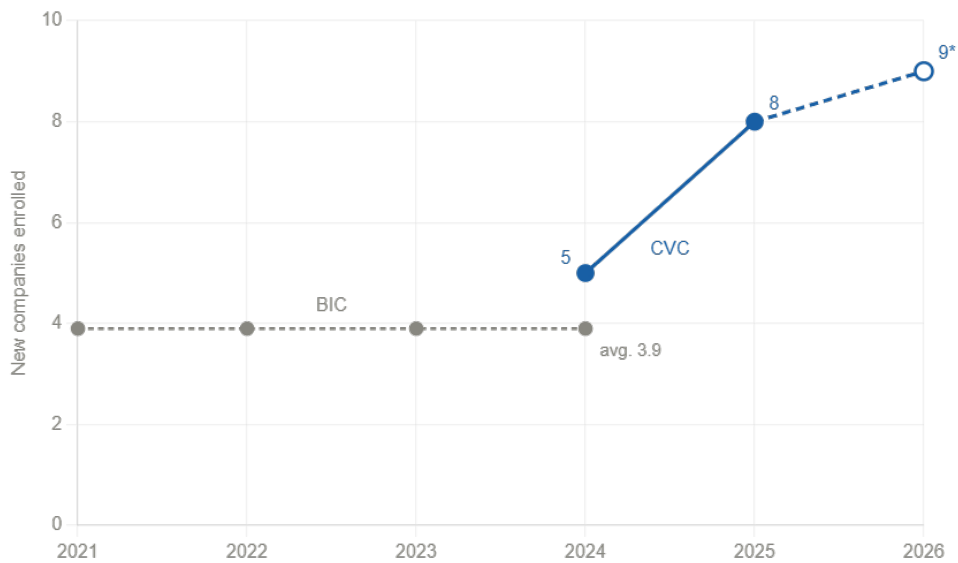
Given the recent establishment of CVC, its performance cannot yet be judged by long-run outcomes such as venture survival or sustained market impact. Evaluation must instead focus on early performance signals that correspond to the programme's underlying logic: namely, whether it attracts entrepreneurial demand; whether it delivers value to founders; and whether these effects support venture progression. Long-term indicators, including venture survival rates and sustained revenue from licensed technologies, are identified as future key performance indicators (KPIs) but cannot yet be assessed robustly. The following sections examine the first two levels, drawing on programme data available as of early 2026.

4.1 Short-term programme uptake

Since its launch in 2023, CVC has enrolled 18 companies across its first 2.5 years of operation, spanning advanced manufacturing and instrumentation, environmental and energy technologies, data infrastructure and artificial intelligence, and robotics and automation (status: April 2026). Annual intake was already double the long-run average of its predecessor in the programme's second year of operation, with a further four companies on track for signing within the second quarter of 2026 (Figure 1). Seven of the 18 companies (39%) were founded by CERN alumni, indicating that the programme is engaging both of its intended target groups. Beyond the active portfolio, CVC has accumulated 150 venture leads as of the end of March 2026, with over a third having progressed to at least preliminary discussion, negotiation or verbal agreement, suggesting that the programme is converting visibility into meaningful engagement. Lead generation has been driven primarily by conference participation and events, followed by website applications and partner referrals.

Internal uptake is also growing: in 2025, CVC engaged several hundred CERN employees through entrepreneurial events and individual mentoring. Furthermore, CERN Knowledge Transfer launched an internal entrepreneurship training programme in May 2026, with the impact on participants' entrepreneurial skill set due to be assessed at the end of 2026.

Figure 1 CERN Venture Connect venture pipeline growth relative to BIC baseline, 2021–2026



Note: BIC is the CERN Business Incubation Centre (BIC) network, CVC is CERN Venture Connect.

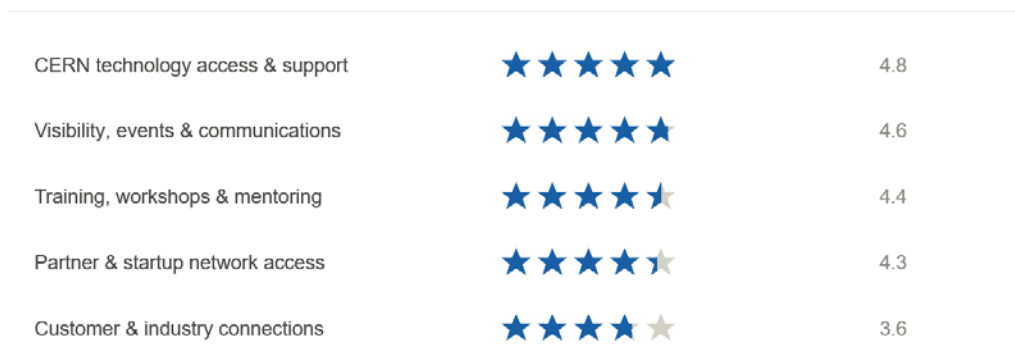
* The 2026 figure includes only those signed agreements and verbal commitments recorded between January and May 2026. The BIC value represents the annual average over the programme period.

Source: CERN Knowledge Transfer/CERN Venture Connect internal program data, 2021–2026, as of April 2026.

4.2 Mid-term satisfaction and venture milestones

The CVC end-of-year 2025 satisfaction survey findings suggest that the programme is performing most strongly in those dimensions closest to its core architecture (Figure 2): access to CERN technologies and technical support received the highest average rating among responding companies (rated 4.8 out of 5), followed by external visibility and exposure through events and communications (4.6), training, workshops and mentoring (4.4), and access to the CVC partner and start-up network (4.3). A weaker average rating for connections to potential customers and industry players (3.6) indicates that the programme may currently be more effective in enabling venture formation than in accelerating downstream commercial embedding – an area for further development.

Among survey respondents, CVC-supported companies collectively raised approximately EUR 5.9 million in funding in 2025 and recorded aggregate headcount growth of 40 percent, corresponding to 25 new hires. Portfolio companies also reported milestones including patents filed or granted, first paying customers and new product launches. CVC's inclusion in the Lakestar Deep-Tech Report 2025, ranking CERN 14th among European research centers for deep-tech entrepreneurship, points to a growing external recognition of CERN's entrepreneurial output (Atlantic.vc *et al.*, 2025).

Figure 2 CERN Venture Connect end-of-year satisfaction survey results, 2025

Note: CVC end-of-year survey 2025. n = 12 (response rate 92%). n varies per dimension; companies that did not receive a service excluded.

Source: CERN Venture Connect end-of-year satisfaction survey, 2025. Response rate: 92%.

4.3 Long-term survival and sustained dissemination

The most demanding indicator for a programme such as CVC is long-term venture survival: that is, whether start-ups remain active long enough to translate CERN-derived technologies into sustained market use. Given the programme's recent establishment, such outcomes are better treated as future KPIs than current measures of success, including 3- and 5-year venture survival rates, sustained revenue from licensed CERN technologies, venture creation by CERN personnel, and qualitative evidence of societal or industrial impact. At the time of writing, all the ventures that have been admitted to CVC remain active.

5. The remaining structural gap

Despite this progress, structural tensions persist between the operating logic of a major intergovernmental research organization and the demands of early-stage venture creation. These fall into two categories: inward-facing considerations concerning how the organization functions internally and outward-facing considerations concerning how it engages with the external venture and industry ecosystem.

5.1 Inward-facing considerations

Timing considerations remain a reality, particularly where venture-facing activities intersect with broader institutional processes and research priorities. As CERN's scientific programme evolves, so does the profile of technologies approaching transfer-readiness, creating a natural variation in the pace of knowledge transfer. Identifying and onboarding new technologies into the portfolio is complex; assessment requires expertise across multiple dimensions, such as technical maturity, commercial potential and field of application, and depends on the active involvement of stakeholders beyond the knowledge transfer office. Sustaining the engagement of technical staff alongside their scientific responsibilities calls for a recognition of such a contribution to be embedded within institutional culture and management strategy.

5.2 Outward-facing considerations

Translating research outputs into application-oriented value propositions requires sustained effort. Technologies developed within a particle physics context are not obvious to venture audiences and framing them in terms of concrete use-cases and market-facing performance metrics demands expertise beyond standard technology documentation. Additionally, corporate access remains an area for development; connecting start-ups to relevant industry players across a diverse portfolio is inherently difficult, and the benefits to corporate partners, such as access to pre-vetted, technically credible start-ups, require clearer articulation. Finally, achieving consistent reach across Europe and all CERN Member States remains an ongoing ambition, as the level of engagement naturally varies across geographies due to factors such as proximity and local ecosystem maturity.

6. Lessons learnt and outlook

The evolution from a decentralized incubation network to an integrated programme architecture offers lessons for other research organizations seeking to strengthen venture-based technology transfer.

Reduce friction at the founder interface. Time-to-first-test and time-to-agreement are among the most consequential variables in deep-tech venture formation. Standardized agreements, curated portfolios and prototype access collectively shorten the founder journey at its most friction-intensive points. Research organizations operating under similar institutional constraints would benefit from identifying and systematically addressing these bottlenecks, rather than treating each transfer case as unique.

Curate the technology portfolio. A founder-facing portfolio improves matching speed and usability, but requires ongoing management. Technologies should be selected not only for transfer-readiness, but also for their potential as enabling components that strengthen or differentiate an existing product or business model. As a portfolio grows, so does the range of potential application cases, making the identification of genuinely founder-friendly technologies a sustained organizational priority.

Structure ecosystem partnerships around shared value creation. External partners bring venture-building expertise and market proximity that lie outside the core mandate of most research organizations. Embedding them directly into programme design creates value for all parties: research organizations gain access to pre-vetted, entrepreneurially mature start-ups; partners gain early access to a credible deep-tech pipeline; and supported ventures benefit from faster connections to funding, mentorship and market expertise.

Embed knowledge transfer in institutional strategy. Sustaining venture-facing activities alongside a core research mission requires more than dedicated programs. Recognizing knowledge transfer contributions within employee objectives, career development frameworks and organizational strategy creates the conditions for broader and more durable engagement. It also reinforces the case that research generates value well beyond the scientific domain.

Outlook. Having established strong foundations, the next phase of CVC focuses on deepening impact across both internal and external founder pathways, while finding the right balance between the two. The internal pathway represents the greater growth opportunity and requires dedicated effort in terms of technology scouting, physical space, institutional recognition and a better understanding of the skill and motivation gaps that distinguish internal founders from their external counterparts. The CERN Entrepreneurship Academy, launched in May 2026 with a first cohort of 23 CERN personnel, is a concrete step in this direction, with its impact on participants' entrepreneurial skill set to be assessed at the end of 2026.

Evaluating a programme's impact over a longer time horizon underpins all of the above. Key metrics to track in the coming years include 3- and 5-year venture survival rates, sustained revenue from licensed technologies, and qualitative evidence of societal or industrial impact. Building the mechanisms required to capture these effects is as much an institutional commitment as a measurement exercise.

7. References

Atlantic.vc, Cambridge Innovation Capital, Dealroom.co, MITO Technology, Northern Gritstone, and Oxford Science Enterprises (2025). *European Spinouts Report 2025*. Dealroom.co. Available at: <https://dealroom.co/reports/european-spinouts-report-2025>.

Calvino, F., C. Criscuolo and C. Menon (2016). No Country for Young Firms? Start-up Dynamics and National Policies. *OECD Science, Technology and Industry Policy Papers*, No. 29. Paris: OECD Publishing. DOI: <https://doi.org/10.1787/5jm22p40c8mw-en>.

CERN (2025). Celebrating eight years of the CERN Alumni Network. Available at: <https://home.cern/news/news/cern/celebrating-eight-years-cern-alumni-network>.

CERN Council (1953). *Convention for the Establishment of a European Organization for Nuclear Research*. Available at: <https://council.web.cern.ch/en/content/convention-establishment-european-organization-nuclear-research>.

CERN Knowledge Transfer (n.d.-a). About us. CERN, Knowledge Transfer website. <https://kt.cern/about-us>.

CERN Knowledge Transfer (n.d.-b). Criteria for becoming a Business Incubation Centre of CERN technologies. CERN. Available at: https://knowledgetransfer.web.cern.ch/sites/knowledgetransfer.web.cern.ch/files/resource/other/criteria-becoming-business-incubation-centre-cern-technologies/criteria-becoming-business-incubation-centre-cern-technologies_2.pdf.

CERN Knowledge Transfer (2018). CERN policy on support for companies established to exploit CERN technologies. CERN. Available at: <https://kt.cern/node/1732>.

CERN Knowledge Transfer (2022). *Knowledge Transfer: 2021 Highlights*. CERN. Available at: https://kt.cern/sites/default/files/resource/annual-report/knowledge-transfer-highlights-2021/kt-highlights-2021_1.pdf.

Erntell, H., K. Dörner, M. Berger-de León, M. Flötotto and T. Henz (2024). *European Deep-tech: What Investors and Corporations Need to Know*. McKinsey & Company. Available at: <https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/european-deep-tech-what-investors-and-corporations-need-to-know>.

Esen, T., M.S. Dahl and O. Sorenson (2023). Jockeys, horses or teams? The selection of start-ups by venture capitalists. *Journal of Business Venturing Insights*, 19, e00383.

European Organization for Nuclear Research (2026). Catalano, G., Vignetti, S., Caputo, A., Colnot, L., Martino, D. C., Rosemberg Montes, C., Kajaria, S., Mihaylova, N., van Gend, L., Cook, T., Neil, B., Aditi, M., Rima, M. & Ivan, L. (2026). Assessment of the Socio-Economic Benefits of CERN Activities. Zenodo. Available at: <https://doi.org/10.5281/zenodo.21072658>

European Strategy Group (2025). *The European Strategy for Particle Physics: Recommendations* (CERN-ESU-2025-002). CERN. Available at: <https://cds.cern.ch/record/2950671/files/CERN-ESU-2025-002.pdf>.

Eurostat (2021). Business dynamics. In *Key Figures on European Business*. European Commission. Available at: https://ec.europa.eu/eurostat/cache/htmlpub/key_figures_on_european_business_2021/business_dynamics.html.

Guimón, J. and C. Paunov (2019). Science–Industry Knowledge Exchange: A Mapping of Policy Instruments and Their Interactions. *OECD Science, Technology and Industry Policy Papers*, No. 66. Paris: OECD Publishing. DOI: <https://doi.org/10.1787/66a3bd38-en>.

Hampel, C.E., P. Tracey and K. Weber (2020). The art of the pivot: How new ventures manage identification relationships with stakeholders as they change direction. *Academy of Management Journal*, 63(2), 440–471.

Hayter, C.S., J. Merker, T. Eyre and A.C. O'Connor (2025). Launching lean: Insights from early-stage entrepreneurship development programs for scientists. *The Journal of Technology Transfer*. DOI: <https://doi.org/10.1007/s10961-025-10288-6>.

Kask, J. and G. Linton (2025). Navigating the innovation process: Challenges faced by deep-tech start-ups. In Aaltonen, P. and E. Kurvinen (eds), *Contemporary Issues in Industry 5.0: Towards an AI Integrated Society*. Cham: Palgrave Macmillan, 197–219.

Leatherbee, M. and R. Katila (2020). The lean start-up method: Early-stage teams and hypothesis-based probing of business ideas. *Strategic Entrepreneurship Journal*, 14(4), 570–593.

Nilsen, V. and G. Anelli (2016). Knowledge transfer at CERN. *Technological Forecasting and Social Change*, 112, 113–120.

OECD (Organisation for Economic Co-operation and Development) (2013). *Commercialising Public Research: New Trends and Strategies*. Paris: OECD Publishing. DOI: <https://doi.org/10.1787/9789264193321-en>.

Richardson, A.W. (2020). VC research study: Success and ROI of cold deal flow companies versus warm deal flow companies. VentuRank. Available at: <https://medium.com/venturank/vc-research-study-success-and-roi-of-cold-deal-flow-companies-versus-warm-deal-flow-companies-74f302e029a3>.

Rocha, V. and L. Grilli (2024). Early-stage start-up hiring: The interplay between start-ups' initial resources and innovation orientation. *Small Business Economics*, 62(4), 1641–1668.

WIPO (World Intellectual Property Organization) (2011). *World Intellectual Property Report 2011: The Changing Face of Innovation*. Geneva: WIPO.

Ziakis, C., M. Vlachopoulou and K. Petridis (2022). Start-up ecosystem (StUpEco): A conceptual framework and empirical research. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), 35.

Copyright

© WIPO, 2026

Attribution 4.0 International (CC BY 4.0)

The CC license does not apply to non-WIPO content in this publication.

WIPO Reference No. GII2026/EN/EXTCONT

DOI: 10.34667/tind.59195

Front image: Getty Images, Unsplash.