UK Atomic Energy Authority

Innovation Management Framework

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1. Introduction

For over two centuries, the United Kingdom has stood at the forefront of global innovation. From the locomotive to the laser, from reaction engines to breakthroughs in computing and medicine, British ingenuity has shaped industries, transformed societies, and fuelled economic growth. This legacy is a national asset, but it is not assured. The pace of innovation worldwide is accelerating, and leadership can be lost as quickly as it was gained. Safeguarding the UK's position requires more than sustained investment in research and development. It also requires the capability to manage innovation efficiently as a strategic, organisation wide discipline, applied consistently not only in industry, but also across the public research sector.

Public research organisations are central to this endeavour. They possess world class expertise, exceptional talent, unique facilities, and missions of national importance. Yet without robust innovation management, even the most promising ideas can stall, fragment, or fail to achieve adoption or scale. By strengthening innovation capability alongside scientific excellence, we increase the likelihood that publicly funded discovery translates into economic, societal, strategic, and environmental value, and does so at a pace that sustains and improves competitiveness over time.

At the UK Atomic Energy Authority (UKAEA), our mission to lead the delivery of sustainable fusion energy demands that we research and develop with rigour, speed, and purpose. In recent years, we have built an approach to managing innovation that is structured and adaptable, drawing on industry tested innovation management practice, and tailoring it to the governance and accountability context of a public research organisation. The UKAEA Innovation Management Framework distils this experience into a model that may be useful (adapted as needed) for other public R&D organisations.

The framework is based on ten guiding principles and consists of ten core components. It is designed to operate end to end, from the identification of opportunities, through disciplined de-risking and exploitation, to adoption, scaling, and value realisation. A central premise is that innovation impact depends on both innovation capability (how effectively the system works) and innovation capacity (the resources mobilised behind it). Strengthening capability helps ensure that investment translates into outcomes, rather than assuming that increased activity alone will reliably deliver impact. The framework places particular emphasis on early de-risking and evidence generation, helping organisations focus effort and resources on the opportunities most likely to progress into real-world use and deliver public value.

This publication is shared in a spirit of contribution and openness, not as a claim to a definitive or "best" model. It is not a Knowledge Asset Management Strategy, a policy document, or an implementation toolkit. Instead, it provides a clear architecture for how innovation can be organised and managed, while deliberately leaving flexibility on how each component is implemented in practice. Implementation can and should vary by organisation, from simple starting points to more advanced practices over time. The framework is aligned with UK government guidance on Knowledge Asset Management issued by the Government Office for Technology Transfer (GOTT), including The Rose Book, and related guidance on commercialisation, spinouts, and incentives.

How to use this booklet

This paper describes how UKAEA manages innovation at an organisational level. It is intended as a practical reference for leaders and practitioners in public R&D who want to strengthen innovation capability and improve the translation of knowledge assets into real world outcomes. It is not an implementation toolkit. Readers can use the framework to compare current practice against a clear end-to-end model, identify gaps or weak interfaces (strategy, governance, portfolio, culture, enabling functions, external partnering, IP –Intellectual Property–), and measurement), and prioritise proportionate improvements based on mission needs and organisational maturity. If you would like to explore application or adaptation, UKAEA welcomes dialogue and shared learning.

2. The framework

The UKAEA Innovation Management Framework describes the way we organise, govern, and deliver innovation at UKAEA. It explains our approach rather than as a prescription for how other public research organisations should operate. Other organisations may find parts of it useful as a reference point, but implementation choices will always depend on mission, context, and maturity.

Our framework is built on a simple foundational relationship. The scale of innovation impact we achieve depends on both innovation capability and innovation capacity. Capability is the effectiveness of the innovation system (how well we identify opportunities, make decisions, manage innovation risk, protect and exploit knowledge assets, and learn systematically). Capacity is the level of resources we can mobilise behind that system (funding, time, talent, infrastructure, and leadership attention). Put plainly, capacity without capability leads to waste, while capability without capacity limits scale.

This is why higher spending alone does not guarantee better outcomes. Experience and evidence across many sectors suggest that investment is only effective when it is matched by the disciplines that turn activity into results. In practice, this means building the organisational conditions that make innovation repeatable, not relying on isolated initiatives or individual champions.

In well-established organisations, inefficient innovation is often systemic rather than symptomatic. It cannot be resolved through one off interventions such as introducing a new process, hiring a small number of specialists, or simply increasing budgets. Instead, it requires a holistic approach that addresses the full set of organisational factors that enable innovation. The framework reflects our belief that innovation capability is multi-dimensional and interdependent. Overlooking any critical component weakens the performance of the whole system.

A defining feature of our approach is early de-risking of ideas to optimise resource allocation and increase the likelihood of successful outcomes. Not every idea or knowledge asset (whether a research result, concept, dataset, software, or invention) should advance. We therefore screen opportunities early, increase investment progressively only when evidence supports it, and focus effort on opportunities most likely to generate meaningful and scalable public value.

Building on these premises, the framework provides a structured model that helps UKAEA organise, drive, and manage innovation in a consistent, efficient, transparent, and strategically aligned way. It is designed to operate across the whole organisation, embedding innovation capability into mission delivery rather than treating innovation as an isolated activity.

The purpose of the framework is to provide a clear architecture for how we manage innovation. This helps us translate strategic intent into operational practice and scale what has been proven to work, while keeping implementation flexible and proportionate as our maturity evolves.

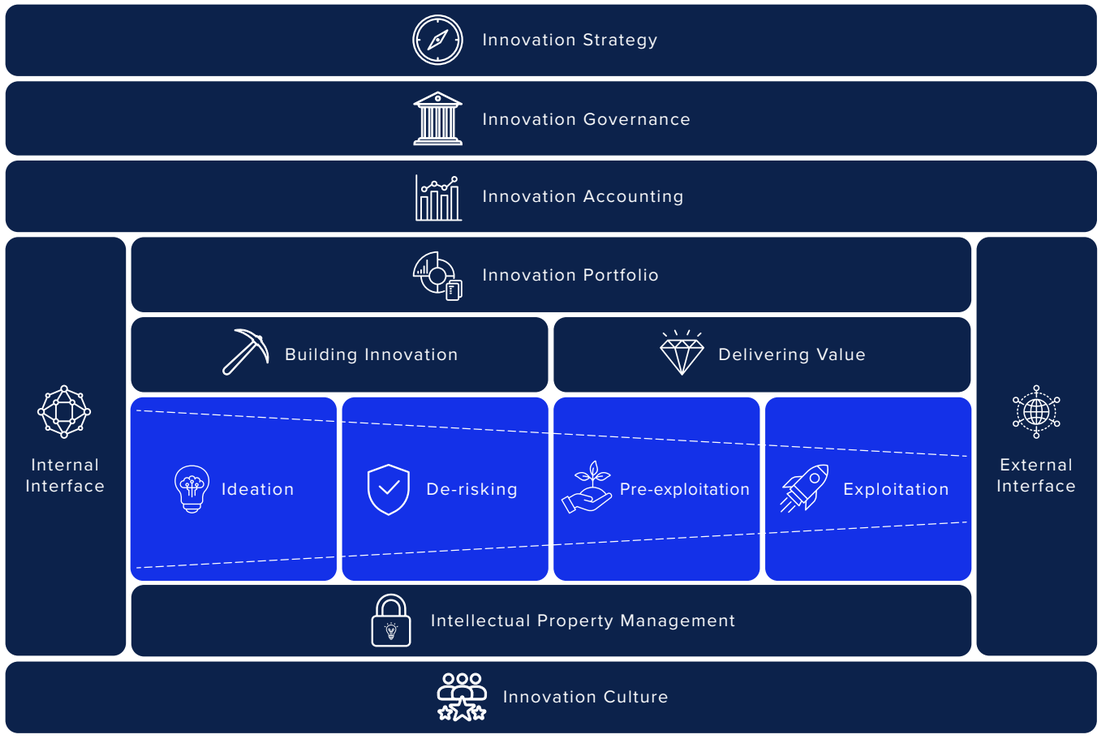

Figure 1: UKAEA Innovation Management Framework

3. Defining innovation

A common and shared understanding of innovation is essential for effective communication and collaboration within organisations, across the public research sector, industry, and the wider ecosystem. The term “innovation” is widely used yet often interpreted differently by individuals and institutions. Without a common language, conversations risk becoming ambiguous, expectations can diverge, and efforts may become misaligned. Establishing shared definitions is also a practical enabler of consistent measurement and benchmarking across organisations.

In the context of this framework, innovation is used in three complementary senses:

- **Innovation as a function.** A defined organisational activity and capability: the structures, roles, competencies, governance, processes, and resources that enable innovation to be pursued intentionally and repeatedly, rather than episodically. This aligns with the concept of an innovation management system as a set of interrelated elements that organisations establish and continually improve to achieve intended innovation outcomes.

- **Innovation as an output.** The result of successfully implementing novelty in practice. A widely used definition describes an innovation as a new or improved product, service or process (or combination thereof) that differs significantly from what existed before and is made available to users or brought into use. In public research organisations, this outcome is judged by the value it creates, such as economic, societal, strategic, and environmental benefit.
- **Innovation as a process.** The systematic set of activities through which ideas and knowledge assets are transformed into valuable outcomes, typically including idea generation, assessment, de-risking, validation, protection where appropriate, and exploitation pathways.

4. Ten guiding principles

These ten guiding principles express a practical view: innovation is a strategic capability that must be deliberately designed, resourced, and continually improved, not left to chance or treated as a downstream activity. They draw on established good practice for innovation management and are intended to help public research organisations build innovation systems that are effective, scalable, and aligned to mission delivery.

Principle 1. Strategic alignment

Innovation delivers the greatest value when it is explicitly aligned with an organisation's strategy and, where relevant, with national priorities. Rather than being opportunistic or isolated, innovation should be guided by a clear purpose, ensuring that resources are directed toward solving the right real-world problems, in the right areas, at the right time. Embedding innovation within organisational strategy helps prioritise effort, clarify decision-making, and maintain coherence across the innovation portfolio.

This alignment is not static. Strategy provides direction, but innovation can also inform and evolve strategy by revealing new opportunities, emerging risks, capabilities, and unmet needs. Treating the relationship as dynamic helps innovation remain relevant, forward-looking, and responsive to change.

For public research organisations, strategic alignment also strengthens accountability. It enables a clear narrative of why particular opportunities are pursued, what outcomes are expected, and how those outcomes contribute to public value. It also provides a stronger basis for selecting meaningful measures (so performance can be assessed in ways that resonate with government, industry partners, funders, and society) and for demonstrating delivery of economic, societal, strategic, and environmental value.

Principle 2. Innovation is transformational, not transactional

Innovation delivers the greatest value when treated not as a reactive or transactional process, but as a strategic and transformational organisational capability. It should not be understood only as a follow-on activity that begins once research has concluded, with results then transferred into use through routes such as licensing or spinouts. These routes remain essential, but they are most effective when supported by a broader innovation system that identifies opportunities early, shapes them deliberately, and builds the evidence needed for adoption, scale, and impact.

The framework therefore promotes a shift from "invent first, commercialise later" to embedding innovation earlier in the research and development lifecycle. This means exploring potential applications while technical choices are still flexible, engaging users, partners, and stakeholders early, and iteratively shaping ideas so that they are more likely to meet real needs and progress into real-world use.

A proactive stance is essential because uncertainty is inherent to innovation. By maintaining a broad and balanced portfolio of opportunities, and by applying disciplined, evidence-based evaluation, organisations can improve decision-making, prioritise resources more effectively, and reduce waste. In practice, this requires close collaboration between innovation leads and technical teams to stimulate idea generation, support early exploration, and learn through iteration, so that promising ideas are strengthened early and weaker ideas are stopped before significant resources are committed.

Principle 3. Innovation as a legitimate business discipline

For innovation to thrive in public research organisations, it must be treated as a core organisational function, on par with research, finance, or programme management. This means moving beyond ad-hoc initiatives or isolated projects to embed innovation within the organisation's structure, strategy, and governance. It requires dedicated leadership, clearly defined accountabilities, and sustained investment in the capabilities that enable innovation to be repeated, not just attempted.

Legitimacy is demonstrated through visibility and authority. Innovation should be explicit in the organisational design: visible in the organisational chart, backed by a dedicated budget, supported by formal roles and responsibilities, and integrated into decision-making processes. It should have clear interfaces with enabling functions (commercial, legal, procurement, finance, HR, and communications) so that innovation work is supported routinely rather than treated as an exception. In practice, this also means defined decision rights, proportionate governance, and a coherent portfolio view so that innovation effort is prioritised and resourced transparently.

Executive-level commitment is central to this principle. When senior leaders champion innovation, they signal that it is expected, not optional. Their support creates the conditions for cultural change, unlocks resources, and enables alignment with strategic priorities. It also provides the authority to address systemic barriers such as siloed structures, risk aversion, and competing priorities.

Principle 4. Organisational culture alignment

A well-designed innovation management system can only succeed if it is aligned with the organisation's culture: the shared values, behaviours, and ways of working that shape how people think and act. Public research organisations often have cultures that rightly prioritise scientific rigour, long-term inquiry, and technical excellence. These are strengths. However, they can sometimes sit in tension with the agility, experimentation, and responsiveness that innovation also requires. Embedding innovation as a core capability therefore means fostering an environment where curiosity is encouraged, learning through well-managed experimentation is normalised, and collaboration across disciplines becomes routine.

Cultural alignment requires visible leadership role-modelling, consistent communication, and practical reinforcement through incentives, recognition, and career pathways. It also means celebrating innovation efforts, integrating innovation expectations into recruitment and performance systems, and ensuring staff feel empowered to propose, test, and refine ideas. Establishing a shared language around innovation is equally important. It enables consistent understanding across disciplines, reduces ambiguity, and supports more coherent collaboration.

An innovation culture also depends on a strong commitment to equality, diversity, and inclusion. Diverse perspectives improve problem framing, challenge assumptions, and expand the range of solutions considered, while inclusive practices ensure those perspectives are heard and acted upon. In innovation work, inclusion is closely linked to psychological safety: the shared belief that it is safe to speak up, ask questions, challenge assumptions, and raise concerns without fear of negative consequences. This is especially important in complex, high-uncertainty environments, where early surfacing of risks, faster learning, and effective cross-functional collaboration can significantly improve the quality of decisions.

By aligning innovation with organisational culture, public research bodies can make innovation a shared responsibility and an integral part of mission delivery, strengthening the conditions required to generate impact consistently.

Principle 5. Agile, structured, and repeatable processes

While innovation is often associated with creativity, insight, and discovery, achieving consistent and meaningful outcomes requires structure. The framework is built on the principle that innovation should be managed through agile, systematic, and repeatable processes. Agility is essential in conditions of uncertainty, where technologies evolve, user needs shift, and external constraints change. It allows organisations to test assumptions quickly, learn from feedback, and adapt based on evidence before committing significant resources.

However, structure should not be confused with rigidity. The framework does not depend on a fixed stage-gate model in which every project must follow the same linear sequence of steps. Innovation opportunities differ in their maturity, uncertainty, technical complexity, context, route to adoption, and potential impact. They therefore require proportionate pathways, tailored activities, and flexible progression. What should be consistent is not the exact route each project takes, but the discipline applied: clear objectives, evidence-based learning, appropriate governance, incremental commitment of resources, and explicit decision points.

Structure and repeatability provide the discipline required to manage innovation consistently across an organisation. This means using clear methods, proportionate support, incremental funding, and timely decisions to guide opportunities from early exploration through development, exploitation, adoption, and scaling. Repeatable processes allow learning to accumulate, enable good practice to spread, and make innovation easier to integrate into day-to-day work, while preserving the creativity and judgement needed for breakthrough thinking.

Principle 6. Speed as a strategic enabler

In innovation, speed is not about rushing; it is about accelerating learning. The faster an organisation can test assumptions, gather feedback, and adapt, the better it can navigate uncertainty and respond to emerging opportunities. Early testing, rapid feedback, and timely decision-making reduce the cost of pursuing ideas that are unlikely to succeed, while increasing the chances of advancing those that show real potential. In fast-moving domains, timing often determines whether an organisation helps shape the direction of travel or is left responding to it.

Speed applies across the full innovation lifecycle, not only to ideation, assessment, and de-risking. It also matters in the transition from validated opportunity to adoption and scaling. If these later steps are slow, unclear, or poorly supported, technically successful innovations can lose momentum, miss windows of opportunity, or fail to translate into meaningful value. A mature innovation system therefore treats speed as an end-to-end consideration: from idea to evidence, and from evidence to adoption at scale.

For public research organisations, embedding speed usually requires both cultural and operational change. It means creating space for iteration, engaging stakeholders early, and valuing evidence of progress over premature perfection. It also means shortening the cycle between hypothesis, experiment, learning, and decision, so that weaker opportunities are stopped or redirected early and stronger opportunities gain momentum quickly. Just as importantly, it requires reducing avoidable organisational latency, ensuring that approvals, enabling functions, governance processes, and partner pathways keep pace with learning.

Done well, speed becomes a strategic enabler. It helps organisations concentrate resources where they matter most, maintain momentum behind promising opportunities, and deliver outcomes at a pace that reflects the urgency and dynamism of the external landscape.

Principle 7. Spaces to innovate

Innovation does not happen by chance; it requires deliberate and protected space to emerge, evolve, and succeed. This is often misunderstood as a call for a dedicated "innovation lab". While physical environments can be valuable, the deeper requirement is organisational: creating the conditions that allow new ideas to be explored, tested, and advanced.

In this framework, "space" is understood in practical terms. It includes dedicated budget to support early exploration, de-risking, and, where evidence justifies it, scaling. It includes protected time, so teams can think, experiment, and reflect rather than being expected to

innovate only in spare moments. It includes psychological space: the permission to test assumptions, surface risks, ask difficult questions, and learn from outcomes without fear or blame. It includes clear pathways to adoption and scale, so validated ideas are not stranded at prototype stage because ownership, routes to use, or resources are unclear. Where relevant, it also includes physical space, such as laboratories, test facilities, collaborative environments, and prototyping capability that make experimentation possible.

These forms of space are not luxuries; they are enabling infrastructure for a functioning innovation system. When they are intentionally created and safeguarded, innovation becomes feasible by design rather than dependent on individual persistence or informal workarounds. The organisation signals what it values, reduces friction for teams doing the work, and prevents promising opportunities from being lost to resource bottlenecks, unclear pathways, or organisational inertia.

Principle 8. Progress and impact measurement

Innovation must be measured to be managed. Without meaningful metrics, organisations cannot understand progress, allocate resources effectively, or demonstrate value to stakeholders. In innovation, measurement should support decision-making under uncertainty by showing not only what activity is taking place, but whether it is generating learning, reducing risk, strengthening evidence, and moving opportunities closer to adoption and impact. This requires visibility across the full lifecycle: from early exploration and project delivery, through outputs and outcomes, to benefits and long-term impact.

This means moving beyond traditional activity indicators, such as the number of ideas submitted, projects initiated, invention disclosures or patents filed. These indicators can be useful, but they do not, on their own, show whether innovation is progressing towards meaningful value. A stronger measurement approach distinguishes clearly between outputs, outcomes, benefits, and impacts: what is produced, what changes as a result, what short- and medium-term value is created, and what enduring long-term gains are achieved. These distinctions make reporting more credible and reduce the risk that activity is mistaken for progress.

A robust measurement system enables consistent and transparent monitoring of the innovation portfolio. It helps show where resources are being directed, what is being learned, which uncertainties remain, what is being stopped or redirected, what is being scaled, and why. Used well, measurement becomes a management tool rather than a retrospective reporting exercise. It supports prioritisation, surfaces bottlenecks, strengthens governance, accelerates learning, and helps public research organisations communicate the value they create in economic, societal, strategic, and environmental terms.

Principle 9. Thriving in a connected community

Innovation thrives in connected ecosystems where ideas, expertise, and resources move effectively across organisational boundaries. Public research organisations are often particularly strong in this role. They routinely convene industry, academia, government, and other partners around shared challenges, bringing credibility, specialist expertise, and access to distinctive facilities. This convening power is a strategic asset and a distinctive advantage in mission-driven innovation.

Purposeful relationships with industry, academia, government, start-ups, investors, end users, and other stakeholders bring new perspectives, accelerate learning, and create routes for co-creation, adoption, and scaling. They help ensure that innovation is grounded in real needs, shaped by practical constraints, and positioned to deliver measurable results beyond the organisation itself.

Creating a vibrant innovation community requires more than ad-hoc engagement. It depends on sustained collaboration built on trust, clarity of purpose, and mutual benefit. This means investing in the mechanisms that make partnership repeatable and productive: shared programmes, joint development activities, knowledge exchange, partner-facing pathways, and well-designed forums where problems, opportunities, and capabilities can be matched.

By actively shaping and participating in their ecosystems, public research organisations extend the reach, relevance, and impact of their work. They make it easier for others to adopt, adapt, and build on publicly funded knowledge, strengthening their ability to deliver economic, societal, strategic, and environmental value while contributing to a more resilient and effective national innovation landscape.

Principle 10. Product and service orientation

Innovation delivers real value when knowledge and technology are applied to solve practical and intense problems. A product and service orientation shifts the focus from invention to utility: from “what we have built” to “what it enables”. This perspective helps ensure that scientific and technical outputs are shaped into solutions that meet user needs, are feasible to deliver, and can be adopted and adapted at scale. Considering these factors early improves the likelihood that innovations move beyond the lab and deliver measurable value.

Embedding product, service, and business-model thinking throughout the innovation process also creates clearer pathways for collaboration, investment, and adoption. It makes it easier for partners and end users to engage because the value proposition, expected performance, constraints, and route to implementation become explicit. For public research organisations, this does not mean replacing scientific inquiry with commercial imperatives. It means complementing scientific excellence with deliberate attention to use, delivery, and uptake.

In practical terms, this orientation encourages teams to define the problem being solved, understand who will adopt, operate, or benefit from the solution, and design with real-world integration in mind. This includes consideration of regulatory, operational, commercial, procurement, and market contexts where relevant. By doing so, organisations can move from promising outputs to usable outcomes, and from isolated demonstrations to solutions that can be replicated, scaled, or embedded in practice.

This strengthens the connection between research and innovation impact, supporting a more reliable translation of publicly funded knowledge into real-world benefit.

5. Core components

The framework is built on ten interdependent components that embed innovation into an organisation's strategic, cultural, operational, and external dimensions (see figure 1). No single component works in isolation; their value comes from how they connect and reinforce one another. Together, they describe what an effective innovation management system looks like and how it operates in practice.

In implementation, each component may be expressed through a combination of policies, processes, governance, roles, good practices, tools, databases, training, and initiatives. The specific form and level of sophistication will vary depending on organisational context and maturity. What matters is that each component is designed intentionally, owned clearly, and improved over time as the system learns.

5.1 Innovation strategy

The innovation strategy is the mechanism that ensures innovation activity is deliberately aligned with an organisation's mission, strategic priorities, and, where relevant, wider national objectives. It creates a clear connection between what the organisation is trying to achieve and how it mobilises innovation to support delivery.

In practice, this interface operates in both directions. Organisational strategy provides the focus and boundaries for innovation, defining the areas, challenges, and opportunities where innovation effort should be concentrated. The Innovation Strategy then translates that direction into actionable intent: priority themes, desired outcomes, the balance between near-term and longer-term work, risk appetite, and the pathways through which knowledge assets are expected to create value. At the same time, insights emerging from innovation activity can refine the organisational strategy by revealing new capabilities, constraints, risks, or opportunities that were not visible at the outset. This dynamic exchange keeps innovation purposeful and responsive rather than rigid or purely reactive.

A robust Innovation Strategy helps convert high-level priorities into a managed set of choices (what to pursue, what not to pursue, what to accelerate, and what to stop) so that resources and leadership attention are applied where they matter most.

Without an Innovation Strategy, innovation risks becoming fragmented or misaligned: producing outputs that are technically strong but strategically peripheral, duplicating effort, or failing to connect with credible routes to adoption and scale. With it, organisations can build a more coherent innovation portfolio, make trade-offs transparently, and ensure that innovation effort remains anchored to mission delivery and real-world need.

Effective implementation requires active leadership engagement, clear prioritisation and review mechanisms, and regular refresh cycles so alignment is maintained as organisational goals and external conditions evolve.

5.2 Innovation culture

Innovation culture is the set of values, behaviours, and shared understandings that shape how people within an organisation perceive, contribute to, and sustain innovation. Strategies, structures, and processes can be designed centrally, but culture determines whether those mechanisms are embraced, applied consistently, and improved (or whether they stall in practice).

In many public research organisations, culture has been shaped by decades of scientific rigour, long-term inquiry, and technical excellence. These strengths are essential for credible research, but they can sometimes sit in tension with the agility, experimentation, and cross-disciplinary collaboration that effective innovation also requires. The purpose of the innovation culture component is not to dilute scientific excellence, but to ensure that research excellence and innovation capability reinforce one another.

A strong innovation culture is characterised by a consistent set of values and behaviours that show up in day-to-day work. These typically include curiosity (seeking new possibilities and asking better questions), critical thinking (challenging assumptions and using evidence to reduce uncertainty), collaboration (working across disciplines and functions to combine perspectives), clear communication (making intent, progress, risks, and decisions visible), customer and stakeholder orientation (engaging early with adopters and delivery partners), and responsible risk-taking (testing hypotheses early, learning quickly, and treating uncertainty as something to be managed rather than avoided). These behaviours should be reinforced through practical norms (how decisions are made, how disagreement is handled, how learning is captured, and how delivery and innovation are balanced).

In practice, this means visible leadership commitment to innovation as a shared responsibility, reinforced through consistent communication, recognition, and incentives. It also means creating psychological safety, so people feel able to propose ideas, challenge assumptions, raise risks early, and learn from outcomes without fear of reputational harm. In public-sector contexts (where scrutiny is high and risk aversion can become a default) this is particularly important. Innovation culture supports a shift from avoiding risk altogether to managing risk responsibly and transparently.

Cultural alignment also relies on a common language. When staff share a clear, practical understanding of what innovation means in their organisational context (how ideas are assessed, what good evidence looks like, who decides, and what success looks like) collaboration becomes easier and misunderstandings reduce. A shared language also improves interactions between research teams, enabling functions, and external partners, and helps innovation efforts connect more coherently across the wider ecosystem.

Innovation culture is not static. It evolves alongside the organisation and the operating environment. Maintaining it requires ongoing attention (listening to staff experience, identifying friction points, reinforcing desired behaviours, and addressing barriers that prevent people from contributing). When actively nurtured, innovation culture turns innovation from an occasional initiative into an embedded, organisation-wide capability.

5.3 Internal interface

The internal interface ensures that innovation is not an isolated activity running in parallel to an organisation's core functions but is integrated into everyday operations and supported by organisational infrastructure. Without this interface, even strong innovation opportunities can be slowed or stalled by misaligned processes, bottlenecks, unclear decision rights, or lack of access to critical resources.

In public research organisations, this interface connects innovation activity with essential enabling functions such as commercial, finance, business development, procurement, human resources, legal, IT, security, safety, and communications. This integration matters because innovation frequently requires flexibility that standard procedures are not designed to provide. For example: rapid contracting, specialist procurement routes, bespoke collaboration or licensing agreements, and efficient communication campaigns. When enabling functions are aligned to the needs of innovation, friction is reduced, and delivery is accelerated.

This component is therefore a practical expression of speed as a strategic enabler. Speed in innovation comes from shortening the cycle time between hypothesis, experiment, learning, and decision. Many of the most common delays are operational rather than technical: contracting timelines, procurement routes, funding approvals, access to facilities, onboarding partners, or ambiguity about who can authorise the next step. A strong internal interface removes these avoidable sources of latency by making pathways clear, proportionate, and repeatable.

In the public research context, this integration supports performance and accountability simultaneously. It allows innovation to move at pace while maintaining appropriate stewardship of public funds and compliance with organisational obligations. Ultimately, the internal interface turns innovation from an occasional "special case" into a routinely supported organisational capability.

5.4 External interface

The external interface governs how an organisation engages with the wider network of stakeholders (such as industry, academia, other research bodies, investors, or start-ups) to co-create, develop, adopt, and realise value from innovation. Organisations rarely deliver impact in isolation; outcomes typically depend on the quality, strength, and purposefulness of external relationships.

A well-functioning external interface goes beyond ad-hoc collaboration. It provides structured pathways for interaction so that partnerships are aligned with strategic priorities and knowledge, expertise, and resources can flow effectively in both directions. Early engagement with potential adopters and delivery partners is particularly important: it helps shape research towards solutions that are technically credible and practically usable, clarifies real constraints, and increases the likelihood of adoption and scaling.

The external interface also determines how the organisation is experienced by partners. Clear communication of capabilities, consistent presence in relevant networks, and predictable ways of engaging (including clear entry points, timely responses, and professional contracting pathways) all contribute to being seen as a credible and desirable partner. Over time, successful collaborations build trust and reduce the friction of future partnership, making it easier to move quickly when opportunities arise.

By investing in this interface, public research organisations expand the reach and relevance of their innovation activity, engage partners, accelerate adoption, enable access to complementary capabilities and investment, and promote outcomes and impact. Ultimately, it turns innovation from a contained organisational activity into a collaborative endeavour with the capacity to deliver value at scale.

5.5 Innovation governance

Innovation governance provides the decision-making structures, accountability mechanisms, and oversight processes that ensure innovation activities are purposeful, transparent, and aligned with organisational strategy and wider priorities. Without effective governance, innovation risks becoming fragmented, poorly coordinated, inconsistent in decision-making, or disconnected from mission delivery.

In public research organisations, innovation governance must balance two needs: enabling agility and experimentation while upholding the standards of accountability, stewardship, and compliance expected of publicly funded bodies. Achieving this balance requires clearly defined roles, responsibilities, decision rights, and escalation routes, so innovation can move quickly when evidence supports it, and stop quickly when it does not.

At the top level, the organisational board or executive committee endorses the innovation strategy and provides oversight for major commitments and risk exposure, such as the creation of new ventures, strategic partnerships, or licensing decisions. Visible senior sponsorship signals that innovation is a strategic priority and helps resolve cross-organisational barriers that operational teams cannot remove alone.

An Innovation Board (or equivalent governance forum) acts as the bridge between senior executive leadership and operational delivery. It reviews portfolio health, ensures alignment with strategic intent, and provides guidance on prioritisation, resourcing, and risk. Day-to-day accountability typically sits with the Chief Innovation Officer, Director, or Head of Innovation, who owns the overall system performance and portfolio outcomes, champions innovation internally and externally, and ensures that governance remains proportionate.

Supporting this leadership are Innovation Leads, who help teams shape ideas, apply appropriate methods, assess evidence at decision points, and strengthen stakeholder engagement. Innovation Owners (often drawn from R&D teams) are accountable for delivering individual innovation projects against agreed objectives and reporting progress through the governance system. Across the organisation, innovators contribute ideas, expertise, and delivery effort into the pipeline.

Strong governance enables faster, more confident decision-making by clarifying who can decide what, the criteria decisions should be based on, and how resources can be committed or released. It also builds trust with stakeholders by demonstrating that public resources are used responsibly and that innovation is ambitious but well managed.

When well implemented, innovation governance is not a constraint on creativity; it is the structure that makes responsible speed possible. It creates the clarity and accountability that allow teams to act decisively, learn quickly, and focus effort where it will have the greatest effect.

5.6 Intellectual property management

Intellectual Property (IP) is both a strategic tool for impact and a public asset. For public research organisations, effective IP management protects knowledge and technologies, enables collaboration with external partners, and supports translation into real-world use in ways consistent with mission and public interest. It is a core enabling function for innovation and should be embedded early in the innovation process.

At UKAEA, the IP function is situated within the Innovation Department to provide organisational-level IP services and is also integrated into the innovation funnel through staged support that increases as opportunities mature. Early on, the IP function provides Innovation Leads with tools and guidance for rapid triage, enabling an initial view of ownership, disclosure risk, and potential constraints, with further support requested where needed. As innovation projects progress, IP support focuses on developing and refining the IP strategy with the team, including whether to protect, publish, or manage (not mutually exclusive) the relevant knowledge as know-how. In the pre-exploitation phase, the focus shifts to execution: completing required actions, such as filing or registering intellectual property rights where appropriate, supporting due diligence, advising on licensing terms, confirming which IP and related knowledge assets are in scope, and ensuring any asset package is robust for deployment.

The types of assets relevant to this approach include technologies, software, data, AI models, know-how, open-source assets, and other forms of specialist knowledge. The appropriate protection, control, or exploitation route will vary by asset type and context.

Ultimately, timely, well-informed and integrated IP management strengthens the organisation's ability to realise value from IP assets, while ensuring that decisions about control, access, and benefit remain consistent with public purpose.

5.7 Innovation accounting

Innovation accounting is the discipline of systematically measuring, tracking, and reporting innovation activity in a way that enables evidence-based decision-making and demonstrates public value. It provides visibility across the innovation lifecycle, supports prioritisation and governance, and creates a credible basis for explaining what innovation is delivering and why.

In many organisations, progress reporting blurs different types of results. It is common to present outputs (such as publications, prototypes, patents, or spinouts created) as if they were outcomes or benefits or long-term impact. This can unintentionally overstate progress, obscure whether anything has been adopted, and make it difficult to compare performance over time. The framework takes a different approach by separating what is produced from what is achieved and what value is created. This distinction improves the credibility of reporting and strengthens decision-making because it clarifies whether innovation is merely active or actually delivering results.

Effective innovation accounting therefore uses a lifecycle view, tracking progress from early exploration through delivery and adoption to longer-term value. In this framework, and based on the Theory of Change, measurement is organised across five levels.

Activities capture the inputs and actions dedicated to advancing innovation: ideas explored, projects initiated, experiments run, partnerships formed, capabilities developed, and time and resources committed.

Outputs are the immediate deliverables produced by those activities: prototypes, demonstrators, datasets, software, documented know-how, licensable technologies, registered IP rights, or validated business cases.

Outcomes are the observable results achieved when outputs are taken into use or committed to a route forward: signed agreements, establishment of new ventures, or adoption by partners.

Benefits describe the short- to medium-term value generated from outcomes: new products and services launched, operational efficiencies, revenue and inward investment, jobs created, skills and supply chains strengthened, and improvements in performance, safety, or resilience.

Impact is the sustained, long-term value delivered at system level: enduring economic, societal, strategic, and environmental gains, such as strengthened national capability, measurable improvements in quality of life, enhanced competitiveness in key sectors, and environmental outcomes including carbon reduction.

A robust innovation accounting system makes these levels measurable through a defined set of metrics tailored to mission and context. It combines quantitative indicators with qualitative evidence, integrates measurement into everyday workflows rather than treating it as occasional reporting, and provides appropriate transparency to stakeholders inside and outside the organisation.

A further practical challenge is that benefits data often sits outside the organisation once an innovation is adopted. For example, licensees and new ventures may be best placed to evidence downstream benefits (such as revenue, investment, jobs, operational performance, or market uptake), but this information is not always readily shared or captured in a consistent

way. To address this, innovation accounting should include mechanisms to obtain benefits data regularly and reliably (for example, agreed reporting clauses in licences and shareholder or collaboration arrangements or structured follow-up cycles).

Crucially, innovation accounting is not only about compliance or retrospective justification. When used well, it becomes a management tool: it reveals portfolio health, highlights bottlenecks, strengthens strategic alignment, and helps leaders allocate resources and attention where they will make the biggest difference.

5.8 Innovation portfolio

Innovation portfolio management is the discipline of selecting, balancing, and actively steering the set of innovation opportunities and projects so that, collectively, they deliver the innovation strategy. In large public research organisations, the portfolio is the practical bridge between strategy and execution: it translates priorities into funded work, clarifies what is being progressed and why, and makes trade-offs visible.

A portfolio should intentionally include opportunities at different stages of maturity and with different routes to impact. It spans early-stage ideas and concepts; structured innovation projects focused on de-risking; pre-exploitation opportunities where pathways are defined and vehicles are being prepared; and exploitation activity, including follow-up with licensees and newly formed ventures. Managing these elements together enables an organisation to maintain a healthy pipeline, avoid “all eggs in one basket” risk, and ensure that learning from early work informs later commitments.

A balanced portfolio is not simply a large one. It is one that is aligned to the innovation strategy (reflecting priority themes, target outcomes, preferred time horizons, exploitation routes, and the relevant markets, sectors, and partners) and that is deliberately balanced across risk and potential value. This balance includes a mix of nearer-term opportunities that can be adopted or commercialised within existing systems, alongside longer-term, higher-uncertainty opportunities that may be strategically important but require sustained development. It also considers practical constraints such as capability, capacity (e.g., funding), dependencies, and the organisation’s ability to scale delivery.

Portfolio governance provides a structured cadence for decision-making and clear decision points so that investment follows evidence. Regular portfolio reviews and decisions create the conditions for responsible speed: they ensure that opportunities are progressed, pivoted, paused, or stopped transparently, using consistent criteria and clear decision rights. A coherent portfolio also relies on a single “portfolio view” that allows leadership to see progress, risks, dependencies, and resource demand across the pipeline, rather than assessing opportunities in isolation.

Innovation accounting provides the measurement backbone for the portfolio. By tracking activities, outputs, outcomes, benefits, and long-term impact, organisations can strengthen prioritisation and assurance, learn what works, and demonstrate how innovation choices translate into public value over time.

5.9 Building innovation

Building innovation is the capability to identify, assess, and develop ideas into validated, investable, and scalable opportunities. It represents the front half of the innovation lifecycle, turning early concepts into propositions that are sufficiently defined and evidenced to justify delivery effort, partnership, adoption, or further investment.

In this framework, building innovation is structured around two tightly linked activities: ideation and de-risking. **Ideation** is the deliberate and continuous sourcing of opportunities from across the organisation and its networks. For the purposes of this framework, an “idea” means an initial opportunity statement that proposes how UKAEA could solve a specific problem or address a need for a defined industry, sector, or market by applying UKAEA technology, invention, data, method, product, service, or expertise. Ideation includes encouraging contributions from research teams, scanning for real-world needs and emerging challenges, and tracking relevant trends in science, technology, markets, and policy. A mature approach combines bottom-up creativity with top-down strategic direction so that the pipeline is both diverse and relevant. This activity includes idea assessment, the discipline of evaluating ideas against clear, transparent criteria to decide what to progress and what to stop early. Criteria typically include strategic fit, potential value, technical feasibility, market size, and market desirability, operational and commercial viability, intellectual property considerations, and the likely route to adoption and scale, among others.

De-risking converts the most promising ideas into opportunities that are ready to move forward. This is done through targeted, time-bound innovation projects designed to address the most critical uncertainties. Depending on the opportunity, de-risking may involve technical validation, prototyping, user discovery, market analysis, regulatory and standards review, delivery planning, partner testing, or business model exploration. The purpose is to build credible evidence for the next decision (whether to invest further and keep de-risking, stop, or start the pre-exploitation phase) while learning quickly through iteration.

These activities are managed as part of the innovation portfolio so that investment is neither a scattergun of unrelated projects nor over-concentrated in a narrow set of themes. Portfolio discipline enables resources to be allocated dynamically as evidence emerges and priorities evolve, while maintaining strategic coherence and appropriate balance across risk, time horizons, and potential value. Supported by governance and innovation accounting, building innovation becomes a repeatable organisational capability, turning individual initiatives into a managed pipeline that can deliver both nearer-term benefits and longer-term impact.

5.10 Delivering value

Delivering value is the capability to take validated innovation outputs and ensure they are adopted, scaled, and translated into measurable outcomes, benefits, and long-term impact. It is where the potential created through “building innovation” is converted into real-world change and public value. In public research organisations, this capability is essential: without it, even strong inventions can stall after technical validation, never reaching the uptake required to justify investment or achieve mission outcomes.

Delivering value bridges the gap between a de-risked proposition and sustained value delivery. It requires active management of adoption pathways, deliberate partnering, and clear ownership of what happens after a project proves feasibility and market desirability. The framework structures this capability into two linked phases: pre-exploitation and exploitation.

Pre-exploitation is the preparation and structuring phase. Its starting point is a successful innovation project with a defined route to adoption and a validated value proposition. The work in this phase is route-dependent but typically includes clarifying the “package” to be transferred (e.g., technology, know-how, process, data, software), confirming the operating model and responsibilities, identifying and securing the right partners, and preparing the commercial and delivery arrangements. The outcome is a ready-to-execute adoption route, such as a licensing deal prepared for signature or a new venture vehicle (for example, a spinout or joint venture) that is sufficiently ready to proceed.

Exploitation is the phase where the chosen route is executed and value is realised in practice. It begins once the adoption mechanism is in place, for example through a signed licensing agreement, joint venture, or new venture. At this point, UKAEA’s role often changes. In many exploitation routes, particularly where a new legal entity has been created or an external partner is responsible for delivery, UKAEA no longer directly controls day-to-day execution. Instead, its role is to support the transition where appropriate, maintain effective relationships, manage its retained rights and obligations, and follow up on progress and benefits in line with the relevant agreement. The focus therefore shifts from preparing the route to enabling adoption and tracking whether value is being realised. Licensing may lead to royalties and partner-led product or service launches. New ventures may lead to investment raised, turnover, jobs created, new products delivered, markets entered, and strategic capabilities established. In all cases, effective follow-up and benefits capture are essential to understand the value generated from UKAEA innovation.

By building this capability, public research organisations increase the likelihood that validated innovations lead to sustained adoption and demonstrable benefits, strengthening both organisational performance and the wider system through which public research translates ultimately into national impact.

6. Component interactions and system dynamics

The components of the UKAEA Innovation Management Framework are not intended to operate in isolation. Their value comes from the way they interact: how information flows between them, how decisions are informed, how resources are allocated, and how learning is captured and reused. The following table illustrates these relationships to show how the framework functions as an integrated innovation management system, rather than as a collection of separate activities.

Influenced component → / Source component ↓	Innovation Strategy	Innovation Culture	Internal Interface	External Interface	Innovation Governance	IP Management	Innovation Accounting	Innovation Portfolio	Building Innovation	Delivering Value
Innovation Strategy	Sets strategic intent, priorities, targets, and review cycle.	Defines the behaviours and values needed to support strategic innovation priorities.	Sets priorities for enabling functions and internal support needs.	Identifies priority ecosystems, partners, sectors, and external opportunities.	Provides decision criteria, risk appetite, and strategic boundaries.	Provides insight into knowledge asset base, IP landscape, strategic opportunities, and constraints to inform innovation priorities.	Defines what activities, outputs, outcomes, benefits, and impacts should be measured.	Sets portfolio themes, balance, priorities, and resource focus.	Defines priority areas for opportunity identification and de-risking.	Defines target value routes and desired mission, economic, societal, strategic, and environmental outcomes.
Innovation Culture	Staff insight, challenge, and behaviours test whether strategy is realistic and embedded.	Establishes shared values, behaviours, language, and norms for innovation.	Encourages collaboration between technical teams and enabling functions.	Supports openness, trust, and productive engagement with partners.	Enables constructive challenge, psychological safety, and better decisions.	Promotes confidentiality awareness and responsible handling of potential IP and knowledge assets.	Supports honest reporting, learning, and avoidance of vanity metrics.	Makes prioritisation, stopping, and redirecting projects more acceptable.	Stimulates idea generation, experimentation, and learning through iteration.	Builds adoption mindset, persistence, and willingness to work beyond technical delivery.
Internal Interface	Provides operational insight on feasibility, capacity, constraints, and delivery readiness.	Reinforces the message that innovation is supported by the organisation, not left to individuals.	Coordinates finance, legal, commercial, procurement, HR, IT, communications support.	Provides contracting, procurement, communications, and operational pathways for partner engagement.	Provides assurance, compliance input, and operational evidence for decisions.	Supports legal, commercial, security, data, and record-keeping requirements for IP assets.	Supplies financial, resource, project, and operational data for measurement.	Shows capacity constraints, enabling-function bottlenecks, and resource availability.	Provides funding routes, procurement, contracts, facilities, and operational support for de-risking.	Enables licensing, collaboration, procurement, communications, implementation, and scale-up activities.
External Interface	Provides market, user, policy, investor, sector, and partner insight to inform strategy.	Exposes staff to external challenge, user needs, and collaborative ways of working.	Reveals where internal processes must improve to support partners effectively.	Builds the relationships, networks, and pathways needed for co-creation and adoption.	Highlights strategic partnerships, commitments, risks, and decisions requiring oversight.	Shapes collaboration terms, ownership positions, licence needs, and confidentiality requirements.	Provides evidence of external outcomes, adoption, benefits, and partner-led impact.	Indicates partner pull, adoption potential, investment interest, and ecosystem demand.	Feeds real-world problems, user needs, adopter feedback, and market signals into ideation and de-risking.	Provides adopters, licensees, investors, customers, collaborators, and scale-up routes.
Innovation Governance	Reviews, endorses, and refreshes innovation strategy and strategic priorities.	Signals leadership commitment and reinforces expected innovation behaviours.	Clarifies decision rights, escalation routes, and expectations of enabling functions.	Approves or guides significant partnerships, collaborations, and external commitments.	Provides oversight, accountability, decision rights, and governance cadence.	Approves significant IP, ownership, protection, access, and exploitation decisions where required.	Defines reporting cadence, evidence requirements, and performance expectations.	Reviews portfolio health, prioritises resources, and decides whether to progress, pause, pivot, or stop.	Approves innovation projects, funding, scope, and continuation decisions.	Approves significant exploitation, adoption, venture, partnership, or scaling decisions.
IP Management	Sets strategic priorities that shape IP asset management.	Builds awareness of disclosure, confidentiality, ownership, and responsible knowledge asset management.	Depends on and informs legal, commercial, data, procurement, and records processes.	Enables collaboration, licensing, publication, open-source, and partner engagement on clear terms.	Provides IP risk, ownership, protection, and exploitation advice for decision-making.	Manages identification, protection, control, and exploitation of IP and related knowledge assets.	Tracks IP assets, filings, disclosures, licences, protection status, and IP-related value indicators.	Supports prioritisation by clarifying protectability, control, risk, and value potential.	Provides early triage, IP position reviews, and asset strategy during de-risking.	Packages IP and knowledge assets for adoption, licensing, spinout, collaboration, or other routes to value.
Innovation Accounting	Provides evidence on whether strategy is delivering intended outcomes and where it should adapt.	Reinforces learning culture by making evidence, progress, and lessons visible.	Identifies bottlenecks in enabling functions and resource flows.	Supports value communication to partners, funders, stakeholders, and the wider ecosystem.	Provides dashboards, evidence, and performance insight for governance decisions.	Measures IP and knowledge asset activity, outputs, outcomes, benefits, and exploitation performance.	Defines and operates the measurement system across activities, outputs, outcomes, benefits, and impact.	Provides portfolio health data, evidence maturity, resource use, and progress indicators.	Tracks learning, de-risking progress, project evidence, and reasons for stopping or continuing.	Tracks adoption, scaling, benefits, and longer-term economic, societal, strategic, and environmental impact.
Innovation Portfolio	Shows whether the strategy is being translated into a balanced set of opportunities.	Makes prioritisation, trade-offs, and evidence-led stopping part of normal innovation practice.	Indicates future resource demand, capability needs and enabling-function workload.	Identifies priority partners, sectors, adopters, investors, and ecosystem gaps.	Provides the main object of governance review and strategic decision-making.	Prioritises IP support according to opportunity maturity, value, risk, and exploitation route.	Defines what needs to be measured across the pipeline and at each maturity level.	Balances opportunities by strategic fit, risk, maturity, time horizon, route to impact, and resource demand.	Selects and prioritises ideas for assessment, de-risking, and innovation project funding.	Promotes mature opportunities into pre-exploitation, exploitation, adoption, or scaling pathways.
Building Innovation	Reveals new opportunities, constraints, risks, and insights that may inform strategic priorities.	Creates practical opportunities for staff to experiment, collaborate, and learn.	Generates demand for funding, procurement, facilities, legal, commercial, communications, and technical support.	Tests user needs, partner interest, market desirability, and adoption assumptions.	Provides evidence for decisions to progress, pivot, pause, stop, or invest further.	Generates disclosures, know-how, data, software, technical evidence, and other assets requiring IP input.	Produces activity, output, learning, and evidence data for measurement.	Feeds the portfolio pipeline and updates maturity, risk, and evidence status.	Runs ideation, assessment, de-risking, experimentation, and innovation project delivery.	Hands over validated opportunities, evidence, asset packages, and recommended routes into pre-exploitation or adoption.
Delivering Value	Provides evidence of what creates value, informing future strategy and priority setting.	Demonstrates impact, reinforces innovation behaviours, and builds confidence in the system.	Requires commercial, legal, procurement, communications, finance, partner management, and operational support.	Manages adopters, licensees, spinouts, investors, customers, collaborators, and scale-up partners.	Reports delivery risks, major commitments, benefits, and decisions requiring senior oversight.	Supports value delivery by confirming and managing the relevant IP assets, licence terms, collaboration arrangements, and control mechanisms.	Supplies outcomes, benefits, impact evidence, and downstream value data.	Updates portfolio status, realised value, scaling decisions, exits, and future investment priorities.	Feeds lessons from adoption, exploitation, and scaling back into future idea assessment and de-risking.	Executes adoption, exploitation, scaling, benefit realisation, and long-term impact delivery.

7. Implementing the framework in practice

The framework is intentionally designed to be adaptable. Public research organisations vary widely in mission, operating model, innovation capacity, constraints, risk appetite, and the maturity of their existing practices. Implementation should therefore be proportionate. Many organisations will already be applying elements of the framework (sometimes under different names or distributed across functions). The aim is not to start from scratch, but to identify what is already working, address gaps, improve coherence, and strengthen the system over time.

A practical way to implement the framework is to focus first on a small number of foundations. For example, innovation strategy, defined governance and decision rights, a process to generate ideas from research results, and a repeatable process for building innovation through staged de-risking. These elements create immediate benefits by improving prioritisation, increasing transparency, and reducing wasted effort, without requiring a large reorganisation or heavy bureaucracy. From there, organisations can strengthen enabling components such as innovation culture, internal interfaces with core functions, external interfaces, IP management, and innovation accounting, building maturity progressively and in line with need.

Implementation should also be treated as organisational change, not simply process design. It requires leadership sponsorship, clear ownership of each component, and deliberate communication so that staff understand why the system exists, how it works, and how to engage with it. Over time, the goal is to move from isolated innovation activity to a coherent innovation management system that is embedded in mission delivery, operates consistently across the organisation, and improves through feedback and evidence.

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