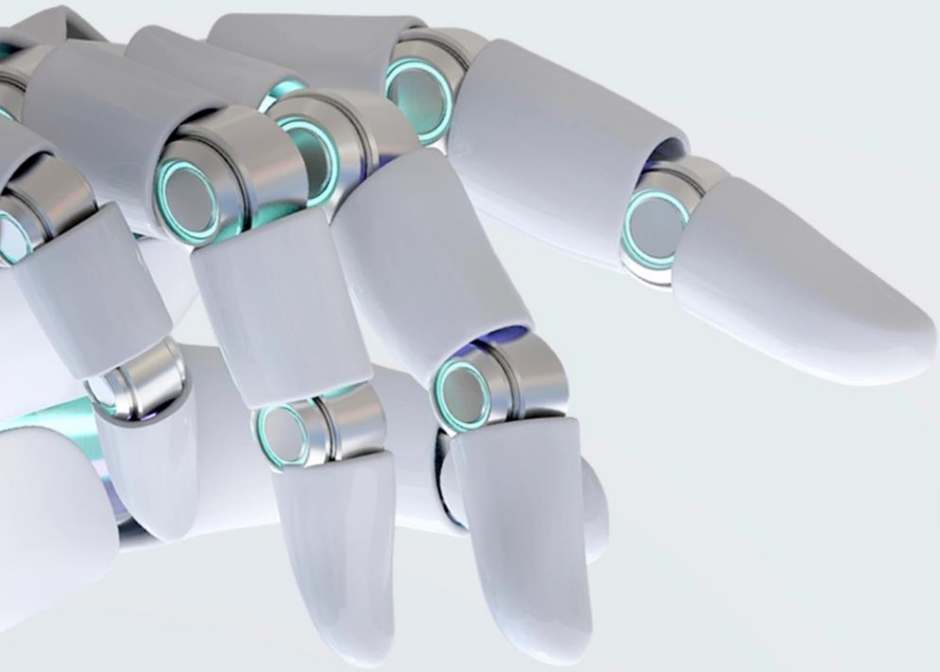
pwc

Turning labs into innovation engines

Table of contents



Executive summary

01

Executive summary

Today, governments are realising that innovation labs are more than just research and development (R&D) engines. They can operate as national platforms that accelerate economic growth and improve citizen outcomes. From the European Innovation Council (EIC) Labs, to the Government Technology Agency of Singapore (GovTech), public-sector labs show how strategy, science, creativity and state capability can come together to enable national transformation.

This playbook sets out principles for governments to design and operate labs that move beyond "innovation theatre" and deliver measurable value. The goal is to establish institutions that convene ecosystems, generate early wins and embed innovation into national systems. Drawing on global and regional examples, we show how labs can deliver impact across economies and societies.

Around the world, too many labs falter due to lack of organisation alignment, weak governance, under-commercialisation, fragmented collaboration or lack of citizen engagement. The ones that succeed will be those built for sustainability, credibility and outcomes - national assets that turn uncertainty into opportunity and convert ambition into tangible progress.

Key insights

Innovation labs are national assets:
They enable priority national agendas and position countries as leaders in emerging fields.

Successful labs are innovation engines, not showcases:
They create measurable value, orchestrate ecosystems and embed themselves in national strategies

Principles for success:
Early wins, building credibility, structuring for sustainability and outcome-focused metrics.

The evolution of innovation labs

02

How innovation labs shaped modern technology

Innovation labs have been central to technological progress for over a century, gaining momentum in the 1950s with breakthroughs such as the transistor, solar cells and early AI from institutions like Bell Labs and MIT's Lincoln Lab.

By the 1970s, labs such as Stanford AI Lab, Philips Research and Xerox PARC were advancing robotics, semiconductors, consumer electronics, and personal computing. Many alumni went on to found major tech companies including Sun Microsystems, Cisco, Oracle and Adobe.

The pace of transformation accelerated in the 1990s and beyond, with labs driving digital breakthroughs like the World Wide Web, Wi-Fi, and MPEG standards. From the 2000s, private-sector labs shifted focus to commercialisation, powering the adoption of smartphones, cloud computing, and electric vehicles.

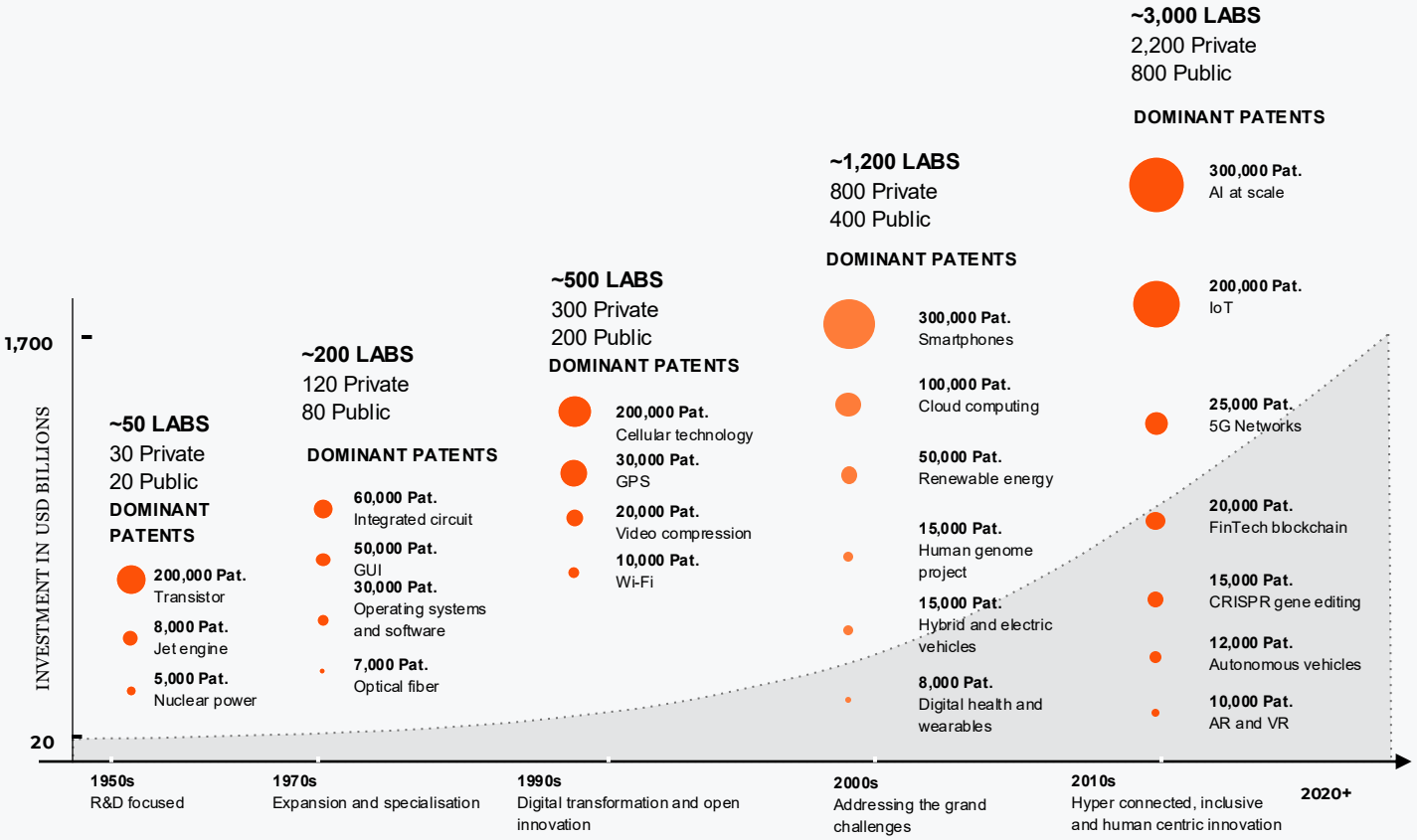
The following decade saw the rise of emerging technologies and AI, led by pioneers such as DeepMind and OpenAI. Breakthroughs in biotech, including CRISPR gene editing at UC Berkeley and advances in quantum computing further accelerated this shift. Together, these developments positioned labs as pivotal enablers of technology adoption, helping governments and organisations address real-world challenges.

Today, innovation labs remain key drivers of new ideas. Governments worldwide are increasingly creating their own innovation labs rather than depending on other public sector organisations. However, this growth coincides with pressures on global research funding.

According to the *Global Innovation Index 2025*, worldwide R&D spending is projected to grow by just 2.9% in 2024 which is the slowest rate since 2010.[i] In this environment of tightening budgets and growing scrutiny, governments must ensure that their innovation labs are not vanity projects but cost-effective platforms that deliver measurable impact.

The global growth of innovation labs

How innovation labs have evolved – and why they matter today



Leading innovation labs around the world

PRIVATE	Bell Labs	PRIVATE	Xerox PARC	PRIVATE	Microsoft Research	PRIVATE	Google X	PRIVATE	DeepMind
PUBLIC	MIT Lincoln Lab	PUBLIC	Stanford AI Lab	PUBLIC	CERN	PUBLIC	MIT Media Lab	PUBLIC	OpenAI
		PRIVATE	Philips Research	PRIVATE	Samsung AIT	PRIVATE	Huawei OpenLab	PRIVATE	AI Singapore
				PUBLIC	European Molecular Biology Lab	PUBLIC	European Bioinformatics Ins	PUBLIC	European Union AI Lab
						PRIVATE	National Renewable Energy Lab	PRIVATE	USA National AI Lab

Source: PwC research

Why innovation labs matter

03

Creating lasting impact and value

The true value of innovation labs lies not only in the breakthroughs they enable, but in the lasting impact they create across industries, governments and societies. Generative AI, for instance, emerged from the convergence of advanced computing power, decades of machine learning research and growing demand for more intelligent digital tools. Platforms such as Carnegie Mellon's Coscientist are now building on these foundations, autonomously running chemistry experiments that accelerate drug development and reshape the pharmaceutical sector.

Their contribution extends beyond technology. Innovation labs drive commercial ecosystems by linking research with application, helping startups and corporates turn concepts into products. The OECD's Global Trends in Government Innovation 2024, based on nearly 800 case studies across 83 countries, shows how governments are investing in scalable digital infrastructure and emerging technologies – from AI to modular architectures – to transform service delivery. Such trends underline the shift in expectation: innovation labs are no longer peripheral experiments but central vehicles for public sector transformation.[ii]

Labs also influence public policy, as seen in regulatory sandboxes for AI and fintech, enhance global resilience and help the designing and launching of products: BioNTech, in partnership with Pfizer, developed and delivered the world's first authorised mRNA COVID-19 vaccine – a breakthrough that is estimated to have saved millions of lives..

Considered national and corporate assets, these assets can be engines that convert uncertainty into opportunity. Their continued success depends on moving beyond the "innovation theatre" and focusing on measurable outcomes that build trust, competitiveness and resilience. For governments and businesses, the question is no longer whether to invest in labs, but how to make them deliver lasting impact.

The Middle East is uniquely positioned

The Middle East has a rare mix of capital depth, digital infrastructure, right skills, creative thinking and policy agility that are having labs that are national innovation engines. They have ambitious national strategies that required accelerators, labs to drive the change and achieve their KPIs.

Appetite for investment

GCC sovereign investors have emerged as some of the world's most active dealmakers, with a rising appetite to lead in frontier technologies.

Rapid build-out of digital infrastructure

The Middle East is scaling data centres and cloud capacity at unprecedented speed, laying the digital foundations for AI-driven innovation across health, mobility and more.[iii]

Policy agility and sandboxes that accelerate adoption

Regulators in the UAE, Qatar and Saudi Arabia have operational sandboxes that shorten time-to-market for novel services which is a practical advantage for labs seeking real-world trials.

Momentum in venture and ecosystem convening

MENA's startup ecosystem is gaining global visibility, with the region positioning itself as a hub that connects sovereign capital, hyperscalers and founders to drive innovation and growth.

A young, ambitious talent base

With over half of GCC nationals under 25, the region has a powerful demographic tailwind for skills development, entrepreneurship and rapid adoption of new services – exactly the conditions innovation labs need to scale pilots into mainstream impact.[iv]

Seven principles for building a successful innovation lab

04

What makes a successful innovation lab?

Innovation labs can play a transformative role in a country's innovation ecosystem, but they are difficult to build – and failures are common. One example was Media Lab Europe, launched in Dublin in 2000 as a sister initiative to MIT's Media Lab and a collaboration between MIT and the Irish government.[v] Despite €35m in government and corporate backing, the lab struggled to generate patents or commercial outcomes and closed in 2005 due to several factors such as an unsustainable funding structure, varying expectations between MIT and the Irish government and lack of clarity on accountability and governance. The case illustrates how even well-funded labs can falter without clear objectives, operational discipline and pathways to impact.

To avoid these situations, we've identified seven principles that underpin labs that scale nationally and endure, drawing on our rich experience of building successful labs globally.

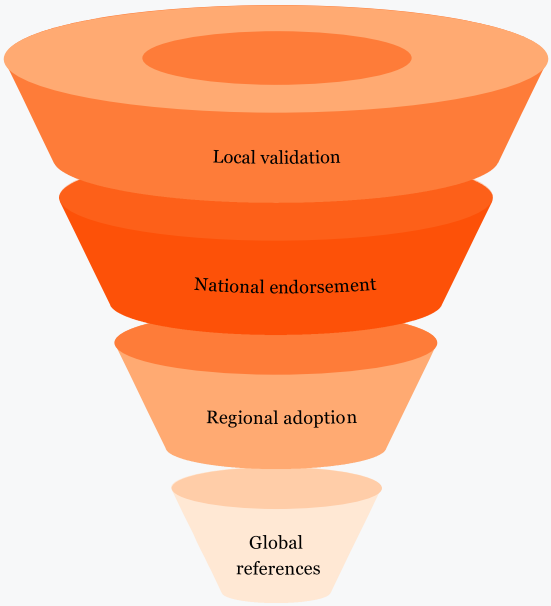
1. Deliver tangible value from day one

To endure, innovation labs must move beyond functionality to become respected, referenced and recognised authorities – both nationally and globally. Credibility secures buy-in from ministries and regulators, while attracting partners, investors, and talent. The key is to define quick wins that are impactful yet feasible and align with organisational mandates and strategy. Public-facing events can also accelerate buy-in, but these must go beyond ceremonial launches to create real value. A strong example is Dubai Future Labs, which, shortly after its 2020 launch, hosted the 2022 Dubai Robotics and Automation Program event. By convening global experts, startups, and policymakers and combining live demos with high-profile partnerships, the event established Dubai as a credible global hub for robotics and AI.

2. Build a credible story and success, locally and globally

To achieve lasting success, innovation labs must transcend functionality and become a respected, referenced and recognised authority among stakeholders both nationally and worldwide. Such credibility can ensure buy-in from ministries, regulators and other key ecosystem players. It also acts as a magnet for partnerships, funding, investment and talent. Reputation, however, is earned gradually. As Figure 2 illustrates, labs should build in stages – first local validation, then national endorsement, regional adoption and finally global recognition.

Figure 2: Building credibility



Demonstrate lab's value through real results in national ecosystem

Secure support from key ministries, regulators and national tech platforms

Position lab as a regional lighthouse for policy and innovation through partnerships and collaboration

Become part of global best practice and benchmarking by showcasing proven success stories and earning recognised international certification.

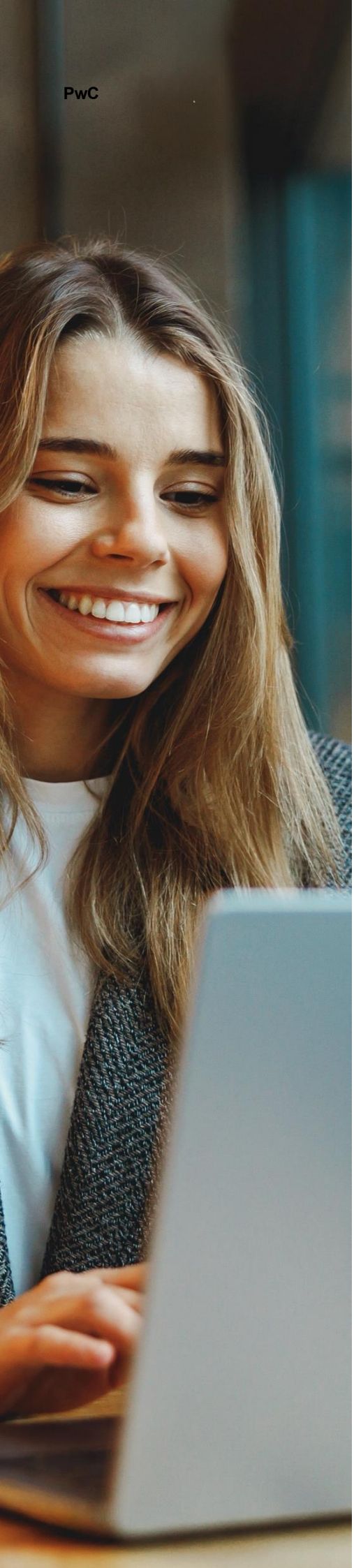
Reputation is also fragile and even world-leading labs can stumble. Consider, for example, the Alan Turing Institute, the UK's national AI and data science lab, which in August of 2025 faced reputational challenges after a government-driven shift in focus from health and societal projects to defence and security.[vi] Staff lodged complaints about governance, spending oversight and mission drift, warning that the institute's "credibility was in serious jeopardy." The episode shows how even high-profile public innovation labs can lose trust if their purpose becomes unclear or redirected.

3. Structure for sustainability

Innovation efforts often fade when funding ends or leadership changes. As such, a successful innovation lab must be designed from the start to become a self-sustaining national platform with the governance, funding models, and institutional capabilities to outlast any operator or contract. At the heart of sustainability is funding. Successful national labs often use a dual funding strategy – starting with public funds, then gradually increasing private-sector contributions until the lab can sustain itself.

An example of this is Germany's Fraunhofer-Gesellschaft. Founded in 1949, with public funding, the lab[vii] gradually evolved into a commercially driven model. Today, around one-third of its funding comes directly from government, another third from public-sector research contracts and the final third from private-sector research contracts.[viii] It has since grown into Europe's largest applied research organisation, with 76 institutes and more than 30,000 staff.

But sustainability goes beyond finance. It must be built into every process: documenting operations for smooth handovers, developing capability pipelines to reduce vendor dependency and tracking progress through a lab maturity model with clear benchmarks for independence and scale. In short, a lab that is not structured for sustainability is simply a project; a lab that is, can become a national institution.



4. Aligned to national programmes and digital infrastructure

Successful labs don't reinvent the wheel – they leverage national programmes and digital platforms already in place. This avoids duplication, accelerates early traction and builds trust by working through systems stakeholders already know. By plugging into existing infrastructure, labs position themselves as orchestrators of innovation rather than platform operators. This distinction is critical: labs may design improvements or test entirely new platforms, but their role is to create, not to run national systems.

Successful examples of this can be seen clearly in the Middle East – for example, in Qatar, the TASMU innovation lab is integrated directly into the TASMU Smart platform and leverages existing partnerships with Microsoft and Google Cloud to power its innovations.[ix] Further afield, in Singapore, GovTech Labs embedded its pilots, such as digital healthcare and e-payments, into existing national platforms like SingPass (Digital Identity)[x] and MyInfo (data-sharing). In both cases, using existing digital infrastructure enabled faster onboarding, smoother scaling, and stronger ecosystem alignment.

5. Design and delivery for people, not processes

Successful labs are built for people, not processes. Too often, innovation labs fail because they optimise internal workflows rather than serving the real users who matter. By designing around key personas – startup founders, students, policymakers, citizens, investors – labs ensure they bring different perspectives together under one roof and deliver tangible value and sustained engagement.

In practice, this means defining a set of representative personas that reflect that lab's key stakeholders and mapping their end-to-end journeys from initial awareness of the lab to active engagement and measurable outcomes.

The end-to-end innovation lifecycle along with tailored toolkits, participation methods, feedback and iteration loops can further improve in delivering tangible solutions. This ensures that you are getting the right inputs and allow the evolution of the product and giving the best chance for the outcome to be successful long-term and scaled impact.

6. Measure what matters, not what's easy

If you measure the wrong thing, you may build the wrong thing. Too many innovation efforts are judged by quantity rather than impact – counting events held or pilots launched instead of the real outcomes achieved. Successful labs focus on value created: jobs generated, skills developed, investments attracted, services improved. For example, the percentage of pilots adopted is far more meaningful than the number of pilots launched. Publishing a quarterly dashboard can help make these KPI's real and can act as a powerful tool for focusing work.

7. Leverage and connect the ecosystem

In the 1950s, innovation labs thrived by co-locating researchers and funding big ideas. Today, success depends on networks: labs must connect startups, corporates, regulators and universities to create powerful ecosystem effects. Just as Google's search improves through the data of millions of users, innovation grows stronger the more institutions are connected. This is why Kendall Square in Massachusetts – home to MIT, Google and Pfizer – is called "the most innovative square mile on the planet."[xi]

PwC partners, the Cambridge Innovation Center, where over 11,000 companies, including Android and Meta have emerged, exemplifies how a hub can orchestrate such networks. By bringing together existing programmes, infrastructure and partnerships within Kendall Square into a single, connected ecosystem, they ensure it remains at the cutting edge of innovation.

Together, these seven principles form a playbook for building innovation labs that scale nationally and endure. When applied consistently, the principles transform labs from short-term showcases into true national innovation engines – platforms that convene ecosystems, accelerate adoption and embed innovation into the fabric of society and the economy.

Case studies

05

Global models of innovation labs – lessons learnt

Nokia Bell Labs, USA

Founded in 1925, Bell Labs pioneered breakthroughs such as the transistor, information theory, fibre optics and the C programming language. Yet, after AT&T's break-up in the 1980s, funding shifted from long-term research to short-term projects. Budget cuts and talent departures weakened its edge, while others like Texas Instruments and Fairchild commercialised its inventions faster.

Lessons: Stable funding and interdisciplinary teams drive breakthroughs; commercialisation pathways are as critical as invention; retaining top talent is vital for sustaining an innovation culture.

GovTech Labs, Singapore

Part of the Smart Nation initiative under the Prime Minister's Office, GovTech Labs prototypes citizen-centric services such as SingPass, a secure digital ID used across 1,400 services. Backed by strong political support, it has transformed service delivery and positioned Singapore as a global leader in digital government.

Lessons: Political sponsorship sustains funding and alignment; citizen-first design builds trust and adoption; ecosystem partnerships and policy integration maximise impact.

European Innovation Council (EIC) Labs, EU

The EU's €10bn deep-tech programme funds the full innovation lifecycle through Pathfinder, Transition and Accelerator schemes. It has backed 400+ research projects, 700+ startups and generated 6,000 active patents. Success stories like QubeDot illustrate how the model helps deep science reach market scale.

Lessons: Early integration of IP strengthens value; structured portfolio management accelerates lab-to-market transition; continuity across funding stages converts science into investable innovation.

Factors that distinguish success from failure

06

Seven potential challenges and how to address them

What separates the case studies above from those which fail? Every lab is unique, shaped by its sector, mandate and stakeholders. Yet after establishing over 31 labs worldwide, PwC has developed a clear perspective on the factors that distinguish success from failure. We know what causes labs to struggle and how to address these challenges.

1. Weak governance:

Labs that lack clear, cohesive governance functions fail to scale.

Solution:

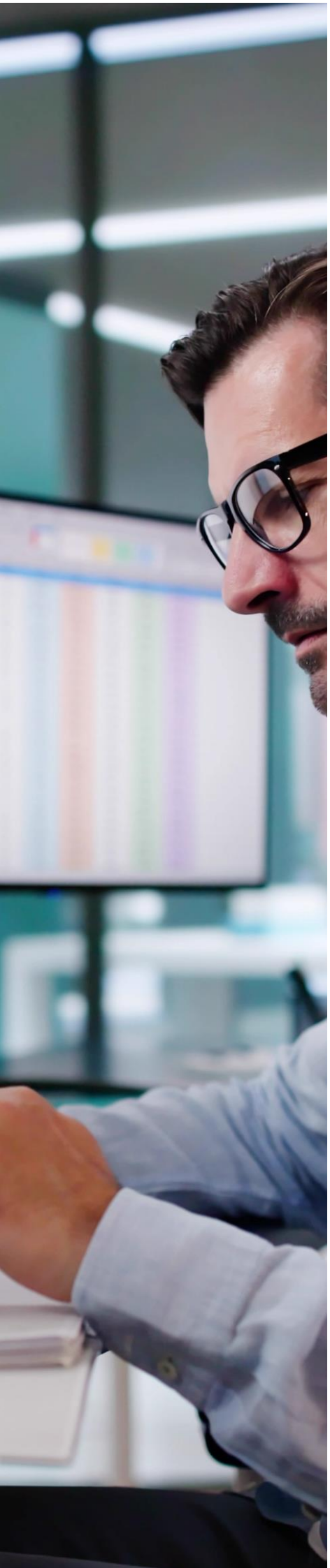
Successful labs establish a single operating model from the outset, defining decision rights, funding flows and accountability. Setting up a dedicated programme management office can also ensure consistency across pilots, partnerships and budgets, while codified playbooks and service manuals make processes replicable and reduce dependency on individuals. Regular reviews, published dashboards and clear handover mechanisms further embed trust, continuity and long-term resilience, turning the lab into a credible national or organisational asset rather than a one-off experiment.

2. Failure to scale and commercialise outcomes:

Promising R&D often stalls without structured pathways for proof of concept, piloting and market readiness.

Solution:

Innovation labs can improve commercialisation by moving beyond ad-hoc pilots and adopting a structured “lab-to-market” pipeline that takes ideas through proof of concept, prototyping and pilot into commercial application. Early engagement with corporates, startups and investors ensures research is market-driven, while partnerships with startup programmes such as incubators and venture studios helps bridge the gap between discovery and scale. In practice, the most successful labs act as conveners of the wider ecosystem and think like entrepreneurs as much as scientists, ensuring research achieves real-world outcomes.



3. Limited access to emerging technologies:

Labs which fail to provide access to key technologies often can't get off the ground. For a lab to be successful, it must reduce the barrier to innovation, either through providing tools which would not be available elsewhere or through reducing regulatory barriers.

Solution:

The most obvious solution to limited access to emerging technologies is to provide that access – whether that's through technology partners or by developing specialised facilities such as wet labs. These can often be highly costly, however and the specialisation of such facilities may not align with the mandate of all labs. An alternative which has proven successful in the public sphere is to provide regulatory sandboxes – these reduce the risk of innovations and allow experimentation.

4. Low engagement (citizen and employees):

Innovation programmes often miss opportunities to involve citizens directly – limiting both legitimacy and adoption.

Solution:

Boost engagement by giving people real opportunities to interact with new ideas and prototypes, rather than treating innovation as a closed technical process. This starts with co-creation sessions, showcases, focus groups and hands-on testing, where participants can experience pilot concepts directly and share meaningful feedback. The result is not only stronger engagement, but also more relevant, user-centred solutions.

5. Fragmented collaboration ecosystem:

Innovation programmes often miss opportunities to involve citizens directly, limiting both legitimacy and adoption.

Solution:

To avoid fragmented stakeholder collaboration, innovation labs need to act as neutral orchestrators, bringing together government, academia, industry and citizens through shared governance, clear incentives and transparent processes. This means establishing a single intake and prioritisation system for projects, supported by formal partnership agreements that clarify roles, responsibilities and benefits. Co-creation events, shared governance forums and regular ecosystem showcases help maintain alignment, while digital platforms can be used to make collaboration visible and trackable. Crucially, success should be measured by joint outcomes – such as scaled pilots, shared IP or talent pipelines – rather than siloed activities, ensuring that every stakeholder sees their contribution reflected in tangible results.

6. Underestimated complexity:

Innovation is challenging. Labs that fail to recognise the scale of the task they have set themselves often struggle due to insufficient resources or even resistance from key stakeholders within the establishing organisation.

Solution:

Labs can address complexities by scoping ambition realistically, resourcing adequately and building change management into their DNA. This means starting with a clear mandate that aligns with the parent organisation's strategy, setting achievable goals in the first 12-18 months and investing early in stakeholder buy-in. Equally important is embedding experienced programme managers and ecosystem partners who understand the operational realities of scaling innovation – bridging the gap between vision and delivery. For example, when Singapore launched its GovTech Open Innovation Platform, it deliberately piloted a limited set of challenges before scaling nationally. By resourcing the programme properly, involving ministries from the outset, and demonstrating early success stories, the platform overcame resistance and is now a core part of Singapore's Smart Nation strategy.

7. Talent gaps

Labs often launch with strong external advisers or contractors but fail to embed skills locally, creating dependency and weakens long-term credibility.

Solution:

Successful labs treat talent development as a core function, not an afterthought. Structured certification programmes in areas core to the innovation lab should be implemented to build a credentialed workforce, with strong alumni networks to ensure skills remain in the ecosystem even after staff move on. In addition to handing over key capabilities to parent organisation staff, knowledge transfer should also be embedded throughout the ecosystem by inviting core stakeholders to second employees with the innovation lab or arranging internships with local universities. Rotational fellowships across academia, government and industry can create a pipeline of talent that understands both research and commercialisation. Ultimately, the lab must be seen not only as a place for experimentation, but as a national talent engine that connects skilled people back into the wider economy.

Looking ahead

07

What comes next

Across the world's most advanced labs, the next chapter of innovation is already unfolding. Research and development has shifted from isolated environments like Bell Labs in the 1950s to highly connected innovation ecosystems. Today's major challenges – from climate change to technological disruption, demographic shifts, global fragmentation and social instability – demand collaborative, multi stakeholder efforts led by national innovation labs.

Labs are now adapting by accelerating green technologies, improving the efficiency of AI to reduce environmental impact and developing solutions that respond to the needs of ageing populations. As global fragmentation grows, many labs are also looking to the Middle East as a bridge between East and West and an emerging hub for innovation.

By following the guidance and learning sset out in this playbook, innovation labs can adapt to changes and help shape the future - delivering impact and value for the region while positioning themselves as global reference points for effective, future-focused innovation.

List of Resources

1. Final obsequies for MediaLab Europe
2. ‘Shut it down and start again’: staff disquiet as Alan Turing Institute faces identity crisis
3. Innovation at Bell Labs
4. The Birth of the Web
5. Stanford AI Lab
6. Xerox PARC tech contributions
7. First Philips Cassette Recorder
8. Bringing WiFi to the world
9. About MPEG
10. About DeepMind
11. Google Acquires AI Pioneer DeepMind Technologies
12. Our Structure - OpenAI
13. Refreshed Singpass reflects improved services and drives digital innovations with private sector
14. Singapore Whole of Government Platforms and Tools
15. Accelerate Estonia
16. Kendall Square Initiative
17. Hamdan bin Mohammed launches the Dubai Robotics and Automation Program
18. TASMU Innovation Lab
19. Microsoft technologies power up TASMU Platform, the World’s Most Innovative Cloud-based Smart City Solution
20. Fraunhofer Finances
21. Fraunhofer Facts & Figures
22. CES: IBM announces Q System One
23. Pfizer and BioNTech Achieve First Authorization in the World for a Vaccine to Combat COVID-19
24. European Innovation Council (EIC)
25. EIC EUROPEUM policy brief
26. The European Innovation Council Impact Report 2023: a €70 billion deep-tech portfolio
27. From Pathfinder to Accelerator: QubeDot’s Innovation Journey Through the EIC Funding Pipeline
28. CMU-Designed Artificially Intelligent Coscientist Automates Scientific Discovery

Contact us

Yazen Al Safi
Technology
Consulting Partner,
PwC Middle East

Paul Kelly
Technology Consulting
Senior Manager,
PwC Middle East

Hadi Kobeissi
Digital and
Technology Partner,
PwC Middle East

Shean Malik
Experience Consulting &
Innovation Partner,
PwC Middle East

Jesko von den Steinen
Experience Consulting &
Innovation Director,
PwC Middle East

Rahaf Abutarbush
Emerging Tech Labs
Innovation Lead,
PwC Middle East

Sami Al-Shatri
Head of Emerging Tech Labs,
PwC Middle East

About PwC

At PwC, we help clients build trust and reinvent so they can turn complexity into competitive advantage. We're a tech-forward, people-empowered network with more than 364,000 people in 136 countries and 137 territories. Across audit and assurance, tax and legal, deals and consulting, we help clients build, accelerate, and sustain momentum. Find out more at www.pwc.com.

With over 12,000 people across 12 countries in 30 offices, PwC Middle East combines deep regional insight with global expertise to help clients solve complex problems, drive transformation, and achieve sustained outcomes. Learn more at www.pwc.com/me.
PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.