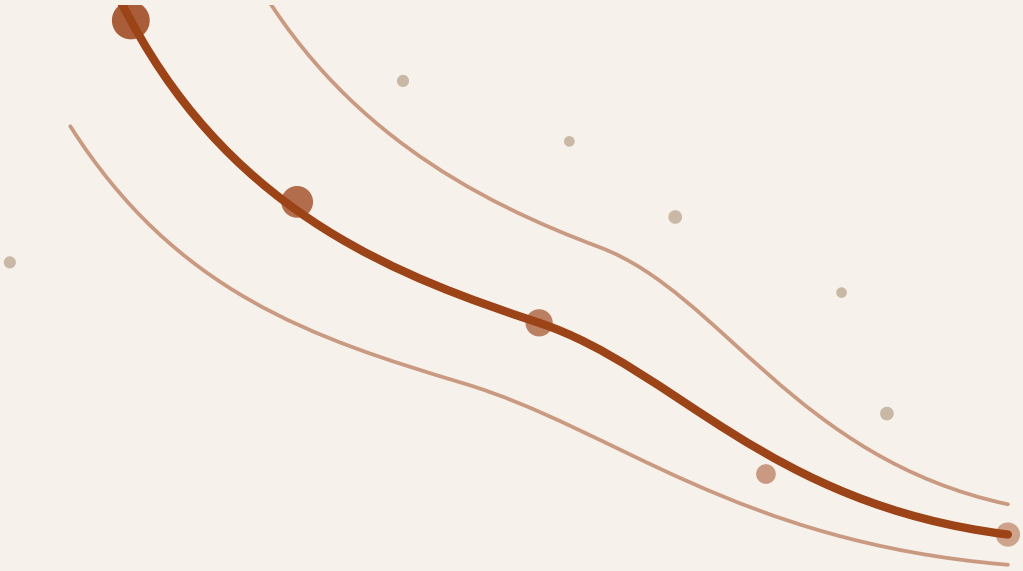
Innovation Management

From scattered initiatives
to a sustained organizational capability

Dr. Omar A. Alsamani



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About the author

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Preface

The word “innovation” now appears in plans, strategies, department names and awards, yet its presence has not always come with agreement on what it means. It may refer to creativity, new technology, improvement, entrepreneurship, or simply the launch of a new initiative. This breadth has a clear practical consequence: an organization that champions the rhetoric of innovation while lacking a shared understanding of what it means by it, and lacking a system that captures opportunities, tests them and turns them into value.

We start from the premise that innovation is a managerial and organizational capability that can be built, learned and improved. It is more than a seasonal exercise in collecting ideas, and too broad to be the remit of a single department. Innovation management is the way an organization sets its directions and identifies its opportunities, receives ideas and initiatives, tests its assumptions, allocates its resources, decides whether to continue, adjust or stop, and then moves successful solutions into operation and scale.

The book brings together two perspectives: that of management, which builds systems, structures and governance, and that of psychology, which studies the innovator: their characteristics, their motivation and what they need from their environment. Many organizations have spent on centres, platforms and programs that remained empty, because they were designed around outputs and overlooked the people who were supposed to innovate within them.

The principles we set out apply to government bodies, companies and nonprofit organizations alike, even though the meaning of “value” differs from one context to another. Most of the book’s examples, however, come from government bodies and universities, because this is the context we know closely and because its innovation challenges have received less attention in Arabic writing. We follow an extended

university case across several chapters and then draw its threads together in Chapter 20 as an application of the book's ideas as a whole. In doing so we draw on the international standards for innovation management (the **ISO 56000** series) and the Oslo Manual, and on the literature of management and the psychology of creativity, reading all of this in light of the Saudi experience wherever possible.

The common thread

The chapters are organized around three pillars: **the problem**, which sets the direction, since innovation begins from a priority need that precedes ideas and guides them; **people**, who innovate through their motivation and needs; and **the system**, which connects people to the problem and turns effort into results. Value is realized when motivated people meet a clear problem within a system that enables them. A principle that recurs throughout the book links the first two pillars: leadership and the system define the "what" and the "why," and people own the "how."

Premises of the book

> Innovation is an implemented outcome that creates value; a new idea alone is not enough to be called innovation.

> The more accurate starting point is a signal, a need or a problem worth understanding; the idea is a hypothesis for a solution.

> Innovation management begins with strategy and priority opportunities, before collecting ideas.

> Uncertainty is a natural part of innovation, which is why learning and experimentation are the basis for decisions.

> People are the core of the innovation system. Innovators have characteristics and needs, such as recognition, opportunity, deferred judgment, cognitive autonomy

and meaning, and the success of the system depends on understanding them and building its processes around them.

A supportive culture is necessary, and it is completed by governance, funding, roles and measurement.

An initiative succeeds fully when its users adopt it, it is integrated into operations and it achieves what it was intended to achieve.

An innovation system is built from within, starting from the organization’s own strengths, needs and character, rather than by borrowing other organizations’ models and goals.

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Part One

Foundations

What innovation is, why it has become a necessity, and what it requires of leadership.

Chapter 1: What is innovation?

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Chapter 1

1 What is innovation?

In this chapter we examine the concept of innovation as defined by four elements drawn from the reference definitions: novelty, implementation, adoption and value. Our aim is to establish a shared language that distinguishes innovation from creativity, invention and improvement, and that delimits its types and degrees, since agreeing on the concept is a precondition for managing it.

Introduction

Opening case: the annual planning meeting (composite case)

At a meeting to prepare an organization's annual plan, each department was asked to present its "innovative initiatives." Human Resources presented an electronic leave-request form to replace the paper one; IT presented a project to pilot an AI assistant to answer enquiries; Services proposed an ideas competition for staff; and Quality showed how it had cut request processing time from ten days to six by reordering the steps of the procedure.

The meeting ended with a list of initiatives, all labeled "innovation," without anyone asking the essential question: which of these is innovation in the strict sense? Which is an operational improvement that simply needs to be done

> well? Which is an activity that prepares the ground for innovation without being innovation itself? And what does this distinction imply for how each should be managed?

This scene has many counterparts in organizations, even if the details differ. Some of these initiatives may be of high value, but without a shared definition the organization ends up managing initiatives of very different kinds in the same way: a highly uncertain initiative is asked for a detailed implementation plan, an improvement whose solution is already known is treated as a bet that needs experimentation, and a motivational activity is counted as an innovation achievement before any of its outputs has become reality.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Define innovation in practical terms that bring together its four elements, and compare its main reference definitions.

٢ Determine the degree of novelty of an initiative: new to the organization, new to the sector, or new to the world.

٣ Distinguish innovation from creativity, invention, improvement, transformation and entrepreneurship.

٤ Classify an initiative by type and degree, and infer the management approach that suits it.

٥ Explain the eight principles of innovation management in the international **ISO 56000** series of standards.

٦ Identify inaccurate notions of innovation in an organization's discourse and practice.

1.1 The need for a shared definition

Attention to definition may look like an academic concern, but in innovation management it is a practical decision with direct consequences: the definition an organization adopts, explicitly or implicitly, determines what it funds, what it measures and what it rewards. Organizations usually fall into one of two opposite errors.

The first error: defining too broadly. When every change is called innovation, it becomes impossible to distinguish initiatives that require exploration, experimentation and learning from improvements that can be managed with quality and continuous-improvement tools. The result is reports full of "innovative" initiatives while what the organization delivers to the people it serves stays much the same. **Blank** called this phenomenon "innovation theater": activities that imitate innovation in appearance, such as workshops, competitions and labs, without changing products, services or ways of working (Blank, 2019).

The second error: defining too narrowly. When innovation is restricted to inventions, advanced technologies and patents, wide opportunities are neglected in services, procedures, the beneficiary experience, the operating model and the relationships between organizational units. Many of the highest-impact innovations in government and service organizations rested on rethinking how the service is delivered and needed no new technology at all.

A good definition avoids both errors: broad enough to include every area where value is created, and precise enough to distinguish innovation from what it is not.

1.2 Innovation in the reference definitions

The modern economic use of the concept of innovation goes back to Joseph Schumpeter, who held that economic development comes from carrying out "new combinations" of resources and knowledge, and identified five forms:

introducing a new good or a new quality of an existing good, introducing a new method of production, opening a new market, securing a new source of raw materials, and reorganizing an industry (Schumpeter, 1934). Two points in this early view deserve attention: innovation goes beyond the product to methods, markets and organization, and it is tied to implementation rather than completed by discovery alone.

Later definitions built on this foundation. Here we look at three of them, as they are the most widely used in public policy, standards and measurement tools.

The Oslo Manual

The Oslo Manual, published by the OECD and Eurostat, is the international reference for measuring innovation in national surveys. Its fourth edition defines an innovation as a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process) (OECD/Eurostat, 2018).

The decisive condition in this definition is **implementation**: an idea that never left the document, a prototype that was never launched, or a system that was purchased but never switched on is not an innovation by the Oslo standard, however novel it is. The Manual adds a second condition, "significant difference," so that a routine minor adjustment does not count as innovation.

The international **ISO 56000** series

The International Organization for Standardization defines innovation as a new or changed entity that realizes or redistributes value (ISO, 2025). The notion of an entity here is deliberately broad: it may be a product, a service, a process, a model or a method. The definition places **value** at its center, since novelty is not enough unless it brings benefit, whether financial, social,

environmental or otherwise. The phrase “redistributes” allows the inclusion of innovations that change who benefits from value without necessarily increasing its total, as when a service reaches a group that was previously excluded from it.

Innovation as what is perceived as new

In the literature on the diffusion of innovations, Rogers defined an innovation as an idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 2003). Damanpour’s definition of organizational innovation is close to this: the adoption of an idea or behavior that is new to the adopting organization (Damanpour, 1991). The value of this perspective is that it shifts the question from “is this new to the world?” to “is it new in this context, and does it require the people in it to change what they are used to?.”

Table 1.1 Comparison of reference definitions of innovation

Source	Core of the definition	Element it highlights	Management implication
Schumpeter (1934)	Carrying out new combinations of resources and knowledge	Breadth of types; implementation	Innovation may occur in the market or the organization as well as the product
Oslo Manual (2018)	A new or significantly improved product or process, made available or brought into use	Actual implementation	An idea or prototype does not count as innovation until it reaches use

Source	Core of the definition	Element it highlights	Management implication
ISO 56000 (2025)	A new or changed entity that realizes or redistributes value	Value	The first question about any initiative: what value is expected, and for whom?
Rogers (2003)	An idea, practice or object perceived as new by those who adopt it	Relative novelty; adoption	A solution known elsewhere may be an innovation in this context, and adoption must be managed

The working definition used in this book

From these definitions we derive a working definition that we use in the chapters that follow:

Definition used in this book

Innovation is a new or significantly improved application that addresses a need or seizes an opportunity, is adopted by users or an operating unit, and creates observable value.

This definition has four elements, and the absence of any one of them is enough to keep an initiative short of innovation:

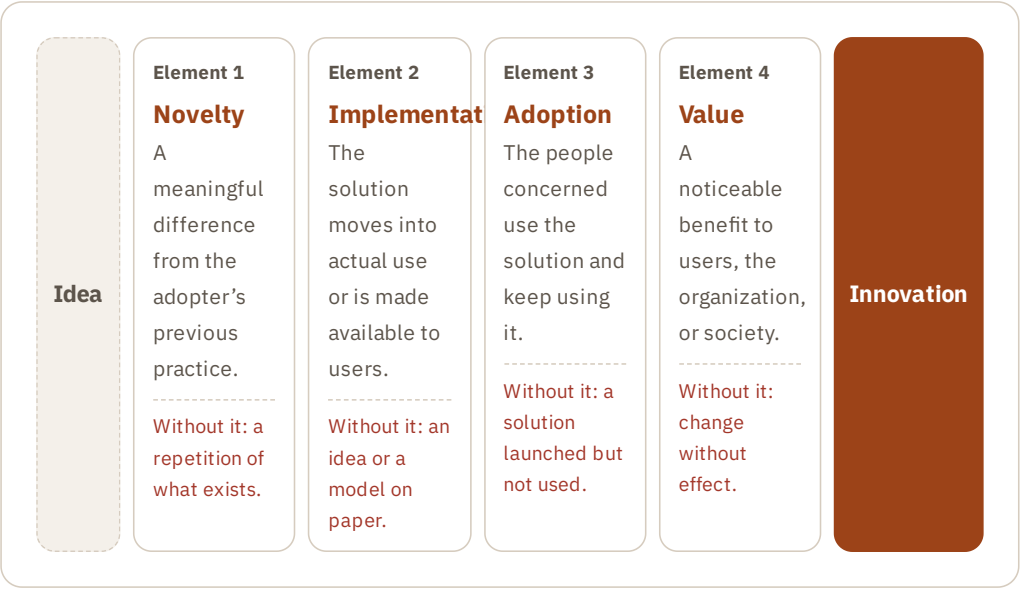


Figure 1.1 The four elements that turn an idea into an innovation, and what follows from the absence of each.

Novelty is a relative concept, discussed in the next section. **Implementation** is what separates innovation from ideas and inventions. **Adoption** is an element that is often overlooked, even though a good number of systems and platforms are officially launched and then left unused, or are used by staff at a bare minimum while they keep their old methods alongside. **Value** may be economic, social, operational, epistemic or environmental, and may accrue to the beneficiary, the employee, the organization or society.

The order of the elements has a temporal meaning: adoption and value come after implementation, so an initiative cannot be judged an innovation on the day it is launched. Launch day proves that a new application exists; proof of innovation has to wait until its use and its effect have been verified. The book's definition is therefore stricter than the minimum the Oslo Manual adopts for statistical measurement, which requires only that the new product be made available to users or the new process brought into use (OECD/Eurostat, 2018), because the book's purpose is managerial: judging whether an initiative has done what it was launched to do.

1.3 Relative novelty

A recurring question in management discussions is whether applying a solution that already exists elsewhere counts as innovation. The answer on which the measurement literature agrees is that novelty is measured relative to a reference unit, and the Oslo Manual distinguishes three degrees (OECD/Eurostat, 2018):



- **New to the organization:** already applied in other organizations, but new to this one. This is the broadest and most common degree, and often the quickest to show results because the solution has been tested in another context.
- **New to the sector or market:** not previously applied in the sector, geographical area or market in which the organization operates.
- **New to the world:** not previously applied anywhere; the rarest and the riskiest.

Figure 1.2 Degrees of novelty: every innovation new to the world is necessarily new to the market and to the organization, but not the reverse.

Two practical consequences follow from this distinction:

First, transferring a successful solution from one context to another can be a genuine innovation, provided it requires meaningful adaptation and change in the adopting organization.

Second, the degree of novelty affects how the initiative should be managed. A solution new only to the organization can draw on others' experience, and its uncertainty lies mainly in fit, adaptation and adoption. A solution new to the

world is uncertain in almost every respect: whether it works, whether it is needed, and what it will cost.

Example

When a government agency adopts an appointment-booking system that other agencies introduced before it, it invents nothing new. But it may need to redistribute staff across time slots, change how walk-in visitors are received, and replace performance indicators that counted daily transactions. These changes are what make the application an innovation at the level of the organization, and they are also what determines its success.

1.4 Innovation and neighboring concepts

In general usage the term innovation is used as a synonym for several related concepts. Distinguishing between them matters, because each has its own management logic, even if they overlap in practice.

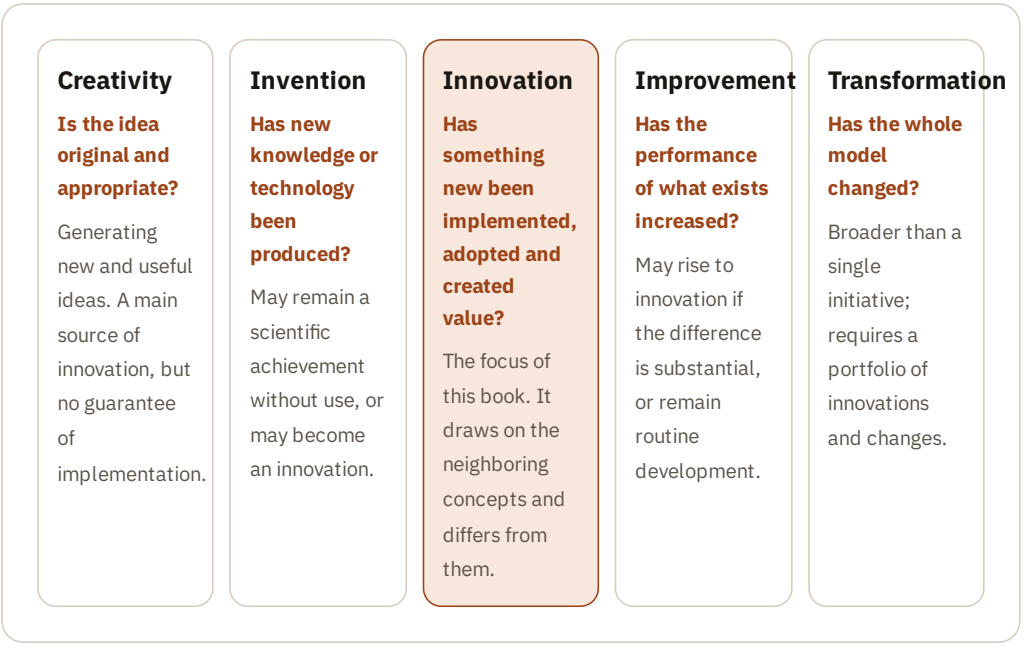


Figure 1.3 Innovation and its neighboring concepts, with the question that distinguishes each.

Creativity and innovation

Researchers in the psychology of creativity agree that a creative product combines originality and appropriateness: it is new and unusual, and useful or suited to a given purpose (Amabile, 1996; Runco & Jaeger, 2012). Creativity in this sense is a main source of innovation, but there is a wide gap between them: a creative idea may stay in its author's head or in the minutes of a meeting, whereas innovation requires what creativity does not: resources, organization, experimentation, decisions and adoption.

Rhodes proposed early on that creativity be viewed from four interrelated aspects: the creative **person**, with their abilities and motivation; the **process** by which ideas are generated and developed; the surrounding **press** or environment, with the pressures it imposes and the opportunities it offers; and the **product** in which creativity is embodied (Rhodes, 1961). The value of this view for innovation management becomes clear when it is set against the common practice of focusing on the product alone, such as the number of

ideas, projects or patents, without attention to the people expected to innovate, the environment in which they work, and the processes that take up their ideas. Amabile showed that organizational innovation depends on the interaction between the creativity of individuals and teams and the work environment, including its resources, management practices and organizational motivation to innovate (Amabile, 1988). We devote Chapter 7 to this relationship.

Invention and innovation

Invention is the production of new knowledge, technology or combination, often documented by a patent. An invention becomes an innovation when it finds use and is incorporated into a product, service or process that creates value. A well-known example: in 1975 a Kodak engineer built an early prototype of the digital camera, yet the company was very slow to make digital photography central to its business, while the same technology became, in other companies' hands, an innovation that transformed the industry. Invention and innovation are thus two overlapping circles: an invention may remain confined to the laboratory, and many innovations, especially in services and business models, involve no new technology at all.

Improvement and innovation

Improvement raises the performance of what already exists: shortening the time a procedure takes, removing an unnecessary step, or raising the quality of a service. Improvement and innovation lie on a continuum. An improvement rises to innovation when it differs substantially from previous practice, is brought into use and creates value. It remains operational development when it is a limited adjustment whose method is already known.

The most useful criterion for telling them apart is the **degree of uncertainty**, which says more than the size of the change. If the solution is known, the cause understood and what is required is disciplined execution, continuous-

improvement tools are sufficient. If the solution is unknown, or there are essential untested assumptions about the user, the implementation or the value, the initiative requires the logic of innovation: experimentation, learning and staged decisions.

Transformation and innovation

Transformation is a fundamental change in the business or operating model, in the relationship with beneficiaries, or in organizational capabilities. It requires a portfolio of integrated innovations and changes, and leadership and change management that extend over years. “Digital transformation” thus includes many innovations, but also purely executional work such as data migration, system consolidation and staff training.

Entrepreneurship and innovation

Entrepreneurship is concerned with discovering an opportunity and organizing resources around it to create a sustainable venture or activity. It may rely on innovation without being synonymous with it: innovation can take place within an existing organization without creating a new venture, and an entrepreneurial venture may apply a known model in a new market with little innovation. The term **intrapreneurship** (Intrapreneurship) describes entrepreneurial behavior within established organizations, and it is closely related to the subject of this book.

Table 1.2 Differences between innovation and neighboring concepts

Concept	Output	Criterion of success	Management logic
Creativity	Ideas	Originality and appropriateness	Widening the options and deferring judgment

Concept	Output	Criterion of success	Management logic
Invention	New knowledge or technology	Technical novelty and scientific proof	Research and development; protecting intellectual property
Improvement	Better performance of what exists	Efficiency, quality and reliability	Analysis, disciplined execution and continuous improvement
Innovation	A new solution, implemented and adopted	Value realized	Experimentation, learning and staged decisions
Transformation	A new business or operating model	Change in capabilities and results across the organization	An integrated portfolio and long-term change leadership
Entrepreneurship	A sustainable venture or activity	Survival and growth	Seizing the opportunity and organizing resources around it

1.5 Types of innovation

Innovation can occur in any element that contributes to creating or delivering value. The literature offers several classifications of its types; we present two that complement each other.

The Oslo Manual classification

The Oslo Manual groups innovation into two main types: **product innovation**, whether a good or a service, and **business process innovation**, which it subdivides into six functions (OECD/Eurostat, 2018).

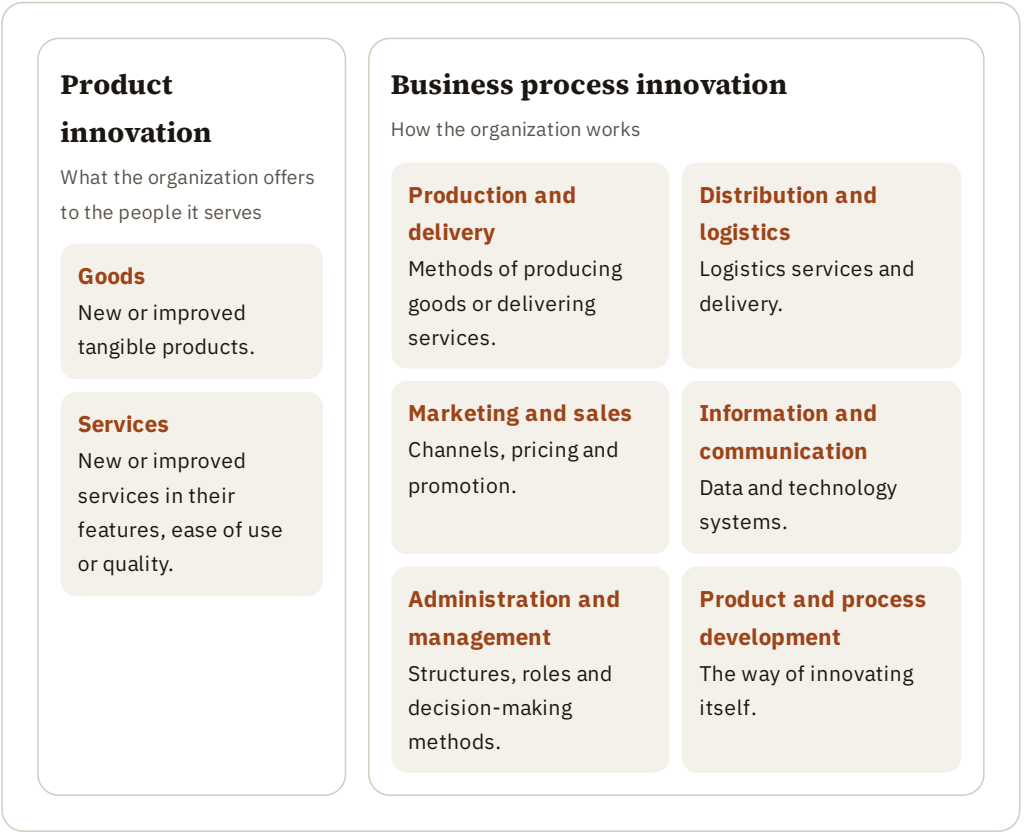


Figure 1.4 Types of innovation according to the Oslo Manual (2018). Source: adapted from **OECD/Eurostat (2018)**.

Note that in this classification "product and process development" is itself a type of innovation: an organization that improves the way it explores opportunities and tests solutions is innovating in its very capacity to innovate, which is the subject of Part Two of the book.

The four Ps of Tidd and Bessant

Tidd and Bessant suggest looking at "innovation space" through four dimensions: **product**, what the organization offers; **process**, the way it is produced and delivered; **position**, the context in which it is offered and to whom; and **paradigm**, the underlying mental model of what the organization does (Tidd & Bessant, 2021). The last two dimensions are useful because they draw attention to innovations that change neither the product nor the process, such as offering an existing service to a new group, or redefining what the organization provides: a product, an outcome, or an integrated solution.

In Practice

Map your organization's list of initiatives onto these two classifications. If the initiatives cluster in a single cell, such as technology or product, your organization's view of innovation is narrower than the opportunities open to it. The largest opportunities often lie in the neglected areas: structure, networks, channels and the way decisions are made.

These types are complementary: an influential solution may combine a change in service, process, technology and operating model at the same time. Technology in particular is one enabler among others, and it enters into innovation when it substantially changes value, experience or performance; digitizing a flawed procedure may speed up the problem rather than solve it.

1.6 Degrees of innovation

Innovations differ in the amount of change they bring. The literature uses several classifications of these degrees, each with a different point of view.

Core, adjacent and transformational innovation

Incremental innovation builds on a known product, service, capability or group of beneficiaries, so its uncertainty is relatively low. **Adjacent innovation** takes an existing capability to a new group or market, or adds a new capability to a familiar field. **Radical** or transformational innovation changes the underlying assumptions, or offers substantially different value and a different model (Nagji & Tuff, 2012).

These degrees describe the extent of change and the uncertainty that comes with it, and each has its place and value: successive improvements may accumulate into a large effect, and a radical idea may prove unsuitable or impossible to adopt. What matters is that the organization identifies the degree of uncertainty, the risks and the capabilities each initiative entails, and manages it accordingly. We return to this distribution when we discuss strategy and portfolio management in Chapters 4 and 10.

Components and architecture

Henderson and Clark observed that the binary classification (incremental/radical) hides two important types of innovation, because every product or service consists of **components** and an **architecture** that links them. Crossing these two dimensions gives four types (Henderson & Clark, 1990):

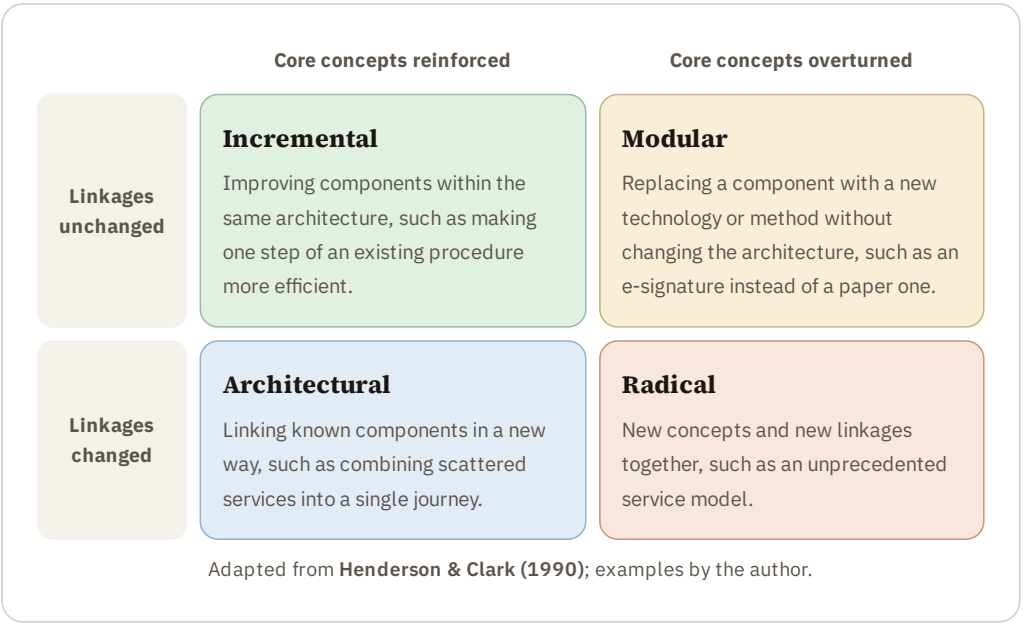


Figure 1.5 The innovation matrix by components and architecture.

Architectural innovation is particularly important in service and government organizations, because many service problems stem from how the components are linked rather than from their weakness. Each department may do its work efficiently while the problem lies in how they connect: hand-offs between units, repeated requests for the same information, and fragmented ownership of the journey. Henderson and Clark showed that this type is especially challenging for established organizations, because it looks limited on the surface while requiring knowledge of the architecture of the whole system, knowledge that is usually embedded in structures and habitual communication channels.

Sustaining and disruptive innovation

Christensen distinguished between **sustaining innovation**, which improves product performance on the dimensions that existing customers value, and **disruptive innovation**, which often starts with lower performance on those dimensions but is simpler, cheaper or more accessible, attracts neglected or

new groups, and then improves until it competes with the prevailing solutions (Christensen, 1997). The "dilemma" of successful organizations is that their very good practices, such as listening to their best customers and investing in the most profitable opportunities, lead them to ignore this type until it is too late.

1.7 Innovation in the public and nonprofit sectors

The innovation literature grew up in the context of firms and markets and carried many of their assumptions, such as competition, profit and a customer free to choose. Yet innovation in government bodies and nonprofit organizations is just as important, and may be more so, because its effects reach large groups of beneficiaries who usually have no alternative to the service.

Mulgan and Albury defined successful public-sector innovation as the creation and implementation of new processes, products, services and methods of delivery that result in significant improvements in outcomes, efficiency, effectiveness or quality (Mulgan & Albury, 2003). Value in this context is what Moore called "public value": what society and its members value, which is broader than financial return (Moore, 1995).

Table 1.3 How innovation differs between the two sectors

Dimension	Firms	Public agencies and nonprofits
Measure of value	Return, market share and customer satisfaction	Social outcomes, equity of access, trust and efficiency
Driver of innovation	Competition and growth	National priorities, beneficiaries' expectations, limited resources and crises

Dimension	Firms	Public agencies and nonprofits
Beneficiary	A customer who chooses and pays	A beneficiary who may have no alternative and may differ from the funder
Risk-taking	Acceptable within the expected return	More sensitive, owing to public accountability and the effect of errors on trust
Diffusion	Innovation is a competitive advantage to be protected	Innovation should preferably be shared across bodies and scaled

One consequence of these differences is that corporate tools need adapting before they are carried over to the public sector; return on investment alone, for instance, cannot adequately assess an initiative that aims to bring a service to an underserved group. In this book we use the term "beneficiary" to cover the customer, the citizen and the internal user, and the term "value" to cover both economic and public value.

1.8 Principles of innovation management

If innovation is the outcome, innovation management is the set of practices and capabilities that make that outcome possible and repeatable. It includes directing opportunities, ideas and initiatives, and managing their flow from the **front end of innovation**, where needs are explored and ideas generated, to implementation and the realization of value. The international **ISO 56000** series rests on eight principles that distill accumulated experience in the field (ISO, 2025; Fernandez & Swart, 2025); we present them here because they sketch a concise map of the book's topics.

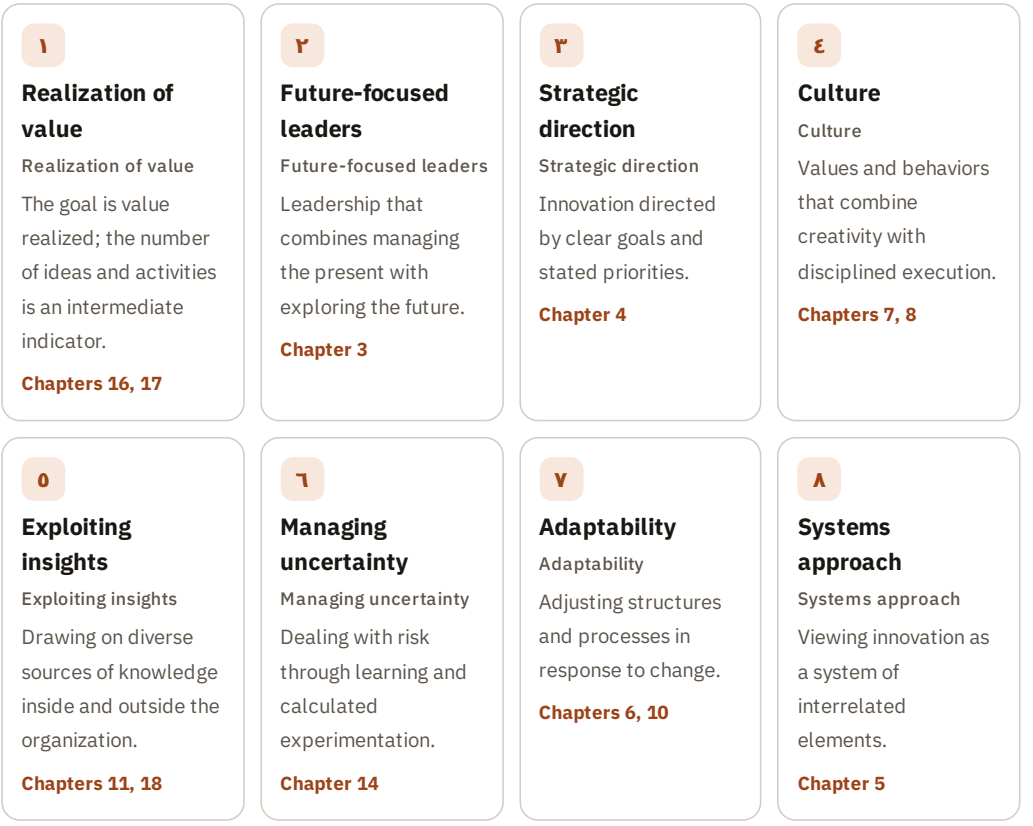


Figure 1.6 The eight principles of innovation management in the **ISO 56000** series, and the chapters of this book that address each.

These principles stand above any particular tool, such as design thinking or hackathons. Tools change; the principles determine when a tool is useful and when it becomes a formality.

1.9 Common misconceptions

We close the conceptual part of the chapter with five inaccurate notions that recur in how organizations talk about innovation. Each leads to specific management decisions, so correcting them goes beyond precision of wording to correcting practice.

Innovation starts with ideas

The more accurate starting point is a need, problem, opportunity or change that calls for a response; the idea comes later as a hypothesis for a solution. An organization that starts by collecting ideas without direction receives a large number of scattered proposals that are hard to evaluate, and few of them ever reach implementation. Chapter 11 discusses this in detail.

Innovation is technology

Technology is an important enabler, but many of the highest-impact innovations lie in services, procedures, business models and structures. Large technology projects have failed to deliver value because they were built for a problem that was not sufficiently understood.

Innovation is for creative people only

An organization needs people who spot problems, analyze evidence, design experiments, implement, sponsor and bring operational expertise. The person not known for a wealth of ideas may be the one who makes an idea workable.

Having a lab or platform proves innovative capacity

Labs, platforms and awards are tools, and they may become part of innovation theater if they are not linked to priorities, resources, decisions and an operating owner, or if they remain isolated from the daily work of units and their people. The test of innovative capacity is an organized flow of opportunities, learning from experiments, evidence-based decisions and results achieved.

Launch is the end of the road

Launch proves that a new application exists; innovation is proven only after it has been adopted and its effect realized. An organization that is content to celebrate the launch and then move on usually loses the hardest and most important part of the journey.

Applied cases: is this initiative an innovation?

In this section we return to the initiatives in the opening case and apply the four elements to them. The cases are illustrative, and their details have been shaped to show the method of analysis.

The electronic leave-request form

Operational improvement

? Novelty	✓ Implementation	✓ Adoption	? Value

The electronic form replaced the paper one, and staff used it because it was the only route available. But the approval path stayed the same, with five successive sign-offs, and the average completion time did not

change. The novelty here is formal, and the value is limited to saving paper.

> **When would it rise to innovation?** If the path itself were redesigned, for example by approving short leave automatically under clear rules and requiring a single approval in other cases, and a substantial reduction in time and workload were then measured.

The enquiries assistant

A potential innovation, not yet complete

✓ Novelty	? Implementation	? Adoption	? Value

Novelty is present at the level of the organization, but the initiative is still an idea: the reasons for the high volume of enquiries have not been studied, nor the quality of the information the assistant would rely on, nor who would be responsible for updating it. Calling it an innovation is therefore premature.

> **When would it rise to innovation?** If it began by understanding why the enquiries arise, was then piloted on a limited scale, the reduction in repeated enquiries and user satisfaction were measured, and an owner were named to keep the content up to date.

The staff ideas competition

An activity that prepares for innovation

– Novelty	– Implementation	– Adoption	– Value

The competition is a mechanism for capturing opportunities; it sits upstream of innovation, and its value depends on what follows it: its link to priority challenges, the time and resources available to evaluate proposals and test the best of them, and whether participants receive a response to their proposals.

> **When would it be worthwhile?** If it were framed around a specific challenge, if what would follow from selecting ideas were announced in advance, and if a modest budget were set aside to test some of them.

Reducing request processing time

An innovation at the level of the organization

✓ Novelty	✓ Implementation	✓ Adoption	✓ Value

Quality reordered the steps of the procedure after finding that requests waited for days between two units without being processed. The two review stages were merged and a shared view of request status was created. Processing time fell from ten days to six, and the reduction held six months later. This is an architectural innovation new to the organization, even though it used no new technology.

> **What would strengthen the judgment?** Comparing the time against a documented baseline, and checking that errors have not simply moved to a later stage.

What the cases show

The initiative whose name suggests innovation may be the furthest from it, and the initiative that looks modest may be the closest. Classifying an initiative determines how it is managed: improvement is managed through disciplined execution, a potential innovation through experimentation and staged decisions, and a preparatory activity through clarity about what will follow from it.

Chapter Tool: The Initiative Classification Card

Use this card to establish the nature of any initiative before deciding on it, at the proposal stage or when reviewing existing initiatives. Its purpose is to put the right questions to you; it is a diagnostic tool rather than a scoring scale.

Initiative Classification Card

Takes about twenty minutes to complete

1 What is the need or opportunity?

Describe it without mentioning the solution.

What evidence shows it matters?

Strong evidence | Initial evidence | Impression

2 What is the degree of novelty?

New to whom?

To the organization | To the sector | To the world | No meaningful novelty

3 What type of innovation?

More than one type may apply.

Product or service | Process | User experience | Business model | Organization and management | Technology

4 What is the degree of uncertainty?

Is the solution known? Is the cause understood? Is adoption assured?

Low: improvement | Medium: incremental or adjacent innovation | High: radical innovation

5 **What value is expected, and for whom?**

Which indicator will change if the initiative succeeds?

Beneficiary | Employee | Organization | Society

6 **Who will adopt and operate the solution?**

A specific, named unit.

Named and involved | Named but not involved | Not named

7 **What management approach fits?**

The conclusion from the answers above.

Execution and continuous improvement | Innovation path with experiments and stages | Initial exploration before deciding

Limited novelty and low uncertainty

The initiative is an improvement: carry it out well, without loading it with the language and tools of innovation.

Real novelty and medium or high uncertainty

The initiative needs an innovation path: stated assumptions, experiments, staged funding and decision gates.

Unclear need

The first step is a short exploration to understand the problem before committing to any solution.

Chapter Summary

- Innovation is a new or significantly improved application that addresses a need, is adopted by users and creates observable value. The absence of any of the four elements is enough to keep an initiative short of innovation.
- The reference definitions (Schumpeter, the Oslo Manual, **ISO 56000** and Rogers) agree that novelty alone is not enough, and differ in the aspect they emphasize.
- Novelty is relative: to the organization, the sector or the world. Transferring solutions between contexts is genuine innovation when

it requires adaptation and change.

- Creativity produces ideas, invention produces knowledge or technology, improvement raises the performance of what exists, and transformation changes the whole model. The practical criterion for distinguishing improvement from innovation is the degree of uncertainty.
- A broader view of creativity takes in the person, the process and the environment alongside the product, aspects on which an organization's capacity to innovate depends.
- Innovation occurs in products and services, in business processes, and in position and paradigm. Technology is one enabler, not a synonym for innovation.
- Innovations range from incremental to radical; architectural innovation matters particularly in service organizations; and each degree has a management approach that suits it.
- Public-sector innovation has a different logic of value, risk and diffusion, and requires adapted tools.
- Innovation management rests on eight principles, headed by the realization of value and completed by viewing innovation as a system.

Key Terms

Innovation Innovation	A new or significantly improved application, adopted by users, that creates value.
Innovation management Innovation management	The practices and capabilities that direct the flow of opportunities, ideas and initiatives, and manage experimentation, decisions and resources through to the realization of value.

Front end of innovation Front end of innovation	The stage before a project is formally launched, including discovering needs, exploring opportunities and generating ideas.
Degree of novelty Degree of novelty	The novelty of a solution relative to a reference unit: the organization, the market or the world.
Business process innovation Business process innovation	A new or improved change in how the organization performs one of its functions.
Incremental innovation Incremental innovation	Innovation that builds on an existing offer or capability without changing its basic nature.
Architectural innovation Architectural innovation	Linking known components in a new way.
Disruptive innovation Disruptive innovation	Innovation that starts at the low end of a market or in a new market, then improves until it competes with prevailing solutions.
Intrapreneurship Intrapreneurship	Entrepreneurial behavior by individuals within an established organization to lead a new innovation.
Public value Public value	What society and its members value in the outcomes of public services and policies.
Innovation theater Innovation theater	Activities that imitate innovation in appearance without changing products, services or ways of working.

Review and Discussion Questions

1. State the four elements of the definition of innovation, and illustrate with an example what follows from the absence of adoption. **Understanding**

2. Compare the Oslo Manual definition with the **ISO 56000** definition in terms of the element each emphasizes, and explain when one is more suitable than the other for a specific management purpose. **Analysis**

1. An organization implemented a system that similar organizations have used for years. Is this an innovation? Specify the conditions under which it would be. **Application**

2. Choose three initiatives from your organization's plan, classify them with the initiative classification card, and compare how they are currently managed with what the classification implies. **Application**

3. What makes architectural innovation difficult for established organizations? Give the example of a service whose units each do their work efficiently while the overall journey remains slow. **Analysis**

4. "An organization that has an innovation lab and an annual innovation award is an innovative organization." Discuss this statement in light of the concept of innovation theater and the four aspects of creativity. **Evaluation**

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2 Chapter 2 Why innovation now?

In this chapter we trace the shifts that have moved innovation from a seasonal activity to a permanent organizational need: accelerating change, artificial intelligence and what it means for the value of people, and the changing skills that work demands. We then read these shifts in the Saudi context and show that investment in the inputs of innovation pays off only to the extent that an organization is able to turn them into results.

Introduction

Opening case: an innovation center (composite case)

Three years ago, a public agency set up an innovation center. It gave the center a budget and a fully equipped space, launched a platform to collect employees' ideas, and ran a series of hackathons. Its annual report carried striking figures: hundreds of ideas, dozens of participating teams, prizes for the winners. Then an internal review asked a simple question: how many of these ideas are in actual use today? The answer: very few.

The agency had every input in place: funding, space, a platform and enthusiasm. The fault lay in the distance between inputs and results. This leads us to two linked questions in this chapter: why has innovation become a

permanent organizational need under present conditions, and why does investment in its inputs fall short of achieving it on its own?

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain how operational discipline and innovation discipline complement each other, and when work calls for each.

٢ Distinguish between an organization's external and internal realities, and use both to read the need for innovation.

٣ Identify the main forces reshaping work, including artificial intelligence and changing skills.

٤ Interpret Saudi Arabia's position in international innovation indices, and explain the gap between innovation inputs and outputs.

٥ Weigh the risks of innovating against the risks of not innovating, and distinguish situations in which innovation is the appropriate response from those in which it is not.

2.1 From the logic of stability to the capacity for renewal

Traditional management had good reason to care about discipline and standardization. In the early twentieth century, the principles of scientific management, with their division of labor, standardized procedures and performance measurement, delivered enormous gains in productivity and quality (Taylor, 1911). This logic remains essential for any work that must be done correctly every time, such as dispensing medicine, paying salaries or processing regulatory transactions.

Yet this logic was designed for problems whose causes and solutions are known, where the challenge lies in skilled execution. Its limits show when it is applied to shifting opportunities and uncertain paths, where the need is not fully understood and the link between intervention and outcome is unclear. In such situations, insisting on a detailed plan drawn up in advance becomes a source of error, because the plan rests on assumptions that have not been tested.

The shift required, therefore, is to hold two kinds of discipline that work together: **operational discipline**, which protects quality and reliability, and **innovation discipline**, which guides exploration, experimentation and learning. The management literature calls the combination of the two organizational ambidexterity, which we discuss in detail in Chapter 3.

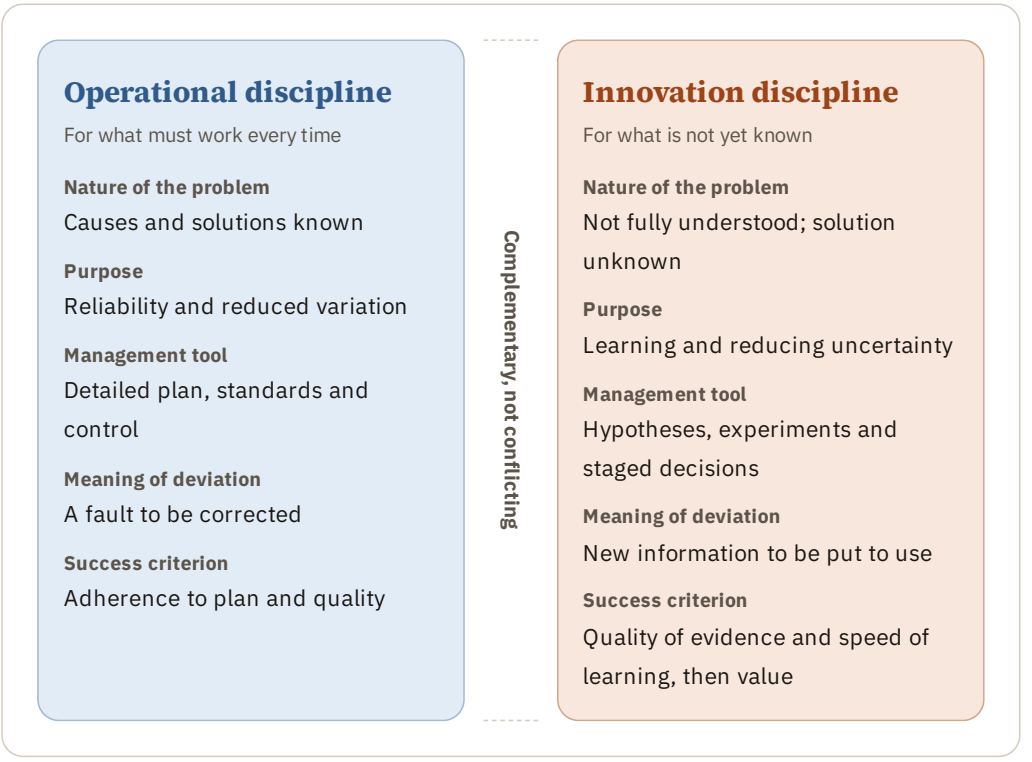


Figure 2.1 How operational discipline and innovation discipline complement each other.

One of the most common management errors is to apply one discipline where the other belongs. An exploratory initiative is judged by the standards of an operational project and is stifled before it can learn, or sensitive operational work is handled with the logic of experimentation and the service is exposed to needless errors. The first management question in any situation is therefore: do we know the solution and need to implement it, or do we first need to discover it?

2.2 External and internal realities

The value of any organization rests on a set of assumptions about the world around it: who its beneficiaries are, what they need, what alternatives are open to them, and what technology and regulation allow. The conditions surrounding the organization, and the ways they change, make up its **external realities**. These include shifts in markets, society, legislation and technology, and the points where they intersect, as when a social shift in young people's expectations meets a technological shift in the ways services are accessed.

The danger is that external realities usually change gradually and quietly, while the organization carries on working on assumptions that held true in the past. As the changes accumulate, the organization may find that the foundation on which its value was built is no longer there.

The pace of this change is quickening. A study of corporate longevity among firms in the S&P 500 index of large US companies tracked the average tenure of a company in the index and found that it fell from about thirty-three years in 1964 to about twenty-four in 2016; the authors projected that it would approach twelve years by 2027, and linked the decline to shifts in technology and business models and to waves of mergers and acquisitions (Anthony et al., 2018). The phenomenon resembles what Christensen described as disruptive innovation, in which a new solution starts out simple at the margins of the market and then improves until it displaces leaders that served their existing customers well (Christensen, 1997). Government organizations are less exposed

to being pushed out of the market, but they face the mirror image of this phenomenon: a widening gap between what they provide and what beneficiaries expect, having grown used to fast digital services in their daily lives.

Set against these are the organization's **internal realities**: its current state in terms of leadership, culture, structures, roles, internal relationships and the skills of its people. If external realities determine *what* the organization should innovate, internal realities determine its *capacity* to deliver it. The distinction is close to the familiar **SWOT** analysis of strengths, weaknesses, opportunities and threats: opportunities and threats belong to external realities, strengths and weaknesses to internal realities. The difference is that an innovation perspective treats strengths and weaknesses as things that can be built and developed.

Teece described an organization's capacity for renewal in a changing environment as **dynamic capabilities**, and identified three components: **sensing**, which means detecting opportunities and threats and listening to beneficiaries before changes force themselves on the organization; **seizing**, which means mobilizing resources and making decisions to capture the opportunity; and **reconfiguring**, which means continually adapting structures, assets and practices (Teece, 2007). Sensing without seizing produces reports that no one acts on; seizing without sensing produces activity in the wrong direction.

Building these capabilities is a responsibility shared across every level of the organization. Sensing often happens at the organization's edges, with the employee closest to the beneficiary; seizing requires leadership decisions and resources; and reconfiguring calls for the participation of all levels. The organization therefore needs a vision that makes renewal part of its purpose, and an environment that encourages initiative at every level, so that responding to change becomes an organizational habit. As change accelerates, building this capability becomes a condition for survival and excellence, and a priority that takes precedence over many operational ones.

In Practice

Ask yourself: when did your organization last learn of a change in its beneficiaries' needs, and how? If it was through complaints or falling numbers rather than regular dialogue with them, sensing is weak. If trends are noted in reports but lead to no decision in the plan or the budget, seizing is weak.

2.3 The forces reshaping work

Innovation management has gained importance because the sources of value and competition, and the very nature of work, are changing. The most influential forces can be summed up in five:

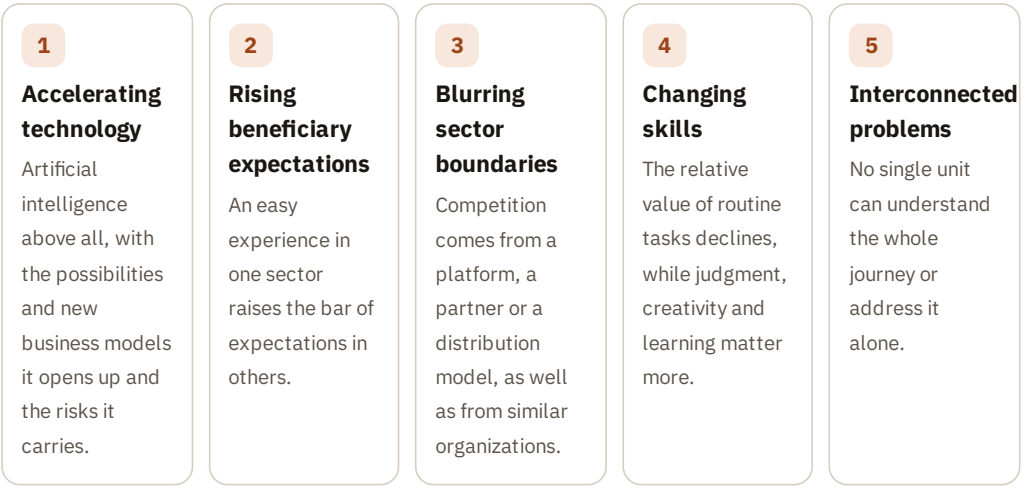


Figure 2.2 Five forces reshaping work.

The fourth force is evident in the World Economic Forum's Future of Jobs Report 2025, in which employers expect 39% of workers' core skills to change by 2030. Notably, the list of skills expected to grow in importance goes beyond

technical skills such as artificial intelligence and cybersecurity to include creative thinking, resilience and flexibility, curiosity and lifelong learning, and leadership and social influence (World Economic Forum, 2025).

This finding bears directly on innovation management: the capacity to innovate depends on people who are ready to question, experiment and learn, and on a work environment that nurtures these abilities, as much as it depends on technology and structures.

2.4 Artificial intelligence and the value of people

Generative artificial intelligence is changing how much a single person can accomplish. In a field experiment with 791 employees at Procter & Gamble working on real product-development challenges, an individual working with AI performed on a par with a team working without it. Those using AI also produced solutions that were better balanced between technical and commercial considerations, whatever their specialty, as though the tool had softened the effect of functional silos (Dell'Acqua et al., 2026). What once required a team and a long stretch of time may now be accomplished by one person, faster and at comparable quality.

The picture has another side, however. In a study of short-story writing, AI-generated ideas raised the creativity of each individual writer, with the largest gains among the less creative, but the stories became more similar to one another, so the diversity of ideas across the group declined (Doshi & Hauser, 2024). When everyone uses the same tools in the same way, their ideas converge.

How the tool is used is what makes the difference. In a study of 123 university students working on entrepreneurial projects, the students followed a structured five-stage collaboration protocol that asked the tool to question their assumptions and suggest alternatives, while leaving evaluation, revision and reflection to them. Of these students, 91.9% reported a marked development in their project ideas, and many showed improvement, to

varying degrees, in aspects of their strategic analysis (Alsamani, 2026). These are self-perceptions from an exploratory study, but they suggest that the tool can act as a thinking partner when collaboration with it is deliberately designed.

In this sense, we argue in this book, artificial intelligence raises the value of people in the innovation system. When generating alternatives and building prototypes becomes easy and available to everyone, the sources of distinction shift to what the tool cannot produce on its own: choosing the problem worth solving, understanding the context and the beneficiaries, exercising judgment when weighing alternatives, diversity of perspectives, and the motivation to keep trying. This shift requires innovation management to revisit entrenched assumptions: team size, the division of roles, the cost of experimentation, which has fallen sharply, and the way individuals and their contributions are evaluated.

The management question

A more productive question than "How do we use artificial intelligence?" is "What has it made possible, and what remains for people to add?"

2.5 The Saudi context

Innovation holds a central place in Saudi Vision 2030 as a means of diversifying the economy, raising public-sector efficiency and improving quality of life (Saudi Vision 2030, 2016 [Arabic]). On June 30, 2022, the national aspirations and priorities for the research, development and innovation sector over the next two decades were announced. They set out four priorities: health and wellness, sustainable environment and supply of essential needs, energy and industrial leadership, and economies of the future. They also set targets for annual spending on the sector to reach 2.5% of gross domestic product by 2040 and for the sector to contribute some SAR 60 billion to GDP, with the Research, Development and Innovation Authority (RDIA) serving as the sector's enabler and regulator (Saudi Press Agency, 2022 [Arabic]).

These efforts are reflected in the Global Innovation Index published by the World Intellectual Property Organization (WIPO): Saudi Arabia rose from 66th place in 2020 and 2021 to 42nd out of 139 economies in 2026 (World Intellectual Property Organization [WIPO], 2026).

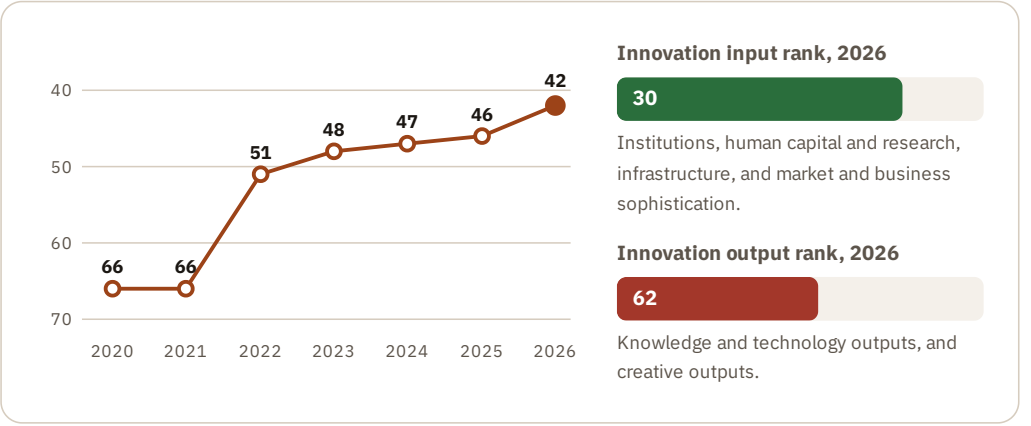


Figure 2.3 Saudi Arabia's rank in the Global Innovation Index (vertical axis: rank; higher on the chart is better), and the gap between input and output ranks in 2026. Bar length reflects the strength of the rank. Source: **WIPO (2025, 2026)**.

A careful reading of the index, however, goes beyond the overall rank. In 2026 Saudi Arabia ranked 30th on innovation inputs and 62nd on innovation outputs, and the report notes that the country produces less innovation output than its level of investment would warrant. The picture was similar in 2025, when it ranked 31st on inputs and 61st on outputs (WIPO, 2025, 2026). Among the notable strengths the report identifies are Saudi Arabia's first place worldwide in the use of information and communication technology and its strong position in startup financing and e-government services; among the weaknesses is its lower ranking in knowledge and technology outputs and in creative outputs.

This gap matters for the subject of this book. Inputs such as funding, infrastructure, centers and programs are a necessary condition for innovation, but they do not turn into outputs automatically. The conversion happens inside organizations: in the way priorities are set, opportunities captured, ideas

tested and decisions made, in how people are involved and motivated, and in how solutions are moved into operation. This is the domain of innovation management. Setting up an innovation center in a university or government agency without linking it to the daily work of departments and units, and to the way their performance is assessed, raises the inputs while the outputs remain contingent on what happens inside those units.

A caution on reading indices

International innovation indices are tools for comparison at the national level, and they are affected by changes in methodology and data sources from year to year. Their general trends and major gaps are what should be read, and they should be used alongside other sources when judging the performance of a particular organization.

2.6 Relevance and risk: when is innovation the answer?

The aim of renewal is for the organization to maintain its **relevance** to its beneficiaries' needs, now and in the future, which is what reconfiguring means in the dynamic capabilities framework. The difference between an organization that **responds** and one that **reacts** is that the first reads change before it is forced upon it, and so is prepared, while the second reads it after the effect has been felt, and so acts under pressure.

Innovation has its risks, because it pursues what has not yet been tried. Risk management in this context is an ally of innovation: it sets the boundaries within which experimentation can proceed without unacceptable harm, and it uses methods such as limited experiments and staged funding to reduce risk. Yet not innovating is not as safe an option as it seems; an organization that stops renewing itself gradually loses its relevance. The right comparison, then, is between risks that can be managed and risks that accumulate unseen.

The need for efficiency persists through all these shifts; skilled operations are what fund renewal. Some problems, moreover, need only adherence to a known standard or the application of a proven practice, and using innovation tools on them slows the solution and undermines the credibility of innovation itself.

Table 2.1 Indicators that help in choosing the appropriate approach

Situation	Indicators	Appropriate approach
Execution failure	The cause is known, the solution proven, and the gap lies in compliance or resources	Operational management and follow-up
Opportunity for improvement	Performance is below standard, the causes can be analyzed, and solutions are mostly known	Continuous improvement and quality tools
Technically complex problem	Requires specialized expertise, but can be broken down and planned	Expert analysis and design
Unresolved need or opportunity	The solution is unknown, and there are essential assumptions about the user, the implementation or the value	Innovation approach: experimentation and staged decisions

A distinction drawn by Bennett and Lemoine helps with this diagnosis. They observed that describing the environment as "volatile, uncertain, complex and ambiguous" becomes an excuse for not planning when it is used as a blanket label for every difficulty, and that its value lies in identifying the type of challenge: volatility is met by building reserves and flexibility, uncertainty by gathering information, and complexity by restructuring and building expertise, while **ambiguity**, where causal relationships are unclear and there are no precedents to go by, calls for experimentation (Bennett & Lemoine, 2014). Experimentation is the core of the innovation approach, which is why

innovation is the most fitting response precisely when ambiguity defines the situation, and why other approaches take precedence for the remaining difficulties.

Organizational maturity shows in diagnosing the situation and choosing the approach that creates value with no more complexity than necessary.

Chapter tool: External realities scanning matrix

Use this matrix to turn the external changes you observe into questions that can be decided on, in strategic planning sessions or periodically every six months. Fill in one row for each significant signal of change.

External realities scanning matrix — One signal per row

Domain	Signal observed	Likely effect on us	Opportunity it opens	Type of challenge	Proposed response
Beneficiaries and society	What has changed in their expectations and behavior?	Which assumption in our model does it threaten?	What new need is emerging?	Volatility / uncertainty / complexity / ambiguity	Act now / explore / monitor
Technology	What new possibilities are available?				
Regulation and legislation	What is changing in regulations and policies?				

Domain	Signal observed	Likely effect on us	Opportunity it opens	Type of challenge	Proposed response
Economy and resources	What is changing in funding and costs?				
Competitors and alternatives	Who offers an alternative from outside the sector?				
Environment and sustainability	What environmental pressures or opportunities are there?				

Rule of use: every signal classified as “explore” should lead to a specific question, an owner and a deadline; otherwise the matrix becomes a monitoring report that changes nothing.

Chapter Summary

- The contemporary organization needs two complementary disciplines: operational discipline for what must work every time, and innovation discipline for what is not yet known. The common error is to apply one where the other belongs.
- External realities determine what an organization should innovate; internal realities determine its capacity to deliver it. The organization needs all three dynamic capabilities: sensing, seizing and reconfiguring.
- Five forces are reshaping work: accelerating technology, rising expectations, blurring sector boundaries, changing skills and

interconnected problems. Among the skills growing in importance are creative thinking, flexibility and curiosity.

- Artificial intelligence multiplies what an individual can accomplish, yet it may reduce the diversity of ideas. The value of what people add therefore rises: choosing the problem, understanding the context, judgment, diversity of perspectives and motivation.
- Saudi Arabia rose in the Global Innovation Index from 66th to 42nd between 2020 and 2026, with a clear gap between its input rank (30) and output rank (62). Converting inputs into outputs is the work of innovation management inside organizations.
- Innovation carries risks that can be managed; not innovating carries risks that accumulate unseen. Maturity shows in diagnosing the situation and choosing the approach that suits it; experimentation is a response specific to situations of ambiguity.

Key Terms

External realities External realities	The conditions surrounding an organization and the ways they change, in markets, society, legislation and technology.
Internal realities Internal realities	The organization's current state in terms of leadership, culture, structures, roles and skills.
VUCA VUCA	A description of the environment in four dimensions: volatility, uncertainty, complexity and ambiguity.
Dynamic capabilities Dynamic capabilities	An organization's capacity to sense opportunities, seize them and reconfigure its resources and

	practices in a changing environment.
Relevance Relevance	The continued fit between what an organization offers and the needs of its beneficiaries, now and in the future.
Innovation inputs / outputs Innovation inputs / outputs	Inputs are the resources and conditions that enable innovation; outputs are its knowledge, technological and creative results.

Review and Discussion Questions

1. Explain the difference between operational discipline and innovation discipline, and give an example of a situation in your organization where one was applied in place of the other. Understanding

2. Choose an external change affecting your sector and determine whether it is mainly a matter of volatility, uncertainty, complexity or ambiguity; then identify the appropriate response to it, and whether that response is innovation. Application

1. "Artificial intelligence will make innovation easier for everyone." Discuss this statement in light of the two studies presented in Section 2.4. Analysis

2. Explain the gap between Saudi Arabia's rank on innovation inputs and its rank on outputs. What factors within organizations might contribute to this gap? Analysis

3. "Not innovating is the safer option." Evaluate this statement, identifying the situations in which innovation is not the appropriate response. Evaluation

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3 Chapter 3 Leading innovation

In this chapter we examine the role of leadership in innovation management: how leading the unknown differs from leading the known, which functions fall to the leader alone, how the leader balances running the present with exploring the future, and why employees take the meaning of innovation from their leader's everyday behavior more than from what the leader says.

Introduction

Opening case: a new director (composite case)

At his first meeting with staff, a new director called for "bold ideas" and promised to back them. A few weeks later, an employee presented an idea for simplifying a procedure carried out every day, which she had tried on a small scale with two colleagues. The first question put to her in the meeting was: "Who authorized you to do that?" The idea was not rejected, its results were not discussed, and the meeting moved on to the next item.

No one in the room tried anything similar again. From a single incident they had learned a lesson that the opening speech could not erase: taking initiative is a personal risk. This is the heart of what we address in this chapter: in

innovation, leadership is measured by what people learn from everyday reactions more than by what is announced.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Distinguish between leading known work and leading work surrounded by uncertainty.

٢ Explain the effect of people-centered leadership on motivation and innovation in light of its theoretical foundations.

٣ Identify the core leadership functions in innovation management.

٤ Explain the concept of organizational ambidexterity and the ways of balancing exploitation and exploration.

٥ Recognize the leadership behaviors that encourage innovation and those that unintentionally stifle it.

٦ Match the leadership decision and the type of evidence required to the stage of the initiative.

3.1 Leading the unknown

Traditional management is built on achieving known goals with defined resources, schedules and procedures, and the leader is held accountable for adherence to the plan. Innovation, by contrast, deals with situations in which aspects of the problem, the solution, adoption or feasibility are still unknown. The leader therefore asks of an innovation team what suits the nature of its work: clear assumptions, sound experiments, fast learning and disciplined decisions, in place of the precision expected of an operational project whose requirements are fully defined.

The leadership question shifts accordingly, from "Can we guarantee the initiative will succeed?" to "What do we need to know before we increase our commitment?" The leader's role here is to keep ignorance from being turned into false confidence, to spread investment across stages, and to tie each stage to the evidence appropriate to it.

3.2 Leadership functions in innovation management

Innovation remains a leadership responsibility even when a specialized department takes it on. An organizational innovation initiative begins with an explicit mandate from top leadership that gives it legitimacy, and with a sustained commitment to support those who run it and to protect them when their initiatives collide with the status quo. This is why the international standard for innovation management systems places it first among the requirements of leadership (International Organization for Standardization [ISO], 2024). The role of leadership can be summed up in seven interrelated functions:

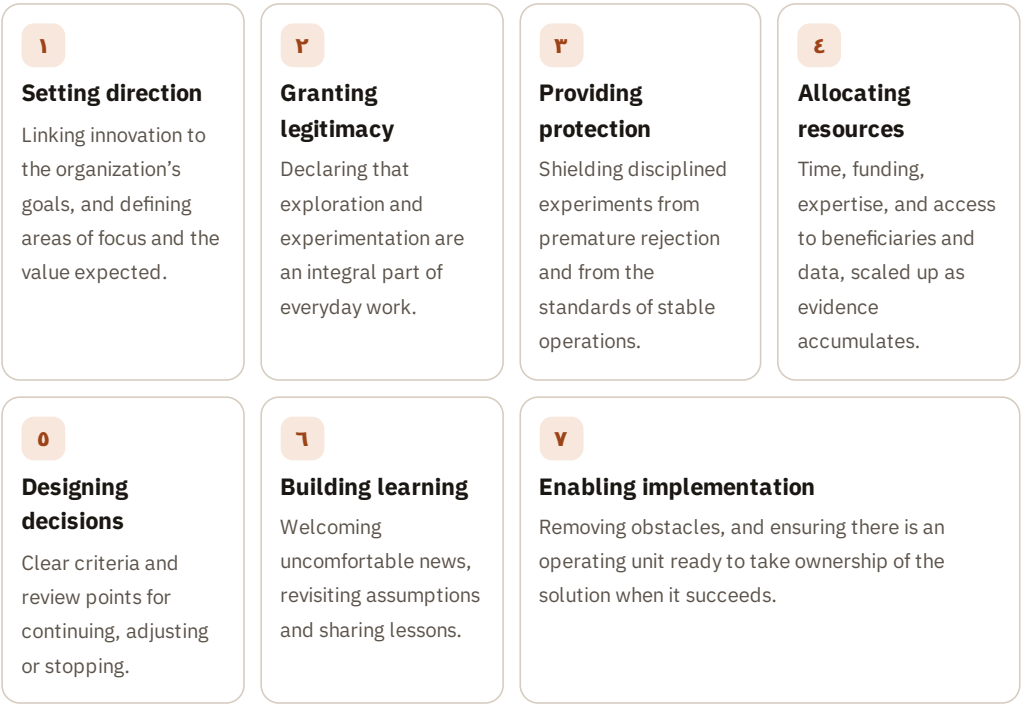


Figure 3.1 The seven leadership functions in innovation management.

In these functions the leader acts more as an architect of context than as the person with the best idea. The leader's task is to design a context in which people with diverse knowledge can discover problems and build solutions, and to make sure that effort turns into decisions and value. This role faces in two directions: **outward**, by following external realities and securing the organization's long-term relevance; and **inward**, by shaping the values, culture and structures that make innovation possible and sustainable.

3.3 Organizational ambidexterity

An organization needs efficiency and reliability to deliver its current work, and at the same time it needs flexibility and experimentation to explore the future. March described these two activities as **exploitation**, refining and deepening what the organization already knows, and **exploration**, searching for what it does not yet know. He showed that organizations tend to favor

exploitation because its returns are nearer and clearer, so that their capacity for renewal weakens over time (March, 1991). The capacity to combine the two is called **organizational ambidexterity** (O'Reilly & Tushman, 2013).

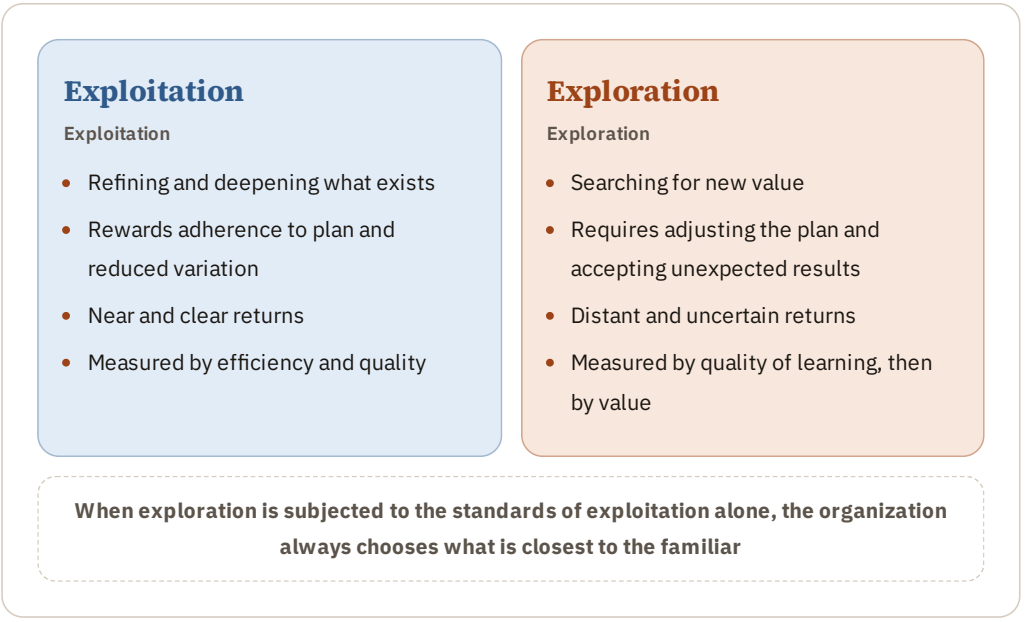


Figure 3.2 Exploitation and exploration: two different logics that the organization needs together.

The tension arises because the operating system rewards adherence to the plan, while exploration requires changing it. When the usual profitability or productivity criteria are applied to emerging initiatives, the organization will mostly choose ideas close to the familiar. When exploration is left without controls, it turns into scattered activity. Organizations handle this tension in one of two ways, or by combining them: **structural separation**, which creates separate units or budgets for exploration that report to top leadership; and **contextual ambidexterity**, which enables individuals and teams to divide their time between the two logics within the same job (O'Reilly & Tushman, 2013). In both cases the aim is to provide a temporary space for learning, and then to build an orderly bridge to operations.

3.4 The leader as shaper of the environment

At the highest levels of leadership, people work for the leader more than they work because of the leader's authority to assign tasks: because the leader values their effort, is mindful of their circumstances and trusts their ability. This kind of leadership has foundations in research that go beyond personal temperament and disposition, and they explain why it leads to deep work and loyalty, and why innovation needs it in particular.

The first foundation: social exchange and the sense of support

Social exchange theory holds that working relationships rest, alongside the formal contract, on an unwritten exchange of trust and care (Blau, 1964). When employees perceive that their organization and their leader value their contribution and care about their well-being, they develop a sense of obligation to reciprocate, which shows in stronger attachment to the organization, greater effort and a readiness to go beyond what is required. A broad review of research on perceived organizational support has confirmed this relationship (Rhoades & Eisenberger, 2002). Innovation is, at its core, work that goes beyond what is required: no one is obliged to expose a problem, propose an alternative or take the risk of an experiment.

The second foundation: basic psychological needs

Self-determination theory shows that intrinsic motivation grows when three basic psychological needs are met: **autonomy**, the sense that one chooses what one does; **competence**, the sense of capability and progress; and **relatedness**, the sense of being valued and connected to others (Gagné & Deci, 2005). An empathetic leader meets these needs by trusting the team and giving it room, acknowledging its progress, and treating its members as partners in the work. The theory connects with what has come earlier in this book: intrinsic motivation is the foundation on which creativity stands (Amabile, 1996).

The autonomy meant here is cognitive autonomy in how people think and solve problems, and it remains tied to the organization's purposes. The leader sets out clearly the **what** and the **why**: the problem to be solved, the needs of the system the solution serves, and the constraints that must not be crossed; then leaves the **how** to the team. Amabile put it this way: people are more creative when they are given freedom to choose how to climb the mountain, without necessarily choosing the mountain itself (Amabile, 1998). Autonomy in this sense is consistent with the book's starting point that innovation begins from a priority problem.

The third foundation: people-centered leadership styles

Transformational leadership includes a dimension called "individualized consideration," attending to each person's needs and supporting their growth, and a meta-analysis of study findings has shown a positive relationship between this style and employee creativity (Koh et al., 2019). **Servant leadership** goes further, making service to followers and attention to each one's needs and growth an end in itself rather than merely a means of raising performance (Eva et al., 2019). A meta-analysis of 130 studies found that this style has explanatory power beyond that of transformational leadership, and that its effect operates through trust in the leader, a sense of fairness, and the quality of the leader–employee relationship (Lee et al., 2020).

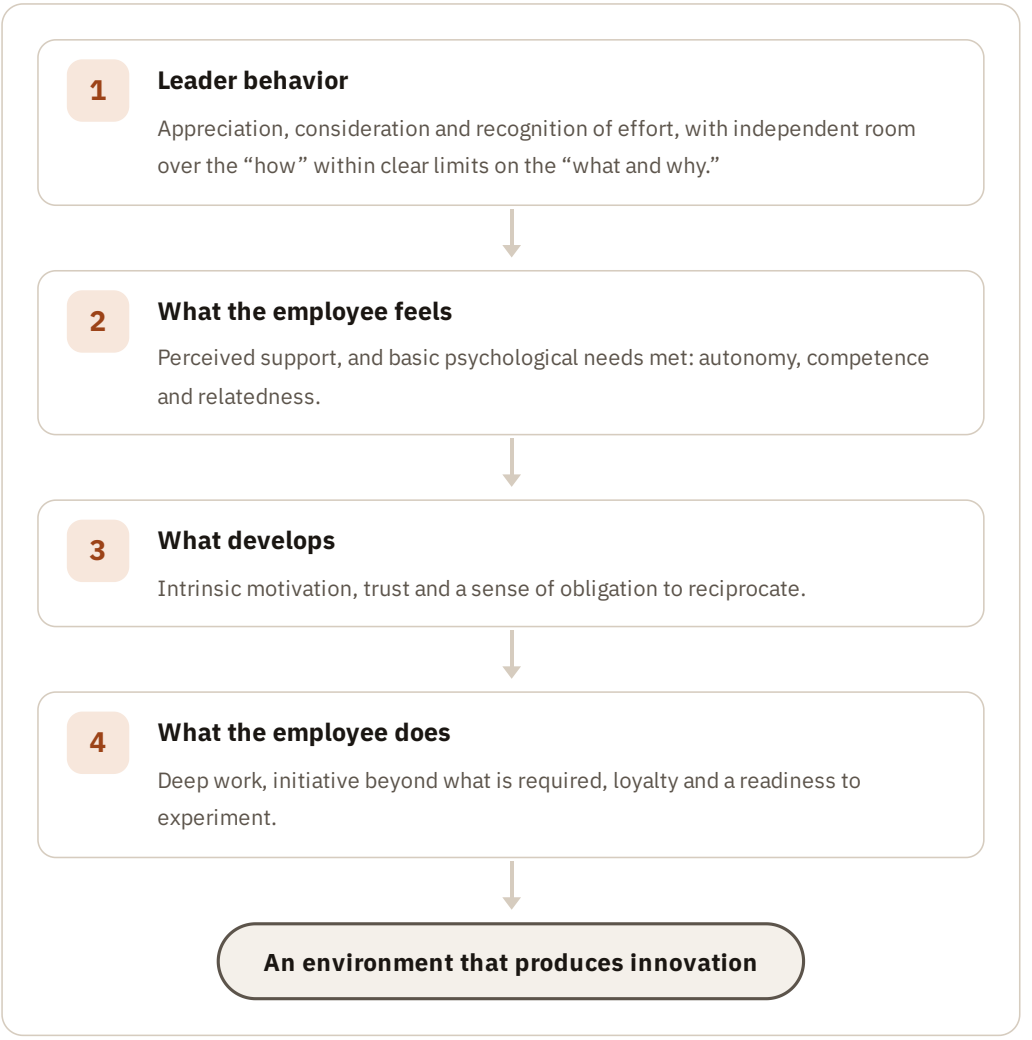


Figure 3.3 How people-centered leadership turns into innovation: a synthesis of social exchange theory, self-determination theory and leadership theories.

What research shows about everyday behavior

These foundations show up in small everyday details. Amabile and her colleagues analyzed some twelve thousand daily diary entries written by 238 individuals in 26 teams across seven companies. They found that a leader's small daily actions, such as listening, recognizing work, and giving or withholding support, affected people's sense of being supported and their creativity, and that reactions to negative actions were stronger than reactions

to positive ones (Amabile et al., 2004). Detert and Burris likewise showed that a manager's openness to suggestions is associated with employees voicing their ideas and concerns, and that this link runs through their sense of safety (Detert & Burris, 2007).

Behaviors that stifle innovation

- Asking who is to blame for a mistake before asking what we learned
- Demanding a guarantee of success before an experiment
- Preferring an attractive presentation to evidence
- Approving many initiatives without adequate resources
- Treating a stop as a personal failure

Behaviors that support innovation

- Asking for evidence behind ideas, and distinguishing opinion, assumption and fact
- Welcoming information that contradicts expectations
- Setting the limits of an experiment rather than forbidding it
- Giving teams direct access to beneficiaries
- Admitting what one does not know, and explaining the reasons for one's decisions

It follows that employees infer the culture of innovation from how their leader deals with the first unfamiliar idea, the first experiment that does not succeed, and the first person who disagrees with the prevailing view. We return to this relationship between individuals and their environment in more detail in Chapters 7 and 8.

Caution

Empathy does not mean lowering standards or avoiding accountability. The environment best able to innovate combines genuine care for people with high expectations of them, as Chapter 8 shows in its discussion of psychological safety. The loyalty meant here is a commitment to the purpose and the team that leaves room for dissenting views.

3.5 How management unintentionally stifles innovation

Few leaders declare their opposition to innovation, yet an organization can suppress it through practices that each seem reasonable on their own. Among the most common:

- Making innovation extra work, to be done after the full operational workload is finished.
- Demanding a detailed feasibility study for an idea that still rests on untested assumptions.
- Putting a small experiment through the same chain of approvals required to roll out a solution across the whole organization.
- Leaving ideas unanswered, crediting them to the wrong people, or implementing them without involving those who proposed them.
- Rewarding error-free operations alone, without recognizing the discovery of problems or the quality of experiments.

The greatest danger lies in the message others learn from the rejection of a single idea. When employees realize that exposing problems adds to their workload, and that ideas vanish without a response, they learn to stay silent.

The literature on employee voice shows that when individuals withhold their suggestions and concerns, the organization is deprived of information that may be critical (Morrison, 2014).

3.6 Executive sponsorship

An executive sponsor has a real role that goes beyond having their name listed on the initiative document. The sponsor's job is to link the initiative to strategy, to secure legitimacy and access for it, to intervene when departmental interests clash, and to ensure that there is a unit ready to adopt it. The sponsor's tasks also include taking under their wing ideas that belong to no particular department in the existing structure, even though they may be the basis of future value. Studies have shown that innovations usually need someone to take them up and defend them against resistance, and that this role extends beyond formal authority to persuasion and coalition building (Howell & Higgins, 1990).

The sponsorship rule

Good sponsorship protects the team so that it can learn; it does not protect the idea from testing. If the evidence shows that the need is weak or adoption difficult, it is the sponsor's responsibility to support adjusting or stopping the initiative.

3.7 Leadership decisions across the stages

The nature of the decision differs with the stage of the initiative, so the information a leader asks for should increase step by step as the stages progress. A detailed feasibility study at the outset of a highly novel idea may produce figures that look precise but rest on weak assumptions. It is better for the precision of decisions to develop as the evidence develops.

Table 3.1 The leader's question and the type of evidence at each stage

Stage	Leader's question	Sufficient evidence
Opportunity	Is it consistent with our priorities, and does it merit exploration?	A clear description of the need, and early indications of its importance
Development	Have we understood the problem, and what have we learned?	Stated assumptions, and results of small experiments
Pilot	Are the ethical, operational and regulatory risks acceptable?	A pilot plan with clear limits and stopping conditions
Scaling	Will the solution last and retain its value at a larger scale?	Evidence of adoption, actual cost, and an operating unit ready to take it on

One of the most damaging forms of leadership decision for innovation is making no decision at all. An idea that is neither accepted nor rejected, and hangs between meetings, dies without anyone learning from it, and its originator learns not to try again. Not deciding is in fact a decision, but one that relieves the decision-maker of responsibility and squanders the chance to learn. In Chapter 10 we present governance mechanisms that keep initiatives from remaining in this zone.

Chapter tool: The leader's mirror

Answer the following items honestly for the past three months, then ask your team to answer them anonymously in assessing you, and compare the answers. The gap between your self-assessment and your team's assessment of you is the most important thing this tool reveals.

The leader's mirror 1 = rarely · 5 = always

١	When I am presented with an unfamiliar idea, I ask about the evidence and assumptions before judging it.	1 2 3 4 5
٢	When an experiment fails, I ask what we learned before asking who is responsible.	1 2 3 4 5
٣	People with ideas receive a clear response from me or from the relevant unit within a known period.	1 2 3 4 5
٤	I allocate real time or resources to exploration.	1 2 3 4 5
٥	I set the permitted limits of an experiment for the team rather than requiring my approval for every step.	1 2 3 4 5
٦	I admit to the team what I do not know, and explain the reasons for my decisions.	1 2 3 4 5
٧	I support stopping an initiative when the evidence points that way, even if I was enthusiastic about it.	1 2 3 4 5
٨	I publicly credit ideas and efforts to the people behind them.	1 2 3 4 5

Reading the results: what matters are the items with the lowest scores and the items on which the leader's rating and the team's rating differ by two points or more; these say more than the total.

Chapter Summary

- Leading innovation is, at its core, leading the unknown: it calls for clear assumptions, sound experiments, fast learning and disciplined decisions.
- Leadership has seven functions in innovation management, beginning with setting direction and granting legitimacy and ending with enabling implementation.

- An organization needs both exploitation and exploration, and combines them through structural separation, contextual ambidexterity, or both.
- Employees learn the meaning of innovation from their leader's everyday behavior, and small negative actions weigh more heavily than positive ones.
- Leadership that people work for rests on foundations in research: social exchange, basic psychological needs, and transformational and servant leadership. It produces the deep work and initiative that innovation needs.
- Management can unintentionally extinguish the spark of innovation through practices that each seem reasonable on their own; the most dangerous are those that teach people silence.
- Good sponsorship protects the team so that it can learn, while keeping the idea subject to testing.
- The precision of decisions develops as the evidence develops, and leaving an initiative undecided is the worst decision of all.

Key Terms

Exploitation Exploitation	Refining and deepening what the organization already knows in order to achieve efficiency.
Exploration Exploration	Searching for new knowledge and opportunities under uncertainty.
Organizational ambidexterity Organizational ambidexterity	An organization's capacity to combine exploitation and exploration at the same time.

Employee voice Employee voice	Employees' expression of their ideas, suggestions and concerns with the aim of improving work.
Servant leadership Servant leadership	A leadership style that makes serving followers and meeting their needs and growth an end in itself.
Perceived organizational support Perceived organizational support	An employee's belief that the organization values their contribution and cares about their well-being.
Executive sponsor Executive sponsor	A leader who links an initiative to strategy, secures legitimacy and resources for it, and removes its obstacles.

Review and Discussion Questions

1. Why is the question "Can we guarantee success?" unsuited to leading innovation? What is the alternative question? Understanding
2. Which of the seven leadership functions is weakest in your organization? What effect does this have on initiatives? Analysis
1. Propose a way of applying organizational ambidexterity in a department working under heavy operational pressure. Application
2. Return to the opening case: what should the director have said? What effect would that have had on the team's behavior? Application
3. "Not deciding is worse than rejecting." Discuss this statement. Evaluation
4. Using self-determination theory, explain why an employee might put exceptional effort into working for a particular leader without any material incentive. Analysis

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Part Two

Institutional foundations and people

What an organization needs for innovation to become a sustained capability: strategy, system and architecture; the people it is built for, with their motivation, culture and teams; and the governance of its decisions.

Chapter 4: Innovation strategy and foresight

Chapter 5: The innovation management system

Chapter 6: The organizational architecture of innovation

Chapter 7: The innovator and their environment: people in the innovation system

Chapter 8: Innovation culture and the enabling environment

Chapter 9: Innovation teams and organization-wide participation

Chapter 10: Governance and portfolio management

Chapter 4

4 Innovation strategy and foresight

In this chapter we examine innovation strategy as a system of choices that determines where the organization looks for value, with what degree of ambition, and by what means. We show how strategy sets out the "what and why" and entrusts the "how" to people, and how foresight supplies it with a systematic reading of the future.

Introduction

Opening case: a strategic plan (composite case)

One organization's strategic plan included a goal that read: "To be an innovative and pioneering organization." A year later, its ideas platform had received more than three hundred proposals heading in dozens of directions, from improving the parking lots to building new apps. The evaluation committee could not choose among them, because no one knew which mattered most to the organization, so it picked the ones that were most appealingly presented. Only a handful were ever implemented.

There was no shortage of ideas, and those who proposed them were enthusiastic; the flaw lay in the absence of choice. “To be innovative” is a wish that never rose to the level of a strategy. It says nothing about where people should look, what the organization will decline to invest in, or the criteria by which ideas will be judged. These are the questions from which we set out toward the strategy that answers them.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Define innovation strategy as a set of interconnected choices.

٢ Derive search fields and challenge questions from the organization’s goals.

٣ Identify the components of an innovation strategy and formulate it on a single page.

٤ Balance the time horizons of innovation according to the nature of the organization.

٥ Use foresight in building and reviewing strategy.

4.1 What is innovation strategy?

An innovation strategy is a set of interconnected choices that determines why the organization needs innovation, where it will look for value, at what level of ambition, by what means, and how it will allocate its resources. Pisano observed that many organizations invest in innovation without a clear strategy, and so accumulate scattered initiatives that are hard to judge or weigh against one another; a strategy, he argued, is defined by the choices it commits to, and equally by those it rules out (Pisano, 2015).

It follows that a strategy is not a wish list, a general statement, or a table of every proposed initiative. Its essence can be distilled into two questions used throughout the strategy literature: **where** to play, and **how** to win (Lafley &

Martin, 2013). In innovation, the first refers to the arenas in which the organization looks for new value, and the second to the means by which it will get there: building internally, partnering, or acquiring a ready-made capability (Capron & Mitchell, 2012).

4.2 From organizational strategy to search fields

Innovation strategy grows out of the organization's own context. It starts from the organization's overarching goals, the challenges that hold it back, and the shifts that may affect its ability to fulfill its mission. Copying fashionable innovation themes detached from these goals is a mistake.

Broad goals are translated into **search fields**, specific opportunity areas that direct exploration, and then into **challenge questions** to which employees and partners can contribute. Instead of inviting everyone to propose any idea at all, exploration is steered toward questions such as: How can we make access to the service simpler for a group that current channels do not reach? How can we cut the time lost between two units? Such questions define the *what* and the *why*, and leave the solution open.

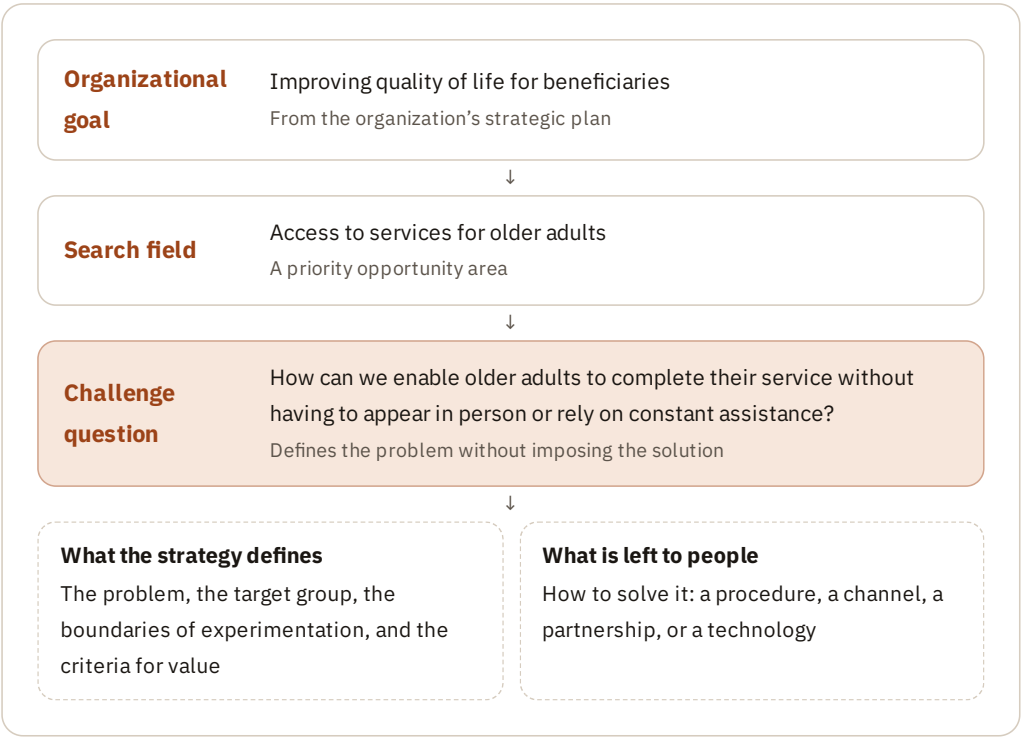


Figure 4.1 From organizational goal to challenge question: strategy defines the "what and why" and leaves the "how" open. (Illustrative example)

In this way, strategy aligns with what Chapter 3 presented on cognitive autonomy within boundaries. Search fields and challenge questions are the clear boundaries that give people freedom to think within them, and they make people's contributions comparable and open to evaluation.

4.3 The components of strategy

A good innovation strategy has six components, each answering a specific question:

Table 4.1 The components of innovation strategy

Component	The question it answers	Example wording
Rationale	Why do we need innovation now?	Rising demand with flat resources
Target outcomes	What value do we want to achieve?	Halve the time it takes to obtain the service
Search fields	Where will we look, and where will we not look for now?	Three priority fields, with everything else explicitly excluded
Level of ambition	How do we divide our effort between the near and the distant?	Most effort on improvement, with a defined share for future bets
Means of delivery	How will we get there?	Internal development, plus partnerships with universities and startups
Principles and boundaries	What risks are acceptable, and what must never be sacrificed?	No experiment that compromises the security of personal data

Each component needs capabilities to support it, including data, expertise, funding and governance; these are the subject of the following chapters in this part.

4.4 Level of ambition and the balance of horizons

Dividing initiatives into three time horizons offers a useful language for balancing the present against the future (Baghai et al., 1999).

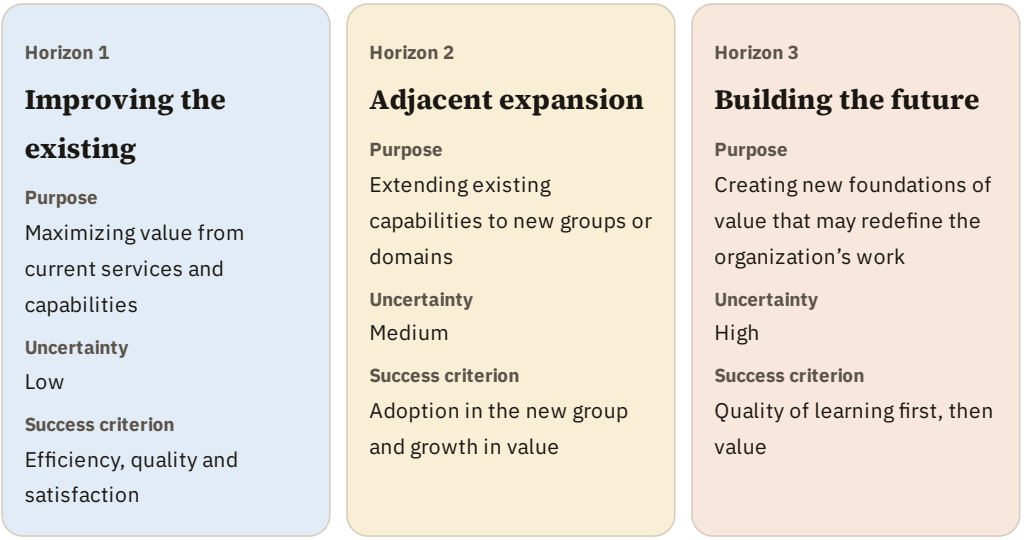


Figure 4.2 The three horizons of innovation. Source: adapted from **Baghai et al. (1999)**.

The horizons are best understood as a flexible framework for thinking, and the common allocation ratios, such as 70/20/10, as indicative estimates; the right allocation depends on the sector, the pace of change, the organization's maturity and its acceptable level of risk. The model's core value is that it makes investment in the future visible and deliberate, and keeps Horizon 1 from dominating simply because it is the easiest to forecast and measure.

For public sector organizations, the Organisation for Economic Co-operation and Development (OECD) proposes viewing the portfolio through four facets: **enhancement-oriented innovation**, which improves the performance of what already exists; **mission-oriented innovation**, which mobilizes effort toward a specific, ambitious outcome; **adaptive innovation**, which responds to emerging changes; and **anticipatory innovation**, which explores future issues that have not yet taken shape (OECD, 2022). The national research, development and innovation priorities presented in Chapter 2 serve as an example of mission-oriented innovation.

4.5 Top-down and bottom-up

Top-down innovation, directed by leadership, identifies priority challenges and mobilizes resources around them. Its strength is clarity and alignment with strategy; its risk is that leaders assume a complete understanding of reality and close off room for discovery. **Bottom-up innovation**, emerging from employees, draws on knowledge close to the work and to beneficiaries; its risk is that it produces a great many local ideas unconnected to priorities, as in the opening case.

A balanced approach combines the two: strategy sets search fields and boundaries from the top, and employees, beneficiaries and partners fill those fields with opportunities and solutions from below. This combination is the organizational application of the principle "the what and why from leadership, the how from people." Bottom-up innovation stays disciplined by priorities, while leadership direction stays open to solutions that were not drawn in advance. Clear fields also give participants a sense of meaning in their contribution, since they know which goal their effort serves.

4.6 Foresight

Strategy rests on assumptions about the future, and these assumptions are often implicit: that beneficiaries will keep behaving the same way, that regulations will not change, that available technology will stay as it is. Foresight is the organized effort to make these assumptions explicit and to test them against plausible alternatives.

Ansoff noted early on that strategic surprises are usually preceded by **weak signals**, that is, early and ambiguous information about a coming change, and that an organization which learns to detect them gains time to prepare before the picture becomes clear to everyone (Ansoff, 1975). Among the most widely used foresight tools is **scenario planning**, which sketches several plausible and divergent futures rather than predicting a single one, so that the organization's decisions can be tested against all of them (Schoemaker, 1995).

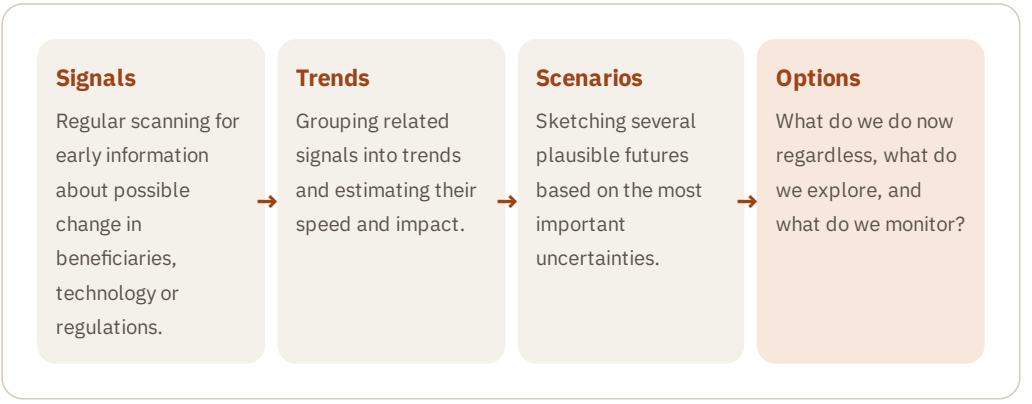


Figure 4.3 From signal to option: how foresight feeds innovation strategy.

The value of foresight is measured by what it changes in decisions. What it should yield is new challenge questions, adjustments to search fields, or exploratory initiatives in Horizon 3. Here foresight connects with the external realities scanning matrix introduced in Chapter 2: the matrix is its tool for regular scanning, and scenario planning its periodic tool.

4.7 Strategy as a living document

Assumptions, markets, technologies and legislation all change, so an innovation strategy is reviewed periodically, and also whenever a strong signal emerges that alters the organization's understanding of its situation. The purpose of the review is to verify that the search fields are still the most important, that resources are not all concentrated in Horizon 1, and that experiments have not exposed an error in a strategic assumption.

A strategy does its job when it reaches beyond those who wrote it to those who carry it out. It should be translated into clear challenge questions, published evaluation criteria, funding priorities, and messages explaining why these fields were chosen, and every sector or unit should know its role in it: discovering opportunities, contributing expertise, running experiments, or adopting solutions.

In Practice

Write down the names of five innovation initiatives your organization is working on now, and ask of each: Which search field in the strategy does it serve? Which challenge question does it answer? If you find initiatives that serve no field, then either the strategy is overlooking a genuine priority that needs to be added, or the initiative is consuming resources outside the chosen direction.

Chapter tool: innovation strategy on a single page

Formulate your organization's innovation strategy on this single page, then discuss it and share it. If you find you cannot fill in one of its boxes clearly, there is a decision that has not yet been made.

Innovation strategy canvas

Reviewed at least once a year

1. Rationale

Why do we need innovation now? What is the change, challenge or ambition?

2. Target outcomes

What value do we want within three years, and how will we know we have achieved it?

3. Search fields

Three to five priority fields, each with a challenge question.

4. What we will not do for now

Fields or types of initiative that are explicitly excluded.

5. Level of ambition

The approximate share of effort in each horizon, and the reason for this allocation.

6. Means of delivery

Internal development, partnerships and others, and who leads each.

7. Principles and boundaries

Acceptable risks, ethical and regulatory safeguards, and what must never be sacrificed.

8. Strategic assumptions and review triggers

What are we assuming about the future? What signal, if it appeared, would lead us to review the strategy?

Chapter Summary

- Innovation strategy is a system of interconnected choices, defined as much by what it rules out as by what it commits to.
- Strategy rests on two inseparable questions: where we innovate, and how we reach our goal.
- The organization's goals are translated into search fields, and then into challenge questions that define the "what and why" and leave the "how" to people.
- Strategy has six components: rationale, outcomes, search fields, level of ambition, means of delivery, and principles and boundaries.
- Balancing the three horizons makes investment in the future deliberate, with the allocation set according to each organization's circumstances.
- A balanced approach combines top-down and bottom-up innovation, giving people freedom within clear fields and a sense of meaning in their contribution.
- Foresight feeds strategy by turning weak signals into trends, scenarios and options on which decisions can be made.

Key Terms

Innovation strategy Innovation strategy	A set of interconnected choices that determines why the organization innovates, where, with what ambition, and by what means.
Search field / Innovation arena Search field / Innovation arena	A priority opportunity area that directs exploration efforts.

Challenge question Challenge question	A formulation of a priority problem that specifies what is needed without imposing the solution.
Three horizons Three horizons	A division of initiatives according to their distance from existing operations and their degree of uncertainty.
Mission-oriented innovation Mission-oriented innovation	Mobilizing effort and resources toward a specific, ambitious outcome.
Weak signals Weak signals	Early, ambiguous information about a coming change.
Scenario planning Scenario planning	Sketching several plausible futures against which to test decisions.

Review and Discussion Questions

1. Why is the statement "To be an innovative organization" not a strategy? Reformulate it so that it meets the conditions of a strategy. Application

2. From one of your organization's goals, derive a search field and a challenge question that defines the problem without imposing the solution. Application

1. How is your organization's current effort distributed across the three horizons? Is this distribution consistent with the changes it faces? Analysis

2. What is the relationship between search fields and the principle of cognitive autonomy within boundaries presented in Chapter 3? Analysis

3 Choose a weak signal in your sector, build two different scenarios around it, and then identify an option that works in both. Evaluation

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Chapter 5

5 The innovation management system

In this chapter we present the framework that moves innovation from scattered efforts, hostage to personal connections and chance, to a regular practice that can be understood and improved: the difference between a process and a system, the system's six stages and where decisions sit within them, and the requirements of the international standard for innovation management systems, **ISO 56001**.

Introduction

Opening case: an innovation procedure (composite case)

One organization adopted a six-stage "innovation procedure," published it in an elegant handbook, and hung its flowchart in the building's corridors. A year later, a review revealed that dozens of proposals were still sitting in the "evaluation" stage with no decision, that two successful pilots had stalled at their conclusion because no one had been assigned to run the solution, and that most employees did not even know how their idea could reach the first stage.

This organization had a written **process**, but it did not have a **system**. The flowchart describes the road; traveling it requires someone to decide at every turn, someone to fund, someone to take over the solution at the end, and a channel that connects the road to people where they work. These elements, which make the road passable, are the focus of this chapter.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Distinguish between the innovation process and the innovation management system.

٢ Describe the six stages of the innovation management system, the output of each, and its common failure.

٣ Design decision points that keep initiatives from remaining unresolved.

٤ Bring the system closer to people so that it captures opportunities from everyday work.

٥ Explain the structure of the **ISO 56001** standard and the limits of its usefulness.

5.1 Process and system

Organizations usually have more ideas than capacity to test and implement them. The problem, more often than not, is the absence of a pathway that singles out the important opportunities, gives resources to the promising ones, stops those that are not progressing, and ties success to adoption. This is where we need to distinguish between two concepts that are frequently confused.

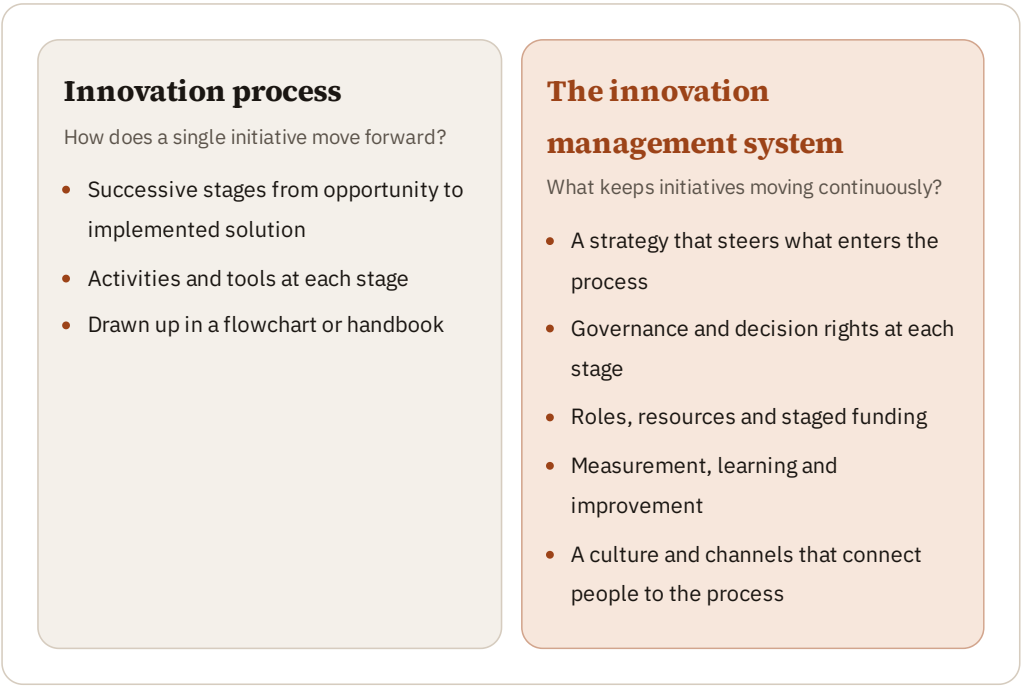


Figure 5.1 The process is part of the system: the former describes the road, and the latter ensures it is traveled.

The international series of standards defines an innovation management system as a set of interrelated and interacting elements of an organization aimed at realizing value (International Organization for Standardization [ISO], 2025). This covers managing the daily flow of opportunities and involving people in it, as well as the governance that determines who decides and how resources are allocated. It now becomes clear what happened in the opening case: the process was there, but the system was missing.

5.2 The six stages

Models of the innovation process essentially agree on a path that begins with searching for opportunities, moves on to selecting what merits investment, then to implementation, and finally to capturing value (Tidd & Bessant, 2021). In this book we break that path down into six stages that operate in a continuous cycle: strategy, opportunity capture, evaluation and selection, initiative setup,

pilot, and scaling. The first stage is foundational; the next three form the engine of the system, turning inputs into projects; and the last two carry the solution into practice.

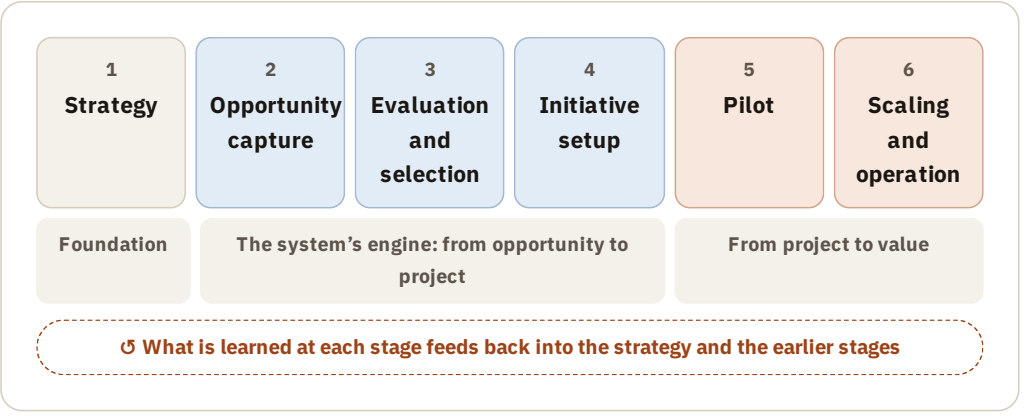


Figure 5.2 The six stages of the innovation management system. Source: prepared by the author based on **Tidd & Bessant (2021)** and **ISO (2024)**.

Table 5.1 The purpose, output and common failure of each stage

Stage	Purpose	Output	Common failure
Strategy	Steering what enters the system	Search fields, challenge questions and criteria	An open call for any idea, with no priorities
Opportunity capture	Discovering needs and opportunities worth considering	Opportunities described and grouped, kept separate from solutions	Storing ideas instead of understanding needs
Evaluation and selection	Determining what merits the cost of the next round of learning	A declared decision: explore, merge, defer or decline	Long waits with no decision or response

Stage	Purpose	Output	Common failure
Initiative setup	Turning the opportunity into a learning project	A leader, a small team, a sponsor, initial funding and hypotheses	No unit identified to take over the solution later
Pilot	Testing the solution in a real-world setting	Evidence on value, adoption and cost	A pilot without success criteria defined in advance
Scaling and operation	Turning the solution into a sustainable operational capability	An owner, a budget, training and indicators	A successful pilot that stalls because no one took it over

These stages are not a rigid production line. An initiative may return to an earlier stage, change direction, or stop. The value of the system lies in its shared language and clear decisions and responsibilities, combined with enough flexibility to accommodate the different paths initiatives take. In Part III of the book we examine in detail what happens within these stages: understanding problems, developing solutions, experimentation, and adoption and scaling.

5.3 The decision at each stage

Every transition between stages ends in a decision, and that decision takes one of five forms: continue, continue with modifications, merge with another initiative, suspend temporarily, or stop. It should rest on what has changed in the evidence, the risks and the expected value, independent of the effort already spent or the standing of the person behind the idea.

Yet the absence of a decision is more damaging to the system than a wrong one. An initiative that is neither accepted nor rejected remains in what we call **decision limbo**: it consumes its owners' attention, nothing is learned from it,

and it teaches those around it that taking the initiative is not worth the trouble. This is what happened to dozens of proposals in the opening case. A good system prevents this limbo through three simple means:

- **A published response time** at each stage, for which the person responsible for the decision alone is held accountable.
- **A written, reasoned response** to every proposal, even when it declines to take the proposal further.
- **A periodic review** of initiatives that have overrun their time, so that they are either resolved or the reason for their suspension is made public.

These means may look procedural, but their effect is above all human: a reasoned response preserves the idea owner's sense of being valued and teaches them something, and a published time frame respects their time. We return to decision rights and gates in Chapter 10.

5.4 A system close to people

The system's value begins at the opportunity capture stage, the stage that connects the system to people. Organizations often limit this stage to a single channel removed from everyday work, such as an online platform, an annual competition or a standalone center, and wait for people to bring their ideas to it. As a result, only an enthusiastic few reach it, while most people, and with them their close-up knowledge of problems, remain outside the system.

The system best able to capture opportunities is the one that goes to people where they work: in unit meetings, in performance reviews, in everyday work tools, and in dealings with beneficiaries. At a university, for example, capture channels widen when some course assignments and projects become an entry point into the innovation ecosystem, rather than the innovation center remaining an entity cut off from the classrooms and unknown to many students.

In Practice

Trace the last ten opportunities that entered your organization's innovation system: where did they come from? If they all came from one channel or from the same people, the system sees only a small part of the organization.

5.5 The international standard ISO 56001

The first edition of **ISO 56001** was published in September 2024. It specifies requirements for an innovation management system that an organization can use to develop and demonstrate its innovation capability (International Organization for Standardization [ISO], 2024). It differs from the guidance standard **ISO 56002** in setting out requirements that can be audited and certified by accredited independent bodies (Fernandez & Swart, 2025). The standard follows the harmonized structure of the International Organization for Standardization's management system standards and comprises seven main clauses:

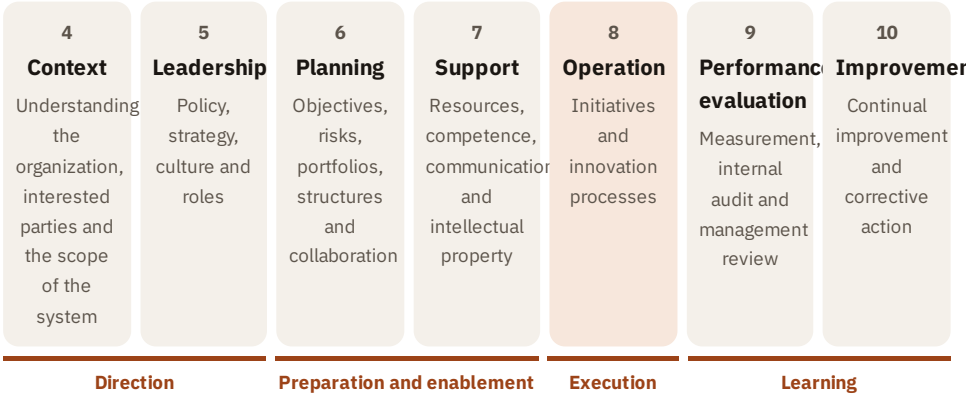


Figure 5.3 The main clauses of **ISO 56001:2024**. Source: adapted from **ISO (2024)**.

Clause 8 specifies five innovation processes: identifying opportunities, creating concepts, validating concepts, developing solutions, and deploying solutions (ISO, 2024). These processes correspond to the stages of the system in this book as follows:

Table 5.2 Correspondence between ISO 56001 processes and the stages of the system

ISO 56001 process	Corresponding stages of the system	Where it is covered in the book
Identifying opportunities	Strategy; opportunity capture	Chapters 4 and 11
Creating concepts	Evaluation and selection; initiative setup	Chapters 12 and 13
Validating concepts	Initiative setup; pilot	Chapter 14
Developing solutions	Pilot	Chapters 12 and 14
Deploying solutions	Scaling and operation	Chapter 15

The limits of the standard's usefulness

The standard is a useful organizational tool for diagnosis and comparison, but it does not produce innovation by itself. Certification can become a new form of innovation theater if effort shifts toward completing documentation rather than improving the actual flow of opportunities, decisions and value. The more productive question when applying it is: has the road from idea to value become shorter and clearer for those who travel it?

Chapter tool: system health check

Examine your organization's innovation system stage by stage. Each stage has a sign that it is working and a sign that it has broken down. Start with the stage where the sign of breakdown is most evident, for it is the bottleneck that determines the performance of the whole system.

Chapter tool Signs of health and breakdown at each stage

Stage	A sign that it is working	A sign that it has broken down
Strategy	Employees know the current search fields and challenge questions	Proposals scattered in every direction
Opportunity capture	Opportunities come from a variety of units and levels	A few recurring sources, or a single channel
Evaluation and selection	Every proposal receives a reasoned response within a published time frame	Proposals stuck without a decision for months
Initiative setup	Every initiative has a leader, a sponsor, hypotheses and a likely operating unit	Initiatives that belong "to everyone" and are owned by no one
Pilot	Success criteria are defined before the pilot	Every pilot is declared a success
Scaling and operation	Successful solutions are handed over to an owner and a budget	Successful pilots that stall once they end

Chapter Summary

- The process describes the initiative's road; the system ensures that the road is actually traveled, resting on strategy, governance, roles,

resources, measurement, and channels that connect people to the road.

- The innovation management system has six stages that operate in a continuous cycle, each with a specific output and a common failure.
- Every transition ends in a decision that takes one of five forms, and the most damaging thing that can befall the system is the absence of a decision. Decision limbo is prevented through a published response time, a reasoned response, and periodic review.
- The system best able to capture opportunities goes to people where they work and makes reaching it part of their day.
- **ISO 56001** sets out certifiable requirements in seven clauses and specifies five innovation processes. Its real value shows in improving the actual flow of initiatives.

Key Terms

Innovation management system Innovation management system	The formal framework through which an organization manages the flow of opportunities and initiatives through to value realization, including strategy, governance, roles, resources and measurement.
Innovation process Innovation process	The successive stages an initiative passes through from opportunity to implemented solution.
Decision limbo Decision limbo	The state of an initiative that is neither accepted nor rejected, and so remains suspended without learning or impact.

Pilot Pilot	A limited run of the solution in a near-real setting to test its value and adoption before scaling.
Certification Certification	Verification by an independent body that an organization's system conforms to the requirements of a specific standard.

Review and Discussion Questions

1. What is the difference between the innovation process and the innovation management system? Why is a written process not enough? Understanding
2. Apply the system health check tool to your organization. Which stage is the bottleneck, and why? Application
1. "The absence of a decision is more damaging than a wrong decision." Analyze this statement from the perspective of the idea owner and from that of the organization. Analysis
2. Propose two opportunity capture channels that connect the system to people where they work in your organization. Application
3. When is pursuing **ISO 56001** certification useful, and when does it turn into innovation theater? Evaluation

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Chapter 6

6 The organizational architecture of innovation

In this chapter we explore how an organization arranges itself to house innovation: where innovation sits in the structure, the enablers it requires, how units can work together rather than each in isolation, and who leads this effort. We take the university as an applied case whose thread runs through later chapters.

Introduction

Opening case: a Saudi university (composite case)

One university has what many organizations aspire to: a business accelerator, a Fab Lab for digital fabrication, an innovation oasis, research centers, a program for gifted students, and a Deanship of Student Affairs that organizes competitions. Each of these units has its own plan, indicators and annual reports. Yet a student survey showed that many students did not know these units existed, and those who did saw no connection between them and their courses. Assignments in most courses measure the ability

> to answer exam questions; a student with an idea does not know where to take it; and each unit waits for students to come to it.

This university has all the inputs. What it lacks is the architecture that would bring these units together into a single ecosystem reaching students where they learn. That architecture is our concern in this chapter: how an organization arranges itself so that its side-by-side entities become an organizational capability for innovation.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Distinguish between the success of a standalone initiative and building an organizational capability for innovation.

٢ Compare centralized, distributed and hybrid models for organizing innovation.

٣ Identify the enablers that innovation needs, with time foremost among them.

٤ Analyze the opportunities hidden in the gaps between units and design integration among them.

٥ Design an orchestrating unit that links the components of the ecosystem without becoming a new isolated entity.

٦ Define the role and competencies of the chief innovation officer and the ways they influence units and leadership.

6.1 From standalone initiatives to organizational capability

An innovation initiative may succeed thanks to an enthusiastic leader or an exceptional team, but that does not mean the organization has become capable of innovation. Organizational capability shows itself when the flow of opportunities, experiments and implementation is supported by a structure of roles, resources and relationships that endures when the organization's standout members move on, and through which innovation is spread across the whole organization. This is why the international standard defines the innovation management system as the organization's means of developing and demonstrating its innovation *capability* (ISO, 2024).

When innovation stalls, organizations tend to blame a shortage of ideas or a lack of employee enthusiasm. It is more useful to ask about the architecture: Does innovation have a clear place in the structure? Are its enablers in place? Do units work together? Does the system reach people where they work?

6.2 Where does innovation sit in the structure?

Organizations follow one of three models in organizing innovation, each with its strengths and limits. From their study of large firms pursuing radical innovation, O'Connor and DeMartino concluded that building the capability for it requires turning scattered efforts into a clear organizational function (O'Connor & DeMartino, 2006).

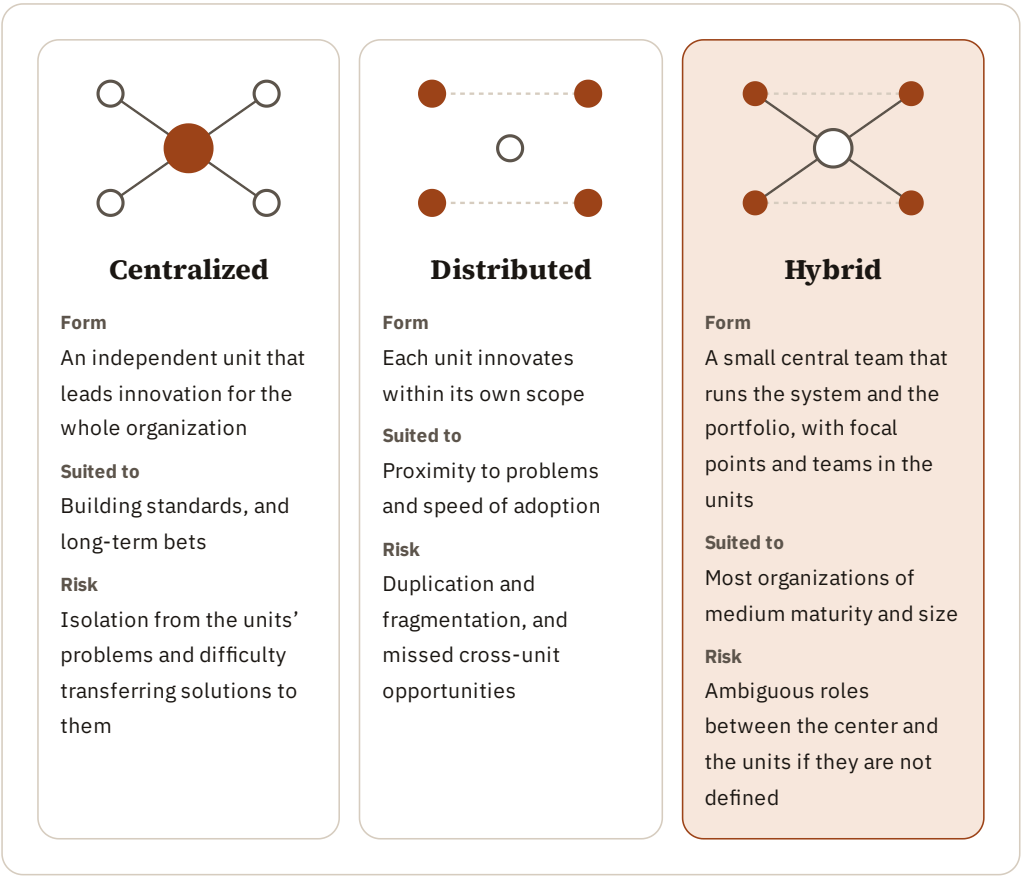


Figure 6.1 Three models for the place of innovation in the organizational structure.

A particular form of the centralized model, the **innovation lab**, has spread widely in the public sector. A study of 35 government labs found that the motives for setting them up included tackling complex problems and technical challenges, but also imitating other agencies and seeking legitimacy (Tõnurist et al., 2017). A lab created because others have created one, or to make the organization look innovative, risks remaining an input with no output.

6.3 Enablers

Wherever it sits in the structure, innovation needs enablers that are a precondition for its work. An organization's declared support for innovation remains incomplete as long as people are innovating with the same resources

they use for their routine work.

Table 6.1 The core enablers of innovation

Enabler	What it means	Sign of its absence
Time	Protected time for exploration within official working hours	"Innovate once you've finished your tasks"
Skills	Understanding beneficiaries, formulating hypotheses and designing experiments, alongside generating ideas	Repeated brainstorming workshops with no progress
Data and tools	Access to data and to prototyping and testing tools	Teams waiting months to obtain data
Spaces	Places for collaborative work and experimentation, close to people	An elegant space in a remote building that no one visits
Networks	Connections to experts and partners inside and outside the organization	Every team starts from scratch
Funding	Funding that increases in step with the evidence	Either no funding at all, or large early funding with no stages

Time deserves particular attention, because it is the scarcest and most overlooked of the enablers. Amabile and her colleagues analyzed the diaries of 177 employees and found that time pressure undermines creative thinking when people feel they are on a treadmill or working on autopilot, whereas creativity remains possible under pressure when people feel they are on a meaningful mission, know its purpose, and are protected from distraction (Amabile et al., 2002). The issue, then, goes beyond the amount of time to its meaning: do individuals feel that their time is directed toward a clear purpose, or spread across scattered tasks that never end?

6.4 Innovation between units

Many innovation opportunities lie in the gaps between organizational units. One unit may carry a burden created by a decision in another; an employee may re-enter data because systems are not integrated; a beneficiary may wait between two service points because ownership of their journey is fragmented. Each unit may look efficient on its local indicator, while the overall journey remains slow.

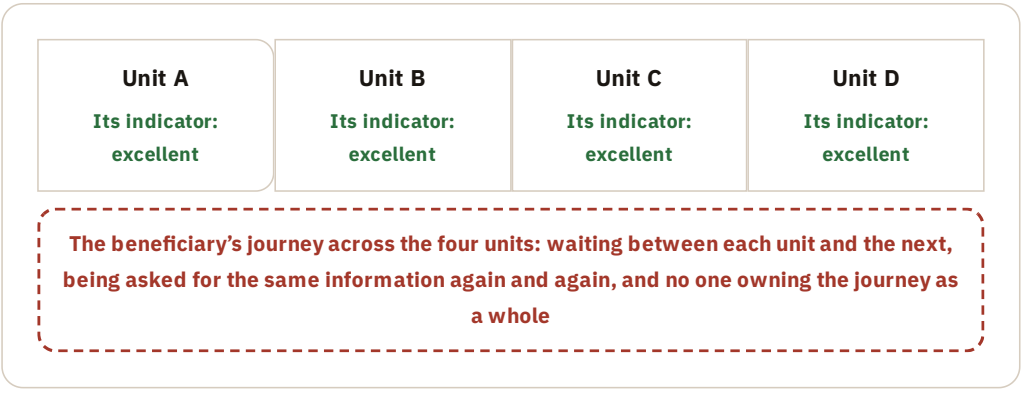


Figure 6.2 When every unit excels on its own indicator yet the overall journey stays slow: the territory of architectural innovation.

This does not mean that the answer is more meetings and joint committees. Hansen showed that collaboration between units has a cost, that it pays off only when its expected value exceeds that cost, and called for **disciplined collaboration**: collaboration measured by the specific result toward which it is directed (Hansen, 2009). Productive integration between units requires:

- A shared purpose and an outcome that goes beyond each unit's indicator.
- A single picture of the journey: the flow of data and decisions, and the waiting points.
- Clear decision rights: who recommends, who decides, and who implements.
- Time, data and resources allocated to actual experimentation.

- An owner who takes responsibility for sustaining the solution once it has been tested.

6.5 The orchestrating unit

The opening case returns with a practical question: how can the university's side-by-side units become a single ecosystem? The common response is to set up a new unit in charge of "innovation." The risk is that this unit becomes a seventh isolated entity alongside the other six. A better alternative is an **orchestrating unit** that reports to senior leadership and works in the background. Its function is limited to connecting the existing units with one another and connecting all of them to the student, without owning initiatives or competing with those units.

A unit that becomes a new, isolated entity

- Launches its own programs and competes with existing units
- Measures its success by the number of its activities
- Waits for students to come to it
- Reports to a mid-level official

An orchestrating unit

- Connects existing units and supports their work
- Measures its success by the flow of students and ideas between units and the results achieved
- Goes to students in their classrooms and courses
- Reports to senior leadership so that it has the authority to coordinate

Figure 6.3 The difference between a unit that adds a new isolated entity and one that builds bridges between existing entities.

At a university, integration can take several possible forms, depending on what the diagnosis reveals. Three pathways stand out:

- **Linking to formal learning:** redesigning the assignments and projects in a limited number of common courses so that they become graded creative

and innovative tasks, connecting them to the accelerator, the lab and university competitions, and then scaling up what works.

- **The student's extended pathway:** from attracting gifted students at the secondary school stage, to nurturing and empowering them during their studies in ways that fit their majors, to alumni services that keep them connected to the ecosystem.
- **Linking to the external ecosystem:** partnerships with government and industry bodies in the region that open up real problems and opportunities for application to students.

We return to these pathways in the chapters on the innovator and their environment, adoption and scaling, and innovation ecosystems, and then bring them together in Chapter 20 on the university innovation ecosystem.

Principle

An ecosystem is built by designing the flow between its entities more than by adding new ones. The question that reveals the quality of the architecture is: how many steps does an idea's owner need to take to reach someone who can help?

6.6 The chief innovation officer: role and competencies

The orchestrating unit needs someone to lead it. Many organizations assign this to an innovation officer who goes by various titles: director of the innovation unit, head of innovation, or chief innovation officer. The role carries a paradox: its holder is responsible for results that are mostly achieved within units they do not head, by people who do not report to them. Their success is therefore measured more by their ability to make others succeed than by what they carry out themselves.

What the role takes on and what it avoids

The chief innovation officer's role is consistent with the logic of the orchestrating unit: they build capability and leave ownership of ideas with those who originated them. Table 6.2 sets out the main domains of the role, what the officer takes on in each, and what they would do well to avoid.

Table 6.2 Domains of the chief innovation officer's role. Prepared by the author.

Domain	What they take on	What they avoid
Strategy	Works with leadership to formulate search fields and the level of ambition, and translates them into understandable priorities	Writing the strategy alone, or copying it from another organization
Portfolio	Manages gates and staged funding, and ensures a reasoned response to every idea	Owning initiatives in place of their originators, or deciding on them unilaterally
Enablers	Provides tools, skills and protected time, and removes procedural obstacles	Becoming the organization's only source of ideas
Connection	Connects units with one another, and connects the organization with partners and beneficiaries	Competing with existing units through parallel programs
Measurement	Measures flow and impact, and learns from failure	Measuring their success by the number of events and competitions
Communication	Tells the story of what is achieved and credits it to those responsible	Attributing success to their own unit

Competencies

The OECD identified six core skills for public sector innovation that public servants need to varying degrees, and that those who lead innovation need to a greater degree: **iteration**, that is, developing solutions through rapid rounds of prototyping and testing; **data literacy**; **user centricity**; **curiosity**, that is, seeking out new ideas and different perspectives; **storytelling**, that is, explaining change through a narrative that builds support for it and links the past to the present and a possible future; and **insurgency**, that is, challenging the status quo, working with unusual partners, and treating setbacks as opportunities to learn (OECD, 2017).

The chief innovation officer's position between units adds a critically important competency: **influence without authority**. Cohen and Bradford argue that such influence rests on exchange: the person making a request understands what the other party cares about and what they can offer in return, whether resources, information, support or recognition, so that the relationship shifts from a request to a partnership (Cohen & Bradford, 2005). Those who lead innovation by instruction alone usually obtain formal compliance; exchange is more likely to generate commitment.

Winning leadership attention

The chief innovation officer also needs to place on leadership's agenda issues that were not there before. Dutton and Ashford described this phenomenon and named it **issue selling**: the efforts employees make to direct senior management's attention to issues they consider important and to shape how management understands them (Dutton & Ashford, 1993). A later study identified three sets of moves that distinguish successful attempts: **packaging** moves, such as linking the issue to the organization's goals and presenting it in the language of results and cost; **involvement** moves, such as building a coalition of supporters before the pitch; and **process** moves, such as careful preparation, choosing the right timing, and combining formal and informal

channels (Dutton et al., 2001). A good idea presented at the wrong time, or in language that does not speak to leadership, may be rejected even though it deserves acceptance.

Where to begin?

When someone is put in charge of innovation, it is tempting to start with a visible program that proves their presence: a competition, a platform or an award. It is wiser to understand before building. They can map the internal ecosystem using the tool presented in this chapter, listen to leadership, units and beneficiaries, look for successful efforts already under way, and agree with leadership on a clear mandate and defined decision rights. Then they can choose one or two initiatives that address a problem everyone acknowledges, use them to produce early evidence of value, and earn the trust on which to build what comes next.

Chapter tool: internal ecosystem map

Draw a map of the units that support innovation in your organization. For each unit, note what it offers, who actually benefits from it, its connection to people's everyday work, and its connection to the other units. Then look for three signs on the map: a unit unknown to those it is supposed to serve, two units offering the same service, and an idea that finds no clear path from one unit to another.

Chapter tool Internal ecosystem map (example from the university case)

Unit	What it offers	Who actually benefits	Connection to everyday work	Connection to other units
Business accelerator	Incubating entrepreneurial ventures	A limited number of proactive students	Weak: no link to courses	Limited
Fab Lab	Prototyping and fabrication tools	Students from some engineering colleges	Moderate	No link to the accelerator
Gifted program	Enrichment programs	Those enrolled in the program	Separate from students' majors	Limited
Colleges and courses	Formal learning	All students	They are the everyday work itself	Do not refer students to any unit
...				

Chapter Summary

- Organizational capability for innovation rests on a structure of roles, resources and relationships that holds firm when individuals move on, and so goes beyond reliance on a few of them.
- There are three models for placing innovation in the structure: centralized, distributed and hybrid. The hybrid model suits most

organizations, provided roles are clearly defined between the center and the units.

- Labs and centers set up out of imitation or in pursuit of legitimacy risk remaining inputs without outputs.
- Innovation needs enablers: time, skills, data, spaces, networks and staged funding. Time is the scarcest of these, and what matters is its meaning more than its quantity.
- Many opportunities lie in the gaps between units, and productive integration is disciplined collaboration directed toward a specific result.
- An orchestrating unit connects existing units with one another and with people, removing the need to add a new isolated entity.
- The chief innovation officer leads results achieved in units they do not head. They build capability and leave ideas to their originators, rely on influence without authority and on issue selling to leadership, and begin by understanding before building.

Key Terms

Innovation capability Innovation capability	An organization's ability to innovate repeatedly and independently of particular individuals.
Innovation lab Innovation lab	A unit dedicated to experimentation and to tackling complex problems with new methods.
Disciplined collaboration Disciplined collaboration	Collaboration between units directed toward a result whose value exceeds its cost.
Orchestrating unit Orchestrating unit	A unit that reports to senior leadership and links the components of the existing ecosystem without

	owning its initiatives.
Chief innovation officer Chief innovation officer	The person who leads the orchestrating unit and achieves results through units they do not head.
Issue selling Issue selling	Employees' efforts to direct senior management's attention to issues they consider important and to shape how management understands them.
Influence without authority Influence without authority	A person's ability to mobilize people who do not report to them, through exchange and partnership building.

Review and Discussion Questions

1. What is the difference between an organization in which an innovation initiative has succeeded and an organization that has the capability to innovate? Understanding

2. Which of the three models for organizing innovation suits your organization? What needs to be clarified to avoid its risk? Application

1. In light of the time pressure study, how can a leader protect their team's creativity without abolishing deadlines? Analysis

2. Draw your organization's internal ecosystem map, and identify the shortest path an idea can take from its originator to someone who can help. Application

3. You have been put in charge of leading innovation in your organization. What will you do in your first three months? What will you avoid? Application

4 "The solution to fragmented innovation units is to create a new unit to oversee them." Evaluate this statement. **Evaluation**

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Chapter 7

7 The innovator and their environment: people in the innovation system

Having covered strategy, the system and the architecture in the preceding chapters, we now return to the one for whom all of these are built: the person who carries the idea. We look at the characteristics and motivation of innovators, trace the path an idea travels with them, and consider what they need from their environment at each stage along the way.

Introduction

Opening case: a university student (composite case)

During her field training, a third-year student noticed that people visiting one agency waited for hours to complete a procedure that could easily be shortened, and she pictured a simple fix. She took the idea to the professor of one of her courses, who praised it and then reminded her that the final exam covered chapters one through ten. She went to the university's business accelerator, where she was asked for a full business plan she did not know how to write. She then logged the idea on the ideas platform and received an

> automated acknowledgment; nothing came after it. Two semesters later, she had forgotten the idea. No one rejected it, and no one accepted it.

The student noticed the problem, imagined the solution and knocked on three doors. Where, then, did her idea stall? And what did she need in order to take a single step forward? That is the question this chapter takes up, and we approach it from the innovator's own vantage point: who the innovator is, what they need, and how the environment and systems around them are designed.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain why well-funded innovation systems remain empty when they overlook people.

٢ Describe the characteristics of innovators without reducing them to innate talent.

٣ Trace the innovator's path from thinking to practice, and identify what the innovator needs at each stage.

٤ Distinguish between barriers to and enablers of a creative environment, and diagnose them in one's own organization.

٥ Review existing innovation systems from the perspective of the innovator's experience.

7.1 Why does innovation begin with people?

Many organizations have innovation centers, platforms and budgets, yet they do not produce innovation on a recurring basis. In our view, one of the most important reasons is that these systems were designed around procedure and

overlooked people: they specify stages, templates and criteria, and then assume that ideas will flow into them. An idea, however, is born in the mind of someone who notices, questions and connects, and who then decides to make an extra effort that no one asked of them. It is this final decision that the environment either wins or loses.

Amabile offered the most influential model for explaining this relationship, the **componential model of creativity** (Amabile, 1988, 1996). It holds that individual creativity is shaped by three components within the person, all of which are surrounded and influenced by the work environment, as Figure 7.1 shows.

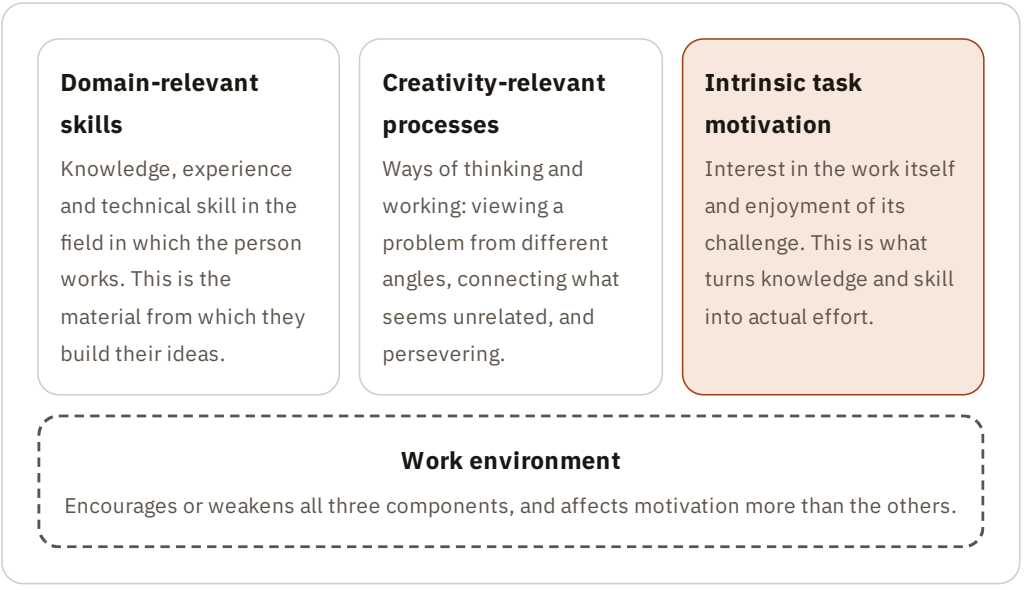


Figure 7.1 The components of individual creativity and the surrounding work environment, adapted from Amabile (1996).

For innovation management, the significance of this model lies in the third component. Skills and processes grow slowly through education and experience, whereas motivation responds quickly to what happens to a person on a given day: how their idea was received, whether they found time for it, and whether they saw any result from their effort. This is why a poor environment can extinguish in weeks what years of education have built.

Amabile and Pratt later developed the model to link individual creativity with organizational innovation, adding two elements: the **progress** a person perceives in work they consider **meaningful**. Together these feed motivation and keep it renewing itself (Amabile & Pratt, 2016).

Putting people first does not mean neglecting the system. The preceding chapters built the strategy that identifies which problems are worth working on, the system that turns ideas into value, and the architecture that connects the various units. This chapter places people at the center of all this, for the system is what connects people to problems; if either side is missing, there is nothing left for it to connect.

Innovators themselves see it this way. In a phenomenological study with ten innovative Saudi entrepreneurs, each with fifteen to twenty-five years of experience building innovative ventures, participants described a supportive community as one that begins by recognizing the innovator's distinctiveness and understanding their personal and cognitive style, and then invests in them and connects them with suitable economic environments. The study concluded that effective support invests in the innovator as a strategic human resource and goes beyond tracking their outputs (Alsamani, 2026 [Arabic]).

7.2 Who is the innovator?

A popular image casts the innovator as a rare genius born with a gift. The research does not support this image in any absolute sense. In a meta-analysis of personality studies, Feist found that creative people in the sciences and the arts tend to share certain traits, most notably openness to new experiences, autonomy, self-confidence and high motivation (Feist, 1998). These traits, however, are distributed among people along a continuum. Every organization has some people who possess them to a high degree, and a larger number who possess them to a degree sufficient to innovate if they find the right environment.

The characteristics of innovators can be grouped into three clusters, as classified in the "innovator's path" model presented in the next section:

- **Knowledge and skill:** broad knowledge and high skill in the field of interest, higher-order thinking skills, and the ability to research and gather information.
- **Self-regulation:** the ability to evaluate one's own work, focus on a long-term goal, self-confidence, self-awareness and autonomy.
- **Openness and learning:** curiosity, flexibility, openness to new experiences, and the capacity for self-directed learning.

One characteristic that deserves managers' particular attention is **creative self-efficacy**: a person's belief in their ability to produce new and useful ideas. Tierney and Farmer found that it predicts employees' creative performance and is influenced by supervisor behavior and job experience (Tierney & Farmer, 2002). This means that part of an innovator's "talent" is built or broken in their work environment: an employee whose first ideas were met with ridicule learns that they are "not creative," while a colleague who found someone to take their ideas seriously learns the opposite.

The same pattern appears in the experiences of successful innovators. In a phenomenological study conducted in 2023 with eleven prominent Saudi innovators, each with fifteen or more years of innovative work and products and ventures of wide impact, certain factors recurred in their narratives of their journeys. Nine of them regarded self-confidence as a necessity without which the path cannot be completed, and some mentioned talented friends who did not finish their projects because they lost confidence in their abilities. All participants agreed that continuous self-directed learning, driven by love of the field, was one of the reasons for their success (Alsamani, 2023).

Oldham and Cummings's research with employees at two manufacturing facilities sheds light on this question. They measured creativity through employees' suggestions, their patents and their supervisors' ratings, and found that the highest creativity emerged when three conditions came together: a

creative personality, complex and challenging work, and supportive, noncontrolling supervision (Oldham & Cummings, 1996). A creative personality, then, is a disposition that the environment either reveals or conceals.

Common misconception

"The organization needs to hire innovators." Hiring matters, but an innovator who enters an environment that rewards compliance and punishes mistakes adapts to it within months. The more useful step is for the organization to ask first: what happens today to the ideas of the people it already has?

7.3 The innovator's path

A qualitative study with teachers of gifted students concluded that creativity and innovation are related yet distinct concepts: creativity is a complex, multifaceted process of *generating ideas*, which may be individual or collective and requires knowledge of the domain; innovation is the *production* of original, useful and tangible outcomes that society values (Alsamani, 2019). The difference between the two goes beyond definition to need: what a person needs while thinking differs from what they need while turning their idea into reality.

Building on this distinction, we propose the **innovator's path** model, illustrated in Figure 7.2. The model reads an idea's journey from the perspective of the person who holds it.

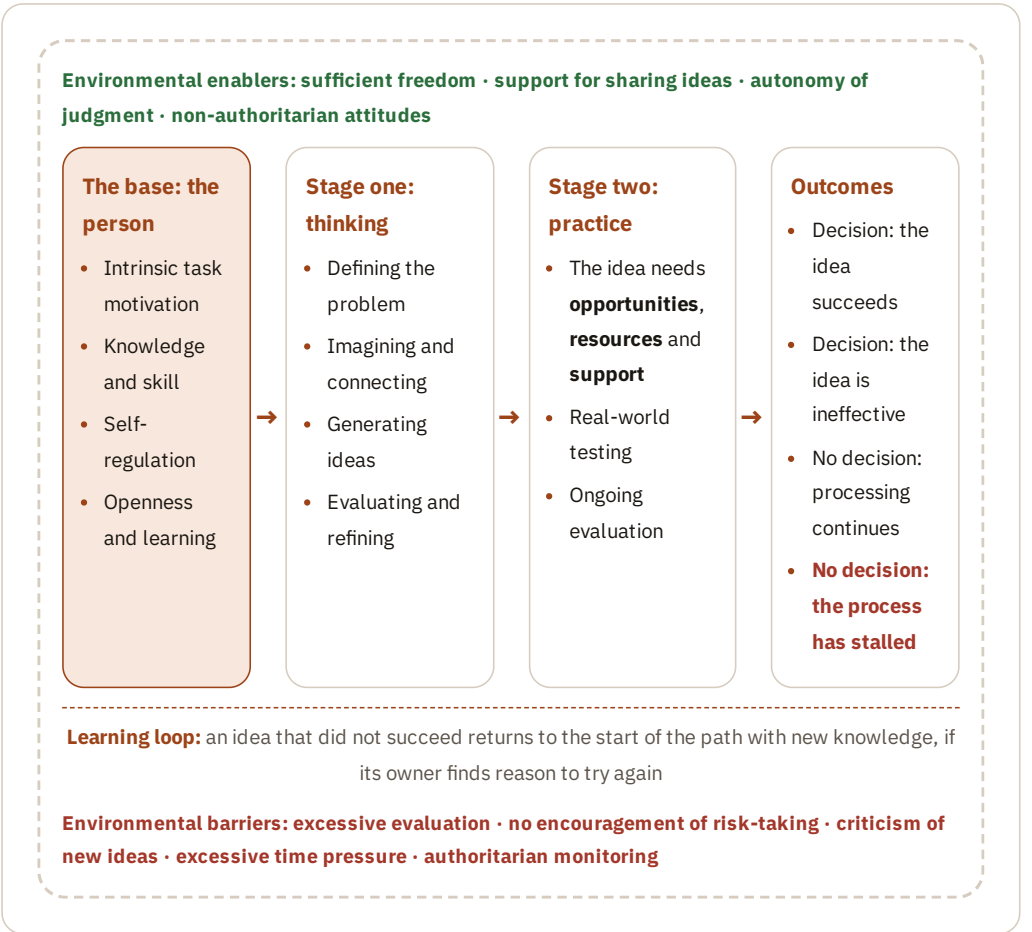


Figure 7.2 The innovator's path from thinking to practice, and the environment surrounding it. Developed by the author (first developed in 2017–2018).

The model rests on four ideas:

The first is that the person stands on motivation. Cognitive and personal characteristics do not set themselves in motion; intrinsic motivation is what turns them into actual effort. This is why it is placed as the foundation on which the entire path rests.

The second is that the path consists of two different stages. In the thinking stage, a person needs freedom to explore, time to reflect, and as little premature judgment as possible. In the practice stage, the need changes: the idea now requires an *opportunity* to be tried in a real setting, enough *resources*

to test it, and *support* from people who hold the authority or the expertise. Many organizations do one of the two stages well and neglect the other: competitions and hackathons celebrate thinking and then leave the winners with no route to practice. This is consistent with Baer's finding that creative ideas get implemented when their originators have both the motivation to implement them and a network of relationships to help them do so (Baer, 2012). The finding also matches what the Saudi innovators in the study cited above described: they all agreed on the importance of interacting with peers, and eight of them saw their network of relationships as a route to opportunities. Eight of them likewise held that turning the innovation into a source of income early on is a condition for persisting, and one recounted how a talented friend, forced into a job far from his passion, lost interest in his project (Alsamani, 2023). In the practice stage, then, resources do more than allow the idea to be tried; they determine whether the innovator will stay on the path.

The third is that the path has four possible outcomes. Besides the idea succeeding or proving ineffective, the path may remain without a decision. This outcome comes in two forms: continued processing, in which the person needs time to reflect, which is healthy; and a stalled process that no one has resolved, which Chapter 5 called *decision limbo*. The latter is the most damaging to motivation, because a reasoned rejection teaches its recipient something, whereas silence teaches them not to try again. This is what happened to the student in the opening case.

The fourth is that the environment surrounds the entire path. Enablers and barriers affect every step along it. Section 7.5 addresses them in detail.

The learning loop completes these ideas: an idea that has proven ineffective becomes a new starting point if its owner comes away with new knowledge and a desire to try again. That desire depends to a large extent on how the organization treated the failure.

7.4 What innovators need

If motivation is the foundation of the path, the practical question is what nourishes it. Self-determination theory answers that intrinsic motivation grows when three psychological needs are satisfied: autonomy, competence and relatedness (Gagné & Deci, 2005). We translate these general needs into specific needs that innovators experience within the organization, summarized in Table 7.1.

Table 7.1 What innovators need and what the organization does to meet those needs

Need	What it looks like when met	What the organization does	Discussed in
Recognition of the idea	The idea's owner feels it was read and understood, and receives credit for it	A reasoned response within an announced time frame, and keeping the owner's name attached to the idea at every stage	Ch. 5, Ch. 8, Ch. 10
Opportunity	Finds a route to a real problem, and to someone who can try out the solution	Opening problems up to people, and reducing the steps between the idea's owner and those who can help	Ch. 6, Ch. 11
Deferred criticism	The idea is explored before it is judged	Separating idea-generation sessions from evaluation sessions, and judging each stage by its own criteria	Ch. 12
Autonomy within boundaries	Knows the problem and the goal, and owns the way to solve it	Defining the “what” and the “why” clearly, and leaving the “how” to people	Ch. 3, Ch. 4

Need	What it looks like when met	What the organization does	Discussed in
Resources and support	Finds enough to test the idea, and a sponsor who champions it	Staged funding, protected time, prototyping tools and executive sponsorship	Ch. 6, Ch. 10, Ch. 14
Understanding and fit	Finds a system that suits their way of thinking and makes room for differences among people	Flexible entry routes: a conversation, a prototype or a written proposal	Ch. 5, Ch. 8
Meaningful progress	Sees their idea moving, and sees its effect on a problem they care about	Making the idea's status visible, and celebrating interim steps alongside final results	Ch. 8, Ch. 15, Ch. 16

Two of these needs deserve a closer look. The first is **deferred criticism**. As early as the middle of the last century, Osborn called for separating the generation of ideas from judging them (Osborn, 1953). Amabile's research explains why this separation matters: expecting evaluation while working weakens intrinsic motivation and pushes people toward safe, familiar solutions (Amabile, 1996). Deferring criticism means putting it in its proper place along the path: an idea needs rigorous evaluation, but only after it has been given a chance to take shape.

The second is **autonomy within boundaries**, the concept that ties the chapters of this book together. Innovators do not need absolute freedom; indeed, boundless freedom can scatter their efforts. What they need is a clear problem and an understood goal, and then to be left to choose the route (Amabile, 1998). Leadership that specifies the “how” in detail deprives them of autonomy, and leadership that fails to specify the “what” deprives them of direction.

In Practice

Take the last five ideas put forward by people on your team and ask yourself about each one: Does its owner know what happened to it? Were they told the reasons for the decision? Is their name still attached to it? Your answers reveal what your team has learned about whether thinking is worth the effort.

7.5 The environment: barriers and enablers

If motivation is the component of creativity most quickly affected by the environment, the next question is what in the environment raises or lowers it. Amabile and her colleagues developed an instrument for assessing the work environment for creativity and used it to compare projects rated as high and low in creativity within the same organizations. They found that the high-creativity projects were distinguished by encouragement at the level of the organization, the supervisor and the work group, by freedom in how the work was done, by challenge, and by sufficient resources. The low-creativity projects were marked by organizational impediments, such as internal conflict, conservatism and rigid formal structures, and by excessive workload pressure (Amabile et al., 1996).

These findings intersect with the environmental arc in the innovator's path model, as Figure 7.3 shows.

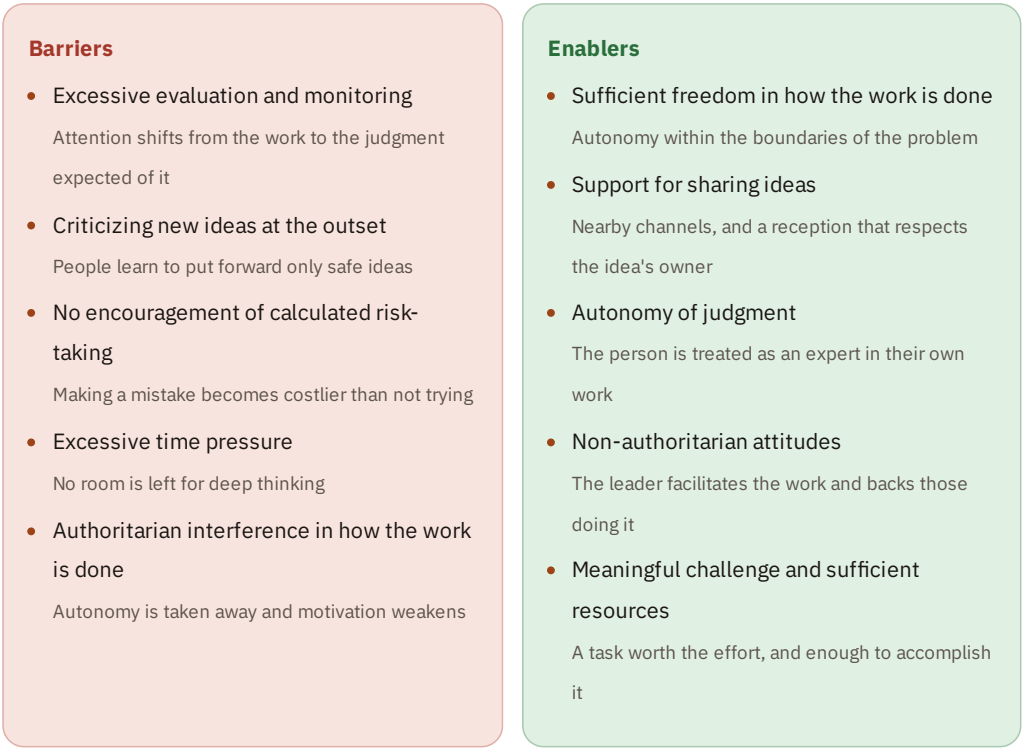


Figure 7.3 Barriers to and enablers of a creative environment. Developed by the author, drawing on Amabile et al. (1996).

Three things stand out in the figure. First, most barriers are small everyday practices: a sarcastic remark in a meeting, a weekly progress report that no one reads, or an unnecessary deadline. Second, many of them arise from good intentions: monitoring is meant to ensure quality, and early criticism is meant to save effort. Third, the enablers cost little money, but they require awareness on the part of leaders and a change in their habits. This is why many organizations spend on visible inputs, such as centers and platforms, while keeping the everyday barriers that cancel out their effect.

Chapter 8 treats culture as the wider frame for these practices: unwritten values and norms, psychological safety, and the handling of failure.

7.6 Systems with room for people

The opening case returns with one final question: if the university redesigned its system around the student rather than around its procedures, what would change? Each step in her journey can be read as an unmet need:

- **In the course:** she needed an *opportunity*. An assignment that measures memorization of information has no room for an idea. An assignment that asks students to identify a problem in their field of study and propose a solution to it, by contrast, turns the course itself into a channel for innovation and gives the professor the role of first supporter.
- **At the accelerator:** she needed *fit*. A full business plan suits someone who has reached the practice stage; someone still in the thinking stage needs a conversation, guidance and a small next step.
- **On the platform:** she needed *recognition*. A reasoned response within an announced time frame, even a polite decline, would have kept her on the path, and might have brought her back to it with a better idea.

The first step on this list matters most, because it touches every student, whereas only a few of them ever knock on the accelerator's door. In a study of 373 undergraduates from several Saudi universities, faculty support in everyday teaching was associated with students' creative self-efficacy and their innovative behavior, and self-efficacy explained part of this relationship (Alsamani & Alqahtani, 2026). It follows that specialized structures, such as incubators and accelerators, and the daily work of faculty members with their students are two parts of a single system. Faculty members themselves believe that students with creative traits need, alongside thinking and problem-solving skills, to become aware of promising creative and innovative opportunities aligned with Saudi Vision 2030 (Alsamani, 2023 [Arabic]).

This reading extends beyond the university. In any organization, each stage of the innovation system can be reviewed with a single question: what does the idea's owner need here, and what do they actually find? A system that asks this

question regularly evolves around people; one that does not evolves around itself.

This question grows more important with artificial intelligence. AI tools now do much of what used to set the expert apart, including drafting the kind of business plan that stopped the student in her tracks. What remains for people is what the tool cannot do for them: noticing a problem no one asked them to notice, and caring about it enough to follow it through. These two things are precisely what the environment wins or loses.

Principle

A system built around procedure waits for ideas; a system built around people calls them forth. The difference between the two shows in what happens to one person's idea in its first week.

Chapter tool: The innovator's journey

Choose a real idea that passed through your organization in the past year, preferably one that was never completed. Sit down with its owner and trace its journey together, step by step. At each step, record the unit it dealt with, what the idea's owner needed, and what they actually found. Then identify the point at which the path stalled and the need that went unmet there. Repeat the tool with three or four ideas, and look for the point that recurs.

Chapter tool The innovator's journey (example from the opening case)

Step	Unit	What was needed	What was found	Effect on motivation
Noticing the problem	Field training site	Time and space to reflect	Available	High

Step	Unit	What was needed	What was found	Effect on motivation
First pitch	Course professor	An opportunity in the course to develop the idea	Praise without opportunity	Steady
Seeking support	Business accelerator	Guidance suited to the thinking stage	A requirement for a full business plan	Low
Formal registration	Ideas platform	A reasoned response within an announced time frame	Automated reply, then silence	Extinguished
Stalling point: decision limbo on the platform. Unmet need: recognition.				

Chapter Summary

- Innovation systems remain empty when they are designed around procedure and assume that ideas will flow into them of their own accord; an idea is born in a person who chooses to make an effort no one asked of them.
- Individual creativity is shaped by domain-relevant skills, creativity-relevant processes and intrinsic motivation. Of these, motivation is the most quickly affected by the environment.
- The characteristics of innovators are distributed among people in varying degrees, and some of them, such as creative self-efficacy, are built or broken by the work environment.
- The innovator passes through two different stages: thinking, which calls for freedom and time; and practice, which calls for opportunities, resources and support.

- The path has four possible outcomes, and the most damaging to motivation is “no decision” with the process stalled, because silence teaches the idea's owner not to try.
- Most barriers to a creative environment take the form of small everyday practices, whereas the enablers call for awareness and well-established habits more than for money.
- A professor's support in everyday teaching is associated with students' creative self-efficacy and innovative behavior, and it works together with incubators and accelerators as part of a single system.
- An innovation system is reviewed from the perspective of the idea's owner with one question at each stage: what do they need here, and what do they actually find?

Key Terms

Componential model of creativity Componential model of creativity	A model that explains individual creativity through domain-relevant skills, creativity-relevant processes and intrinsic task motivation, within the context of the work environment.
Intrinsic task motivation Intrinsic task motivation	The drive to engage in work because of the interest and challenge it holds, rather than for an external reward.
Creative self-efficacy Creative self-efficacy	A person's belief in their ability to produce new and useful ideas.
The innovator's path The innovator's path	A model that reads an idea's journey from the perspective of its owner, from thinking to practice,

	along with its possible outcomes and the surrounding environment.
Work environment for creativity Work environment for creativity	The enablers and barriers within an organization that affect employees' creativity, particularly their motivation.

Review and Discussion Questions

1. Why is intrinsic motivation the component of creativity most affected by the environment? What does this imply for managers? Understanding
2. In light of Oldham and Cummings's study, what are the limits of relying on hiring people with creative personalities to raise innovation in an organization? Analysis

1. Choose an innovation program in your organization, identify which of the two stages of the innovator's path it serves, and what it would need in order to serve the other. Application
2. Apply the innovator's journey tool to a real idea, and identify the unmet need at the stalling point. Application
3. “Deferring criticism weakens the quality of ideas because it lets weak ones through.” Evaluate this statement. Evaluation

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Chapter 8

8 Innovation culture and the enabling environment

In this chapter we approach culture as the unwritten rules that determine what people do when no one is watching: whether they put forward their ideas, whether they admit their mistakes, and whether they experiment. We examine how these rules take shape and the ways in which they change.

Introduction

Opening case: a government agency (composite case)

A government agency launched an internal campaign titled "Try, Learn, Advance," hung its posters in the corridors, and the CEO devoted his annual address to accepting failure as a path to learning. A few months later, a pilot launched by one team to simplify an online service ran into trouble, and the agency received complaints from some service users. An investigation committee was formed, and the team leader was transferred to another department. No circular was issued afterward, and none was needed; employees had understood the real rule. In the next round of the ideas competition, the number of submissions fell by half.

The posters were sincere; they expressed a genuine wish on the part of the leadership. But employees learn culture from what they witness more than from what they are told, and in a single week they learned what an entire campaign could not teach them. It is this gap between what is declared and what is practiced that we examine in this chapter, in order to see how to build a culture in which innovators find what they need.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Distinguish between the three levels of culture, and explain the gap between espoused values and actual behavior.

٢ Describe the tensions whose two sides an innovative culture needs to hold together.

٣ Distinguish psychological safety from comfort, and link it to high standards.

٤ Classify types of failure, and identify the appropriate response to each.

٥ Identify forms of recognition and motivation that nourish intrinsic motivation, and design flexible entry routes for different thinking styles.

٦ Identify the mechanisms through which culture is formed and changed, and apply them to one's own organization.

8.1 What is culture?

Organizational culture has many definitions, the most widely used being Schein's, which describes it as a pattern of shared basic assumptions that a group has learned as it solved its problems, and that has worked well enough to be taught to new members as the correct way to perceive, think and feel (Schein, 2010). Schein distinguishes three levels of culture, illustrated in Figure 8.1.

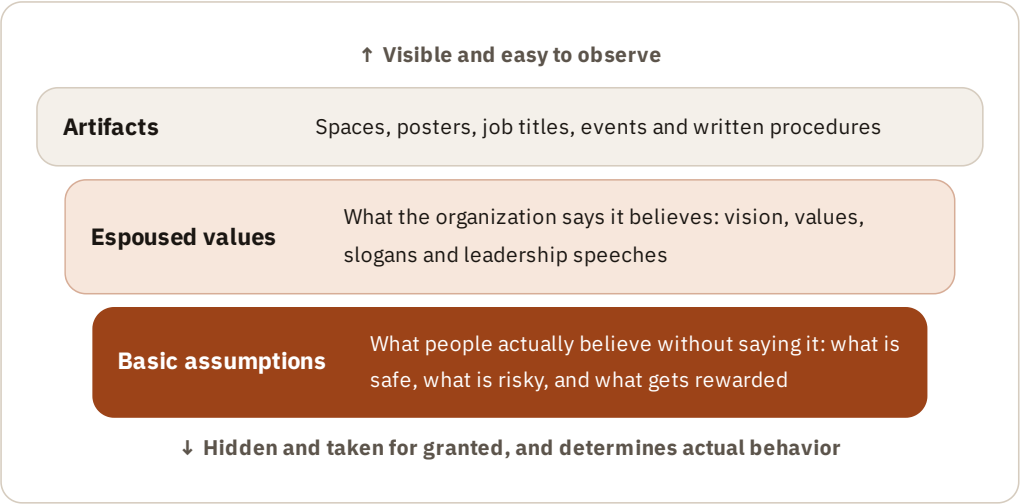


Figure 8.1 The levels of organizational culture, adapted from Schein (2010).

The value of this distinction is that the deepest level is the one that governs behavior. In the opening case, the artifacts and the espoused values changed, while the basic assumption remained as it was: mistakes are punished. When what is declared conflicts with what is assumed, people follow the assumption. This is why many "innovation culture" programs that begin with colorful spaces and slogans fail: they work on the two upper levels and leave the third untouched.

Alongside culture, the concept of **climate** is used to describe the patterns of behavior and feeling that people observe in their daily work, such as the degree of trust, openness to ideas and room for experimentation (Ekvall, 1996). Climate lies closer to the surface and is easier to measure, which makes it a useful indicator of culture; we return to it in the chapter on measurement.

8.2 The necessary tensions in an innovative culture

Innovative culture is usually described in attractive terms: tolerance of failure, freedom, collaboration and openness. Pisano argues that this description is incomplete, and that stopping at it explains why such a culture is so hard to

build. Each of these qualities needs a counterweight to balance it, or it turns into its opposite: tolerance of failure without standards becomes laxity, and freedom without discipline becomes chaos (Pisano, 2019). Table 8.1 summarizes these tensions.

Table 8.1 The necessary tensions in an innovative culture, adapted from Pisano (2019)

Desired quality	Its counterweight	What happens when the balance is missing
Tolerance of failure	No tolerance for incompetence	Avoidable mistakes are excused in the name of experimentation
Willingness to experiment	Rigorous discipline in experimentation	Many experiments that test no clear hypothesis and are not stopped when they fail
Psychological safety	Candor in critiquing work	Politeness that protects relationships and weakens ideas
Collaboration	Individual accountability	Consensus decisions whose consequences no one owns
Flat structure	Strong leadership	Endless debate, with no one to settle the direction

This analysis is consistent with the concept that ties this book together: *autonomy within boundaries*. An innovative culture is clearer than others about its boundaries, and freer within them. That is what makes it difficult: it asks leaders to be supportive and demanding at the same time.

8.3 Psychological safety and high standards

Edmondson defined **psychological safety** as a belief shared by members of a team that the team is safe for interpersonal risk-taking: asking a question, admitting a mistake, disagreeing or offering an unfinished idea without fear of

embarrassment or punishment. In her study of fifty-one work teams in a manufacturing company, she found that psychological safety was associated with team learning behavior, such as seeking feedback and discussing errors, and that learning behavior was in turn associated with team performance (Edmondson, 1999).

Psychological safety is sometimes understood as comfort, niceness or lowered expectations. Edmondson stresses that it is the opposite: it is what makes candid discussion possible. To illustrate, she places it on one axis and the standards expected of the team on another, as in Figure 8.2 (Edmondson, 2019).

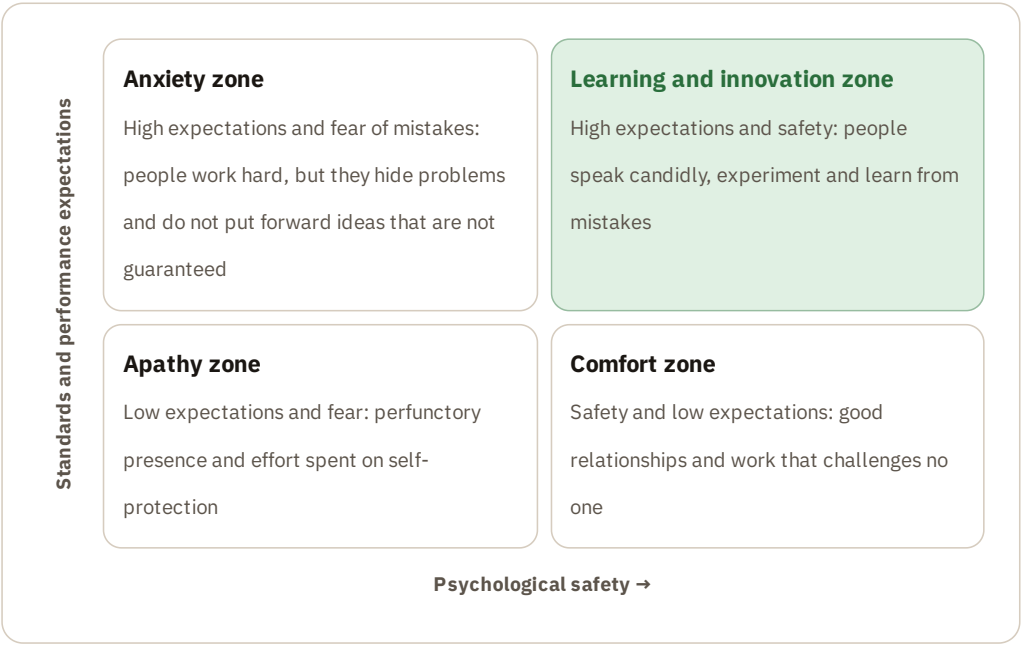


Figure 8.2 Psychological safety and standards: four zones, adapted from Edmondson (2019). The top row represents high expectations, and the right-hand column high safety.

The figure explains the point made in Chapter 3 that the environments most capable of innovation combine genuine care for people with high expectations of them. A leader who raises expectations without building safety pushes the team into the anxiety zone, where performance looks good until the hidden problems come to light. A leader who builds safety without expectations

creates a comfortable team that does not innovate. The learning zone requires both together. Psychological safety is also tied to employee voice: safety is the condition that leads people to speak up, and an open leader is the first thing they test before deciding to do so.

In Practice

In your next meeting, before offering your own view, ask: "What could make this plan fail?" Then wait. If an objection comes, thank the person who raised it before you respond. A team learns more from how you respond to the first objection than from any talk about openness.

8.4 Dealing with failure

Many organizations say they accept failure, then treat every failure the same way. Edmondson proposes distinguishing among types of failure according to their causes, because each type calls for a different response (Edmondson, 2011). Figure 8.3 illustrates this distinction.

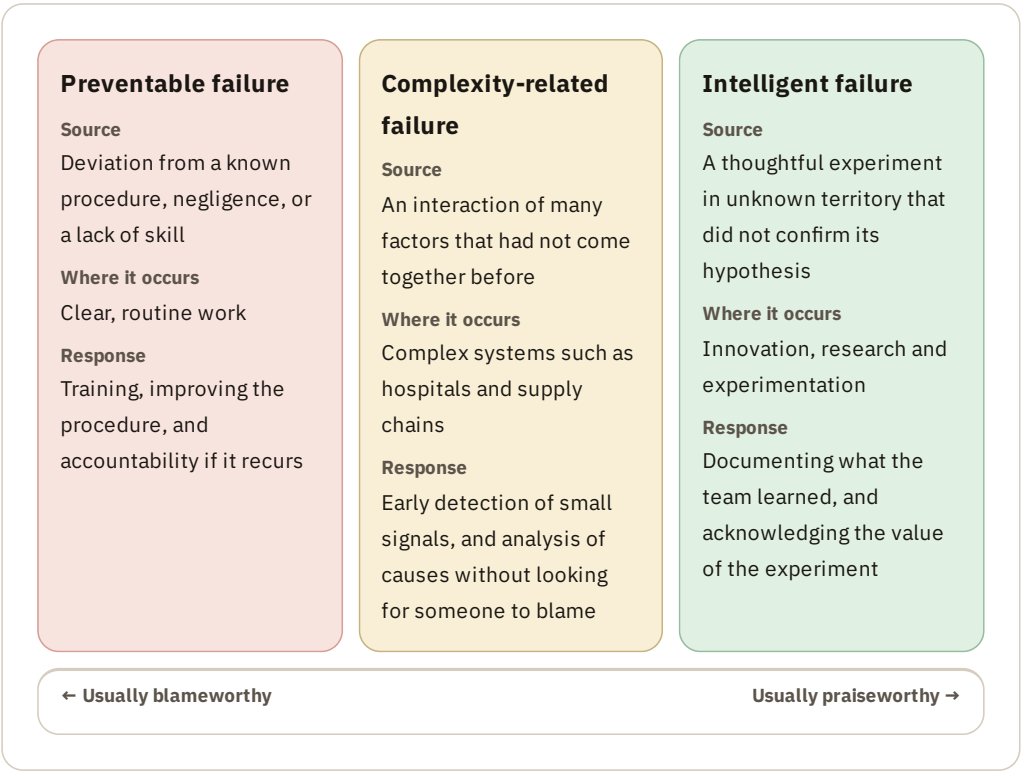


Figure 8.3 Types of failure and the appropriate response to each, adapted from Edmondson (2011).

Intelligent failure has conditions: the experiment must take place in genuinely unknown territory, serve a valuable opportunity, build on what is already known, and be small enough that its loss is bearable. An experiment that fails after meeting these conditions yields knowledge that was not available before. In the opening case, however, an experiment of the third type was treated as if it belonged to the first, and employees learned not to experiment.

Economic research supports this distinction. Azoulay and colleagues compared life scientists funded by the Howard Hughes Medical Institute, which provides long-term funding, tolerates early failure and leaves researchers free to change direction, with comparable researchers funded by a government program with short cycles and predefined goals. They found that the first group produced high-impact papers at a markedly higher rate, and also produced more papers that attracted little attention; in other words, they

experimented more and succeeded more (Azoulay et al., 2011). This is what theory predicts: incentives that tolerate early failure and reward long-term success are the best suited to motivating innovation (Manso, 2011).

This complements what Chapter 7 presented about the learning loop in the innovator's path: an idea that did not succeed returns to the start of the path with new knowledge if it is treated as an intelligent failure, and its owner's willingness to try again ends with it if it is treated as a shortcoming.

Caution

Accepting failure does not mean celebrating it. An organization that celebrates every failure confuses the three types just as an organization that punishes every failure does. The test comes down to two questions: Was the experiment well designed? And did we learn from it?

8.5 Recognition and motivation

Organizations often turn to awards and financial rewards to encourage innovation. These rewards raise a long-standing question in creativity research: do external incentives undermine the intrinsic motivation on which creativity depends? The meta-analysis by Byron and Khazanchi offers a balanced answer: rewards are positively related to creative performance when they are tied to creativity itself rather than to mere task completion, when they carry information about the quality of performance, and when they give the person some degree of choice (Byron & Khazanchi, 2012).

Three practical principles follow from this:

- **Reward what you actually want:** a prize for the number of ideas submitted produces many weak ideas. It is more useful to recognize the quality of an experiment and what the team learned from it, even if it did not succeed.

- **Make recognition informative:** explaining why a piece of work is being recognized tells its author what they did well, and tells others what the organization values.
- **Give non-material recognition its due:** crediting the idea to its owner, involving them in implementing it, and giving them the opportunity to present it to the leadership. These are among the innovator's needs set out in Table 7.1.

Yet reward, whether material or symbolic, remains only one form of motivation. An environment that meets the needs for autonomy, competence and relatedness nourishes intrinsic motivation, which is the kind most closely aligned with creativity (Gagné & Deci, 2005). Amabile and Pratt's model adds that the most powerful driver of people's working day is their sense of progress in meaningful work (Amabile & Pratt, 2016). These are things shaped by the details of daily management more than by budgets.

Recognition holds a special place for gifted and innovative people. In the phenomenological study with innovative entrepreneurs presented in Chapter 7, participants repeatedly stressed that a supportive community begins with appreciating and acknowledging talent. One of them described creative people as highly sensitive to recognition of their worth, adding that ignoring this need may drive them to withdraw or turn inward. For them, recognition extended from a kind word to smoothing the way for tasks, removing obstacles, and protecting creative people from having their energy drained by routine operational work (Alsamani, 2026 [Arabic]). This is consistent with a study of distinguished, successful innovators, which showed that working with a supportive team that handled operational matters was among the main things that freed them to focus on developing their innovations (Alsamani, 2023). Table 8.2 presents forms of motivation, most of which call for attention more than budget.

Table 8.2 Low-cost forms of motivation

Form	Need it meets	Example from the university
Acknowledgment and attribution	Recognition of worth	Naming the idea's owner at the college council or in the university newsletter, and keeping their name on the idea when it is implemented
Involvement in implementation	Meaning and belonging	Assigning the proposer to lead its pilot or to serve on the pilot team
Partnership in the work	Belonging and competence	A faculty member joining a student project as a partner and mentor, in addition to their role as assessor
Access to leadership	Recognition and influence	Presenting the idea directly to the dean or vice dean and hearing their view of it
Protected time and freedom	Autonomy	Hours set aside for the project in the schedule, and freedom to choose how to solve the problem
Meaningful challenge	Competence and meaning	Assigning a real problem facing the university instead of a hypothetical exercise
Removing obstacles	Progress	Streamlining procedures, and relief from some routine duties during the project
Documentation	Lasting recognition	Recording the participation in the student's skills transcript or in the employee's performance file

8.6 A culture with room for different thinking styles

Innovation programs tend to reward a single type of innovator: the person with a bold idea who presents it well. Kirton, however, showed that people differ in their style of creativity just as they differ in its level: some are **adaptors**, inclined to improve existing systems from within and with precision, while others are **innovators**, inclined to move beyond the existing framework and propose alternatives that differ from it (Kirton, 1976). An organization needs both styles: the first produces most of the incremental innovation on which operational efficiency depends, while the second opens up new possibilities. A culture that celebrates only one of them forfeits half its capacity.

The differences extend well beyond creative style. Some people think out loud and need dialogue, some need time alone before they share an idea, and some express an idea better through a prototype than through words. An enabling culture therefore needs **flexible entry routes** for ideas:

- A short conversation with someone who has the authority to steer the idea to its next step.
- A prototype or a practical demonstration instead of a written document.
- A written proposal for those who prefer to think on paper.
- The option of submitting the idea in the name of a team or of its owner alone, as the owner prefers.

The value of these routes depends on all of them leading into the same system and being held to the same standards. Flexibility of entry means removing barriers unrelated to the quality of the idea, while the standards remain the same.

8.7 How does culture change?

If people learn culture from what happens, then changing it runs through changing what happens. Schein identifies a set of **primary mechanisms** by which leaders embed culture, whether they intend to or not (Schein, 2010). Table 8.3 presents them, along with what people learn from each and an example from the university case we follow throughout the book.

Table 8.3 Culture-embedding mechanisms, adapted from Schein (2010)

Mechanism	What people learn from it	Example from the university
What leaders pay attention to, measure and monitor	What really matters	If periodic reports ask only about exam pass rates, that is what professors will care about
Responses to incidents and crises	What is safe and what is risky	How the first experiment was treated when a professor changed the way a course was assessed and some students objected
Allocation of resources	What the priority is	Are hours or a budget allocated for developing courses through innovative projects, or does this remain voluntary effort?
Role modeling and teaching	What behavior is expected	Leaders who take part in judging student projects and ask about them
Allocation of rewards and status	What is valued	Does supervising students' innovative projects count toward promotion and the annual evaluation?
Recruitment, selection and promotion	Who succeeds here	Is the ability to teach creativity taken into account when selecting new professors and department heads?

The table reveals why campaigns fail: they work with a single tool, rhetoric, while the six mechanisms pull in the opposite direction. The reverse route is slower and harder, but it is the only one that changes assumptions: leadership starts with one or two mechanisms that everyone can see, such as its response to the first intelligent failure, or counting the supervision of innovative projects toward promotion, and then keeps them consistent until people believe them.

Principle

Culture is what happens after the first failure, after the first objection, and after the first idea that comes from the most junior employee. These moments are more truthful than anything written about values.

Chapter tool: Revealing incidents

With your team or a group of colleagues, recall the most recent incident of each type in the following table. Describe precisely what happened, without embellishment, then write down the message people took from it. Compare these messages with the values your organization espouses; the difference between them is the distance that culture change needs to cover. Then choose one incident and decide how you will respond to a similar one next time.

Chapter tool Revealing incidents

Incident	What happened	The message people took away	The response we want
The most recent experiment that did not succeed			
The most recent objection to a leadership decision			

Incident	What happened	The message people took away	The response we want
The most recent idea from a new employee or someone at a lower job level			
The most recent mistake admitted by the person who made it			
The most recent promotion or award			

Chapter Summary

- Culture has three levels: artifacts, espoused values and basic assumptions. The last of these governs behavior and resists slogans.
- An innovative culture rests on combining balanced qualities: tolerance of failure with intolerance of incompetence, experimentation with discipline, safety with candor, and collaboration with accountability.
- Psychological safety is a condition for candid discussion, and the learning and innovation zone is reached when safety and high standards come together.
- Failure comes in types: preventable, complexity-related and intelligent. Each type has its own response, and confusing them teaches people not to experiment.
- Rewards support creativity when they are tied to creativity itself and carry information about the quality of performance. The most effective forms of motivation cost little: acknowledgment, involvement, autonomy, and a sense of progress in meaningful work.

Gifted people in particular are highly sensitive to recognition of their worth.

- An enabling culture makes room for different thinking styles, offering ideas flexible entry routes governed by a single set of standards.
- Culture changes when leaders change what they pay attention to, measure and reward, and through how they respond to revealing incidents.

Key Terms

Organizational culture Organizational culture	The shared assumptions a group has learned and passes on to its new members as the correct way to think and act.
Creative climate Creative climate	The patterns of behavior and feeling observed in daily work that encourage or hinder creativity.
Psychological safety Psychological safety	A shared belief within a team that asking questions, objecting and admitting mistakes will not bring punishment or embarrassment.
Intelligent failure Intelligent failure	An unexpected result of a small, thoughtful experiment in unknown territory that yields new knowledge.
Culture-embedding mechanisms Culture-embedding mechanisms	The practices from which people learn the actual culture, such as measurement, reward and responses to crises.

Review and Discussion Questions

1. Why do culture change programs that begin with spaces and slogans fail? Explain your answer using the three levels of culture. **Understanding**

2. Choose one tension from Table 8.1, identify which of its two sides your organization leans toward, and describe the effect of this. **Analysis**

1. Classify the three most recent failures in your organization according to Figure 8.3, and compare the response that actually occurred with the appropriate response. **Application**

2. Design a recognition system for innovation initiatives in your organization that takes into account the findings of the meta-analysis on rewards. **Application**

3. "Psychological safety makes teams lax." Evaluate this statement in light of Figure 8.2. **Evaluation**

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Chapter 9

9 Innovation teams and organization-wide participation

In this chapter we move from the individual to the group: how innovation teams are formed and organized, and what distinguishes a team that carries its idea through to implementation. We then widen the lens to broader organizational participation: how an organization can open the door to innovation for all its employees without drowning in ideas it cannot respond to.

Introduction

Opening case: A technical team (composite case)

An organization tasked a team of five outstanding engineers in its IT department with developing a solution to reduce data-entry errors in a service run by the operations unit. The team worked enthusiastically for four months, built a sophisticated automated validation system, and presented it at a closing meeting where it won the admiration of everyone in the room. Two weeks later, however, the operations staff refused to use it: it added three screens to a procedure they performed dozens of times a day, and no one had asked them during development how they actually

> worked. The problem was not the engineers' competence. It was that the entire team had come from one place and had worked within its own boundaries.

The case shows that a good team requires more than good individuals. An innovative team is designed: whom it includes, what roles its members play, how it connects with people outside it, and where it sits in the structure. These questions are the focus of this chapter. We take them up one by one before moving on to the wider participation that opens innovation to every employee.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain why innovation increasingly relies on teams, and identify what distinguishes innovative teams.

٢ Form an innovation team that is balanced in knowledge and roles.

٣ Describe a team's activities with external parties and link them to its success.

٤ Compare team structures and choose the one that fits the degree of innovation.

٥ Design broad organizational participation that the organization is able to respond to.

9.1 Why teams?

Wuchty, Jones, and Uzzi analyzed some twenty million scientific papers and two million patents spanning several decades. They found that teams have come to dominate knowledge production in nearly every field, and that work produced by teams is more likely to be highly influential than work produced by individuals (Wuchty et al., 2007). The explanation is that the problems worth

innovating on have become too complex for any single discipline to encompass, and the knowledge needed to solve them is distributed among different people.

Yet a team is not the sum of its members. A team of average performers may achieve what a team of stars cannot, if it knows how to combine its members' knowledge and reach the people it needs. Innovators need an environment, and the team is the environment closest to them; it is there that they find, or fail to find, much of what they need.

This is borne out in the experiences of innovators themselves. In a phenomenological study of the experiences of prominent Saudi innovators, nine of the eleven participants counted working with a supportive team among the reasons for their success, as when a partner took over operational tasks so that the innovator could concentrate on development (Alsamani, 2023).

9.2 What distinguishes innovative teams?

Hülsheger, Anderson, and Salgado brought together more than thirty years of research in a meta-analysis of team-level predictors of innovation. They found that factors related to processes within the team had a stronger effect than factors related to its composition (Hülsheger et al., 2009). Figure 9.1 summarizes the most prominent of these factors.



Figure 9.1 Team-level innovation factors, ranked approximately by strength of effect, adapted from Hülsheger et al. (2009). The bars are illustrative and do not represent numerical values.

This finding has a direct practical implication. Organizations invest considerable effort in selecting team members, then leave the team to work without a shared vision, without contact with beneficiaries, or without real support for experimentation. The research suggests that what happens within and around the team matters more than the list of its members' names. Note, too, that diversity helps when it is diversity of knowledge relevant to the specific problem. Another review showed that diversity cuts both ways: it broadens the knowledge available to the team, but it can also open the door to division, and the outcome depends on the team's ability to exchange and integrate information (van Knippenberg & Schippers, 2007).

9.3 Team composition and roles

Team configurations vary as widely as their tasks, but innovation teams generally need five roles to be covered; in small teams, one person may hold more than one of them:

- **Team leader:** keeps the problem and purpose clear, coordinates the work, and protects the team's time.
- **Voice of the beneficiary:** someone who lives the problem or knows those who do, and who brings the team back to it whenever it drifts away. This role's absence is what caused the team in the opening case to fail.
- **Technical expertise:** the specialized knowledge needed to build and test the solution.
- **Voice of operations:** someone who knows how the solution will be used day to day, and what will hinder its adoption once the project ends.
- **Sponsor:** a leader from outside the team with the authority to remove obstacles and secure resources, as Chapter 3 explained.

Composition is also tied to stage. While exploring the problem, the team needs wider diversity and closer proximity to beneficiaries. While developing the solution, it needs technical depth. At scale-up, it needs people with operational experience. Team composition is therefore best treated as a decision to be revisited as the initiative moves from one stage to the next.

Equally important is the way members join the team. A team whose members join by choice, out of interest in the problem, starts with a different kind of motivation from one whose members were assigned without being asked. Many organizations combine the two: leadership defines the problem and the roles required, then opens the door to anyone who wishes to volunteer. This is another application of autonomy within boundaries.

9.4 The team and its boundaries: working beyond the team

External communication was among the strongest innovation factors in the meta-analysis above. Ancona and Caldwell studied this aspect in product development teams and found that the most successful teams were not necessarily those with the most external contact, but those that carried out specific kinds of external activity, above all communicating with leadership to secure support and resources, and coordinating with the other units on which the work depended. Teams that confined themselves to gathering general information, without these two activities, performed worse (Ancona & Caldwell, 1992). Figure 9.2 illustrates these activities.



Figure 9.2 The team's activities with external parties, adapted from Ancona & Caldwell (1992).

This finding casts the opening case in a new light: the engineering team succeeded at technical scouting and presented its final result skillfully to leadership, but it never coordinated with the unit that would use the solution.

It also confirms what Chapter 7 said about the importance of a network of relationships in moving an idea into implementation (Baer, 2012). An innovative team works at its boundaries as much as within them.

In Practice

Write down the names of the people whose cooperation your team needs for its solution to be genuinely used. Then put a mark next to those you have spoken with in the past four weeks. The unmarked names are your project's biggest risks.

9.5 Team structures

Where a team sits in the structure depends on the degree of innovation required. Clark and Wheelwright distinguished four structures for development teams, graded by how fully members are dedicated to the team and how much authority its leader holds (Clark & Wheelwright, 1992). Table 9.1 presents them.

Table 9.1 Innovation team structures, adapted from Clark & Wheelwright (1992)

Structure	What it looks like	Suited to	Risk
Functional	Each member works in their own unit, and the work passes from one unit to the next in sequence	Small improvements within a single unit	Slowness, and no one who owns the whole outcome
Lightweight	A coordinator follows up the work, while members remain attached to their units	Improvements that touch more than one unit to a limited extent	A coordinator without authority, so unit priorities prevail

Structure	What it looks like	Suited to	Risk
Heavyweight	A leader with strong authority and members dedicated part- or full-time, who remain linked to their units	Significant innovation that requires integration across units	Tension between the leader and unit managers if authority is not settled
Autonomous	A dedicated team outside the usual structure, with its own rules and resources	Radical innovation, or innovation that conflicts with the existing model	Difficulty bringing the solution back into the organization once it succeeds

Organizations frequently assign lightweight teams to tasks that call for heavyweight ones: employees are asked to devise a solution that will change how three departments work, they work on it after finishing their regular duties, and they are led by a coordinator who cannot ask anything of anyone. The result is predictable. This connects with what Chapter 6 showed about time as the scarcest enabler of innovation.

9.6 Broad organizational participation

Alongside assigned teams, many organizations seek to involve all their employees in innovation through idea platforms, competitions, and internal challenges. This is the right direction: valuable ideas can come from anywhere, and the employee closest to a problem sees it before anyone else. Yet such participation often fails for a simple reason. The organization opens the door to more ideas than it can respond to, most of them end up in decision limbo, and participants learn that taking part is pointless.

A study of an open idea platform launched by a major technology company reveals another side of the problem. Bayus found that repeat contributors were better than others at offering ideas the company judged valuable, but they

seldom repeated their first success once their ideas had been implemented, tending instead to propose ideas resembling what had worked before (Bayus, 2013). A steady flow of good ideas therefore takes more than a platform; it takes a design that keeps renewing broad participation.

Successful participation tends to share four features:

- **The challenge before the platform:** time-bound campaigns that start from challenge questions set by the strategy, as Chapter 4 explained, rather than an open box for everything.
- **The response before the invitation:** before any campaign is launched, it is settled who will read the ideas, when, and how their authors will receive a reply.
- **From idea to team:** the best ideas become small teams that include their originators and receive time and resources to test them, rather than being handed to another unit to implement.
- **A network close to people:** individuals in different units who serve as innovation ambassadors. They know the system, help colleagues frame their ideas, and carry challenges from the field to the responsible unit.

At a university, this might take the form of an **annual innovation day** at which students present their projects alongside their faculty supervisors, with senior leaders attending and taking part in the judging. The value of such a day lies in meeting several needs at once at modest cost: an opportunity to present, public recognition, connections between students and the bodies that could support their projects, and a signal from leadership about what it cares about. This is close to what one participant in the innovator study cited above recounted about a business incubator he had visited: he found that one secret of its success was that it brought emerging innovators together with innovators who had succeeded within the past three years, because they were closer to the obstacles the newcomers would face (Alsamani, 2023).

Principle

Broad participation is a promise to people that their ideas will be heard. The organization's capacity to keep that promise is what should determine how much participation it asks for.

Chapter tool: Team composition card

Use this card when forming a new innovation team, then revisit it as the initiative moves from one stage to the next. Answer each question with specific names and actual facts. A blank answer points to a gap in the team itself.

Chapter tool Team composition card

Dimension	Question	Answer
Problem and purpose	What is the problem? For whom? How will we know we have succeeded? Does every member state it in roughly the same words?	
Roles	Who is the leader? Who is the voice of the beneficiary? Who provides technical expertise? Who is the voice of operations? Who is the sponsor?	
Diversity	What knowledge does the problem require that the team lacks?	
Time	How many hours a week does each member actually devote? And which of their managers has agreed to this?	
Structure	Is the structure (functional, lightweight, heavyweight, autonomous) suited to the degree of innovation required?	
Boundaries	Which units do we depend on? And when do we communicate with the sponsor?	

Dimension	Question	Answer
Mode of joining	Did members join by choice, or were they assigned? Do they know why they were chosen?	

Chapter Summary

- Teams have become the predominant source of knowledge production and innovation, because problems require knowledge distributed among different people.
- What happens within and around the team, such as a shared vision, support for innovation, and external communication, affects innovation more than the team's composition does.
- Useful diversity is diversity of knowledge relevant to the problem, and its payoff depends on the team's ability to integrate that knowledge.
- Innovation teams need five roles: the leader, the voice of the beneficiary, technical expertise, the voice of operations, and the sponsor.
- The most successful teams work at their boundaries: they communicate with leadership and coordinate with the units they depend on.
- A team's structure is chosen according to the degree of innovation; assigning a lightweight team to a task that needs a heavyweight one is among the most common causes of failure.
- Broad participation is a promise of response, and so it should be designed to match the organization's capacity to keep that promise.

Key Terms

Boundary-spanning activities Boundary-spanning activities	A team's activities with external parties: communicating with leadership, coordinating with other units, and gathering knowledge.
Heavyweight team Heavyweight team	A team with a leader of strong authority and dedicated members, suited to innovation that requires integration across units.
Job-relevant diversity Job-relevant diversity	Differences in disciplines and experience relevant to the problem among team members.
Innovation campaign Innovation campaign	A time-bound call for ideas on a specific challenge question, with an announced mechanism for responding.
Innovation ambassador network Innovation ambassador network	People in different units who help their colleagues frame their ideas and connect the field with the innovation system.

Review and Discussion Questions

1. Why do process factors within a team have a stronger effect on innovation than composition factors? Understanding
2. Analyze the team in the opening case using the five roles and the three boundary-spanning activities, and identify what would have changed the outcome. Analysis
1. Choose an innovation initiative in your organization, identify its team's current structure, and judge whether it suits the degree of innovation

required. Application

2 Design an innovation campaign for a single challenge question in your organization, specifying the response mechanism before launch. Application

3 "The more ideas submitted to an innovation platform, the stronger the evidence of its success." Evaluate this statement. Evaluation

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Chapter 10

10 Governance and portfolio management

In this chapter we address how innovation decisions are made: to whom each category of decision belongs, how the gates between stages are designed, how idea owners are treated fairly when the outcome is not what they hoped for, and why initiatives that should have been stopped keep going. We then turn to how initiatives are managed together as a balanced portfolio.

Introduction

Opening case: An innovation committee (composite case)

The innovation committee of one organization meets once every two months and is made up of eight senior managers. Each meeting's agenda carries between fifteen and twenty initiatives, with ten minutes allotted to each. An initiative is presented, a few general questions are asked, and the team is asked for "further study." Two years on, the portfolio held forty-two active initiatives; not one had been stopped, and not one had been scaled. Every team was working with a quarter of the resources it needed, waiting for the next meeting.

The committee was neither lenient nor strict; it was absent from the decision while present at the meeting. It never defined what it would decide itself and what it would leave to the teams, it never asked for different evidence at each stage, and it never stopped what needed stopping so as to free up resources for others. Closing these gaps is what the governance we set out in this chapter is built to do.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain how innovation governance differs from the governance of stable operations.

٢ Allocate decision rights between governance levels and teams.

٣ Design gates whose criteria progress from assumptions to evidence.

٤ Apply the principles of procedural justice in dealing with idea owners.

٥ Explain escalation of commitment, and set kill criteria in advance.

٦ Manage initiatives as a balanced portfolio funded in stages.

10.1 Governance for uncertainty

Most governance tools in organizations were designed for stable work: an annual plan, a budget approved in advance, fixed performance indicators, and accountability for deviations from the plan. These tools work well when the path is known. In innovation, however, the path itself is unknown, and departing from the original plan may be evidence of learning. Innovation governance therefore fails in two directions: when the tools of stable work are applied to innovation, they stifle it; when innovation is exempted from governance altogether, it consumes resources without results.

Governance suited to innovation rests on a simple idea: investing in an initiative buys *learning* that reduces uncertainty, and every subsequent decision builds on what the team has learned. An initiative is not asked at the outset for what it cannot yet have, nor is it allowed at the end to continue without what it must have. This is what the following sections build.

10.2 Decision rights

Much governance confusion stems from ambiguous decision rights. Who decides whether an initiative continues? Who decides how it is carried out? Who decides how resources are allocated across initiatives? When these questions go unanswered, all decisions drift upward, and senior committees become crowded with details they lack the knowledge to judge, as in the opening case. Figure 10.1 proposes a distribution of decision rights across three levels that applies the principle of autonomy within boundaries: leadership determines the "what" and the "why," and teams own the "how."

Level	Decides	Does not decide
Senior leadership Board or steering committee, two or three times a year	Search fields and challenge questions, total investment, portfolio balance, and the big bets	The details of individual initiatives and how they are carried out
Portfolio committee Monthly or at gates	Gate decisions: continue, modify, merge, suspend, or stop, and funding for the next stage	How the team works within a stage
The team and its sponsor Continuously	Designing experiments, ways of working, and use of the approved stage resources	Exceeding the stage's limits or resources without returning to the gate

Figure 10.1 The distribution of decision rights in innovation governance. Prepared by the author.

In this distribution, senior leadership's role remains the most far-reaching even though it makes fewer decisions: it determines where the organization searches, how much risk it takes, and how it balances the near term against the long term. These decisions are often neglected because they are harder than reviewing individual initiatives. The international standard for innovation management systems assigns top management responsibility for setting innovation policy and strategy, providing resources, and defining roles and authorities (ISO, 2024), which is consistent with this distribution.

Decision rights are best written down and announced, so that the team knows what it can decide on its own without waiting, and when it must return to the gate. Putting them in writing protects both sides: it shields the team from interference in the details of its work, and it shields the organization from initiatives expanding without a decision.

10.3 Gates: from assumptions to evidence

Among the most widespread tools of innovation governance is the **Stage-Gate** system developed by Cooper. The system divides an initiative's journey into stages separated by gates, at which a decision is made to continue, stop, suspend, or recycle the work according to criteria set in advance (Cooper, 1990). The value of a gate is that it turns a decision from a general impression into a specific question: has the initiative generated enough knowledge to merit investment in the next stage?

The most important principle in gate design is that **the criteria change from one stage to the next**. At the early gates, it is enough that the problem matters and the assumptions are stated. With each gate, stronger evidence is required, until the initiative reaches the scaling gate with evidence of adoption, cost, and sustainability. Table 3.1 set out the leader's question and the type of evidence at each stage, and Figure 10.2 illustrates the logic of this progression.

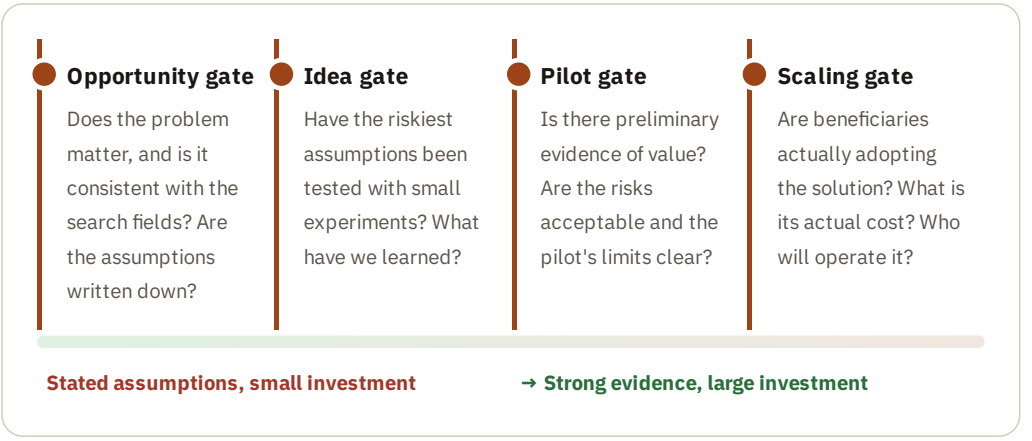


Figure 10.2 Gate criteria progressing from assumptions to evidence, with investment increasing alongside them. Prepared by the author, drawing on Cooper (1990).

The Stage-Gate system has been criticized for becoming slow and bureaucratic, and for fitting poorly with highly novel initiatives in which the understanding of the problem itself shifts as the work proceeds. Cooper responded to this criticism with hybrid models that combine gates with agile ways of working: shorter stages, lighter gates for small initiatives, and short build-and-test cycles within each stage (Cooper, 2014). The lesson is that a gate is first and foremost a tool for learning and decision making, and that its depth should match the size of the risk: a small, low-cost experiment does not need the same gate as rolling out a solution across the entire organization, as Chapter 3 cautioned.

Caution

A gate that always ends in approval is not a gate. If no initiative has been stopped at a gate over a full year, then either the organization chooses its ideas with rare brilliance, or the gates are not working.

10.4 Procedural justice

Chapter 5 presented three ways to prevent decision limbo: an announced response time, a reasoned response, and periodic review. One question remains: why does a reasoned response matter so much to the idea owner, even when it is a rejection? Research on **procedural justice** provides the answer. Kim and Mauborgne showed that people accept decisions that do not go their way, and continue to cooperate, if they see the process by which those decisions were made as fair. This fairness rests on three principles: *engagement*, giving those concerned the opportunity to present their views and ideas; *explanation*, setting out the reasons for the decision; and *expectation clarity*, making known what will be required next and the criteria by which it will be judged (Kim & Mauborgne, 1997).

In innovation governance, these principles translate into specific practices:

- **Criteria announced before evaluation:** idea owners know in advance on what basis they will be evaluated, so they are not surprised by a criterion that was never mentioned.
- **An opportunity to present in person:** at major gates, the team presents its initiative itself and answers questions, rather than having it discussed in its absence.
- **A response with four elements:** what was decided, why, what would have changed the decision, and what next step is open to the idea owner.
- **Attributing the idea to its owner:** the idea owner's name stays attached to the idea through every stage, and they are involved in implementing it if they wish, rather than having it handed to another unit that carries it out without them.

In this way, governance itself becomes a means of meeting the innovator's needs set out in Chapter 7, particularly recognition and understanding. An organization that rejects an idea fairly keeps its owner; one that accepts an idea without crediting its owner may lose them.

10.5 Why don't initiatives stop?

Innovation portfolios suffer from a problem that is the reverse of decision limbo: initiatives that continue even though the evidence does not support them. Staw studied this phenomenon, which he called **escalation of commitment**. In his experiment, participants who were personally responsible for a failing investment decision allocated more additional funds to it than did those who were not responsible for it (Staw, 1976). People tend to persist with a decision they have made in order to justify their original choice, even when new evidence points the other way.

In innovation governance, escalation takes familiar forms: an initiative sponsored by a senior leader, which no one dares propose stopping; an initiative on which a great deal has been spent, prompting the refrain "we can't stop now"; and an initiative run by an enthusiastic team that, it is feared, would be demoralized by a stop. Three practices curb this escalation:

- **Kill criteria set in advance:** at the start of each stage, the results that would stop the initiative, whether achieved or missed, are defined before anyone becomes attached to it.
- **Separating the decision from its original owner:** parties other than the sponsor who championed the initiative take part in the decision to continue.
- **Honoring a good stop:** a team that stopped its initiative at the right time and documented what it learned has done good work, and is treated accordingly. This is a direct application of the concept of intelligent failure from Chapter 8.

This explains the opening case: a committee that stops nothing spreads innovation resources across more initiatives than it can fund, and so weakens them all.

10.6 Portfolio management

If gates govern the individual initiative, portfolio management governs initiatives collectively. In their study of company practices, Cooper, Edgett, and Kleinschmidt found that portfolio management pursues three goals: maximizing total value, balancing types of initiatives, and aligning with strategy. They also found that one of the most common problems is having more initiatives than resources allow, so that all of them are delayed (Cooper et al., 2001). Figure 10.3 illustrates these goals.

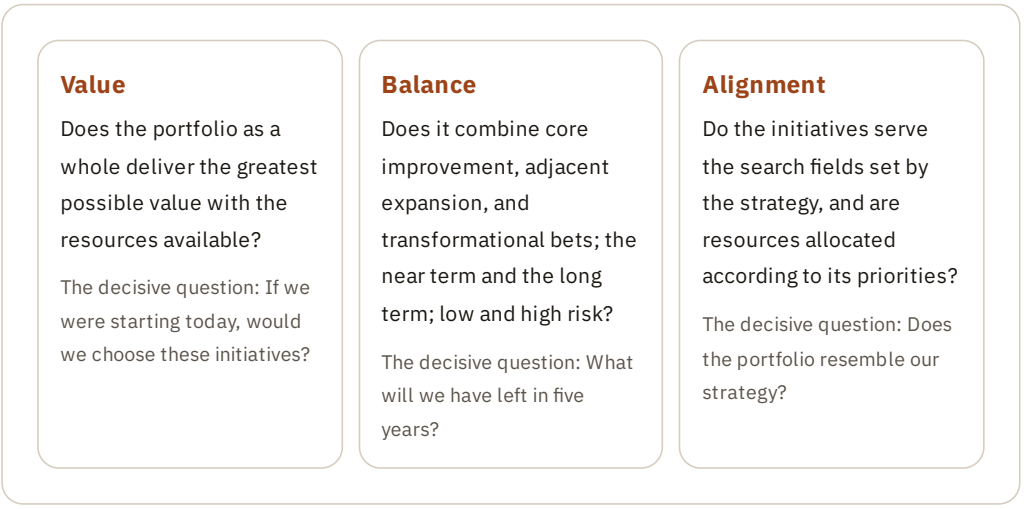


Figure 10.3 The goals of innovation portfolio management, adapted from Cooper et al. (2001).

Balance is tied to the degrees of innovation presented in Chapter 1: incremental, adjacent, and radical. Nagji and Tuff propose that resources be distributed among them in proportions suited to the nature of the organization (Nagji & Tuff, 2012). The right proportion varies from one organization to another, but a portfolio that lacks any one of the three types calls for an explicit question about why.

One of the most important tools of portfolio management is **staged funding**. Rather than approving an initiative's full budget at the outset, it is funded stage by stage, with each stage's funding tied to passing its gate. Gompers showed that venture capital firms rely on this approach because it preserves their

ability to review and stop, and that they shorten the interval between funding rounds as uncertainty increases (Gompers, 1995). The logic of **real options** explains why: a small investment at an early stage is like buying an option that allows the organization to invest more if the opportunity materializes, or to stop with a limited loss if it does not (McGrath, 1999). By this logic, early failure becomes a reasonable price for knowledge that cannot be gained without experimentation.

The portfolio concept extends beyond the initiatives within a single unit. In organizations with multiple innovation units, such as the university described in Chapter 6 with its accelerator, its digital fabrication lab (Fab Lab), and its centers, each unit manages its own portfolio in isolation, so initiatives are duplicated and ideas get lost in the gaps between units. The alternative is a shared portfolio: a single entry point for ideas, shared gates, and the movement of an initiative from one unit to another according to its stage. We return to this design in Chapter 20.

In Practice

List all the active initiatives in your organization, then ask of each: If it were presented to us today for the first time, knowing what we know now, would we start it? The initiatives for which the answer is “no” are candidates for stopping, and their resources are candidates for initiatives that deserve them more.

Chapter tool: The gate charter

For each gate in your system, write a short charter that answers the following questions, and share it with teams before the stage begins. If you cannot answer one of the questions, that is a governance gap that should be closed before the stage begins.

Chapter tool The gate charter (example: the pilot gate)

Item	Question	Example
Gate question	What do we need to know in order to invest in the next stage?	Is there preliminary evidence that the solution addresses the problem for beneficiaries?
Evidence required	What exactly does the team submit?	The results of at least two small experiments, and what the team learned from them
Decision owner	Who decides? Who is consulted?	The portfolio committee, after hearing from the team and the sponsor
Response time	When is the decision issued once the submission is complete?	Within two weeks
Possible decisions	What options are available?	Continue, modify, merge, suspend, or stop
Kill criteria	What stops the initiative? (Defined at the start of the stage)	More than half of the beneficiaries in the pilot do not use the solution
Funding for the next stage	What resources does passing the gate unlock?	The pilot budget and the time of two dedicated members
Informing the team	How is the decision communicated?	A written response containing the four elements, and a discussion with the team

Chapter Summary

- Innovation governance differs from the governance of stable work: investment buys learning that reduces uncertainty, and every decision builds on what the team has learned.
- Decision rights are distributed across three levels: senior leadership for direction and balance, the portfolio committee for gates, and the team for ways of working.
- Gate criteria progress from assumptions to evidence, and their depth is proportionate to the size of the risk.
- People accept decisions that go against their interests when they are confident the process is fair: through engagement, explanation, and clear expectations.
- Escalation of commitment keeps alive initiatives that should have been stopped; it is curbed by setting kill criteria in advance, separating the decision from its original owner, and honoring a good stop.
- Portfolio management seeks value, balance, and alignment, and avoids piling up initiatives on limited resources.
- Staged funding preserves the ability to review, and makes early failure a limited price for knowledge.

Key Terms

Decision rights Decision rights	A specification of who has the authority to make each type of innovation decision.
Stage-Gate Stage-Gate	A system that divides an initiative's journey into stages separated by decision points with criteria set in advance.
Procedural justice Procedural justice	The fairness of the way a decision is made, based on engagement, explanation, and expectation clarity.
Escalation of commitment Escalation of commitment	Continuing to invest in a failing course of action in order to justify the original decision.
Staged funding Staged funding	Funding an initiative stage by stage, with each tranche tied to passing a gate.
Real options Real options	A logic that views a small early investment as a right to expand later or to stop with a limited loss.

Review and Discussion Questions

1. Why do governance tools designed for stable work fail when applied to innovation? Understanding
2. Analyze the committee in the opening case using the concepts of decision rights, gates, and escalation of commitment, and propose three changes. Analysis

1. Write a charter for one gate in your organization's innovation system, including kill criteria. **Application**

2. Write a response to the owner of an idea that was not accepted, including the four elements of a fair response. **Application**

3. "Stopping an initiative after a great deal has been spent on it is a waste of public money." Evaluate this statement in light of the logic of real options. **Evaluation**

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Part Three

The initiative journey

The path from signal to implemented solution, step by step.

Chapter 11: Understanding problems and opportunities

Chapter 12: Developing innovative solutions

Chapter 13: Business model and value innovation

Chapter 14: Experimentation and risk reduction

Chapter 15: Adoption and scaling

Chapter 11

11 Understanding problems and opportunities

With this chapter we begin the initiative journey at its proper starting point: the problem, which comes before the idea. We trace the sources of opportunity, ways of understanding a problem from the perspective of those who live it, and methods for framing and reframing it, and then the criteria for selecting, from among many problems, those worth investing in.

Introduction

Opening case: A government service (composite case)

A government agency was receiving repeated complaints about how long one of its services took to complete. It formed a team to improve the service, and the team started from an assumption that seemed self-evident: the problem lay in the slowness of the online system. Eight months and considerable expense later, a much faster system was launched, and the complaints did not decline. When a new team member sat down with a number of service users and traced their journey step by step, he discovered that most of the delay had nothing to do with the system: a third of all

> applications were being returned because applicants did not know which documents were required, and they found out only days after applying. The solution that ended most of the complaints was a clear checklist of documents displayed before an application began.

The team had not been negligent; it had efficiently solved the problem it had defined. But it had solved the wrong problem. The subject of this chapter is the step that should have preceded its work and was overlooked: understanding the problem before seeking a solution.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain why finding and formulating a problem is creative work that determines the quality of the solution.

٢ Identify internal and external sources of opportunity, and recognize lead users.

٣ Use observation, interviews, and journey mapping to understand a problem from the perspective of those who live it.

٤ Formulate and reframe a problem in ways that open up new solutions.

٥ Prioritize problems by their importance and by current satisfaction with existing solutions.

11.1 Why does the journey begin with the problem?

Chapter 1 corrected a common belief that innovation begins with ideas, showing that the more accurate starting point is a need, problem, or opportunity, with the idea coming afterward as a hypothesis for a solution. The opening case shows the price of ignoring this: the team began with a solution idea, invested in it, and revisited the problem only after the solution had failed.

This case has many parallels. In a survey of 106 senior executives in 91 public and private organizations across 17 countries, 85 percent said their organizations were poor at diagnosing problems, and 87 percent said this weakness carried significant costs (Wedell-Wedellsborg, 2017). Organizations tend to jump to solutions because a solution feels like productive work, whereas pausing over the problem feels like delay.

Problem finding has a creative dimension that many overlook. In a classic study, Getzels and Csikszentmihalyi followed art students who were asked to produce a drawing from a set of available objects. Students who spent more time exploring and selecting the objects, and who changed their conception as they worked, produced drawings that judges rated as more original, and seven years later they were more successful in their artistic careers (Getzels & Csikszentmihalyi, 1976). How they engaged with the problem before solving it was part of the creativity itself. This is why the innovator's path model, presented in Chapter 7, begins its thinking phase by defining the problem before generating ideas.

11.2 Sources of opportunity

Drucker held that systematic innovation rests on an organized search for changes that create opportunities. He identified seven sources of such opportunities, four within the organization or its industry and three in the wider environment (Drucker, 1985), as Figure 11.1 shows.

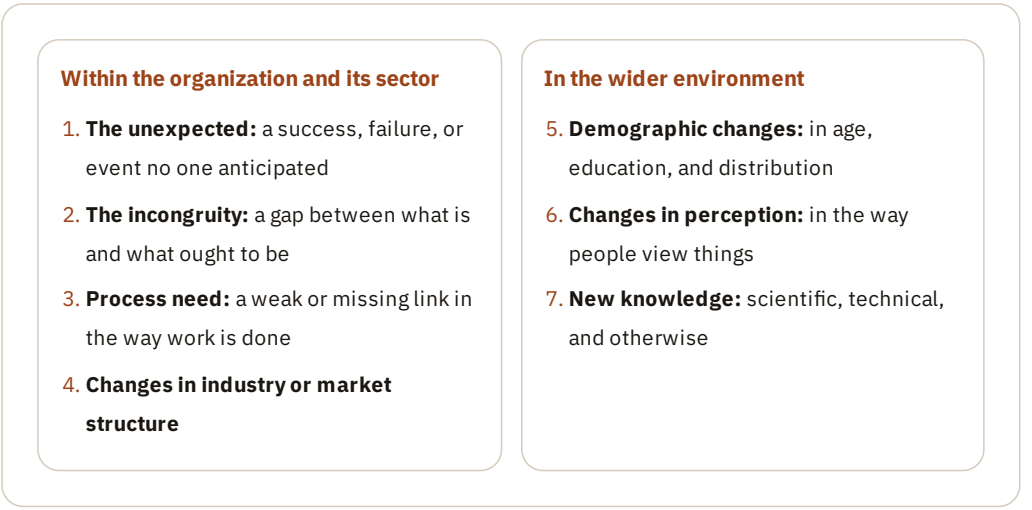


Figure 11.1 The seven sources of innovative opportunity, adapted from Drucker (1985).

Drucker observes that the first sources are closer at hand and less risky, while new knowledge, for all its appeal, has the longest road to application and the highest risk. This matters for organizations that equate innovation with new technology; many of the nearest opportunities lie in complaints, recurring errors, procedures that people bypass, and unexpected results whose causes no one has asked about. Chapter 4 linked the wider environment to foresight and the external realities scanning matrix; this chapter focuses on the nearer sources.

One source deserves particular attention: **lead users**. Von Hippel defined them as people who face a need months or years before most others do, and who expect to benefit significantly from meeting it, so they often innovate solutions for themselves before any provider offers one (von Hippel, 1986). Every organization has lead users: an employee who has built a spreadsheet to shortcut a repetitive task, or a service user who habitually brings a document that was not requested because they know it will be asked for later.

The people closest to problems are those who work with them every day. For example, the student in Chapter 7's opening case noticed a real problem during her field placement that people who had worked at the organization for

years had not. Field placements, applied projects in courses, and work with external organizations are all sources of problems that a university can turn into a structured entry point to its innovation system.

11.3 Understanding the person who has the problem

If a problem lives in a person's experience, understanding it requires getting close to that experience. This principle is the foundation of **design thinking**, which begins with a deep understanding of people's lives and needs before moving on to generate solutions (Brown, 2008). Liedtka points out that the value of this approach lies less in its tools than in its capacity to counter well-known biases in thinking, such as the belief that others see the world as we do, settling for the first plausible explanation, and becoming attached to the first solution (Liedtka, 2018).

Understanding a problem relies on three main tools:

- **Observation:** watching what people actually do in their context, not what they say they do. People are often unable to describe what has become habitual for them, or do not see a problem in it because they have adapted to it.
- **In-depth interviews:** open questions about specific experiences, such as "Tell me about the last time...", rather than general questions or requests for opinions on a proposed solution.
- **Journey mapping:** charting the steps of a person's experience from beginning to end, how they feel at each step, and where they stumble. This is what uncovered the real problem in the opening case.

Among the most telling indicators of need are **workarounds**: the ways people devise to cope with a problem no one has solved for them. The employee who keeps a separate notebook because the system does not allow what they need, and the service user who calls a friend working at the agency to learn the

status of an application, both point to a real need that people are expending effort to meet. A need that people make no effort to work around may not be as important as it appears.

The **jobs to be done** framework offers a complementary angle. Christensen and colleagues suggest asking: What is the person trying to accomplish in a particular circumstance? People draw on a service or product to make progress in their lives (Christensen et al., 2016). What the service user in the opening case wants is to complete the transaction in a single visit without surprises, and the system's speed is only a partial means to that end. This difference in framing is what would have changed the team's entire course.

In Practice

Before your next meeting about a problem in your organization, spend one hour with someone who lives it: an employee who carries out the procedure, or a beneficiary who goes through it. Do not present a solution, and do not ask for their opinion of an idea. Ask them to show you how they work, and write down everything that surprises you.

11.4 Framing and reframing the problem

The way a problem is formulated determines which solutions can be seen. Wedell-Wedellsborg offers a well-known example: the tenants of a building complain that the elevator is slow. If the problem is framed as “the elevator is slow,” solutions turn toward speeding it up or replacing it at great cost. If it is framed as “the wait is annoying,” it may be enough to put a mirror next to the elevator; people waiting become absorbed in looking at it and no longer notice how long they wait (Wedell-Wedellsborg, 2017). This does not mean the second framing is always right; the elevator may really be slow. The point is that a

single problem admits multiple framings, and searching for them reveals solutions that were previously invisible. Figure 11.2 illustrates the reframing in the opening case.

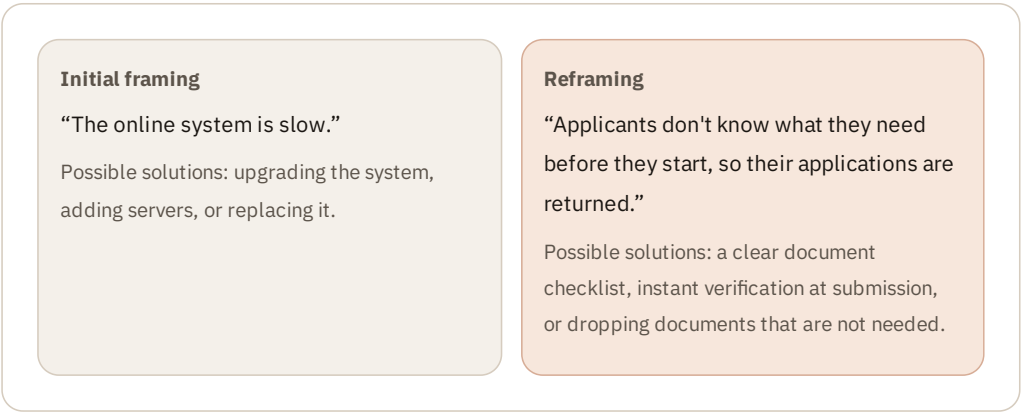


Figure 11.2 Reframing the problem in the opening case, and its effect on the possible solutions.

Simple questions can aid reframing. Are we looking at the problem from the perspective of the person who lives it, or of the one who provides the service? What happens before and after the problem? Is it a symptom of a deeper problem? Is there anyone in the same circumstances who does not suffer from it, and why? Asking "Why?" repeatedly until a root cause is reached is a useful tool here, provided it does not turn into a hunt for someone to blame.

In the public sector especially, many problems are of the kind Rittel and Webber called **wicked problems**: they cannot be given a definitive formulation, their understanding is shaped by the solutions proposed for them, there is no clear rule for knowing when they have been solved, and every attempt to solve them changes the problem itself (Rittel & Webber, 1973). With problems of this kind, framing becomes an ongoing process renewed as the work advances, and small-scale experimentation, the subject of Chapter 14, becomes a tool for understanding the problem as much as for testing the solution.

This stage ends with a clear problem statement on which the team can build. A good statement covers: Who is struggling? In what circumstances? What are they trying to accomplish? What is getting in their way? What is the evidence? It is then turned into a **challenge question** that opens the way to solutions without prescribing them, usually beginning "How might we…?", as Chapter 4 showed in moving from search fields to challenge questions.

11.5 Choosing problems worth working on

An organization discovers more problems than it can work on, so it needs a way to choose those worth investing in. Ulwick proposes a simple criterion: measure each need on two dimensions, its **importance** to the person who lives it and their **satisfaction** with the current way it is met. The biggest opportunities are important needs whose current solutions leave people dissatisfied (Ulwick, 2002). Figure 11.3 illustrates this logic.

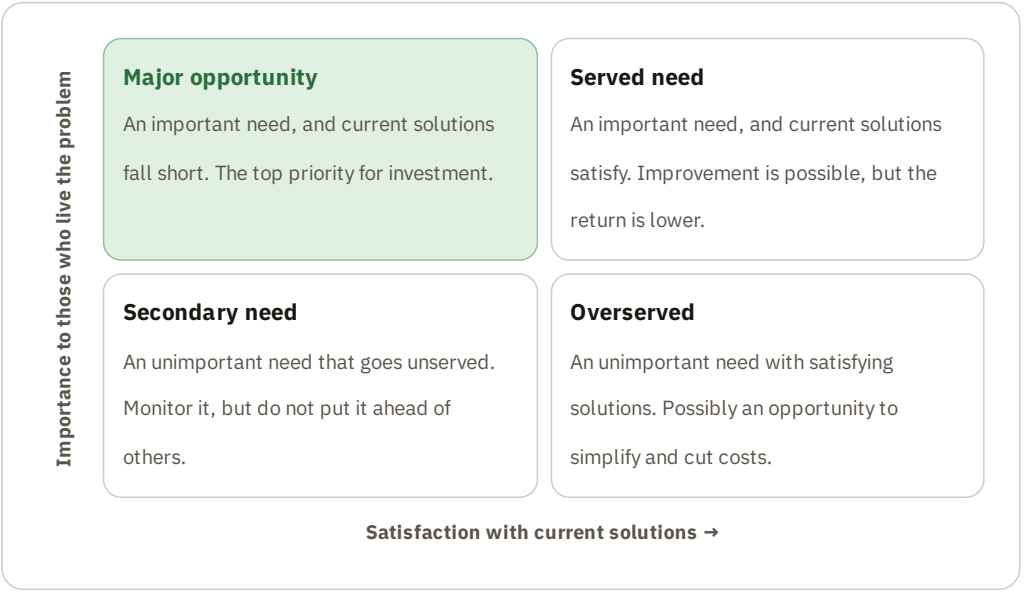


Figure 11.3 Prioritizing problems by their importance and by satisfaction with current solutions, adapted from Ulwick (2002). The top row indicates high importance, and the right-hand column high satisfaction.

To these two dimensions we add three questions. Does the problem fall within one of the search fields set by the strategy in Chapter 4? How strong is the evidence for its existence and scale? Is there anyone in the organization with the motivation and ability to work on it? An important problem that no one is enthusiastic about, or that falls outside the organization's priorities, may end up in decision limbo however valuable it is.

Principle

The time spent understanding a problem is the cheapest and most consequential stage of innovation, even if it looks like a delay to the solution. Changing how a problem is framed at the outset costs nothing; changing a solution after it has been built costs a great deal.

Chapter tool: The problem card

Fill in this card before any discussion of solutions begins. If you find yourself writing a solution in any field, delete it and return to the problem. Ask someone who lives the problem to read the card and tell you whether it describes them.

Chapter tool The problem card (example from the opening case)

Item	Question	Example
Who is struggling?	Who exactly lives the problem, and in what circumstances?	Service users applying for the service for the first time
What are they trying to accomplish?	What job or progress are they seeking?	Completing the transaction in a single visit without surprises
What is getting in their way?	Where do they stumble on their journey?	They discover missing documents days after applying

Item	Question	Example
Workarounds	What do people do today to cope with the problem?	Calling acquaintances at the agency, or bringing every document just in case
Evidence	What demonstrates the problem's existence and scale?	A third of applications are returned for missing documents
Alternative framings	Write at least two other framings	“Applications are returned” / “The applicant doesn't know what is required”
Importance and satisfaction	How important is the need, and how satisfied are people with its current solution?	High importance, low satisfaction
Link to strategy	Which search field does it fall within?	Improving the beneficiary experience
Challenge question	How might we...?	How might applicants know everything they need before they start?

Chapter Summary

- The initiative journey starts from the problem rather than the idea; in a large survey, most executives acknowledged that their organizations were weak at diagnosing problems and that this weakness was costly.
- Finding and formulating a problem is an integral part of creativity itself, closely tied to the originality of solutions.

- Opportunities have near sources, such as the unexpected, incongruities, and process needs, and more distant ones, such as demographic change and new knowledge. Lead users are a particular source of emerging needs.
- The person with the problem is understood through observation, interviews, and journey mapping, and workarounds are among the most telling indicators of need.
- How a problem is formulated sets the horizon of possible solutions, and reframing reveals solutions that were hidden; wicked problems, for their part, call for continual reframing.
- Problems are prioritized by their importance and satisfaction with current solutions, their link to strategy, the strength of the evidence, and whether someone will champion them.

Key Terms

Problem finding Problem finding	The process by which a person identifies and formulates a problem before solving it; it is considered part of creativity.
Lead users Lead users	People who face a need before others and expect significant benefit from meeting it, and so devise solutions for themselves.
Workaround Workaround	A method people devise to cope with a problem no one has solved for them.
Jobs to be done Jobs to be done	The progress a person seeks in a particular circumstance, drawing on a product or service to achieve it.

Reframing Reframing	Formulating a problem from a different angle in a way that reveals new solutions.
Wicked problem Wicked problem	A problem that cannot be given a definitive formulation and that changes with every attempt to solve it.

Review and Discussion Questions

1. What does Getzels and Csikszentmihalyi's study reveal about the relationship between problem finding and creativity? Understanding
2. Choose two of the seven sources of opportunity, and identify an opportunity from each in your organization. Application
1. Find a workaround used by your colleagues or by the beneficiaries of your organization's services, and analyze the need it reveals. Analysis
2. Write three different framings of a single problem in your organization, and identify the solutions each framing opens up. Application
3. “Asking beneficiaries what they want is enough to understand the problem.” Evaluate this statement. Evaluation

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Chapter 12

12 Developing innovative solutions

In this chapter we travel the road from a well-understood problem to a solution worth testing. We show how solution requirements are defined, how alternatives are generated and weighed against one another, what obstacles keep thinking trapped in the first solution, and why organizations tend, without meaning to, to reject the new. We then turn to how an idea matures into a testable concept.

Introduction

Opening case: A hackathon (composite case)

An organization ran a forty-eight-hour hackathon around a single question: How might we reduce food waste at social events? Within the first hour, someone on almost every team proposed an app connecting event hosts with charities, and the teams set off building near-identical versions of it. One team offered a different idea: estimating how much food an event would need in advance, using data from past events, so that the surplus would never arise in the first place. But the team could not prove the accuracy of its estimates in two days, the judging panel considered the idea immature, and the prize went to a polished app resembling ones

> already on the market. A year later, the advance-estimation idea was in use at a number of event halls, introduced by another organization.

Three phenomena that form the subject of this chapter converged in this case: teams fixating on the first solution that occurred to them, a phase of searching for alternatives that was cut short, and evaluators' tendency to prefer the familiar and finished over the new and unfinished. These phenomena stem less from individual shortcomings than from well-known patterns in human thinking, and an organization can design its work in ways that limit them.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Translate a challenge question into requirements against which any proposed solution can be measured.

٢ Design idea-generation sessions that separate expanding from narrowing and avoid the obstacles of group work.

٣ Recognize fixation on the first solution and use methods to break it.

٤ Explain the bias against new ideas in evaluation, and design evaluation that limits it.

٥ Formulate a testable concept with explicit assumptions.

12.1 From challenge question to solution requirements

The previous chapter ended with a challenge question that opens the door to solutions without prescribing them. Before idea generation begins, the team needs an intermediate step that is often neglected: defining the **solution**

requirements, that is, what any solution must achieve to count as successful, whatever form it takes. In product development methodologies, user needs are translated into measurable target specifications before concept design begins, so that they serve as a reference for comparing alternatives (Ulrich et al., 2020).

Requirements usually fall into two kinds: **essential requirements**, without which no solution is acceptable, and **desirable requirements**, which are used to choose among solutions. In the government service example from the previous chapter, essential requirements might include that applicants know every required document before starting their application, and that the solution work for people who are not comfortable with technology. A desirable requirement might be reducing the number of documents itself.

This step yields two benefits. It keeps the team from judging ideas by impression, because it sets an agreed standard before any ideas appear. And it widens the search, because a requirement describes *what* must be achieved without saying *how*, leaving room for solutions of different forms that serve the same end. Here again we see the logic of autonomy within boundaries: the requirements are clear boundaries, and the solution is an open space within them.

12.2 Expanding and narrowing

Guilford distinguished between two kinds of thinking: **divergent thinking**, which produces many varied answers to a single question, and **convergent thinking**, which arrives at the most fitting answer (Guilford, 1967). Developing solutions requires both, but mixing them at the same moment weakens each: judging every idea the instant it appears halts the flow of ideas, while generating without ever deciding prevents a decision from being reached. This is why Osborn called for deferring judgment during generation, as Chapter 7 discussed (Osborn, 1953). Figure 12.1 illustrates this sequence.

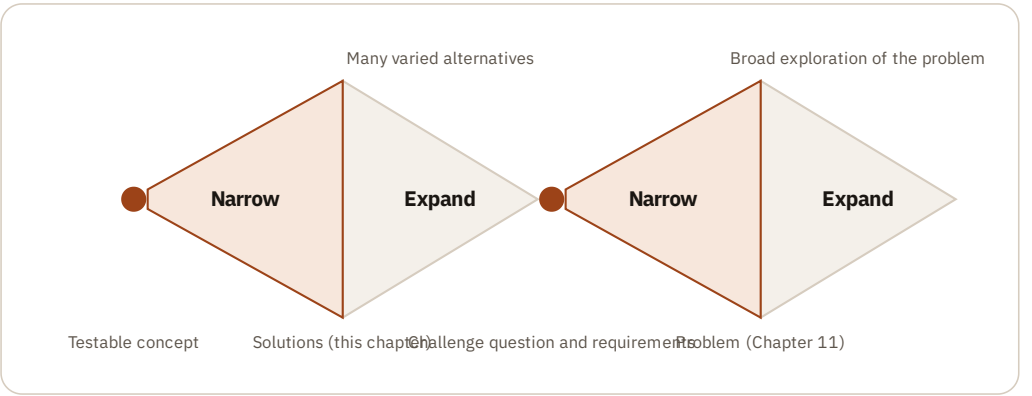


Figure 12.1 The alternation of expanding and narrowing: once to understand the problem, and once to develop the solution. Prepared by the author, drawing on the concepts of divergent and convergent thinking in Guilford (1967).

Research offers specific guidance for designing the expanding phase. Group brainstorming, for all its popularity, produces fewer ideas than is commonly assumed. Diehl and Stroebe found that individuals working alone, whose ideas were then pooled, generated more ideas than the same number of people working in an interactive group. The main cause was what they called **production blocking**: only one person in a group can speak at any moment, and the others forget or abandon their ideas while waiting their turn (Diehl & Stroebe, 1987).

Group work still has its place. Girotra, Terwiesch, and Ulrich compared teams that worked together throughout with "hybrid" teams whose members first thought alone and then met to discuss and develop the ideas. They found that the hybrid teams produced more ideas, and that their best ideas were of higher quality (Girotra et al., 2010). The practical rule: think alone, then build with others.

Generative artificial intelligence deserves a pause here. It is a powerful tool for rapidly expanding the set of alternatives, but Chapter 2 presented a study finding that its ideas raised the creativity of each individual writer while making the results more similar to one another (Doshi & Hauser, 2024). Expansion needs diversity more than it needs volume. It is therefore advisable

for individuals to generate their own ideas first and then draw on AI to develop and challenge them, so that it does not become a shared starting point around which everyone's ideas converge.

12.3 The pull of the first solution

Ideas were not in short supply in the opening case; the problem was that most teams adopted the first idea put forward and spent the rest of their time refining it. Researchers call this phenomenon **design fixation**. Jansson and Smith found that designers shown an example solution before they began produced designs carrying that example's features, flaws included, more often than those shown no example at all (Jansson & Smith, 1991). The first solution, or the familiar one, acts like a magnet: it draws thinking toward it and makes it hard to move away.

Several methods help break this fixation:

- **Reframing:** Returning to the alternative problem formulations produced by the problem card in the previous chapter; each formulation opens up a different set of solutions.
- **Distant analogy:** Looking for a different field that has faced a structurally similar problem: How do hospitals handle waiting? How do restaurants estimate quantities? Research on analogical thinking has shown that people rarely transfer a solution from one domain to another on their own, but they often do so when prompted to look for similarities (Gick & Holyoak, 1980).
- **Imposed constraints:** Asking questions such as: How would we solve the problem if we had no technology? Or if the budget were a tenth of what we have? Or if we had to remove a step rather than add one?
- **Deferring exposure to known solutions:** Having the team generate its ideas before looking at existing solutions on the market, and comparing only afterward.

In Practice

When your team grows enthusiastic about an idea, ask it, before going further, to write down three radically different solutions to the same problem, going beyond improvements to the first idea. If the first idea remains the best after the comparison, it has been chosen deliberately.

12.4 Evaluating ideas and the bias against the new

Organizations say they are looking for new ideas, then reject them when they see them. This can happen in good faith. Mueller and colleagues found that people hold an implicit bias against creativity when they feel uncertain, even while professing to value it, and that this bias weakens their ability to recognize a creative idea when one is put before them (Mueller et al., 2012). A new idea is by its nature unproven, and the uncertainty it carries makes it look weaker than it is.

Evaluation is also shaped by who does the evaluating. Berg studied how well different groups could predict the success of new ideas in an artistic field and found that creators were more accurate than managers in judging their peers' ideas, and that managers tended to undervalue the most novel ideas. Creators, however, overestimated their own ideas (Berg, 2016). These findings suggest involving in evaluation people whose expertise is close to creative work, and spreading the evaluation of an idea across multiple parties rather than leaving it to its originator or to management alone.

This research explains the outcome of the opening case: the judging panel compared an unfinished new idea with a polished familiar one, and the familiar won. One way to limit this bias is to evaluate each solution according to its stage, as Chapter 10 showed in the graduated criteria of the gates: the question at this stage is not “Has the idea been proven to work?” but “Is it worth testing?” Figure 12.2 brings together the lenses through which a solution is viewed at this stage.



Figure 12.2 Solution evaluation lenses. The first three lenses are common in the design thinking literature (**Brown, 2008**); this version adds the responsibility lens, which Chapter 19 addresses.

The first lens comes first by design. A solution that is technically feasible and financially viable loses its value if it does not address a problem anyone cares about. The function of the lenses at this stage is to identify what needs testing before any final elimination: a solution that looks desirable but whose feasibility is unknown needs an experiment on feasibility, and so on.

12.5 From idea to testable concept

An idea is a sentence or an image in the mind; a **concept**, by contrast, is a description of the solution clear enough for others to understand and test. A good concept specifies whom the solution is for, what problem it solves, how it works in broad outline, and what value it offers compared with existing alternatives, and, most important of all, the **assumptions** on which it rests, that is, what must be true for it to succeed.

The idea of estimating food quantities in advance, from the opening case, rests on assumptions such as these: that data from past events are available and accurate enough, that event hosts will accept smaller quantities than they are used to, and that event halls have an incentive to reduce quantities. Each of these assumptions can be tested with a small experiment. Stating the

assumptions this clearly is what would have changed the judging panel's verdict: instead of seeing an “unproven” idea, it would have seen an idea with clear assumptions and a plan to test them.

From here the road branches into two chapters. If the solution requires a different model for delivering or funding value, Chapter 13 addresses business model innovation. Chapter 14 then examines how assumptions are ranked by how critical they are, and how experiments are designed to test them at the lowest cost.

Principle

An idea is judged by what we know about its assumptions, however novel or familiar it may be. A good concept states clearly what must be true, and how we will know.

Chapter tool: The concept card

For each candidate solution, write a one-page concept card before any prototype is built. Show the cards to those who live with the problem and to those who will operate the solution. Focus the discussion on the assumptions field: which are the most critical, and which have we not yet verified?

Chapter tool The concept card (example from the opening case)

Item	Question	Example
Challenge question	What question does the concept answer?	How might we reduce food waste at social events?
Essential requirements	What must any solution achieve?	Reduce surplus without guests feeling any shortage
For whom?	Who is the user, and who is the beneficiary?	Event hosts and event halls

Item	Question	Example
How does it work?	The main outline in two or three sentences	Estimate the required quantity from data on similar events, and present it at booking
Value compared with alternatives	Why is it better than what people do today?	Reduces surplus at the source instead of disposing of it after the fact, and saves cost
Alternatives considered	What other solutions was it compared with?	An app linking hosts to charities; take-home containers for guests
Lenses	What is known and unknown about desirability, feasibility, viability, and responsibility?	Desirability among event hosts is uncertain; feasibility depends on the data
Critical assumptions	What must be true for it to succeed?	Data availability; hosts' acceptance of smaller quantities; incentives for event halls
First test	What is the smallest experiment that tests the most critical assumption?	Compare the estimate with actual consumption at ten events

Chapter Summary

- Before solutions are generated, essential and desirable solution requirements are defined; they become an agreed standard and widen the search, because they describe what must be achieved without specifying how.

- Developing solutions calls for divergent thinking followed by convergent thinking, and keeping the two apart is a condition for both to work.
- Individuals working alone produce more ideas than interactive groups, and the hybrid approach, individual thinking followed by collective building, produces better ideas.
- Fixation on the first or familiar solution is common, and its hold can be broken through reframing, distant analogy, and imposed constraints.
- People hold an implicit bias against new ideas when they feel uncertain, and managers tend to undervalue them. Stage-appropriate evaluation and a diverse set of evaluators help limit this.
- A solution is viewed through the lenses of desirability, feasibility, viability, and responsibility to identify what must be tested before any final judgment.
- A testable concept states its critical assumptions and specifies the smallest experiment that tests the most critical of them.

Key Terms

Solution requirements Solution requirements	What any solution must achieve to count as successful, whatever form it takes.
Divergent thinking Divergent thinking	Producing many varied answers to a single question.
Convergent thinking Convergent thinking	Arriving at the most fitting answer among the alternatives.

Production blocking Production blocking	The decline in idea production in groups because members must wait their turn to speak.
Design fixation Design fixation	The pull of thinking toward the features of a familiar solution or the first one proposed.
Concept Concept	A description of the solution clear enough to be understood and tested, including its critical assumptions.

Review and Discussion Questions

1. Why does mixing divergent and convergent thinking in a single session weaken both? Understanding

2. Design a solution-generation session for a challenge question in your organization, drawing on the findings of Diehl and Stroebe and of Girotra and colleagues. Application

1. Analyze the hackathon case in light of fixation and the bias against the new, and propose two changes to the hackathon's design or its judging criteria. Analysis

2. Write a concept card for a solution you are working on, and identify its most critical assumptions. Application

3. "Innovation ideas should be evaluated by senior managers because they are best placed to judge." Evaluate this statement in light of the research on evaluation. Evaluation

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Chapter 13

13 Business model and value innovation

Once a solution has proven its worth, a question with farther-reaching consequences comes to the fore: How is its value to be delivered, and how is its continuity to be secured? The material of this chapter is organized around that question. We set out the components of the business model, trace its form in the public sector, where public value takes precedence over profit, then review patterns of business model innovation and reflect on what makes changing the model so difficult for established organizations.

Introduction

Opening case: A municipality (composite case)

A municipality piloted a service for reporting streetlight faults through photos that residents sent from their phones; the photos were analyzed automatically and routed to maintenance crews. Over the six months of the pilot, funded from the innovation budget, the time needed to repair faults fell by half, and residents expressed their satisfaction. Then the pilot budget ran out. The service found no department to adopt it: the maintenance department saw it as a technology project, the IT department saw it as a maintenance service, and neither had a budget line for operating costs or for the

> developer's contract. The service was discontinued two months later, even though every one of its indicators had shown success.

The pilot succeeded in proving that the solution worked, yet no one asked during it how the solution would continue: who would own it, who would bear its cost, and how its value would flow back to whoever paid. These are business model questions, and they extend beyond the commercial concerns of companies to every innovation; whatever its sector, an innovation needs a model to carry it.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain why a solution's success is not enough for an innovation to endure.

٢ Describe the components of the business model and the relationships among them.

٣ Apply the concept of public value and Moore's triangle to public sector initiatives.

٤ Use business model innovation patterns to design alternatives.

٥ Identify the obstacles that prevent established organizations from changing their models.

13.1 Why is a good solution not enough?

Teece defines the **business model** as the logic by which an organization delivers value to those it serves and captures enough to sustain itself (Teece, 2010). In his view, a new technology or idea does not carry its value within

itself; its value is determined by the model that brings it to people. This is why the same idea can succeed in one organization and fail in another.

One of the clearest examples is the case Chesbrough and Rosenbloom studied at Xerox's Palo Alto Research Center. The center developed numerous technologies that found no place in the company's business model, which was built on selling copiers and related services. They left in independent start-ups, and some went on to great success with entirely different business models (Chesbrough & Rosenbloom, 2002). The obstacle lay in the existing model, which could not see the value of these technologies.

For innovation management, this idea has two implications. First, the model question should be raised early, alongside the testable concept discussed in the previous chapter, whereas in the opening case it was put off until after the pilot had succeeded. Second, the innovation may lie in the model itself: an existing service delivered differently, funded differently, or with a new party sharing in its delivery. This is what Chapter 1 called innovation in the "mental model," an area often overlooked in favor of products and technology.

13.2 Components of the business model

There are many frameworks for describing a business model, the most widely used being Osterwalder and Pigneur's nine-component canvas (Osterwalder & Pigneur, 2010). Johnson, Christensen, and Kagermann offer a simpler framework of four interlocking elements, which suffices for the purposes of this chapter (Johnson et al., 2008); Figure 13.1 illustrates it.

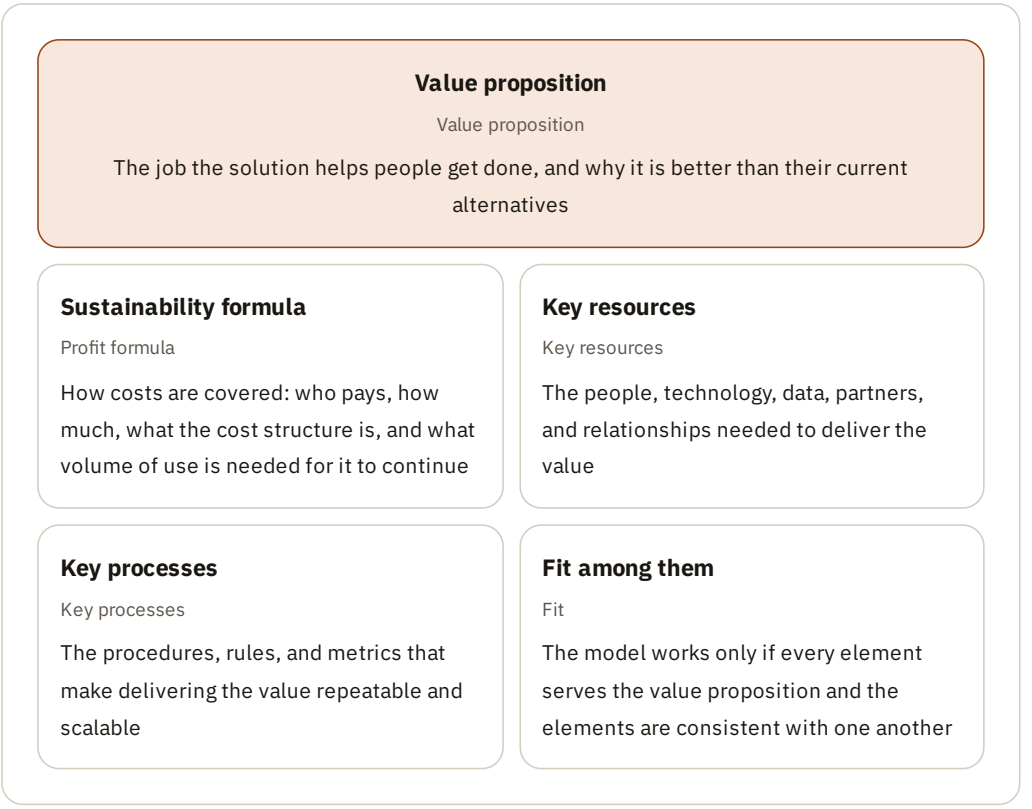


Figure 13.1 Elements of the business model, adapted from Johnson et al. (2008).

The model always starts from the **value proposition**, a direct extension of what Chapter 11 presented on jobs to be done: the value proposition describes the progress the solution brings to those who use it, compared with what they do today. Johnson and colleagues stress that most organizations that succeed in innovating their models begin with a precise understanding of this job before thinking about revenue sources.

Applied to the opening case: the value proposition was clear and strong, and the resources were available during the pilot. The sustainability formula, however, was never designed at all: no one determined who would bear the operating cost, or how the savings the service achieved in maintenance crews' time would be calculated to justify that cost. The same was true of the key processes: no one specified who would own the service after the pilot, or how it would be integrated into routine maintenance procedures.

13.3 Public value and the public sector model

In the public sector, profit is not the goal, and the beneficiary is not always the one who pays. The business model therefore needs a different form. Moore offers a framework for this known as the **strategic triangle**: a public initiative succeeds when three things are aligned. It must create *public value* that society appreciates, enjoy *legitimacy and support* from the bodies that hold the mandate and the funding, and have the *operational capacity* to deliver (Moore, 1995). Figure 13.2 illustrates this triangle.

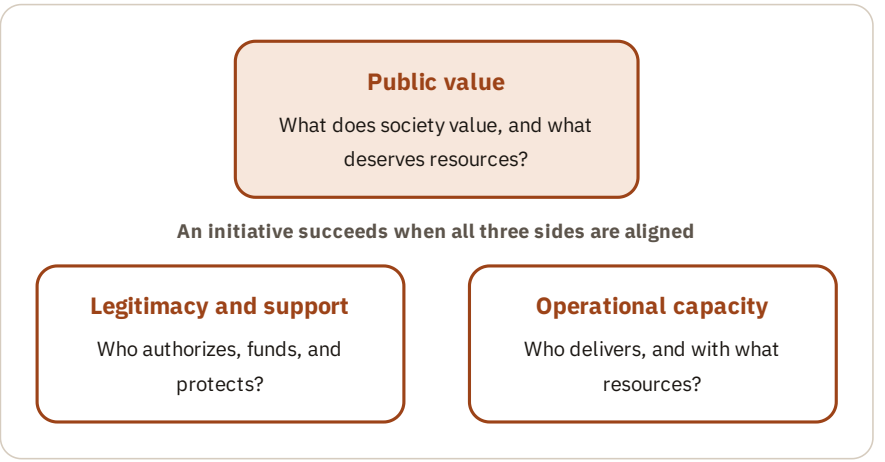


Figure 13.2 The strategic triangle of public value, adapted from Moore (1995).

Reading the opening case through this triangle reveals where things went wrong. Public value was achieved, and operational capacity was demonstrated in the pilot, but the third side, the body that would adopt the service, authorize its continuation, and fund it, was never built. Had that side been built during the pilot, by involving the maintenance department from the start as the future owner and counting the savings in its time as part of the sustainability formula, the outcome would have been different. Chapter 15 returns to the transfer of ownership as a condition for scaling.

In the public sector and in universities, the sustainability formula takes many forms: a line in the budget of an owning body, savings in existing costs that are redirected, fees charged to some beneficiaries, a partnership with the private sector in which the partner bears part of the cost in return for value it receives, or some combination of these. A university's digital fabrication lab (fab lab), for instance, might be sustained by university funding to serve students, along with revenue from services it provides to companies in the region and sponsorship from organizations that see its students as a source of talent they need. The absence of such thinking is what leaves many of these entities dependent on a start-up budget that runs out, after which they remain in place but inactive.

The individual innovator has a model too. In a qualitative study, most of the prominent Saudi innovators interviewed held that turning their innovation into a source of income early on was a condition for continuing with it (Alsamani, 2023). An organization that supports innovators goes beyond funding their ideas to helping them think through the model that will make their innovation sustainable.

13.4 Patterns of business model innovation

Gassmann, Frankenberger, and Csik studied hundreds of innovative business models and found that most of them, around 90 percent, were recombinations of pre-existing patterns, transferred from one industry to another or combined in a new way. They identified fifty-five recurring patterns (Gassmann et al., 2014). This finding means that business model innovation calls less for invention from scratch than for broad knowledge of patterns and the ability to transfer them, which links it to the analogical thinking discussed in the previous chapter. Table 13.1 presents a number of these patterns and the forms they might take in the public sector.

Table 13.1 Selected business model innovation patterns and their possible applications, adapted from Gassmann et al. (2014)

Pattern	Core idea	A possible form in the public sector or a university
Self-service	The beneficiary does part of the work in return for greater speed or flexibility	Online services that beneficiaries complete without an in-person visit
Pay-per-use	The beneficiary pays in proportion to use	Making university labs available to companies by the hour
Freemium	A basic service for everyone, with additional features for a fee	Free initial consultations for entrepreneurs, and advanced incubation programs through paid partnerships
Platform	Connecting parties who need one another instead of delivering the service directly	A platform connecting organizations' problems with students and researchers able to solve them
Outcome-based contracting	Payment is for outcomes achieved rather than for activity	Maintenance contracts paid according to actual repair times
Co-delivery partnership	Another party contributes its own resources to delivering the service	Nonprofit associations or companies delivering part of a public service

A pattern should be chosen for how well it serves the value proposition and fits the organization's resources and capabilities, regardless of how fashionable it is. Many attempts to transfer successful models from one context to another fail because the pattern was moved without the resources and processes that made it work in its original setting. We return to this idea in Chapter 20, in discussing borrowed models in universities.

13.5 Why is the model hard to change?

If business model patterns are well known, why do organizations not change their models more easily? Chesbrough identifies two kinds of obstacle (Chesbrough, 2010). The first is a **conflict with existing assets**: a new model may threaten existing revenue streams, positions, or investments, and those who hold them resist it. The second is a **cognitive barrier**: a successful model becomes the "dominant logic" through which the organization views every new opportunity, so an idea is assessed by the yardsticks of the existing model and appears less attractive than it really is. This is what happened with Xerox's technologies.

Chesbrough proposes treating a new model with the same logic used for a new product: through experimentation. The model's assumptions, such as an organization's willingness to pay or a partner's ability to deliver, are tested with small experiments before full commitment. Chapter 14 takes up this experimentation. This connects to organizational ambidexterity and autonomous teams: a new model that conflicts with the existing one may need a separate space in which to grow before it returns to the organization.

Caution

A pilot funded from the innovation budget tests the solution, but it can mask the model question: as long as the cost is covered, it remains unclear who will bear it later. Every pilot should therefore include an explicit question: Who will pay afterward, and why will they pay?

Chapter tool: The value model canvas

Fill in this canvas for every initiative before its pilot begins. If you cannot answer a question, turn it into an assumption and test it in the pilot itself. The canvas combines the elements of the business model with the public value triangle, so that it serves both sectors.

Chapter tool The value model canvas (example from the opening case)

Item	Question	Example
For whom?	Who are the beneficiaries, who are the users, and are they the same group?	Residents are beneficiaries and reporters; maintenance crews are users
Value proposition	What job does the solution get done? Why is it better than the alternatives?	Faster repair of faults and more precise dispatching of maintenance crews
Public value	What does society gain?	Safer streets and greater confidence in the municipality's responsiveness
Resources and partners	What resources are needed? Who are the partners?	The analytics platform, the developer, and maintenance crews
Processes	How does the solution fit into daily work? Who runs it?	Automatic routing into the existing maintenance system
Sustainability formula	What is the ongoing cost? Who bears it? What savings or returns offset it?	An annual operating cost offset by savings in field inspection rounds
Owner	Who owns the solution after the pilot? Did they take part in it?	The maintenance department, which should be involved from the start
Legitimacy and support	Who authorizes, funds, and protects?	Municipal leadership, and a line in the maintenance budget
Critical assumptions	What must be true for the model to endure?	That the savings cover a substantial share of the operating cost

Chapter Summary

- A business model is a logic for delivering value and securing its continuity, and an idea's value depends on the model that carries it; the same idea may therefore succeed with one model and falter with another.
- The model question should be raised early, in parallel with the testable concept and before the pilot.
- The model has four interlocking elements: the value proposition, the sustainability formula, key resources, and key processes. It always starts from the value proposition.
- In the public sector, an initiative succeeds when public value, legitimacy and support, and operational capacity are aligned.
- Most business model innovations are recombinations of existing patterns, and a pattern is chosen for its fit with the value proposition and resources.
- The model is hard to change because of its conflict with existing assets and the hold of the dominant logic; experimentation and separate spaces help overcome this.

Key Terms

Business model Business model	The logic by which an organization delivers value to those it serves and captures enough to sustain itself.
Value proposition Value proposition	The job the solution helps people get done, and why it is better than their alternatives.

Public value Public value	The outcomes of public work that society and its members value.
Strategic triangle Strategic triangle	A framework linking the success of a public initiative to the alignment of public value, legitimacy and support, and operational capacity.
Dominant logic Dominant logic	The way of thinking that the existing model imposes on the assessment of new opportunities.

Review and Discussion Questions

1. Why might the same idea succeed in one organization and fail in another? Understanding

2. Analyze the opening case using the strategic triangle, and identify what should have been done during the pilot. Analysis

1. Choose an innovation entity in your organization, such as a lab or center, and design a sustainability formula for it that combines two or more sources. Application

2. Choose two patterns from Table 13.1 and apply them to a service your organization provides. Application

3. "The business model is a matter for profit-making companies, and the public sector has no need of one." Evaluate this statement. Evaluation

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Chapter 14

14 Experimentation and risk reduction

Between an idea and a major investment lies a stretch of assumptions, and experimentation is what turns them into knowledge before the organization commits to something that is hard to reverse. Within this horizon we move step by step from ranking assumptions by how critical they are, to the types of tests available, to designing an experiment that yields genuine learning, and we close with the common mistakes made in pilots.

Introduction

Opening case: An appointment system (composite case)

A service organization developed a new appointment booking system for its branches and chose its main branch in the capital to pilot it: the newest branch, the most heavily staffed, and the closest to the project team. Three extra staff members were assigned to the pilot to help visitors, and the development team came in daily to fix any problem on the spot. After three months, the pilot was declared a success: waiting times had fallen and visitor satisfaction had risen. The system was then rolled out to forty branches. In most of

> them, work was disrupted for weeks: the small branches had no one to help visitors, some had slower networks, and the development team could not be everywhere at once.

The pilot did not fail; it was designed to succeed. The system was tested under the best possible conditions, so the pilot proved that it worked under those conditions and said nothing about the conditions in which it would actually operate. This difference between an experiment that proves and one that teaches is what this chapter is about.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain experimentation as a means of turning assumptions into knowledge and reducing uncertainty.

٢ Rank an initiative's assumptions by their importance and the strength of the evidence behind them.

٣ Choose the appropriate type of test for each assumption and stage.

٤ Design an experiment with a hypothesis, a measure, and a success criterion set in advance.

٥ Avoid the common mistakes made in pilots.

14.1 Managing uncertainty through learning

In conventional projects, the plan is built on knowledge, and success is measured by adherence to it. In innovation, by contrast, the initial plan rests more on assumptions than on knowledge. McGrath and MacMillan observed that many new ventures fail because their founders treat assumptions as if they were facts, only to discover their errors after everything has been

invested. They proposed what they called **discovery-driven planning**: writing the assumptions down explicitly and sequencing the stages so that each stage tests the most important assumptions before moving on, so that assumptions are gradually converted into knowledge (McGrath & MacMillan, 1995).

Experimental evidence supports this approach. Camuffo and colleagues conducted a randomized trial with 116 start-ups in Italy, half of which received training in making decisions by a scientific method: formulating hypotheses, testing them, and judging the results. The trained start-ups were more likely to change direction or stop when the evidence did not support their idea, and they achieved higher revenues (Camuffo et al., 2020). The experimental approach leaves the odds of the first idea succeeding unchanged; its benefit lies in knowing when the idea needs to change.

This is the logic underlying the gates of Chapter 10 and staged funding: each stage buys knowledge that reduces uncertainty, and the next stage is funded according to what the team has learned. Experimentation is the tool with which the team buys this knowledge. It is consistent with the principle of "managing uncertainty" among the principles of innovation management: dealing with risks by confronting them and learning from them.

14.2 Critical assumptions and how to rank them

Chapter 12 ended with a testable concept that states its critical assumptions, and Chapter 13 noted that the business model itself rests on assumptions. Experimentation begins by gathering all of these assumptions and then ranking them. They can be classified by the four evaluation lenses: assumptions about *desirability* (Do people want the solution?), *feasibility* (Can it be built and operated?), *viability* (Can it be sustained?), and *responsibility* (Is it fair and safe?).

Testing all the assumptions at once is neither possible nor useful. Priority goes to assumptions that combine two qualities: they are **important**, meaning that if they are wrong the entire initiative collapses, and the **evidence for them is**

weak. Bland and Osterwalder propose ranking them along these two dimensions (Bland & Osterwalder, 2019), as Figure 14.1 shows.

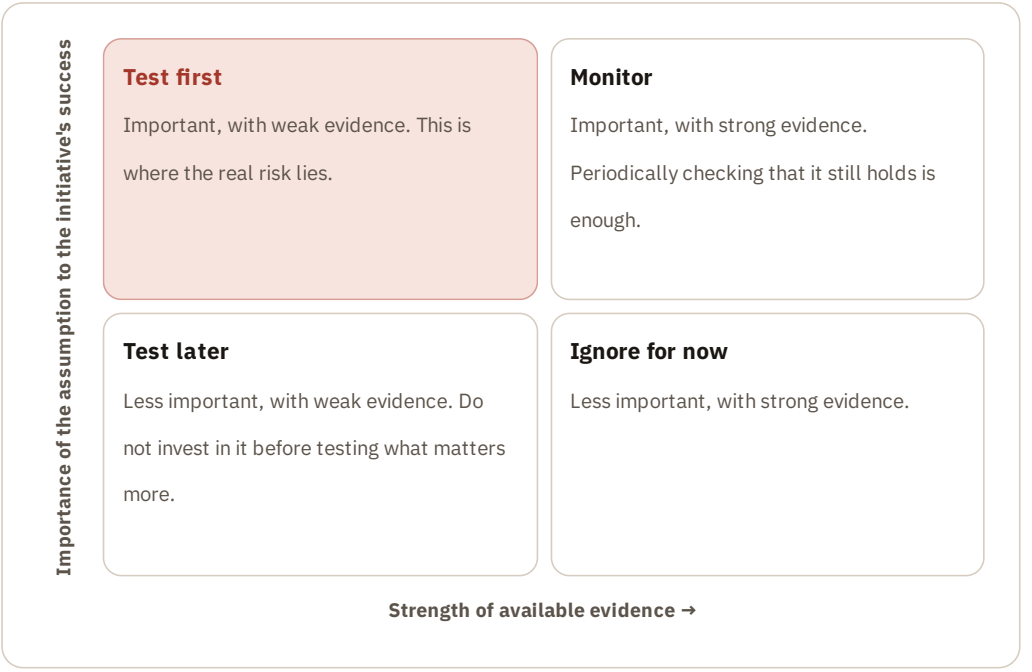


Figure 14.1 Ranking assumptions by their importance and the strength of the evidence behind them, adapted from Bland & Osterwalder (2019). The top row indicates high importance, and the right-hand column strong evidence.

Teams tend to start with what is easy to test before what must be tested. A technical team tests feasibility because that is what it does well, and postpones the desirability assumption because testing it means going out to people. The result is a solution that works technically and that nobody uses. Ranking assumptions in this way puts risk ahead of convenience.

14.3 The testing ladder

Tests vary in their cost and in the strength of the evidence they provide. The principle of choice is simple: start with the cheapest test that could disprove the assumption, and move up to a costlier test only if the assumption survives the cheaper one. Figure 14.2 shows a ladder of such tests.

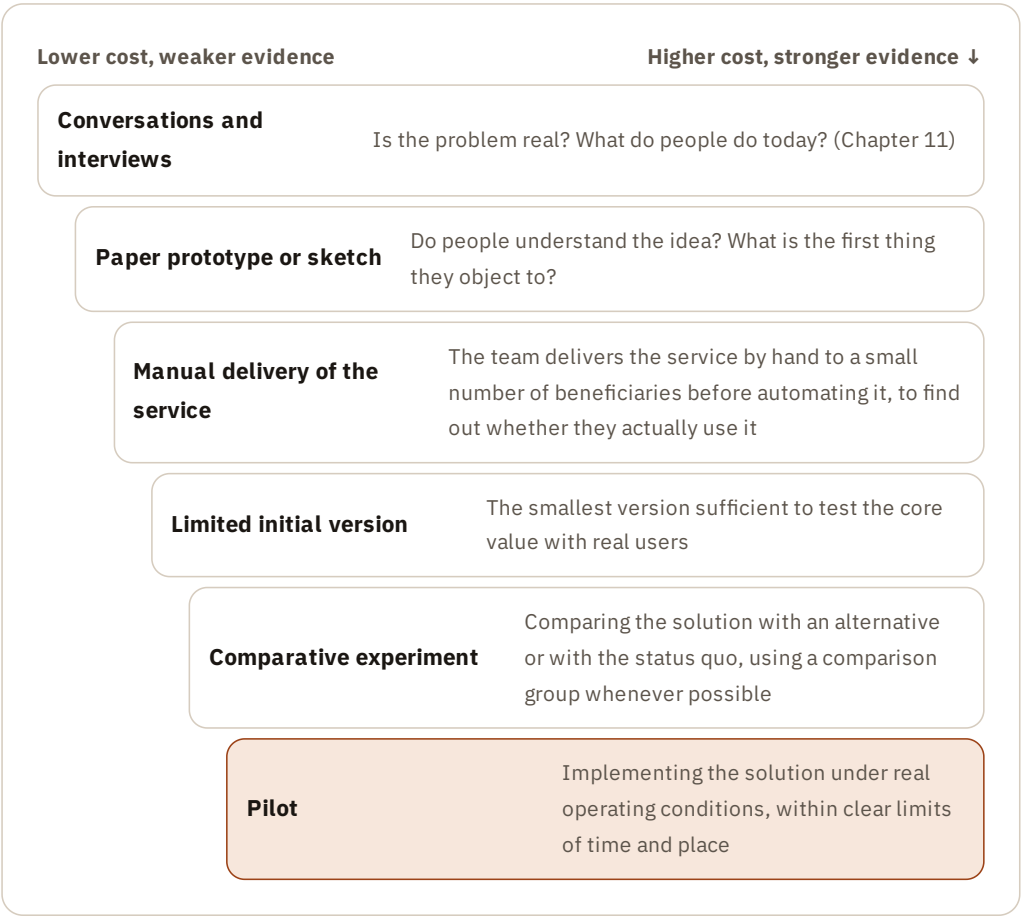


Figure 14.2 The testing ladder, from cheapest to costliest. Prepared by the author.

Every rung on the ladder requires a **prototype** of some kind. Houde and Hill pointed out that the most important question in designing a prototype is not "What are we building?" but "What do we want to find out?" They distinguished among prototypes that test the *role* of the solution in the user's life, prototypes that test its *look and feel*, and prototypes that test its technical *implementation* (Houde & Hill, 1997). Each question has its own prototype: one that answers the feasibility question falls short on desirability, and perfecting a prototype that answers the wrong question is waste.

One of the most widespread concepts in this area is the **minimum viable product**, the smallest version of a product that allows the team to learn as much as possible about users with the least effort (Ries, 2011). The key word in the definition is "learn": the initial version is a tool for testing an assumption, not a stripped-down version of the final product that is launched and then added to.

In Practice

Before your team asks for a budget to build an initial version, ask: Which assumption will this version test? And is there a cheaper test lower down the ladder that could disprove it? Many questions can be answered through conversations or manual delivery of the service before a single line of code is written.

14.4 Designing a learning experiment

The difference between an experiment that teaches and one that merely proves lies in the design, before the start. A good experiment needs five elements defined in advance:

- **A clear hypothesis:** "We believe that [a specific group] will do [a specific behavior] because [a reason]."
- **A behavioral measure:** one that captures what people actually do; actual use is more telling than stated opinion.
- **A success criterion set in advance:** the figure that, if reached, means the hypothesis is supported, and if not reached, means it is rejected. Setting it after seeing the results opens the door to interpreting any result as a success.
- **A comparison:** with the status quo or with an alternative, because improvement may occur for reasons that have nothing to do with the solution.

- **Duration, limits, and stopping conditions:** when the experiment ends, to whom it applies, and what would halt it early if harm emerges.

Comparison is the hardest of these elements and the most often neglected in the public sector. The UK government's Behavioural Insights Team has advocated the use of randomized controlled trials in public policy, showing that in many cases they are less costly and complex than is commonly assumed, and that they allow organizations to learn what actually works before scaling it up (Haynes et al., 2012). Where random assignment is not feasible, comparison with similar branches or periods is still far better than no comparison at all.

At a university, these elements can become part of applied projects in courses: instead of presenting a solution and defending it, students present a hypothesis and test it with real users, and they are assessed on the quality of the experiment and what they learned from it, even if their hypothesis is rejected. This links the course to the innovation system and teaches students the method before it teaches them the result.

14.5 Pilots and their pitfalls

The pilot is the highest and costliest rung on the ladder, and it is run once the core assumptions have survived the cheaper tests. Its function is to reveal how the solution works under real operating conditions; it is a tool for learning more than for proof. Certain mistakes recur in pilots:

- **Ideal conditions:** choosing the best site, the most enthusiastic staff, and exceptional support from the project team, as in the opening case. The alternative is to run the pilot at a site that represents ordinary conditions, or at two different sites.
- **The never-ending pilot:** a pilot extended again and again without a decision, which either becomes a permanent service with no owner and no budget or dies quietly. This is one form of decision limbo.

- **No future owner:** a pilot run by the innovation team alone, which finds no one to adopt it once it ends, as in the opening case of Chapter 13.
- **Measuring what is easy to measure:** the number of users or their satisfaction in a survey, rather than the behavior that signals value: Did they come back? Did completion time change? Did errors decrease?
- **Overlooking the true cost of operation:** exceptional support during the pilot hides what routine operation will require.

Every pilot has three possible outcomes, all of them useful if the pilot is well designed: the solution is scaled up, it is modified and tested again, or it is stopped. Chapter 15 addresses the move from pilot to scale.

Caution

An experiment that cannot fail teaches nothing. If the team cannot specify before the start the result that would lead it to stop or modify the initiative, then what it is running is a demonstration, even if it is called an experiment.

14.6 A culture of experimentation

Organizations that experiment at scale uncover a seemingly discouraging truth: most ideas fail. Kohavi and Thomke reported that only 10 to 20 percent of experiments at major search engines produce positive results, and that small changes whose effect no one anticipated sometimes yielded large returns, such as a tweak to the way ad headlines were displayed that raised one search engine's revenue by about 12 percent (Kohavi & Thomke, 2017). The implication is that experience and intuition, however valuable, still need testing, and that an organization implementing its ideas without testing them implements many unhelpful ideas along with them.

A culture of experimentation is broader than its tools. It requires what Chapter 8 discussed: psychological safety that allows a team to announce that its hypothesis was rejected, a distinction between intelligent failure and avoidable failure, and leadership that asks “What did we learn?” before it asks “Why did we fail?” It also requires respect for the people on whom experiments are conducted: the beneficiary of a public service is not a test subject, and has a right to be informed and protected from harm. Chapter 19 addresses the ethics of experimenting on people.

Chapter tool: The experiment card

Write a card for each experiment before it begins, and ask someone outside the team to review it. Once the experiment is over, complete the last two fields without altering anything written above them.

Chapter tool The experiment card (example from the opening case, as it should have been designed)

Item	Question	Example
Assumption tested	Which critical assumption does the experiment test?	That branches with ordinary resources can run the system without additional support
Hypothesis	We believe that… will… because…	We believe that visitors to a mid-sized branch will book their appointments without assistance because the interface is simple
Type of test	Which rung on the ladder? Why?	A pilot in two branches: one mid-sized and one small
Measure	What behavior will we measure?	The share of bookings completed without staff intervention, and waiting time

Item	Question	Example
Success criterion	What figure supports the hypothesis? (Set before the start)	Seventy percent of bookings completed without intervention, and waiting time cut by a quarter
Comparison	What do we compare against?	Two similar branches running the old system over the same period
Duration and limits	When does it end? To whom does it apply?	Six weeks, in the two branches only, with no additional staff
Stopping conditions	What would halt the experiment early?	Waiting time doubling for two consecutive weeks
Future owner	Who will adopt the solution if it succeeds? Are they involved?	The branch management department, represented on the pilot team
Result	What happened? (After the experiment)	
What we learned and the decision	Scale up, modify, or stop?	

Chapter Summary

- In innovation, the plan rests on assumptions, and experimentation turns them into knowledge before major investment; the most valuable thing about the experimental approach is that it reveals when an idea needs to change.
- Assumptions are ranked by their importance and the strength of the evidence behind them, with priority given to important assumptions with weak evidence.

- Start with the cheapest test that could disprove the assumption, and move up the ladder if it holds. A prototype is designed to answer a specific question.
- A learning experiment needs a hypothesis, a behavioral measure, a success criterion set in advance, a comparison, and limits and stopping conditions.
- Common mistakes in pilots include ideal conditions, the never-ending pilot, the absence of an owner, and measuring what is easy to measure.
- Most ideas fail when tested, which is why testing remains necessary however strong the intuition. A culture of experimentation requires psychological safety and respect for those on whom experiments are conducted.

Key Terms

Discovery-driven planning Discovery-driven planning	Planning that writes assumptions down explicitly and sequences stages to test the most important ones first.
Critical assumption Critical assumption	An assumption that, if wrong, brings down the entire initiative.
Prototype Prototype	A representation of the solution built to answer a specific question about its role, its look and feel, or its implementation.
Minimum viable product Minimum viable product	The smallest version of a product that enables the most learning with the least effort.

Randomized controlled trial Randomized controlled trial	An experiment in which participants are randomly assigned to the solution or an alternative, in order to isolate the solution's effect.
Pilot Pilot	Implementing the solution under real operating conditions, within clear limits, before scaling it up.

Review and Discussion Questions

1. What is the difference between an experiment that proves and one that teaches? Illustrate your answer with the opening case. Understanding
2. Write down five assumptions for an initiative you are working on, and rank them on Figure 14.1. Application
1. Take the top-ranked assumption and identify the cheapest test that could disprove it. Application
2. Analyze the most recent pilot in your organization in light of the five mistakes in Section 14.5. Analysis
3. "Randomized controlled trials are a luxury ill-suited to government agencies." Evaluate this statement. Evaluation

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15 Chapter 15 Adoption and scaling

With this chapter, the initiative journey reaches its most demanding stage: moving a solution that succeeded in a pilot into broad, real-world use. We examine the gap between adopting an innovation and implementing it, the factors that make some innovations spread faster than others, and the concerns of those who are asked to change, before turning to scaling readiness and the transfer of ownership.

Introduction

Opening case: a Saudi university (composite case)

The center for teaching excellence at a university developed a model for innovation project assignments: students identify a real problem in their field and test a solution to it with actual beneficiaries. The model was piloted in three courses taught by enthusiastic faculty members, and the results were striking: serious projects, high engagement, and students who took their projects on to the business accelerator. Once the results were presented to the university council, a circular was issued requiring the model to be applied in sixty courses the following semester. A year later, the model was “implemented” in every course

> on paper: most faculty members had simply renamed their old assignments to match it, and what students actually did had not changed.

The model succeeded when it was adopted by those who chose it, and it faltered when it was imposed on people who had never been consulted and were given neither the time nor the support to understand it. This story recurs across organizations in many forms, and it is our entry point into understanding why the move from limited success to wide use is the hardest stage of the journey.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Distinguish between adopting an innovation and actually implementing it, and explain the implementation gap.

٢ Assess the characteristics of an innovation that affect how quickly it is adopted.

٣ Recognize adopters' stages of concern and provide the support suited to each.

٤ Assess a solution's readiness for scaling, and distinguish between its core, which must be implemented faithfully, and its periphery, which can be adapted.

٥ Plan the transfer of a solution's ownership and its scaling pathway.

15.1 The implementation gap

The implementation literature distinguishes between the **adoption** of an innovation, that is, the organization's decision to use it, and its **implementation**, that is, its actual and consistent use by the intended people.

Klein and Sorra showed that many innovations are adopted and then never implemented, or are implemented only superficially. In their view, implementation effectiveness depends on two things: the **implementation climate**, meaning the extent to which people perceive that using the innovation is expected, supported and rewarded; and the **innovation's fit with their values**, meaning the extent to which they see it as consistent with what they believe in their work (Klein & Sorra, 1996). When implementation is expected and required but fit is weak, people comply on the surface without being convinced, which is exactly what happened in the opening case.

Klein and Knight observe that many innovations fail not because they are ineffective, but because they were never implemented with enough quality and consistency for their effectiveness to show (Klein & Knight, 2005). An organization may therefore pronounce a good innovation a failure when, in truth, it never implemented it at all. This is why scaling demands management as careful as that devoted to development.

15.2 Why do some innovations spread faster?

Chapter 1 presented Rogers's definition of innovation. Among his most important contributions is the identification of five characteristics of an innovation, as perceived by adopters, that explain much of the variation in how quickly innovations are adopted (Rogers, 2003). Table 15.1 sets them out, together with the question each one poses for the scaling team.

Table 15.1 Characteristics of an innovation that affect the speed of its adoption, adapted from Rogers (2003)

Characteristic	Meaning	Design question
Relative advantage	The degree to which people perceive the innovation as better than what they currently use	What does the user personally gain, beyond what the organization gains?

Characteristic	Meaning	Design question
Compatibility	Its consistency with their values, experience, needs and ways of working	What must the user give up in order to adopt it?
Complexity	How difficult it is to understand and use	What is the simplest form in which it can start?
Trialability	Whether it can be tried on a limited scale before commitment	Can users try it without risking much?
Observability	How visible its results are to others	How will others see its results among their colleagues?

These characteristics underline that adoption turns on adopters' *perceptions* of an innovation's attributes. From the center's perspective, the model in the opening case was undoubtedly better; to many faculty members, however, it looked like a complicated additional burden that did not fit courses designed around transmission and testing, and they were given no chance to try it before committing to it. Greenhalgh and colleagues' review extended these characteristics to the context of service organizations, adding factors such as organizational readiness for change and adopters' ability to adapt the innovation to their own context (Greenhalgh et al., 2004).

15.3 The human side of adoption

Where Chapter 7 dealt with the needs of the innovator, this section turns to the needs of those asked to adopt someone else's innovation. Adoption is a change in a person's work, and it raises legitimate questions and concerns. Working in the context of implementing educational innovations, Hall and Hord developed a model of the **stages of concern** that people pass through when asked to adopt an innovation. They showed that these concerns tend to shift

from one level to another, that they may overlap within the same person, and that effective support responds to the stage the person is in (Hall & Hord, 2015). Figure 15.1 presents these stages in grouped form.

Stage	The person's question	Appropriate support
Self Awareness, information and personal impact	What is this? What will change for me? Can I do it?	Clear information, dialogue about the effect on work and time, and honest reassurance
Task Management and execution	How do I organize my time? How do I deal with this practical problem?	Hands-on training, ready-made tools, and close support during implementation
Impact Consequences, collaboration and refocusing	Does this benefit the beneficiaries? How can I improve it?	Data on results, exchange of experience with colleagues, and room for development

Figure 15.1 Adopters' stages of concern grouped into three clusters, with the support appropriate to each, adapted from Hall & Hord (2015).

A common mistake is to address people with impact questions while they are still preoccupied with self questions: presenting the innovation's results and its benefits to the organization while they are asking how it will affect their time, their work and how others see them. In the opening case, faculty members were shown the results of the three courses, but no one asked them about the extra time that supervising real student projects would require, or about the support they would need. Their superficial compliance was therefore less a rejection of the innovation than a response to concerns that no one had answered.

This is consistent with what Chapter 8 said about culture: an administrative circular operates at the level of espoused values, while the faculty member's basic assumption remains that the annual evaluation and promotion do not

count this effort. Changing that assumption is beyond the reach of a circular; it requires culture-embedding mechanisms.

In Practice

Before rolling out an innovation to your colleagues, sit down with five of them who did not take part in the pilot and ask: What worries you most about it? Their answers will tell you which stage of concern they are in, and what support they need before any presentation of results.

15.4 Scaling readiness

Chapter 14 cautioned that a pilot run under ideal conditions says nothing about ordinary conditions. List calls this phenomenon the **voltage effect**: many programs that achieve strong results in their early trials lose much of their impact when they scale. The causes are largely predictable. Among them: the initial result was a false positive; those who took part in the pilot do not represent those who will later use the solution; pilot conditions differ from operating conditions; and costs rise with scale instead of falling (List, 2022).

Most of these causes converged in the opening case: the faculty members teaching the three courses were enthusiasts who had chosen the pilot, whereas those teaching the sixty courses had not; and the three courses enjoyed the center's direct support, which the sixty did not. This is why readiness questions should be asked before scaling: Has the solution been tested under conditions that represent reality? Does it work with people who did not choose it? What does it actually cost without exceptional support? Who will own and operate it?

One of the most important things to settle before scaling is the distinction between a solution's **core** and its **periphery**. Greenhalgh and colleagues' review noted that innovations with a fixed, well-defined core and a flexible, adaptable periphery spread more easily than innovations that are either

entirely rigid or entirely flexible (Greenhalgh et al., 2004). The core is what must remain unchanged for the value to survive; the periphery is what each unit can adapt to its own context. Figure 15.2 illustrates this distinction.

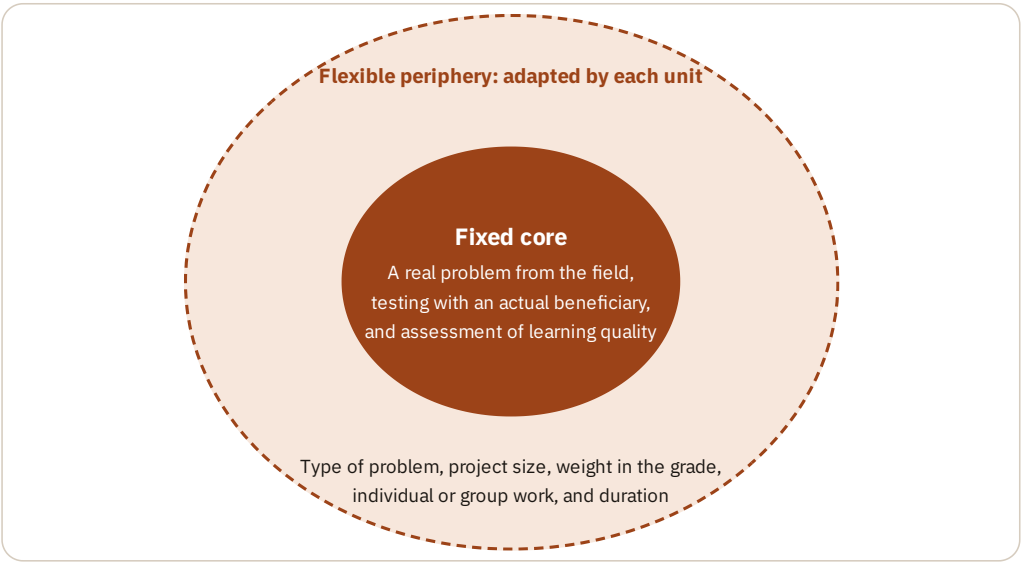


Figure 15.2 The fixed core and flexible periphery of the innovation project assignment model. Developed by the author, drawing on Greenhalgh et al. (2004).

Had the core been defined this clearly in the opening case, each faculty member could have adapted the model to their course without losing its value, and genuine implementation could have been told apart from superficial implementation with a single question: Has the core survived?

15.5 Transferring ownership

It is common in organizations for an innovation team to develop a solution and then "hand it over" to the unit that will operate it, only for that unit not to adopt it. The opening case of Chapter 13 offered one version of this. The reason is that ownership is built during the journey; it is not handed over at the end. Building it requires:

- **Involving the future owner from the start:** a representative of the operating unit should be a member of the team from the pilot stage onward, taking part in decisions and coming to see the solution as an integral part of their own work.
- **Embedding the solution in existing systems:** the budget, procedures, job descriptions and performance indicators. A solution that remains outside these systems remains a temporary project, however long it lasts.
- **Transferring knowledge alongside documentation:** the tacit knowledge the development team has acquired does not travel through written manuals; it requires a period of working together.
- **Defining the innovation team's role after the transfer:** Does it withdraw completely, or does it remain in a supporting role for a set period? And how will later improvements be passed on?

This is why the "operations voice" is one of the five roles on an innovation team, and why "Who will operate it?" is among the questions at the scaling gate.

15.6 Scaling pathways

Scaling takes more forms than a single leap from one unit to the entire organization. Three pathways can be distinguished, differing in speed and risk:

- **Phased scaling:** moving from one unit to a small number of units with different conditions, then to more, learning along the way with each wave. It is the slowest pathway and the least risky.
- **Pull-based scaling:** making the solution available to those who wish to adopt it, with clear support, and making its results visible so that it draws others in. It respects autonomy and builds on observability.
- **Comprehensive scaling:** implementation across the whole organization at once. It suits simple, proven solutions, or those whose nature requires

uniform implementation.

At the university, we propose that embedding innovation in courses begin with a limited number of interdisciplinary courses and then scale through pull and phasing together: the model is offered to interested faculty members with support from the center for teaching excellence, their students' projects are showcased at the annual innovation day, and supervising those projects counts toward the annual evaluation. When other faculty members see the results among their colleagues and find support and recognition, they adopt the model out of conviction. We return to this design in Chapter 20.

Principle

Administrative mandates produce compliance; conviction produces adoption. The quickest route to superficial compliance is to impose an innovation on people who were never consulted and never given what they needed to understand it.

Chapter tool: Scaling readiness check

Answer the following questions before any decision to scale, and give each dimension a rating: ready, partly ready, or not ready. A dimension that is not ready identifies what must be done before or during scaling, without necessarily requiring that scaling be halted.

Chapter tool Scaling readiness check

Dimension	Check question	Rating
Evidence	Has the solution been tested under conditions that represent reality, and with people who did not choose it?	
Core and periphery	Has it been defined what must remain fixed and what can be adapted?	

Dimension	Check question	Rating
Perceived characteristics	Do adopters see its advantage, compatibility and simplicity? And can they try it out?	
Adopters' concerns	Do we know their current concerns? And is support designed around them?	
Implementation climate	Is use of the solution expected, supported and recognized in the formal systems?	
Cost	What is the actual operating cost without exceptional support? And who bears it?	
Ownership	Who owns the solution? Did they take part in developing it? Has it been embedded in their budget and procedures?	
Pathway	Has the appropriate scaling pathway been chosen: phased, pull-based or comprehensive?	
Follow-up	How will we know that implementation is genuine rather than superficial?	

Chapter Summary

- There is a distance between adopting an innovation and implementing it, and implementation effectiveness depends on a climate that supports use and on the innovation's fit with users' values.
- The failure of many innovations owes more to shortfalls in the quality and consistency of their implementation than to any weakness in their effectiveness.

- Adoption is shaped by five characteristics as perceived by adopters: relative advantage, compatibility, complexity, trialability and observability.
- Adopters pass through stages of concern, beginning with self, then task, then impact, and effective support responds to the stage the person is in.
- Many programs lose their impact when they scale because pilot conditions were far removed from reality. Defining a fixed core and a flexible periphery helps a solution scale while preserving its value.
- Ownership is built throughout the journey, by involving the future owner and embedding the solution in existing systems.
- Scaling can follow several pathways: phased, pull-based and comprehensive. Administrative mandates produce compliance; conviction produces adoption.

Key Terms

Innovation implementation Innovation implementation	The actual, consistent use of an innovation by its intended users after the decision to adopt it.
Implementation climate Implementation climate	People's perception that using the innovation is expected, supported and rewarded.
Stages of concern Stages of concern	The progression of adopters' questions and concerns from self, to task, to impact.
Voltage effect Voltage effect	The decline in a program's impact as it scales from pilot to wide implementation.

Hard core and soft periphery Hard core and soft periphery	The distinction between what must remain fixed in an innovation and what can be adapted to each context.

Review and Discussion Questions

1. What is the difference between adopting an innovation and implementing it? And why might a good innovation be judged a failure? Understanding
2. Assess an innovation you are working to roll out against the five characteristics in Table 15.1, and identify the weakest. Application
1. Analyze the opening case using the concepts of stages of concern, the voltage effect and implementation climate. Analysis
2. Identify the fixed core and the flexible periphery of an innovation in your organization. Application
3. "A formal mandate from leadership is the fastest route to adopting an innovation." Evaluate this statement. Evaluation

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Part Four

Value and the ecosystem

How we know innovation creates value, and how it connects to what lies outside the organization.

Chapter 16: Measuring innovation and maturity

Chapter 17: Innovation and spending efficiency

Chapter 18: Open innovation and innovation ecosystems

Chapter 19: Responsible innovation

Chapter 16

16 Measuring innovation and maturity

How can an organization be confident that its innovation is creating value, and that its capability to innovate is growing? This question organizes the chapter: the results chain, the three levels of measurement, measuring people and the environment, and the errors that allow indicators to devour the very goals they were meant to serve, before arriving at the concept of maturity.

Introduction

Opening case: the ideas indicator (composite case)

A government agency added a new indicator to its employees' individual performance targets: submit at least two innovative ideas a year through the ideas platform. At year's end, the agency announced in its annual report that the number of ideas submitted had quadrupled. The platform's evaluation team, however, found that most of the ideas were duplicates or generic, that some had been copied from other agencies' platforms, and that many had been submitted in the final week of the year. Unable to evaluate such a volume, the team let the ideas pile up unanswered,

> and the few serious ones among them were lost in the crowd. The following year, employees spoke of the platform as a formality to be completed for the sake of the indicator.

The indicator hit its numerical target and damaged the purpose it was set up to serve: it measured activity and overlooked value, rewarded quantity at the expense of quality, and flooded the system beyond its capacity to respond. In this chapter, we set out how measurement can be designed to support innovation rather than distort it.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain the difficulties of measuring innovation and the effect of indicators on behavior.

٢ Build a results chain that links inputs to impact.

٣ Design indicators at the initiative, portfolio and system levels.

٤ Measure the human and environmental dimensions of innovation.

٥ Avoid common measurement errors, and use maturity assessment as a tool for learning.

16.1 Why is innovation hard to measure?

Innovation is hard to measure for at least three reasons. Its results are *delayed*: years may pass between an idea and its impact. They are *uncertain*: most initiatives do not succeed, and the few successes are the fruit of an entire portfolio of initiatives. And they are *difficult to attribute*: when an organization's performance improves, it is hard to say how much of the

improvement stems from any particular innovation. For these reasons, organizations tend to measure what is easy to measure: the number of ideas, events, participants and amounts spent.

Measurement, however, is not a neutral tool. Hauser and Katz observed that organizations become what they measure: indicators direct people's attention and effort, and people act in ways that improve the indicator even when this harms the purpose (Hauser & Katz, 1998). Decades earlier, Kerr had drawn attention to what he called "the folly of rewarding A while hoping for B": organizations often reward one behavior and then wonder why the behavior they wanted is missing (Kerr, 1975). The opening case is a direct example: submitting ideas was rewarded, while innovation was what had been hoped for.

16.2 The results chain

The **results chain**, known in the evaluation literature as the logic model, helps link what an organization spends to what it achieves (W. K. Kellogg Foundation, 2004). Figure 16.1 shows its links as applied to innovation.

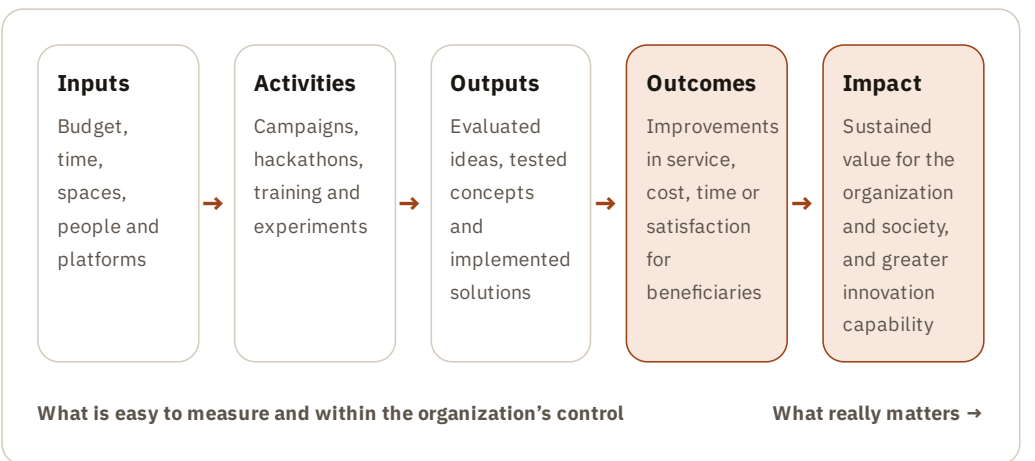


Figure 16.1 The innovation results chain, adapted from the logic model in W. K. Kellogg Foundation (2004).

Most innovation reports concentrate on the first two links, because they are the easiest to measure and the most within the organization's control. Outcomes and impact are what matter, but they take more effort to measure. Chapter 2 presented one version of this gap at the national level: the gap between the Kingdom's ranking on innovation inputs and its ranking on innovation outputs in the Global Innovation Index. An organization that measures only its inputs and activities may consider itself successful while producing nothing.

Inputs and activities remain necessary for understanding efficiency, but every indicator in the early links needs to be read alongside an indicator in the later ones: the number of ideas on its own says nothing, whereas the share that was implemented and the results it achieved say a great deal.

16.3 Three levels of measurement

Innovation management needs measurement at three levels, each with its own questions and indicators, as Table 16.1 shows.

Table 16.1 Levels of innovation measurement and suggested indicators for each

Level	Question	Suggested indicators
Initiative	Is the initiative learning enough to deserve to continue?	Number of critical assumptions tested, and which were confirmed or refuted; the cost and duration of each experiment; initiative-specific outcome indicators after implementation
Portfolio	Are initiatives flowing, balanced and delivering value collectively?	Distribution of initiatives across types and horizons; average time an initiative spends at each stage; share of decisions made on time; number of initiatives stopped by decision; share reaching implementation; value realized from what was implemented

Level	Question	Suggested indicators
System and capability	Is the organization's capability for repeated innovation growing?	Creative climate; participation of different units; response time to ideas; share of ideas whose authors received a reasoned response; share of implemented solutions still in use after a year

Two indicators in this table deserve particular emphasis, because they measure what this book regards as among the most serious breakdowns in the system. The first is the **share of decisions made on time**, together with the average age of ideas still awaiting a decision; these directly measure the extent of the decision limbo described in Chapter 5. The second is the **share of implemented solutions still in use after a year**, which distinguishes genuine implementation from the superficial implementation discussed in Chapter 15.

Note that indicators for an initiative in its early stages measure learning; outcome indicators belong to later stages. Asking an initiative in the exploration stage for a financial return is like applying the criteria of the scaling gate at the opportunity gate.

16.4 Measuring people and the environment

If people are the heart of the innovation system, as this book holds, then measuring them is an integral part of measuring the system. What this means is measuring what people experience in their environment: Do they find recognition, opportunity and support? Counting how many ideas each employee submits, as in the opening case, measures something else entirely.

Well-established research instruments exist for this purpose. Ekvall developed a measure of **creative climate** covering dimensions such as challenge, freedom, idea support, trust and openness, idea time, risk taking, and conflict as a negative dimension (Ekvall, 1996). Amabile and colleagues developed an instrument for assessing the work environment for creativity, measuring both

stimulants and obstacles (Amabile et al., 1996). Such instruments allow an organization to know where it stands and to track the effect of what it does to improve its environment.

The innovator's experience of the system can also be measured directly, using indicators drawn from the needs set out in Table 7.1:

- **Recognition:** the share of ideas whose authors received a reasoned response, the average response time, and the share of implemented ideas whose authors remained involved in implementing them.
- **Opportunity:** the number of steps between the person with the idea and someone able to help, and the share of units from which ideas have come.
- **Time and resources:** the share of initiatives whose members received protected time.
- **Climate:** results of a short periodic creative climate survey, compared across units and years.

At the university, the findings of a study on faculty support can be measured by asking students how far their instructors encourage their creative ideas in courses, and how confident they are in their own creative abilities (Alsamani & Alqahtani, 2026). This measures a link in the ecosystem that does not appear in incubator and accelerator reports, even though it touches every student.

In Practice

Pick ten ideas submitted in your organization six months ago and trace what became of each: Was a decision made on it? When? Did its author learn the reason? This simple measure says more about the innovation system than the number of ideas submitted.

16.5 When the indicator devours the goal

The psychologist Campbell formulated an observation that has come to be known as his law: the more a quantitative indicator is relied upon for social decision-making, the more it is subject to corruption pressures and the more it distorts the processes it was meant to monitor (Campbell, 1979). In the measurement of innovation, this phenomenon appears in recurring forms:

- **Vanity metrics:** numbers that look good in reports but say nothing about value, such as the number of ideas, events, attendees and followers.
- **Tying the indicator to individual incentives:** it then turns from a learning tool into a target to be chased, as in the opening case.
- **Premature measurement:** demanding results from an initiative before it has had time to achieve them, so that promising initiatives are halted or their early results are overstated.
- **The single indicator:** relying on one number that reduces innovation to a single figure, which is then improved at the expense of everything else.
- **Measuring entities rather than flow:** each unit measures its own activity in isolation, so what is lost in the spaces between them stays invisible, such as ideas that never find their way from the course to the accelerator.

These errors can be limited by using indicators as a balanced, multidimensional set; reading activity indicators alongside outcome indicators; separating learning indicators from individual incentives; and periodically reviewing the indicators themselves by asking: Does this indicator still serve the purpose, or has it become an end in itself? The balanced scorecard offers a closely related idea: performance should not be reduced to a single dimension, and the different dimensions should be read together (Kaplan & Norton, 1992).

Caution

An indicator tied to an individual incentive stops measuring reality and starts shaping it. If the aim is for people to put forward good ideas, measure what happens to their ideas after they are submitted.

16.6 Innovation management maturity

Many organizations use **maturity models** to assess their innovation management; these models describe successive levels of capability. Figure 16.2 offers a simplified version of these levels, derived from the logic of this book.

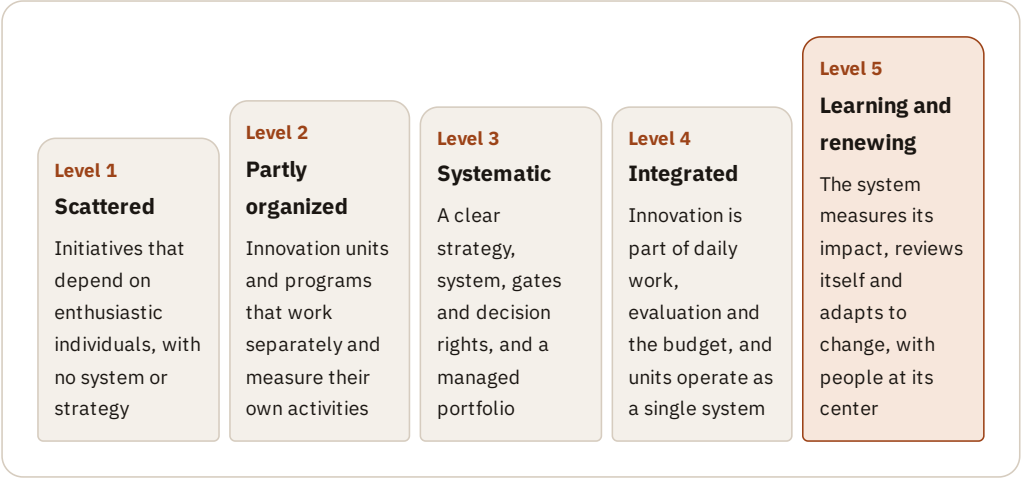


Figure 16.2 Levels of innovation management maturity in simplified form. Prepared by the author.

Maturity models have both uses and limits. They are useful in giving an organization a shared language for describing its situation and identifying the next step. Their limit is that they can turn into a ladder climbed for appearances: the organization meets a level's requirements on paper, much as a certificate of conformity can become a stage for innovation theater. The international guidance on innovation management assessment recommends that assessment serve as a means of understanding the current situation and

drawing out what can be improved (ISO, 2019). The most important question in any maturity assessment is not "What level are we at?" but "What is preventing us from innovating repeatedly, and what is the next step to remove it?"

Chapter tool: Balanced measurement dashboard

Build a measurement dashboard for your organization's innovation system with two or three indicators per cell, and no more. Make sure every indicator in the activities column is matched by one in the outcomes column. Then ask of each indicator: How could it be met on paper only? If you find an easy way, rewrite it.

Chapter tool Balanced measurement dashboard (example from the university case)

Level	Inputs and activities	Outputs	Outcomes and impact
Initiative	Cost and duration of experiments	Assumptions tested and those confirmed	Improvement in the problem indicator for beneficiaries
Portfolio	Distribution of initiatives across types and units	Share of decisions on time; initiatives stopped by decision	Share implemented; value realized from it
System and capability	Courses that include innovation projects	Response time to ideas; student movement between units	Creative climate; students' confidence in their creative abilities; solutions still in use after a year

Chapter Summary

- Innovation is hard to measure because its results are delayed, uncertain and difficult to attribute to their source, and organizations become what they measure.

- The results chain links inputs and activities to outputs, outcomes and impact, yet most reports stop at its first two links.
- Innovation is measured at three levels: the initiative through learning indicators, the portfolio through flow and balance indicators, and the system through capability indicators.
- The share of decisions made on time measures decision limbo, and the persistence of solutions after a year distinguishes genuine from superficial implementation.
- People and the environment are measured with creative climate instruments and with indicators derived from innovators' needs and the fate of their ideas.
- The more an indicator is relied upon and tied to incentives, the more it is distorted; balanced measurement and periodic review of indicators limit this.
- Maturity models are a shared language and a learning tool, and they lose their value once they turn into a ladder climbed for appearances.

Key Terms

Results chain / logic model Results chain / logic model	A sequence linking inputs and activities to outputs, outcomes and impact.
Vanity metrics Vanity metrics	Numbers that look good in reports but do not indicate the value actually achieved.
Campbell's law Campbell's law	The more a quantitative indicator is relied upon in decision-making, the greater the pressure to corrupt it and to distort what it measures.

Creative climate Creative climate	The observable patterns of behavior and feeling at work that encourage or hinder creativity, and that can be measured.
Maturity model Maturity model	A description of successive levels of capability, used to assess the current situation and identify the next step.

Review and Discussion Questions

1. Why do organizations tend to measure inputs and activities? And what is the danger of stopping there? Understanding
2. Analyze the opening case using Kerr's and Campbell's ideas, and propose two alternative indicators. Analysis
1. Design three indicators for your organization's innovation portfolio, one of which measures decision limbo. Application
2. Build a balanced measurement dashboard for your organization's innovation system, and test each indicator by asking: How could it be met on paper only? Application
3. "Reaching Level 5 in the maturity model is the most important goal of innovation management." Evaluate this statement. Evaluation

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Chapter 17

17 Innovation and spending efficiency

The relationship between innovation and money has two inseparable sides: innovation is a route to greater spending efficiency, and spending on innovation must itself be efficient. The chapter is built on these two sides. We show how early knowledge reduces the cost of error, why the total cost of a solution over its lifetime should be the yardstick, why large projects overrun their budgets, how feasibility can be assessed along multiple dimensions, and which costs never appear in any budget.

Introduction

Opening case: two projects (composite case)

A government agency decided to rebuild one of its main services digitally in a single large three-year project, following a detailed feasibility study and a contract with a major firm. By the third year, the project had run roughly double its budget and its launch was a year late; when it finally went live, users discovered that the regulations governing many of the steps it had been built around had changed during the implementation period. Meanwhile, a small team in another department had spent six weeks

> testing a change to a single step in a similar service, at negligible cost, cutting its completion time in half, and then gradually rolled it out to the remaining branches.

The difference between the two projects lies less in the technical competence of those who carried them out than in how they handled uncertainty: the first committed to everything before it knew, while the second learned before it committed. This paradox is our starting point for explaining why the second approach usually makes more efficient use of money, even though the first may look more disciplined.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Distinguish between innovation as a means of spending efficiency and efficiency in spending on innovation.

٢ Explain why the cost of change rises as a project advances, and the value of spending early on learning.

٣ Calculate the total cost of a solution over its lifetime.

٤ Explain why large projects overrun their budgets, and the methods for limiting such overruns.

٥ Assess an initiative's feasibility along multiple dimensions, and recognize the hidden costs of weak innovation management.

17.1 Two sides of the relationship

Governments, including the Kingdom under Vision 2030, are seeking to raise the efficiency of public spending, that is, to achieve greater value with the resources available (Saudi Vision 2030, 2016 [Arabic]). Innovation relates to this direction in two ways.

On the one hand, innovation is a **means of spending efficiency**: many public-sector innovations reduce costs, save time, prevent waste, or achieve a better result for the same cost. The change made by the small team in the opening case is an example. On the other hand, **spending on innovation itself needs to be efficient**: centers, platforms, accelerators and large projects consume resources, and may not produce enough to justify their cost.

We bring the two sides together in a single question: How can an organization spend on innovation so that every riyal buys the greatest possible amount of learning and value? Here we build on the staged funding and real options logic presented in Chapter 10, and on the discussion of experimentation in Chapter 14.

17.2 The cost of learning and the cost of error

One of the oldest observations in software engineering is that the cost of correcting an error rises the later it is discovered. Boehm showed that correcting a requirements error after a system is in operation can cost many times more than correcting it during the requirements stage, and that in large projects the difference can reach a hundredfold (Boehm, 1981). The same logic holds for innovation in general, as Figure 17.1 illustrates.

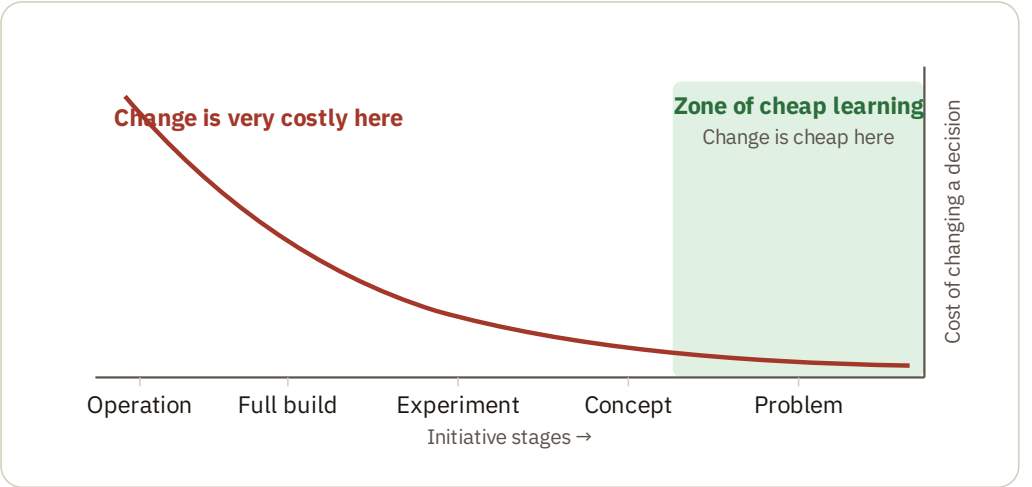


Figure 17.1 The rising cost of changing a decision as an initiative advances. Developed by the author, drawing on **Boehm (1981)**. The curve is illustrative.

A simple principle follows: early spending on learning is the cheapest spending in innovation. Thomke and Fujimoto studied what they called **front-loading** problem solving in automotive development, and found that companies that identify and solve problems in the early stages of development, through simulation and prototypes, shorten development time and reduce its cost compared with those that discover problems late (Thomke & Fujimoto, 2000).

In the opening case, most of the money was spent after commitment, when every change had become expensive. The small team, by contrast, spent a little in the zone of cheap learning and then spent on scaling once it knew what worked. This is what it means to understand the problem before the solution and to test assumptions before building: it is the most efficient way to spend money.

17.3 Total cost, not launch cost

Organizations often make the mistake of evaluating a solution by its launch cost alone: the cost of building, buying or setting it up. Yet this may be the smallest part of the true cost. The concept of **total cost of ownership** proposes

that a solution be costed over its entire lifetime: purchase, operation, maintenance, training, support, upgrades and indirect internal costs, and then the cost of decommissioning or replacement (Ellram, 1995).

This concept explains a recurring phenomenon in innovation ecosystems: entities established with large start-up budgets whose annual operating costs, and the staff time needed to bring them to life, were never calculated, so that they remain standing but inactive. A digital fabrication lab (fab lab) at a university costs, in addition to the price of its equipment, technicians to run it, consumables, maintenance, faculty hours to integrate it into courses, and sustained effort to draw students to it. An organization that funds the set-up and overlooks these elements buys equipment, while the ecosystem remains outside its reckoning. This connects to the sustainability equation in the business model discussed in Chapter 13.

In Practice

Choose an innovation entity or platform in your organization and calculate its total cost over the past year: its approved budget, plus the time of staff who work in it or with it, licenses, space and maintenance. Then divide the total by the number of solutions actually implemented thanks to it. This figure may change the way you talk about it.

17.4 Why do large projects overrun their budgets?

Flyvbjerg and colleagues studied a database of more than sixteen thousand large projects across different sectors and countries. They found that only about 8.5 percent were delivered on budget and on time, and only about 0.5 percent were delivered on budget, on time and with the expected benefits (Flyvbjerg & Gardner, 2023). They attributed this to multiple factors, chief among

them **optimism bias**, which leads planners to underestimate costs and risks and overestimate benefits, along with the pressure to make a project look attractive so that it gets approved (Flyvbjerg, 2014).

Flyvbjerg and Gardner propose several principles for limiting overruns, most of which are consistent with the logic of this book:

- **Think slow, act fast:** invest time in planning and experimentation while change is cheap, then execute quickly once delay becomes costly. This is what Figure 17.1 illustrates.
- **Reference class forecasting:** estimate a project's cost and duration by looking at what actually happened in similar projects, since focusing solely on the details of the project at hand invites optimism.
- **Small, repeatable modules:** projects built from small units that are repeated and improved with each iteration are less prone to overruns than huge one-off projects. This is consistent with the phased scaling discussed in Chapter 15.

This does not mean that large projects are wrong in themselves; some solutions cannot be broken down. It does mean that every part that can be tested small before a large commitment should be tested.

17.5 Multidimensional feasibility

Feasibility studies are sometimes reduced to a financial calculation: cost against return. Public investment decisions, however, call for a broader view. HM Treasury's guidance on appraising public investment offers a framework of five cases that any investment proposal should address (HM Treasury, 2022). Table 17.1 sets them out alongside their counterparts in this book.

Table 17.1 The five dimensions of feasibility assessment, adapted from HM Treasury (2022)

Dimension	Its question	Counterpart in this book
Strategic	Is there a genuine need for intervention? And is it consistent with priorities?	Understanding the problem (Ch. 11), and search fields (Ch. 4)
Economic	Does this option deliver the best value for society compared with the alternatives, including doing nothing?	Comparing alternatives (Ch. 12), and public value (Ch. 13)
Commercial	Can the solution be procured or delivered on suitable terms and through workable partnerships?	Resources and partners in the business model (Ch. 13)
Financial	Is the total cost affordable and covered over the solution's lifetime?	Total cost (this chapter), and the sustainability equation (Ch. 13)
Management	Are the capability and governance needed for delivery and operation in place?	Governance (Ch. 10), and ownership and scaling (Ch. 15)

Drawing on the logic of this book, we add to these dimensions a sixth that is often overlooked: the **human dimension**. Is there anyone with the motivation and ability to work on this initiative? And will those who are to use and operate it accept it? An economically sound initiative that no one adopts fails just as surely as an economically weak one, and Chapter 15 showed why.

The depth of analysis in each dimension should match the initiative's stage. As Chapter 10 showed, criteria progress from assumptions to evidence, and the feasibility study progresses with them: brief questions at the start of an initiative, and deeper study before committing to scale.

17.6 Costs that do not appear in the budget

Organizations count what they spend, but rarely count what they lose. In innovation management there are substantial costs that do not appear in any budget, as Figure 17.2 shows.

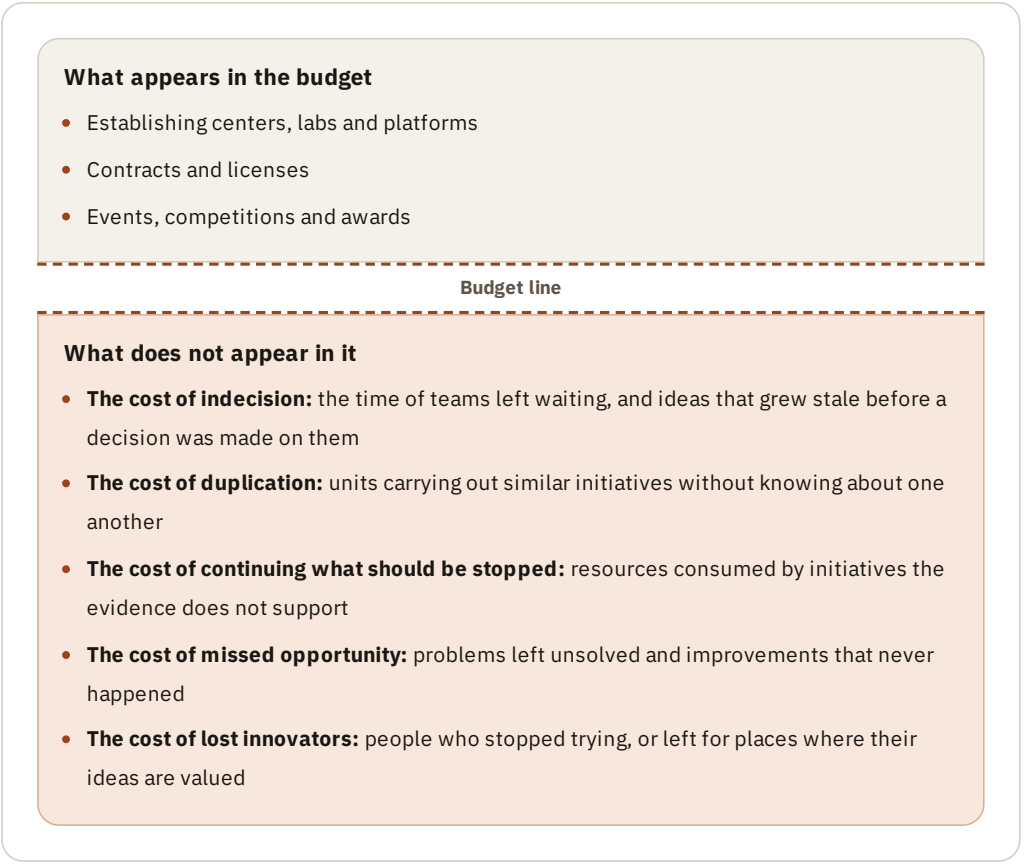


Figure 17.2 Visible and hidden costs in innovation management. Prepared by the author.

The heaviest of these costs is the last, and it is also the hardest to calculate. Chapter 7 recounted what one successful innovator said about a gifted friend who was forced into a job far from his passion, whereupon his interest in his project faded (Alsamani, 2023). Every organization has people who have stopped putting forward their ideas because they have learned that no one listens. This is the thesis on which this book rests, expressed in financial terms: a system

that spends on visible inputs and neglects people pays twice over, once for what it built and again for what it lost of people's capacity and desire to innovate.

Principle

The most efficient spending on innovation is early spending on learning and sustained spending on people. The least efficient is setting up large entities before it is known who will use them, how they will work, and who will bear their cost.

Chapter tool: Value and total cost worksheet

Complete this worksheet for any initiative or entity proposed for establishment or expansion. Make sure the cost is calculated over at least five years, and that it is compared with two alternatives: a smaller option and a do-nothing option.

Chapter tool Value and total cost worksheet

Item	Question	Answer
Need	What problem does it address? What is the evidence for it?	
Launch cost	Building, purchase or set-up	
Annual operating cost	People, maintenance, licenses, materials and space	
Internal human cost	Staff or faculty time needed to bring it to life	
Five-year total cost	Sum of the above	
Expected value	What will improve? How will it be measured? (Chapter 16)	

Item	Question	Answer
Reference class estimate	What happened in similar initiatives here or in other organizations?	
Smaller option	What is the smallest version that could test the value first? And what would it cost?	
Do-nothing option	What happens if we do nothing?	
Human dimension	Who will work on it? Who will use it? Do they want it?	
Owner and permanent funding source	Who bears the cost after the first year?	

Chapter Summary

- The relationship between innovation and money has two sides: innovation is a means of spending efficiency, and spending on innovation needs to be efficient.
- The cost of change rises as an initiative advances, which is why early spending on learning is the cheapest spending in innovation.
- Solutions are evaluated by their total cost over their lifetime; funding set-up while overlooking operation provides equipment but leaves the ecosystem unbuilt.
- Most large projects overrun their budgets for reasons led by optimism bias; reference class forecasting, small repeatable modules, and thinking slowly before acting quickly help limit this.
- Feasibility is assessed along five dimensions, strategic, economic, commercial, financial and management, to which we add the human dimension.

- Among the heaviest costs of innovation are those that never appear in the budget: indecision, duplication, continuing what should be stopped, and lost innovators.

Key Terms

Spending efficiency Spending efficiency	Achieving the greatest possible value with the resources available.
Front-loading Front-loading	Identifying and solving problems in the early stages, when change is cheapest.
Total cost of ownership Total cost of ownership	The cost of a solution over its entire lifetime, from purchase through operation to decommissioning.
Optimism bias Optimism bias	The tendency, when planning, to underestimate costs and risks and to overestimate benefits.
Reference class forecasting Reference class forecasting	Estimating cost and duration by looking at what actually happened in similar projects.

Review and Discussion Questions

1. Why is early spending on learning the most efficient spending in innovation? Understanding
2. Calculate the total cost of an innovation entity in your organization, and compare it with its approved budget. Application
1. Analyze the two projects in the opening case using the chapter's concepts: the cost of change, optimism bias and small modules. Analysis

2 Apply the five dimensions and the human dimension to a proposed initiative in your organization. **Application**

3 "Spending on innovation is a luxury in times of spending restraint." Evaluate this statement. **Evaluation**

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Chapter 18

18 Open innovation and innovation ecosystems

In this chapter we look beyond the boundaries of the organization. We trace how an organization can benefit from the knowledge and ideas that exist outside it, how far it should open up, what capacity it needs to absorb what flows in, and which forms of partnership are available to it; we then turn to how innovation ecosystems work, bringing together universities, government, the private sector and society.

Introduction

Opening case: a services company (composite case)

For years, a logistics services company struggled to improve the scheduling of its fleets, and its technical team worked on the problem with little to show for it. It then launched an open challenge with a modest prize, and an effective solution arrived from a graduate student in applied mathematics who knew nothing about logistics but recognized in the problem a mathematical model familiar from her own field. Yet the company could not make use of the solution. No one on its team understood the model well enough to integrate it into the company's systems, and some

> engineers felt that a solution from outside the field "doesn't understand our reality." The solution stayed in the challenge report.

The company succeeded in opening up and failed at absorbing. Knowledge reached it from an unexpected quarter, but it lacked both the internal capacity to understand and use that knowledge and a culture willing to accept what came from outside. These two sides together form the subject of this chapter: how an organization opens up, and how it absorbs what it opens up to.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Define open innovation and distinguish among its three directions.

٢ Explain why too much openness can be as harmful as closedness.

٣ Explain absorptive capacity and recognize resistance to what comes from outside.

٤ Choose the appropriate form of partnership for each purpose.

٥ Describe innovation ecosystems, the organization's place within them, and their role in supporting innovators.

18.1 From closed to open innovation

For most of the twentieth century, the research laboratories of large companies operated on a closed logic: the organization innovates by itself, with the best minds it can hire, protects what it produces, and develops it all the way to the market. Chesbrough observed that this logic had lost much of its validity, because knowledge had become widely distributed, talented people moved between organizations, and no single organization could any longer

monopolize the knowledge it needed. He proposed an alternative he called **open innovation**: the organization uses external ideas alongside internal ones and makes its unused ideas available to others (Chesbrough, 2003). Later, with Bogers, he defined it as a distributed innovation process based on purposively managed knowledge flows across organizational boundaries (Chesbrough & Bogers, 2014).

The word "purposively" matters in this definition. Open innovation does not mean throwing the doors open to everything; it means designing the flows of knowledge between the organization and its surroundings. Three directions of these flows can be distinguished, as Figure 18.1 shows.

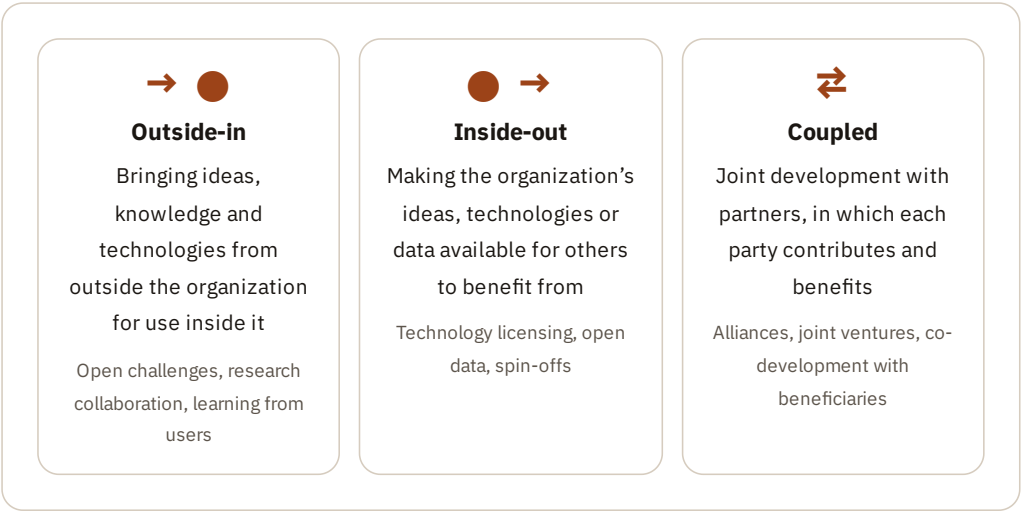


Figure 18.1 The three directions of open innovation, adapted from Chesbrough & Bogers (2014).

Chapter 11 presented one form of the first direction in lead users, who innovate for themselves before any provider offers them a solution. Chapter 13 presented one form of the second direction in the Xerox technologies that found no place in the company's business model and left to become spin-offs.

18.2 How open should an organization be?

If openness is beneficial, does its benefit keep growing the more open an organization becomes? Laursen and Salter studied data on some 2,700 British manufacturing firms and measured their openness along two dimensions: **breadth**, the number of external sources a firm draws on, and **depth**, the extent to which it relies on each source. They found that the relationship between openness and innovative performance takes the shape of an arc: performance improves as openness increases up to a point, then declines once openness exceeds the organization's ability to follow its sources and benefit from them (Laursen & Salter, 2006). An organization that opens channels with every possible party may drown in relationships it cannot manage, just as an organization that opens a platform to every idea does.

Among the strongest arguments for openness is that a solution may come from where it is least expected. Jeppesen and Lakhani studied more than 160 scientific problems that companies had posted on an open challenge platform after their own laboratories had failed to solve them, and found that the likelihood of a solution was higher when the solver's field of expertise was distant from the field of the problem (Jeppesen & Lakhani, 2010). The distant specialist sees the problem through the tools of their own field, just as the student in the opening case saw the scheduling problem as a familiar mathematical model. This connects with the discussion in Chapter 12 of distant analogy as a way of breaking design fixation.

18.3 Absorptive capacity

Knowledge reaching the organization is only a first step; what follows is the ability to understand and use it. Cohen and Levinthal coined the concept of **absorptive capacity** to describe this: an organization's ability to recognize the value of new external knowledge, assimilate it and apply it. They showed that this ability depends on the organization's prior related knowledge; an organization can absorb only what lies close to what it already knows. For this

reason, they argued, internal research and development has two faces: it generates new knowledge, and it builds the capacity to absorb the knowledge of others (Cohen & Levinthal, 1990).

An important practical consequence follows from this concept: open innovation rests on an internal capability that supports it and receives what it brings in. An organization that hollows itself out of expertise by relying on partners and suppliers loses the ability to judge what they offer and to integrate it into its work. This is what happened in the opening case: no one in the company understood the mathematical model well enough to use it.

Absorption faces another obstacle, this time rooted in attitudes: resistance to what comes from outside, known as the not-invented-here syndrome. Katz and Allen studied R&D teams and found that the longer members remained together, the less the team communicated with external sources, and the more its performance declined along with it (Katz & Allen, 1982). This tendency can be countered by the boundary-spanning activities discussed in Chapter 9 and by the culture open to different ways of thinking discussed in Chapter 8. Respect for knowledge arriving from outside is another face of respect for ideas arriving from the most junior employee inside.

In Practice

Before you launch an open challenge or enter a partnership, identify by name who in your organization will receive what it brings: who will read the solutions, who has the knowledge to evaluate them, and who will integrate them into the work. If you cannot find these people, start by building this capacity before opening up.

18.4 Forms of partnership

Openness takes many forms, each suited to a particular purpose and each carrying its own risks. Table 18.1 sets out the most prominent of them.

Table 18.1 Forms of partnership in open innovation

Form	Suited to	What it requires of the organization	Risk
Open challenges	A specific problem that can be clearly formulated and might be solved from a distant field	Precise problem formulation, and the capacity to evaluate and integrate solutions	Solutions that go unused, as in the opening case
Research collaboration with universities	Problems that require deep scientific knowledge and a longer time frame	Patience with the pace of research, and someone who translates between the language of research and the language of practice	Published research that never turns into application
Working with startups	Fast-evolving technical solutions, and trying out new approaches	Flexible procurement and contracting procedures suited to the size of a startup	Procedures that exhaust the startup before it begins
Co-development with beneficiaries	Services whose value depends on the experience of those who use them	Respect for beneficiaries' time, and a clear response to their contributions	Token participation in which beneficiaries' views have no influence
Partnership with the private sector in service delivery	Services for which the private sector has capabilities or resources the agency lacks	Contracts that specify the public value required and accountability for it	Transferring risk without transferring the capacity to manage it

Form	Suited to	What it requires of the organization	Risk
Making data and technologies available	Data or technologies held by the organization on which others can build	Standards for privacy, quality and intellectual property	Releasing what should not be released, a matter taken up in Chapter 19

Two conditions recur across most of these forms. The first is that the problem be clear before the partnership begins, as Chapter 11 showed; a partnership built around a vague problem usually ends in conflicting expectations. The second is that the organization have a person or unit that acts as a bridge between the partner and the inside: one that understands the language of both sides, follows the relationship, and ensures that what comes from outside reaches those who need it.

18.5 Innovation ecosystems

An organization innovates within a wider system of actors, regulations and relationships. The concept of the **national innovation system** emerged to describe the network of public and private institutions that interact to produce, diffuse and use knowledge in a given country, and to stress that national innovation performance depends on the quality of these interactions as much as on the capabilities of each actor (Lundvall, 1992). The **triple helix** model focuses on three main parties in this system and holds that innovation arises from their interaction, to the point that each party sometimes takes on some of the roles of the others (Etzkowitz & Leydesdorff, 2000), as Figure 18.2 shows.

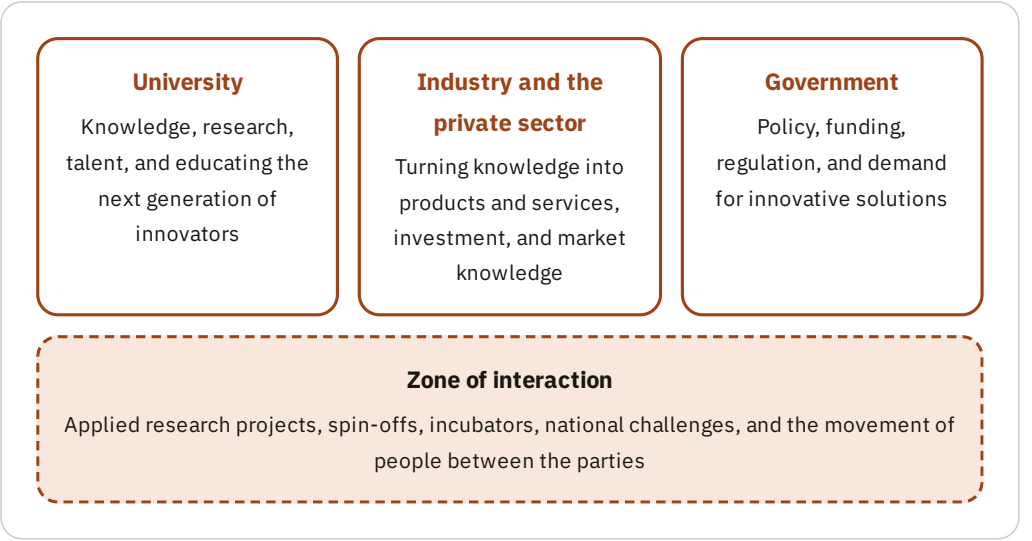


Figure 18.2 The triple helix of the innovation ecosystem, adapted from Etzkowitz & Leydesdorff (2000).

In the Kingdom, this system is taking shape around the national research, development and innovation priorities presented in Chapter 2, and around the role of the Research, Development and Innovation Authority (RDIA) as enabler and regulator of the sector (Saudi Press Agency, 2022 [Arabic]). This means that an organization, whether a university, a government agency or a company, can link the search fields in its strategy to these priorities and so find partners, funding and demand for its solutions.

Ecosystems carry risks of their own. Adner warned that the success of an innovation may depend on other parties in the ecosystem whom the organization does not control: on partners who must also innovate for the solution to work, and on links in the adoption chain that must accept the solution before it reaches the end beneficiary (Adner, 2006). A government solution that requires another agency to change its systems, or a university solution that depends on acceptance by a field-training provider, is exposed to risks invisible to anyone who looks only at their own organization.

18.6 The community that supports the innovator

Innovation ecosystems are usually studied from the perspective of institutions; in this book we also look at them from the perspective of the person: what does the innovator need from the community around them? In a phenomenological study conducted with ten Saudi innovative entrepreneurs, participants identified four features of a supportive community: recognizing the innovator's distinctiveness and understanding their personal and cognitive style; investing in the innovator, promoting them and connecting them to suitable economic settings; financial and operational empowerment of their initiatives; and building their innovative and entrepreneurial identity through flexible environments that allow deep learning and genuine practice (Alsamani, 2026 [Arabic]).

These features converge with the findings of another study of the experiences of prominent innovators, most of whom saw their network of relationships as a pathway to opportunities, and all of whom agreed on the importance of interacting with peers (Alsamani, 2023). In the innovator's eyes, the ecosystem is people who know them, opportunities they can reach, and peers they learn alongside.

The university holds a unique position in this ecosystem, because it is the party through which most innovators pass during their formative years. When it connects its students with the problems of government agencies and companies in its region, offers them internships and joint projects, and introduces them to opportunities aligned with national priorities, it builds for them the network of relationships they need before they graduate. We return to this role in detail in Chapter 20.

Principle

Openness brings in knowledge, internal capacity absorbs it, and culture accepts it. An organization that has only the first collects solutions in reports; one that has all three turns them into value.

Chapter tool: the partner map

Draw a map of the external parties that could contribute to an initiative or an innovation area in your organization. For each party, write down what it offers, what it wants in return, the appropriate form of partnership, and who in your organization will receive what comes from it. Then identify the party on which the initiative depends but which you do not control: it is your first source of risk.

Chapter tool The partner map (an example from the university case)

Party	What it offers	What it wants	Form of partnership	Who receives it internally
Regional development authority	Real development problems, data, and potential funding	Workable solutions, and local talent	Annual student challenges on regional priorities	The orchestrating unit, and instructors of related courses
Major companies in the region	Internships, mentors, and sponsorship	Job-ready graduates, and solutions to their problems	Joint capstone projects, and mentoring programs	The partnerships unit, and project supervisors

Party	What it offers	What it wants	Form of partnership	Who receives it internally
National bodies for innovation and gifted education	Programs, competitions, and funding	High-quality student participation	Linking their programs to the student's extended pathway	Gifted support services, and the accelerator
Innovative alumni	Peer mentoring, and relatable stories	Belonging, and opportunities for networking and investment	A network of innovative alumni	Alumni affairs

Chapter Summary

- Open innovation is a process based on purposively managed knowledge flows across organizational boundaries, in three directions: outside-in, inside-out, and coupled.
- Openness has an optimal level, beyond which it exceeds the organization's ability to benefit from its sources.
- A solution may come from a field distant from that of the problem, and this is among the strongest arguments for openness.
- Absorptive capacity is a precondition for benefiting from external knowledge and depends on related internal knowledge, so openness is no substitute for internal capability.
- Each form of partnership has its purpose and its risks, and all share two conditions: a clear problem, and an internal bridge to receive what comes from outside.
- An organization works within an ecosystem that brings together university, industry and government, and the success of its innovation may depend on parties it does not control.

- In the innovator's eyes, the ecosystem is people, opportunities and peers, and the university holds a unique position in building a network of relationships for its students before they graduate.

Key Terms

Open innovation Open innovation	A distributed innovation process based on purposively managed knowledge flows across organizational boundaries.
Absorptive capacity Absorptive capacity	An organization's ability to recognize the value of external knowledge, assimilate it and apply it.

Not-invented-here syndrome Not-invented-here syndrome	Resistance to ideas and knowledge that come from outside the team or the organization.
National innovation system National innovation system	The network of public and private institutions that interact to produce, diffuse and use knowledge in a given country.
Triple helix Triple helix	A model that explains innovation through the interaction of university, industry and government.
Ecosystem risk Ecosystem risk	The dependence of an innovation's success on partners and adoption links that the organization does not control.

Review and Discussion Questions

1. Why is open innovation no substitute for internal capability? Understanding

2. Analyze the opening case using the concepts of absorptive capacity and the not-invented-here syndrome, and suggest what should have been done before the challenge. Analysis

1. Choose a problem in your organization and identify the most suitable form of partnership for it from Table 18.1, giving your reasons. Application

2. Draw a partner map for an innovation area in your organization, and identify the party that represents the greatest ecosystem risk. Application

3. "The more partners an organization has, the greater its capacity to innovate." Evaluate this statement. Evaluation

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19 Responsible innovation

Chapter 19

In this chapter we turn to the most neglected side of innovation management: its effect on those who were never asked about it. We propose a framework that builds responsibility into the initiative journey, and from there move on to the ethics of experimenting on people, the governance of data and artificial intelligence, fairness in the ownership of ideas, and the environmental impact of innovation.

Introduction

Opening case: a reporting app (composite case)

A city launched an app that automatically detects road defects from residents' phones while they drive and ranks maintenance work by the number of reports from each neighborhood. The app looked like a clear success: thousands of reports, faster response, and lower costs than field inspections. A year later, an engineer noticed that maintenance had become concentrated in newer, higher-income neighborhoods, while it had declined in older ones. The reason was that residents of the older neighborhoods,

> many of them elderly, used the app less. The app had redistributed the service without anyone deciding that it should.

There was no intended injustice in this case. The app was designed in good faith and succeeded on every measure applied to it. Yet the measure itself, the number of reports, reflected who used the app, while those who needed maintenance remained outside the picture. This paradox is our starting point for the question that occupies this chapter: how can responsibility be built into innovation management as part of its quality?

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain why innovations produce unintended consequences, and why these are hard to control once the innovations have spread.

٢ Apply the four dimensions of responsible innovation to an initiative in their own organization.

٣ Apply the core ethical principles when designing experiments involving people.

٤ Recognize the risks of data and artificial intelligence in innovation initiatives, and the frameworks for governing them.

٥ Design a fair policy for the ownership and attribution of ideas.

٦ Evaluate the environmental impact of an innovation initiative and identify the level of sustainability-oriented innovation to which it belongs.

19.1 Why is responsibility part of innovation management?

As early as the 1930s, the sociologist Merton pointed out that every purposive social action produces consequences its actor did not intend, owing to incomplete knowledge, errors of judgment, and a focus on immediate rather than distant results (Merton, 1936). Innovation, by its very nature, is action in unknown territory, so its unintended consequences are all the more likely.

One of the clearest examples is what Obermeyer and colleagues uncovered in an algorithm widely used in the US health system to identify patients in need of additional care. The algorithm used past treatment costs as a proxy measure for health need, and because less was spent on treating Black patients, for reasons related to access to care, it underestimated their need. The researchers found that correcting the measure would have raised the share of Black patients receiving additional care from about 18 percent to about 46 percent (Obermeyer et al., 2019). This case is another illustration of the point made in Chapter 16 that an indicator can swallow the goal: a proxy measure carries assumptions that those who use it may not see.

Anyone who wants to control these consequences faces a dilemma formulated by Collingridge. In the early stages, an innovation is easy to change, but its consequences are not yet known. In the later stages, its consequences are clear, but changing it becomes difficult and costly because it has spread and interests and systems have become tied to it (Collingridge, 1980). Figure 19.1 illustrates this dilemma.

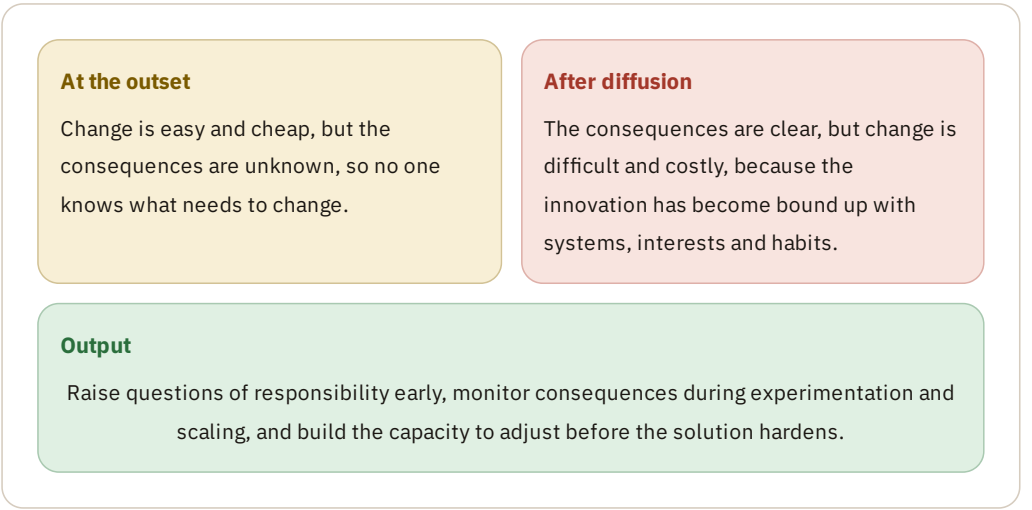


Figure 19.1 The dilemma of controlling innovation, adapted from Collingridge (1980).

This dilemma mirrors the cost-of-change curve presented in Chapter 17: responsibility, like learning, is cheaper at the start. That is why Chapter 12 added the responsibility lens to the lenses for evaluating a solution, so that its questions are raised from the very first concept.

19.2 Dimensions of responsible innovation

Stilgoe, Owen and Macnaghten proposed a framework for **responsible innovation** built on four dimensions that are practiced during the innovation process itself (Stilgoe et al., 2013). Figure 19.2 presents them together with the question each one raises.



Figure 19.2 The four dimensions of responsible innovation, adapted from Stilgoe et al. (2013).

These dimensions are consistent with what the book has built in earlier chapters. Inclusion extends the understanding of those who live the problem in Chapter 11; responsiveness extends the stopping criteria in Chapters 10 and 14; and reflexivity, that is, critical review of oneself and one's assumptions, extends the discussion in Chapter 8 of the psychological safety that allows a team to admit what it does not know. Responsible innovation is simply good innovation management, with a wider circle of people it cares about.

In the opening case, the anticipation question alone would have been enough to reveal the problem: who does not use the app, and do they need maintenance any less than others? Inclusion would have added an alternative reporting channel, such as a phone line or a neighborhood monitor, along with regular field inspections of the neighborhoods where use was lowest.

19.3 The ethics of experimenting on people

Chapter 14 called for experimentation before scaling and cautioned that the beneficiary of a public service is not a test subject. The balance between the two rests on well-established ethical principles for research involving human beings. The Belmont Report set out three basic principles (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979):

- **Respect for persons:** people are treated as the decision-makers in matters that concern them, so they know what is being tested on them and consent to it whenever possible, and groups less able to protect themselves receive special protection.
- **Beneficence and non-maleficence:** risks are minimized and benefits maximized, and no one is exposed to harm that the value of what is learned cannot justify.
- **Justice:** the burdens and benefits of an experiment are distributed fairly, so that no particular group bears the risks of experimentation while others benefit from its results.

In innovation experiments, these principles translate into practical questions. Do participants know they are in an experiment? Can they withdraw without losing the service? Are there stopping conditions if harm appears? Was the participating group chosen because it is best suited for learning, or because it is least able to object? In universities, research involving human beings passes through research ethics committees, and it is advisable to apply the same principles to student projects that test solutions with real beneficiaries.

In Practice

Before any experiment with beneficiaries, ask yourself: if I, or a member of my family, were in the group to be experimented on, what would I want to know in advance? And what would I want guaranteed? Write down the answer and make it part of the experiment card.

19.4 Data and artificial intelligence

Many innovation initiatives today depend on personal data and on artificial intelligence, both of which are sources of great value and of great risk alike. The Kingdom has established a legal framework for protecting personal data with the issuance of the Personal Data Protection Law (Personal Data Protection Law, 2021 [Arabic]), and the Saudi Data and AI Authority (SDAIA) has published AI ethics principles intended to guide the development and use of AI in ways that safeguard rights and strengthen trust (Saudi Data and AI Authority, 2023 [Arabic]). Internationally, these frameworks intersect with the OECD AI Principles, which emphasize values such as respect for human rights and fairness, transparency and explainability, robustness and safety, and accountability (OECD, 2019).

Compliance with these frameworks does not remove the need for questions the innovation team must ask itself, the most important of which are:

- **What do the data actually represent?** The report data in the opening case, and the cost data in Obermeyer's algorithm, represented something other than what they were assumed to represent.
- **Who is missing from the data?** Groups that use technology less, or appear less in records, may be excluded without anyone noticing.
- **Can the decision be explained?** A decision that affects people, and that those who made it cannot explain, is hard to defend and hard to correct.
- **Where does the human remain in the decision?** Artificial intelligence supports human judgment, but accountability remains with a specific person.

This section returns us to a thesis presented in Chapter 2: that artificial intelligence raises the value of the human rather than eliminating it. The larger the share of work that tools take on, the more important human judgment becomes in determining what they should do, for whom, and at what cost.

19.5 Intellectual property and fairness to idea holders

Innovation management raises questions about the ownership of ideas and solutions. Who owns an employee's idea that the organization has developed? Who owns a student project that originated in a course or a university laboratory? What share of the value of an innovation goes to the innovator? Uncertainty about the answers harms both sides: innovators who do not know their rights may withhold their ideas or take them where they will be protected, and an organization that has not defined its policy faces disputes once an idea succeeds.

Fairness here requires a clear policy, announced in advance, that specifies what the organization owns, what remains with the innovator, how any returns are to be shared, and how credit is attributed. This connects directly with the discussion in Chapter 10 of procedural justice and attributing an idea to its originator, and with the discussion in Chapter 7 of recognition as one of the innovator's foremost needs. In universities in particular, such a policy needs to be understandable to students and to encourage them to develop their ideas within the university's own ecosystem.

Intellectual property also bears on the open innovation discussed in Chapter 18: an organization that makes its data available or collaborates with partners needs clear rules on what is shared, what is protected, and how individuals' privacy is preserved in the data it releases.

19.6 Environmental impact: sustainability-oriented innovation

The question of responsibility extends to innovation's impact on the environment, one of its longest-lasting effects and the hardest to reverse. Adams and colleagues defined **sustainability-oriented innovation** as making intentional changes to an organization's philosophy and values, as well as to

its products, processes and practices, in order to create environmental and social value alongside economic value. From a systematic review of 127 sources, they derived three contexts through which such innovation progresses (Adams et al., 2016):

- **Operational optimization:** the organization does what it already does with greater environmental efficiency, for example by reducing energy and material consumption and waste in its operations.
- **Organizational transformation:** the organization offers new products, services or business models that create environmental or social value, accompanied by a change in its values and way of thinking.
- **Systems building:** the organization works with partners beyond its boundaries to change an entire system, such as a city's transport or waste management system.

This progression is especially useful for public sector organizations and universities. Digitizing a service so that beneficiaries no longer need to travel or use paper is an operational optimization with a direct environmental effect. Redesigning a service around the principle of sharing resources rather than owning them is an organizational transformation. Tackling an environmental problem in the region in partnership with other bodies is systems building, the level that connects with open innovation. The Kingdom has made environmental sustainability and essential needs one of its four national research, development and innovation priorities (Saudi Press Agency, 2022 [Arabic]), so environmental impact has become a question put to initiatives from the outset, where it was once left until after implementation.

Principle

Responsible innovation is good innovation management with a wider circle of concern: those who use the solution, those who do not, and those affected by it without ever being asked.

Chapter tool: the responsibility check across the initiative journey

Add these questions to the gates of your organization's innovation system, so that the team answers them at each stage as far as available knowledge allows. Their value lies in the discussion they open, more than in completing a formal compliance checklist.

Chapter tool The responsibility check across the initiative journey

Stage	Responsibility questions
Understanding the problem	Who lives the problem? Which groups are least represented in it? Have we heard from them directly?
Developing the solution	Who might be harmed if the solution succeeds? Which proxy measures are we relying on, and what do they actually represent?
Experiment	Do participants know they are in an experiment? Can they withdraw? What are the stopping conditions? Have the burdens been distributed fairly?
Data and artificial intelligence	Are we complying with the Personal Data Protection Law? Who is missing from the data? Can the decision be explained? Who is accountable for it?
Environmental impact	What is the solution's effect on energy and material consumption and waste? Could it create environmental value alongside its core value?
Scaling	Did we monitor unintended consequences during the experiment? Do we still have the capacity to adjust after scaling?
Ownership and fairness	Does the idea holder know their rights? Have they been given credit? Are the rules public to all parties?

Chapter Summary

- Every purposive action has consequences its actor did not intend, and innovation is especially prone to them because it takes place in unexplored territory.
- Proxy measures may carry assumptions that disadvantage groups absent from the data, without anyone intending it.
- Early on, an innovation is easy to change but its consequences are unknown; once it has spread, its consequences are known but it is hard to change. The way out is to raise questions of responsibility early and to monitor consequences continuously.
- Responsible innovation has four dimensions: anticipation, reflexivity, inclusion and responsiveness. In essence, they are an extension of good innovation management.
- Experimenting on people rests on respect for persons, beneficence and non-maleficence, and justice in the distribution of burdens and benefits.
- Data and AI initiatives require compliance with regulations, along with questions about what the data represent, who is missing from them, explainability, and keeping a human accountable.
- A clear, published policy on the ownership and attribution of ideas is part of being fair to their originators, and part of the organization's ability to retain them.
- Sustainability-oriented innovation progresses from operational optimization, to organizational transformation, to systems building with partners, and environmental impact is a question to be raised from the start of an initiative.

Key Terms

Responsible innovation Responsible innovation	Taking care of the future through collective stewardship of science and innovation in the present, based on anticipation, reflexivity, inclusion and responsiveness.
Unintended consequences Unintended consequences	Outcomes of a purposive action that its actor neither intended nor foresaw.

Collingridge dilemma Collingridge dilemma	The difficulty of controlling innovation: it is easy to change while its consequences are unknown, and hard to change once they become clear.
Proxy measure Proxy measure	A measure used in place of the intended quantity because the latter is hard to measure directly; it may carry hidden biases.
Sustainability-oriented innovation Sustainability-oriented innovation	Intentional changes to an organization's values, products and processes that create environmental and social value alongside economic value.
Explainability Explainability	The ability of those who use an automated system to explain the reasons behind its decisions.

Review and Discussion Questions

1. Why is it hard to control the consequences of an innovation once it has spread? How does this relate to the cost-of-change curve? Understanding

2. Apply the four dimensions of responsible innovation to an initiative you are working on, and identify the one least present. Application

1. Analyze the opening case and the health-care algorithm case using the concept of a proxy measure, and identify what the two have in common. Analysis

2. Design a brief policy on the ownership of students' ideas and projects at your university or educational institution. Application

3. Classify three initiatives in your organization according to the three contexts of sustainability-oriented innovation, and suggest how one of them could move up to the next level. Application

4. "Responsible innovation slows innovation down and constrains it." Evaluate this statement. Evaluation

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Part Five

Application

How the book’s ideas come together in a single system within a specific organization.

Chapter 20: The university innovation ecosystem: from scattered initiatives to an integrated system

Chapter 20

20 The university innovation ecosystem: from scattered initiatives to an integrated system

In this chapter we gather the book's threads in a single applied setting, the university, and we argue for a specific thesis: that a university innovation ecosystem is built from within, starting from the university's own strengths, needs and distinctive character. We then trace what this thesis demands: a strategy that is understood and shared, integration among the parallel systems within the university, the everyday environment of classroom and administration, motivation and recognition, the continuity of initiatives, the contribution of faculty researchers and staff, and the governance that brings all of this together.

Introduction

Opening case: an ordinary teaching day (composite case)

On the morning of an ordinary teaching day, the fab lab at a university stands quiet: state-of-the-art equipment that cost millions of riyals, a single technician sorting materials, and two engineering students working on a graduation project. Two hundred meters away, in a crowded lecture hall, one

> hundred and fifty students from various majors are reviewing for a midterm exam. Most of them have never set foot in the lab; no course has ever asked them to, and many do not know it exists. That same week, at a meeting of the university council, a proposal was presented to establish a new entrepreneurship center modeled on one at a leading international university, complete with performance indicators lifted from that university's report.

This university has both the resources and the ambition. What it lacks is a connection between what it has built and what its students experience day to day, and a way of thinking that starts from its own needs. We believe this situation recurs in many universities, and that the path from it to a functioning ecosystem runs through a review of the logic by which the ecosystem is built, before any new entity is created.

Learning Objectives

After studying this chapter, the reader should be able to:

١ Explain why borrowed models fail in university innovation ecosystems.

٢ Diagnose a university's strengths and needs, and formulate from them an innovation strategy that is understood and shared.

٣ Analyze why innovation units, gifted-student services and formal education become disconnected, and design connection points among them.

٤ Evaluate the everyday environment of classroom and administration in terms of how far it supports initiative.

٥ Design forms of motivation and recognition suited to students, faculty and staff.

ד Plan for the continuity and institutionalization of initiatives, and extend the ecosystem to include faculty researchers and staff.

ה Design governance responsible for integration, and chart a phased roadmap whose content is determined by diagnosis.

20.1 The borrowed-model trap

When a university sets out to build an innovation ecosystem, the easiest route seems to be to look at successful universities and copy what they have: an accelerator like theirs, a lab like theirs, indicators like theirs. DiMaggio and Powell explained this tendency through what they called **mimetic isomorphism**: when goals are ambiguous and the environment uncertain, organizations tend to imitate those they regard as successful or legitimate, and so over time they come to resemble one another in form, whether or not this improves their efficiency (DiMaggio & Powell, 1983). Government innovation labs offer one illustration: some were established in imitation of other agencies and in pursuit of legitimacy (Tõnurist et al., 2017).

Andrews, Pritchett and Woolcock went further, describing a phenomenon they called **isomorphic mimicry**: an organization adopts the forms of successful organizations, their structures, programs and titles, without the capability that makes them work. From the outside, the organization appears to possess what successful organizations possess; on the inside, it remains unable to perform its function. Mimetic isomorphism, then, is a tendency to imitate under uncertainty, while isomorphic mimicry is what results when form is transferred without function. As an alternative, they proposed what they called **problem-driven iterative adaptation**, built on four principles: local solutions to local problems, a search for successful attempts within the system itself, continuous experimentation, learning and adaptation, and scaling through diffusion (Andrews et al., 2013).

This literature explains what happens in many universities. An accelerator transplanted from another university presupposes students who arrive with ready-made projects, an entrepreneurial culture in the colleges, and a network of investors around it. Where these conditions are absent, the accelerator remains form without function. The same holds for transplanted indicators: a number of startups appropriate for a university in a mature entrepreneurial ecosystem may push another university to inflate figures that do not reflect its reality. The problem is not learning from others, which is essential, but allowing imitation to take the place of diagnosis.

20.2 A strategy from within, understood and shared

In this book we propose the opposite logic: that a university's innovation strategy begin with a **diagnosis of its strengths, needs and distinctive character**; that the strategy then be designed; and that the system of ideas and initiatives that puts it into effect then be built, step by step, adapting to what is learned along the way. This logic draws on what strategic management calls the **resource-based** view, which holds that sustained advantage comes from an organization's resources and capabilities that others find hard to imitate (Barney, 1991). Whatever sets a university apart, whether its strong disciplines, its region and that region's problems, its relationships or its students, is what its ecosystem should be built on.

Self-assessment tools are available to help universities with this diagnosis. Among the most prominent is a framework for entrepreneurial universities developed by the European Commission and the OECD, which allows a university to assess itself in areas including leadership and governance, organizational capacity and incentives, entrepreneurial teaching and learning, support for student entrepreneurs, knowledge exchange and collaboration, internationalization, and impact measurement (European

Commission & OECD, 2012). The value of this framework lies in its being a tool for self-reflection that helps a university see itself by its own standards; it loses much of its usefulness when used for comparison and ranking.

Diagnosis also needs to hear directly from students and faculty. In a study published in 2023 of one hundred and one faculty members at a Saudi university, participants viewed the needs of students with creative characteristics along three dimensions: developing the creative personality, a stimulating university environment, and support for the creative process and product development. This support could take the form of training linked to students' interests and awareness of opportunities aligned with Saudi Vision 2030 (Alsamani, 2023 [Arabic]). This kind of local knowledge is precisely what cannot be borrowed from another university's report. Table 20.1 presents the core diagnostic questions.

Table 20.1 Questions for diagnosing a university innovation ecosystem from within

Domain	Diagnostic questions
Distinctive strengths	Which disciplines are strong? Which problems are characteristic of the region? What relationships exist with agencies and companies?
Students	What are their interests and needs? Where do they spend their time? What do they know about the innovation units, and what keeps them from reaching them?
Faculty	Who actually practices creative teaching? What do they need? Which of their efforts does the evaluation and promotion system count?
Existing units	What does each unit offer? Who actually benefits from it? How is it connected to courses and to other units?
Successful attempts	Where within the university itself, in a course, a department or a student club, are there successful experiences that can be built on?
Researchers and staff	Do faculty research partnerships with external organizations count? Is there a channel for staff ideas on improving university services?

Domain	Diagnostic questions
Cost and sustainability	What is the total cost of each unit? And what does it deliver in return?

The question of **successful attempts** deserves particular emphasis. Every university has faculty members who turn their courses into spaces for creativity without anyone asking them to, student clubs that run real projects, and departments with living relationships with outside organizations. These are the seeds that the iterative adaptation approach advises looking for and building on, because they have already proven that they work in the university's own context.

It is not enough for the strategy to be written from within; it must also be **understood and shared**. In a survey of more than eleven thousand managers in more than four hundred companies, only about a third of senior managers could correctly name their organization's top three priorities (Sull et al., 2015). If this is the case among managers, the gap is likely wider for the faculty member in a department, the staff member in an office, and the student in a classroom. A strategy these people do not know does not guide what they do each day, however well crafted its document may be.

A university innovation strategy therefore needs to be expressed in a few priorities, in language a non-specialist can understand; it needs to be built with the participation of those who will work with it; and it needs to persuade them of what it means for each of them: for the student on their journey, for the faculty member in their course and research, and for the staff member in their service. Taking part in building a strategy is the first thing that creates commitment to it, and shared understanding is what makes the many small decisions scattered across departments and offices move in a single direction.

20.3 Parallel systems that do not connect

Several systems operate within a single university, each with its own logic: innovation and entrepreneurship units with their competitions and programs, gifted-student services with their criteria and offerings, formal education with its study plans, courses and exams, and administrative offices with their procedures. Often these systems simply sit side by side: the gifted-student unit does not know what the accelerator offers, the faculty member in the classroom does not know what goes on in the lab, and the academic system does not count what the student accomplishes outside it. The student thus lives in separate worlds and has to connect them alone, if they can.

Weick offered an early explanation of this phenomenon, describing educational organizations as **loosely coupled systems**: their units respond to one another, yet each retains its identity and independence, so that what happens in one carries over to the others only to a small degree (Weick, 1976). Weick did not see this as a pure flaw; loose coupling allows each unit to experiment and adapt without bringing the whole organization to a halt. Its cost for innovation, however, is clear: an initiative succeeds in one unit, fails to travel to others, and its value remains confined to whoever happened upon it.

This explanation converges with what Clark found when he studied five European universities that had successfully transformed into entrepreneurial universities and identified five elements they shared (Clark, 1998), as shown in Figure 20.1.

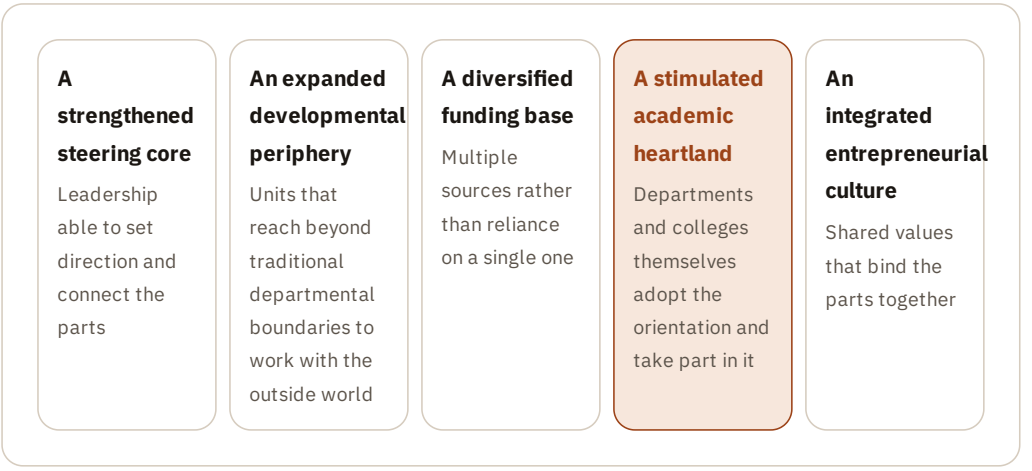


Figure 20.1 Elements of the transformation into an entrepreneurial university, adapted from Clark (1998).

The fourth element is the key to the opening case. Clark stressed that peripheral units, such as centers and incubators, are not sufficient on their own, and that transformation is complete only when the academic heartland, the departments and colleges where teaching and research take place, embraces it. The university in the opening case built its periphery and neglected its heartland: a lab in the middle of campus, and classrooms with no connection to it.

What is needed, then, is the design of deliberate **connection points** among these systems while each retains its own identity, since merging them into a single unit would strip them of their flexibility. Connection points mean that each unit knows what comes before it and what comes after; that formal education counts some of what the student accomplishes outside it; and that units share information about the student with the student's consent. One possible form of such connection is to view the scattered units from the student's own vantage point, as stations along a single **journey** the student travels, as Figure 20.2 illustrates.

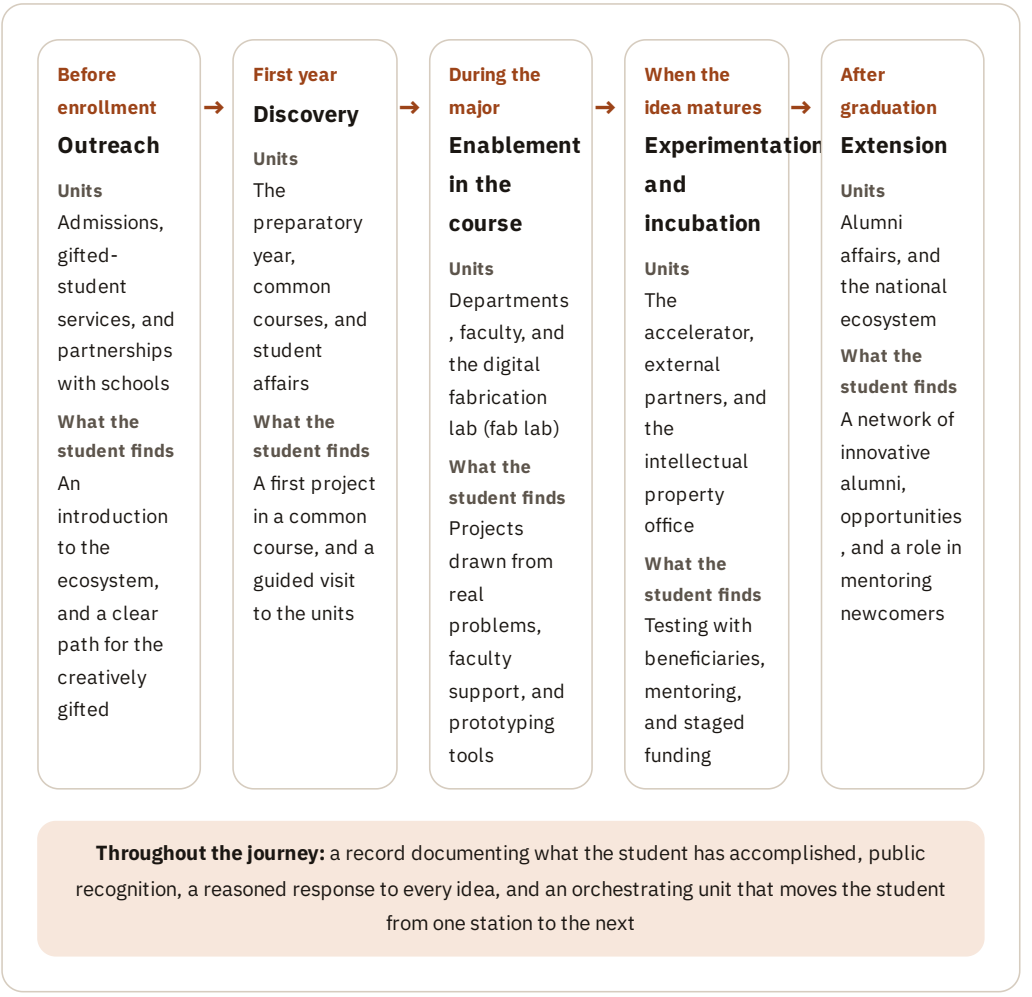


Figure 20.2 One possible picture of the student innovator journey across university units. Prepared by the author.

The stations and their names vary from one university to another, but the journey rests on three principles. First, **the ecosystem goes to the student** wherever the student is, in the classroom, the course, the residence hall and the club, rather than waiting for them in its own buildings. Second, **each station knows what comes before and after it**: the faculty member knows where to refer a student who has an idea, and the accelerator knows which courses its projects come from. Third, **the journey accommodates different**

stages of maturity: a student at the stage of thinking needs something different from one who has reached the stage of practice, and the first is not asked for what is asked of the second.

20.4 The everyday environment: classroom and administration

A university may have well-integrated innovation units, yet its students spend most of their time in an environment that does not invite them to think: a lecture delivered, an assignment that measures memorization, an exam that rewards the single right answer. A staff member may have an idea for improving a procedure and find no one in the office willing to hear it. It is the everyday environment, in the classroom and the office, that ultimately determines whether people experiment or stop trying.

This environment begins with the faculty member. In a study of students at several Saudi universities, faculty support in day-to-day teaching was associated with students' confidence in their creative abilities and with their innovative behavior (Alsamani & Alqahtani, 2026). The faculty member in the classroom is the point in the ecosystem closest to every student, and the course is the gateway through which everyone passes.

A systematic review of creative learning environments, mainly in school education, identifies recurring features: flexible use of space and time, availability of materials, learning outside the classroom, play-based approaches that give learners a degree of autonomy, respectful relationships between teacher and learner, opportunities for peer collaboration, partnerships with outside organizations, awareness of learners' needs, and planning not bound by rigid templates (Davies et al., 2013). Most of these features require neither buildings nor budgets; what they require is a faculty member who sees students as partners in learning.

This environment is most visible in **student assignments**. Research on high-impact educational practices has shown that practices such as undergraduate research projects, service learning, internships and capstone projects are associated with deeper engagement and better learning (Kuh, 2008). By contrast, a qualitative study with teachers of the gifted found that a focus on grades and standardized tests narrows the space available for creativity (Alsamani, 2019), and an assignment that measures memorization alone may reproduce this barrier at the university. Turning some assignments into projects that address real problems makes the course a channel for capturing problems and ideas, and makes the innovation unit an extension of the classroom. This can take many forms, from a project within an existing course to a common course in creativity and entrepreneurship assessed through a project; diagnosis determines which of these suits the university.

This support also needs to accommodate differences among students. The high academic achiever differs from the student who is creative in a performance domain such as the arts, design or programming, and both differ from the innovator who produces a tangible project or prototype. The most likely to be overlooked is the gifted student whose abilities are not reflected in their GPA, because systems that see nothing but grades do not see them. An environment that treats everyone by a single standard loses some of them without knowing it.

Administration is part of this environment. A decision delayed for no reason, a response given without explanation, a procedure that requires the person with an idea to obtain one approval after another: these are messages that teach students, faculty and staff that initiative is a burden. A university that celebrates innovation at its events and then obstructs it in its procedures teaches more through its procedures than through its rhetoric.

20.5 Motivation and recognition in the university system

People learn what an organization values from what it counts and rewards, more than from what it proclaims. One reason students are slow to take up what innovation units offer is that their effort there appears nowhere: not in their academic transcript, not on a certificate, not in what they present to employers.

Recognition holds a special place for the gifted and for innovators. Saudi innovative entrepreneurs described a supportive community as one that begins by acknowledging the innovator's distinctiveness and valuing their talent, then invests in them, enables their initiatives, and offers them a flexible environment in which to build their innovative identity (Alsamani, 2026 [Arabic]). The aim is for students to feel that innovation is an integral part of their university journey: that they are invited to it, welcomed in it, and valued for it.

Forms of recognition are many, and they need not be costly: a record issued by the university documenting the student's participation in projects and challenges alongside the academic transcript; micro-credentials recognizing specific competencies acquired in a short program (OECD, 2021); a minor that complements the student's major; and an annual day on which students showcase what they have accomplished with their supervisors. Each university chooses from these, or from others, whatever fits its own regulations.

Recognizing faculty effort matters no less than recognizing student effort. A faculty member who turns a course into a space for innovation and supervises real projects puts in more effort than traditional teaching demands. If the evaluation and promotion system does not count this effort, the orientation remains dependent on the enthusiasm of a few individuals, and it ends when they move on or burn out.

One possible form of motivation here is for faculty members to enter student projects as partners, in addition to their role as assessors: co-supervising a team, bringing along a problem from their own research area, and sharing in whatever results, whether a publication, a patent or a prototype. The student gains a mentor close to their work, and the faculty member gains live research questions and junior colleagues from whom they learn as much as they teach. This is completed by details that cost little: naming the supervisor alongside the team when projects are showcased, counting the supervision in the faculty member's performance file, and granting protected time for this work.

20.6 Continuity: from enthusiasm to institutionalization

Many initiatives in universities begin with enthusiasm: a successful competition, a program that draws strong participation, a faculty member who turns a course into a space for innovation. Then, after a year or two, they decline: the person in charge moves on, the initial funding runs out, or priorities shift. Continuity does not follow automatically from initial success. Wiltsey Stirman and colleagues reviewed one hundred and twenty-five studies on the sustainability of programs and innovations after implementation and found that few of the studies that measured it recorded full continuation of the programs, and that sustainability is shaped by the characteristics of the innovation itself, the organizational context, the capacities available to it in funding, staff and champions, and the processes and interactions among the parties involved (Wiltsey Stirman et al., 2012).

This means that continuity must be designed from the start. An initiative that rests on one person ends when that person leaves, and one that rests on exceptional funding ends when the funding stops. An initiative that enters the regular systems, however, by being written into study plans, having the effort of those who work on it counted in evaluations, receiving a line in the recurring budget, and being measured among the university's indicators,

survives the departure of its founders. This is what **institutionalization** means: the initiative becomes part of the normal way of working, and so it continues after its founders' enthusiasm has cooled.

Institutionalization does not mean keeping every initiative forever. Some initiatives are better stopped when they do not achieve what they were meant to, and this is part of portfolio management. The question that distinguishes healthy continuity is this: does the initiative continue because it produces value, or because no one has decided to stop it?

20.7 Faculty researchers and staff

In the preceding sections we considered the faculty member as teacher and the staff member within their administrative environment; this section addresses the faculty member as researcher and the staff member as innovator in university services. The university has three missions, teaching, research and community service, and each is a source of innovation. Etzkowitz and Leydesdorff described the university in the knowledge economy as one of three parties, alongside government and industry, whose roles overlap in producing innovation (Etzkowitz & Leydesdorff, 2000). An ecosystem confined to students overlooks two other parties within the university itself: the faculty member as researcher, and the staff who run its services.

Faculty researchers: from research to impact

Many universities tend to measure their contribution to innovation by patents and by startups spun out of their research. A broad review of the literature on university–industry relations shows that this picture is narrow. What researchers call **academic engagement**, such as joint research with external organizations, contract research, consulting and informal relationships, is more widespread among faculty than commercialization, and closer to their regular research work. Faculty engage in it mostly to obtain resources and questions that serve their research agendas (Perkmann et al., 2013).

This means that a university that sees nothing of research innovation but patents overlooks most of what its faculty actually contribute. The shortest route to research impact may be a real problem that an organization in the region brings to a research team ready to take it on. Ways of supporting this include counting joint research and consulting in evaluation and promotion, simplifying contracting procedures with external organizations, and linking the university's research priorities to the problems of its region.

Staff: a university that innovates in its own work

The university is also an organization that delivers services: admissions and registration, housing, libraries, e-services, and financial and administrative procedures. What this book has said about managing innovation in organizations applies to it as it does to any service organization: capturing problems from beneficiaries, managing ideas, piloting, and measurement. The staff members who live these procedures daily know best where the waste lies, and the students who pass through them know best what they suffer from them.

It is a paradox for a university to call on its students to innovate while processing their requests through procedures that have not been reviewed in years. A university that practices innovation in its daily work teaches by example what its courses teach by explanation. What was said about motivating faculty holds for staff as well: what motivates them most is inexpensive, such as crediting an idea to its originator, involving them in implementing it, and showing its effect on student services.

20.8 Governance that moves people and ideas between units

To turn this approach into practice, the university needs a unit responsible for integration. One possible form is a **strategic innovation unit** reporting directly to the university president, whose task is to build the innovation

strategy from within using the approach set out in this chapter, to connect the scattered parts, and to monitor and adjust implementation. This unit leaves initiatives to their owners and to existing units; its value lies solely in direction and integration. The initiatives it may support differ from one university to another according to their strengths and needs. Here we gather, from tools presented in the book's chapters, what makes an orchestrating unit effective, whatever its form:

- **A strategy from within:** search fields that arise from the university's strengths and the problems of its region, are aligned with national priorities, and are expressed in language everyone understands and helps to build.
- **A shared portfolio:** a single entry point for ideas, shared gates, movement of an initiative between units according to its stage, and a reasoned response by an announced date.
- **Measuring flow:** indicators that track the movement of students and ideas between units, the courses that include innovation projects, and students' confidence in their creative abilities; these say more about the state of the ecosystem than the number of events each unit holds on its own.
- **Total cost:** calculating what each unit costs and what it delivers, before any new unit is established.
- **A clear policy on ownership of student ideas:** one that encourages students to develop their ideas within the ecosystem.
- **Partnerships that bring in real problems:** with government agencies and companies in the region.

The most important characteristic of this governance is that it be **dynamic**: that it review itself periodically, adjust what does not work, and expand what succeeds, as the iterative adaptation approach suggests. A strategy written once and implemented unchanged for years reproduces the logic of the borrowed model, even if it was written from within.

Principle

A university innovation ecosystem is measured by the number of people, students, faculty and staff alike, who found their way from problem to idea to experiment, and by what they felt along the way, more than by the number of units the university has created.

20.9 A roadmap

An ecosystem is not transformed all at once. Figure 20.3 proposes a three-phase logic that applies phased scaling and pull-based scaling. What is fixed in this logic is the order of the phases and the question each phase asks. The initiatives that fill them, and the duration of each phase, are determined by each university's diagnosis. The initiatives mentioned in this chapter are examples to aid thinking, and each should be adapted to what the diagnosis reveals.

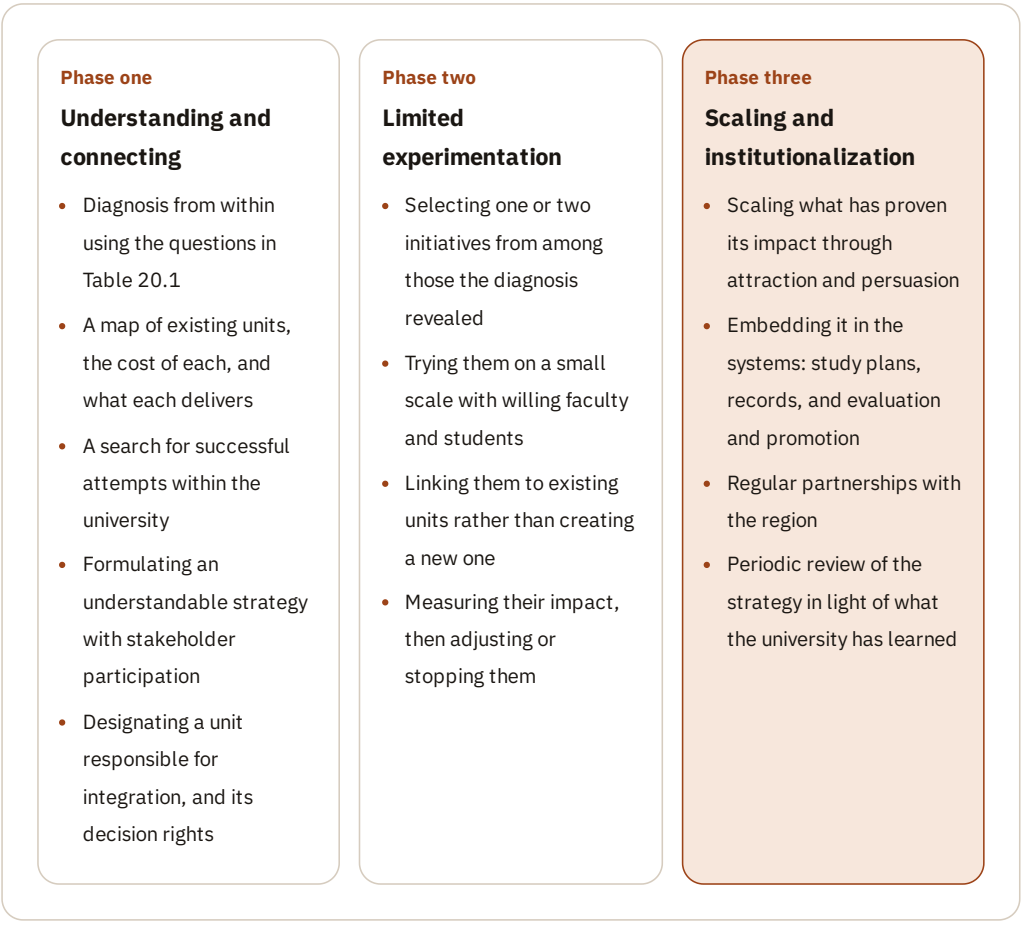


Figure 20.3 A proposed roadmap for building a university innovation ecosystem: the logic of the phases is fixed, while each university determines their content. Prepared by the author.

This roadmap means that the first thing a university does is understand what it already has and connect it, before creating any new unit. In the first phase it may discover that it has more entities than it needs, and fewer connections than it needs between those entities and its students. That discovery alone may save it millions that would otherwise have been spent on yet another isolated entity.

Here the threads of the book come together in a single institution: it starts from the problem before the model, and from people, students, faculty and staff, before buildings, and it builds the ecosystem as connections before building it

as entities. A university that does this becomes an innovative institution in its own right, not only one that graduates innovators.

Chapter tool: diagnosing the university innovation ecosystem

Use this tool with a team that includes representatives of leadership, departments, existing units and students. Rate each dimension at one of three levels: absent, partial or established. Then choose just two dimensions to work on in the first year, giving priority to those that lie in the academic heartland, that is, the departments and colleges.

Chapter tool Diagnosing the university innovation ecosystem

Dimension	Diagnostic question	Rating	Next step
Strategy from within	Do the innovation arenas arise from the university's strengths and the problems of its region?		
Clarity of strategy	Can students, faculty and staff name the university's innovation priorities? Did they take part in building them?		
Integration across systems	Do the innovation units, gifted-student services and departments know what the others offer? Does formal education count any of what the student accomplishes outside it?		
The student journey	Does the student know where to take an idea? How many steps does it take to reach someone who can help?		

Dimension	Diagnostic question	Rating	Next step
The everyday environment	How many courses include projects that address real problems? Do administrative offices respond to ideas by an announced date and with a reasoned reply?		
Faculty support	Do students feel that their professors encourage their ideas? Is faculty effort counted?		
Recognition and documentation	Does the student's innovative effort appear in a record or certificate?		
Continuity	Do existing initiatives depend on individuals or on exceptional funding? Has the total cost of each unit been calculated?		
Researchers and staff	Is faculty research engagement with external organizations counted? Is there a channel for staff ideas on improving services?		
Measurement	Does the university measure flow and impact, or the activity of each unit in isolation?		
Partnerships	Do real problems from the region reach the university on a regular basis?		

Chapter Summary

- Under ambiguity, universities tend to imitate the models of successful universities, transferring the forms without the capabilities that make them work.
- A university innovation strategy begins with a diagnosis of the university's strengths and needs, and it does its work when it is

understood, persuasive and shared among students, faculty and staff.

- Innovation units, gifted-student services and formal education generally operate as parallel, loosely coupled systems; the remedy is to design deliberate connection points among them that preserve each one's flexibility. The transformation is complete only when the university's academic heartland embraces it.
- The everyday environment, in the classroom, in student assignments and in administrative procedures, is what determines whether people experiment or give up.
- People learn what an organization values from what it counts and rewards. Appreciation and recognition hold a special place for the gifted and for innovators, and most forms of recognition cost little.
- After its initial success, an initiative needs designed continuity, achieved by embedding it in the regular systems, while stopping whatever does not produce value.
- The university innovation ecosystem extends beyond students: faculty researchers contribute through engagement with external organizations, not only through patents, and staff have a role in improving the university's own services.
- The ecosystem needs a unit responsible for integration that measures flow between units, reviews itself periodically, and is built in phases: understanding and connecting, then limited experimentation, then scaling and institutionalization.
- The initiatives mentioned in this chapter are examples whose relevance is judged by each university's own diagnosis.

Key Terms

Mimetic isomorphism Mimetic isomorphism	The tendency of organizations, under ambiguity, to imitate organizations they regard as successful or legitimate.
Isomorphic mimicry Isomorphic mimicry	Adopting the forms of successful organizations without the capabilities that make them work.

Problem-driven iterative adaptation Problem-driven iterative adaptation	An approach that builds solutions locally, starting from problems, through continuous experimentation, learning and adaptation.
Academic heartland Academic heartland	The departments and colleges where teaching and research take place, as distinct from peripheral units.
Loose coupling Loose coupling	A condition in which units respond to one another while each retains its independence, so that what happens in one carries over to the others only to a small degree.
Institutionalization Institutionalization	Embedding an initiative in an organization's regular systems so that it continues without depending on the enthusiasm of individuals.
Student innovator journey Student innovator journey	An extended pathway that connects university units around what the student needs at each stage.
Academic engagement Academic engagement	Faculty collaboration with external organizations through joint or contract research or consulting, as

	distinct from the commercialization of research.
Micro-credential Micro-credential	Formal recognition of specific competencies acquired in a short educational program.

Review and Discussion Questions

1. What is the difference between learning from other universities' experiences and isomorphic mimicry of them? Understanding
2. Ask ten students, faculty and staff at your university about its innovation priorities, and compare their answers with what the strategy states. What does the gap reveal? Analysis
1. Apply Clark's five elements to your university or educational institution, and identify the weakest. Analysis
2. Map the student innovator journey at your university as it is today, and identify the station at which most students drop off. Application
3. Choose a course you teach or have taken, evaluate it in light of the features of creative learning environments, and propose one change to its assignments. Application
4. Choose an innovation initiative at your university that began with enthusiasm and then declined, analyze the reasons for its decline in light of the factors of sustainability, and propose what might have embedded it in the regular systems. Analysis
5. Choose an administrative procedure at your university that students frequently go through, and apply the steps of innovation management to it: from problem, to idea, to pilot. Application

6 "The solution to a weak innovation ecosystem at a university is to establish a new center modeled on leading international universities." Evaluate this statement in light of the chapter as a whole. Evaluation

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Back matter

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Conclusion

Innovation management as an integrated system

We opened this book with a question: how does an organization move from scattered initiatives that celebrate innovation to a sustained capability to produce it? In this conclusion we draw together the answer the twenty chapters have offered, then pause at the limits of that answer and the open questions it leaves for research.

What ties the chapters together?

To a reader who takes its chapters one at a time, the book may look like a collection of adjacent topics: leadership, strategy, culture, governance, experimentation, measurement. In truth, they are parts of a single picture resting on three pillars that we set out in the preface, and it is now clear how the chapters are distributed among them.

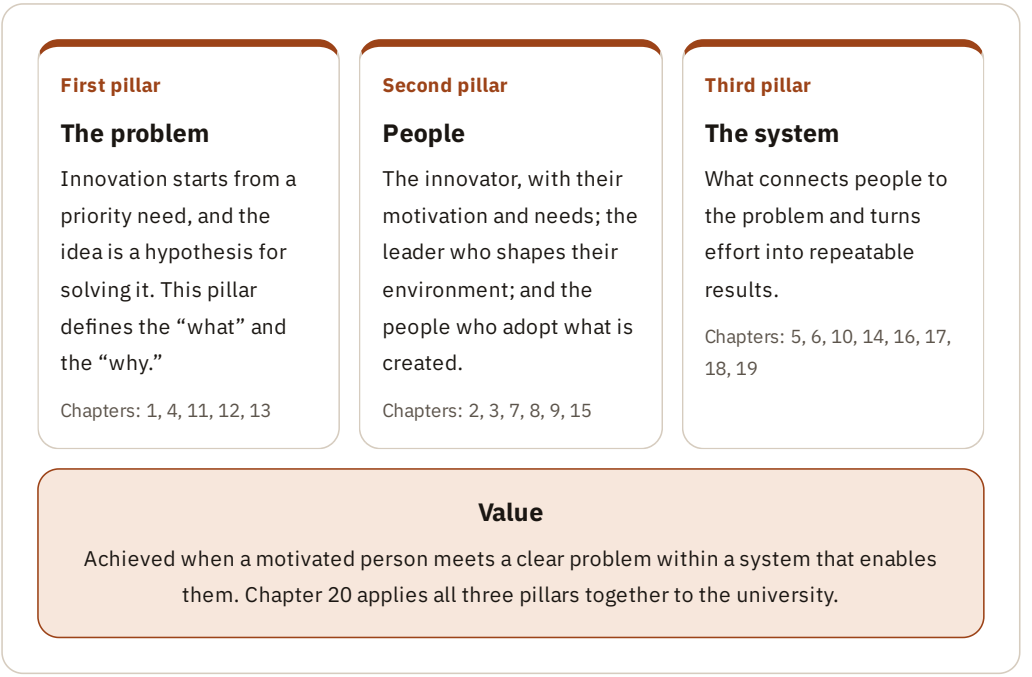


Figure C.1 The book's three pillars and the chapters that address them.

The pillars were linked by a concept that recurred in different guises: **autonomy within boundaries**. Leadership and the system define the problem, the goal and the constraints, while people own the way to the solution. The concept appeared in Chapter 3 as a leadership principle, in Chapter 4 as search fields and challenge questions, in Chapter 8 as necessary tensions within culture, in Chapter 10 as decision rights, and in Chapter 12 as solution requirements that leave the form of the solution open. It is the practical formula through which the pillar of people meets the pillar of the problem without either overwhelming the other.

Ten takeaways

The yield of the chapters can be distilled into ten takeaways:

1. Innovation is an implemented outcome that creates value. An idea that never reaches use remains, at best, a source of learning.

   Chapter 1

٢ The innovation journey begins with understanding the problem, and the time spent on this understanding is the least costly and most consequential stage of the journey.

Chapters 11 and 17

٣ People are the heart of the system. Innovators have needs, foremost among them recognition and opportunity, and a system that does not meet them stays hollow however much is spent on it.

Chapters 7 and 8

٤ Culture is shaped by what happens after the first failure and the first objection, more than by stated values.

Chapter 8

٥ The absence of a decision is more dangerous than a wrong decision; a reasoned response teaches the person with the idea, while silence teaches them to stop trying.

Chapters 5 and 10

٦ The value of an experiment lies in the learning it makes possible; an experiment designed so that it cannot fail, or run under ideal conditions, says little about reality.

Chapter 14

٧ To endure, a good solution needs a model to carry it and an owner to champion it, and ownership is built from the start of the journey.

Chapters 13 and 15

٨ Administrative mandates produce compliance; conviction produces adoption.

Chapter 15

٩ Organizations become what they measure; it is therefore more useful to measure what happens to people's ideas than how many ideas they submit.

Chapter 16

١٠ The system is built from within, from the organization's own strengths and needs, and it requires a strategy that is understood and shared, along with connections among its components that ensure its initiatives continue.
Chapters 6 and 20

People, first and last

If the book has a single thesis that unites all of the above, it is that the difference between a system that is funded and produces innovation repeatedly, and a system that is funded and stays hollow, lies in people. Funding, centers and platforms supply the inputs; repeated output is produced by people who find in their environment someone who values their ideas, gives them opportunity, withholds judgment until those ideas are fully formed, and leaves the way to the solution to them once the goal is clear.

This thesis rests on evidence from multiple sources. Research on motivation has shown that creativity is affected by the support or constraint people encounter in their everyday work environment (Amabile, 1996). Research on psychological safety has shown that teams learn and experiment when their members feel safe from the consequences of asking questions and making mistakes (Edmondson, 1999), and other research has uncovered a hidden bias against new ideas even among those who profess to value them (Mueller et al., 2012). In the Saudi context, innovators themselves have described the role that self-confidence, peers and a supportive community played in their paths (Alsamani, 2023; Alsamani, 2026 [Arabic]), and faculty support in the classroom has been associated with students' confidence in their creative abilities and with their innovative behavior (Alsamani & Alqahtani, 2026). This evidence points to a single conclusion: what happens to people in their daily lives is a decisive factor whose absence no published plan can make up for.

This point gains importance with the spread of artificial intelligence tools, which now perform much of what once set the expert apart. Everything these tools take on raises the importance of human judgment about what should be

done, for whom, and at what cost. People retain a role that a tool can hardly assume: noticing a problem they were not asked to notice, and caring about it enough to pursue it until it becomes value. This is a capacity that the environment either nurtures or weakens.

Limits of the book and directions for research

This work has limits that should be acknowledged. Much of the evidence on which it draws originated in Western contexts, and mostly in private organizations; transferring it to government organizations and universities in the region calls for caution. The Saudi evidence it draws on is still limited in quantity and needs broader studies to test it across different organizations and sectors. The opening cases in the chapters are composite cases for illustration, not documented case studies.

This leaves questions worth investigating: How do innovation units in Saudi government organizations actually work, and what distinguishes the successful ones? What effect do appreciation and recognition have on whether innovators remain within their organizations and continue to contribute? How do innovation units and gifted-student services integrate with formal education in universities, and with what effect on students? How is artificial intelligence changing the work of innovation teams in the public sector? Answering these questions through rigorous local studies is what will turn much of what this book offers from inference into tested knowledge.

Where to begin?

For those who lead an organization or a unit, we suggest three first steps that require no major program:

- **Trace ten ideas.** Pick ten ideas submitted in your organization six months ago and find out what became of each: Was a decision made? When? Did the person who proposed it learn the reason? You will learn more about your system from this than from any report.

- **Sit with those who live the problem.** Choose a problem that concerns you and spend an hour with people who live it every day, without offering a solution. Write down whatever surprises you.
- **Connect before you create.** Before any proposal to establish a new center, platform or program, map what you already have and ask: How many steps does a person with an idea need to reach someone who can help? Then remove one step.

The tools in each chapter were designed to be steps of this kind: usable in a real organization, with available resources.

A final word

We wrote this book with two images in mind. One is of organizations that spent heavily on innovation, building centers, platforms and competitions, only to find that little had changed. The other is of people who carry ideas worth implementing yet cannot find the way to do so: a student who noticed a problem during her internship and knocked on three doors; an employee who learned that his ideas go unread; an innovator forced into a job far from his passion. The distance between these two images is the subject of innovation management as we understand it.

We hope the book has given its readers something to help them narrow this distance in their own organizations: a clearer understanding of what is happening, tools for what can be done, and a conviction that repeated innovation is the product of a system built around people, one that knows the problem it is working to solve and learns from every attempt.

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Back matter

Guide to the book's tools

This guide brings the tools of all twenty chapters together in a single table, so that readers can return to it when they face a particular question. It does not reproduce the tools themselves; each appears, with its explanation, in its place in the relevant chapter.

Table T.1 The book's tools: the question each tool answers and the output it produces

Tool	Location	The question it answers	Output
Initiative classification card	Chapter 1	Is this initiative an innovation? What is its degree and its domain?	A classification of the initiative that determines how it should be managed
External realities scanning matrix	Chapter 2	Which external shifts call for a decision?	A list of signals of change, each paired with decision questions
The leader’s mirror	Chapter 3	Do my leadership practices encourage innovation or hinder it?	The gap between the leader’s self-assessment and the team’s assessment, with priorities for improvement
Innovation strategy on a single page	Chapter 4	Where do we look for value, with what ambition, and how do we succeed?	A concise strategy ready for discussion and dissemination

Tool	Location	The question it answers	Output
System health check	Chapter 5	At which stage does the flow of initiatives break down?	Identification of the stage that forms the bottleneck
Internal ecosystem map	Chapter 6	Who provides what, and how does an idea reach those who can help it?	A map of units and their links, with gaps and duplications
The innovator's journey	Chapter 7	Where do ideas stall, and what did their owners need?	The point on the path where the idea stalls, and the unmet need at that point
Revealing incidents	Chapter 8	What messages do people learn from events?	A comparison of the actual messages with the stated values, and a proposed response
Team composition card	Chapter 9	Does the team have the roles and connections the stage requires?	A team with a full set of roles and clearly identified gaps
The gate charter	Chapter 10	Who decides, by what criteria, and when?	A published charter for each gate
The problem card	Chapter 11	What is the problem, who lives with it, and why does it deserve solving?	A problem statement endorsed by those who live with the problem
The concept card	Chapter 12	What is the candidate solution, and what assumptions does it rest on?	A testable concept, with its assumptions ranked by risk

Tool	Location	The question it answers	Output
The value model canvas	Chapter 13	How is the solution's value delivered, and how is it sustained?	A value model, with assumptions to be tested in the experiment
The experiment card	Chapter 14	What are we testing, and how will we know the result?	An experiment design, its result, and the decision that follows from it
Scaling readiness check	Chapter 15	Are the solution, the organization and the users ready to scale?	A readiness rating for each dimension, and what is needed before or during scaling
Balanced measurement dashboard	Chapter 16	Does the organization measure results, or does it settle for measuring activity?	A balanced set of indicators that is hard to satisfy on paper alone
Value and total cost worksheet	Chapter 17	What is the total cost over five years, and what is the value compared with the alternatives?	A comparison of the proposal with two alternatives
Partner map	Chapter 18	Who provides what, and what do they want in return?	A map of partners, identifying the primary source of risk
Responsibility check across the initiative journey	Chapter 19	Who might be harmed, and are we experimenting and using data responsibly?	Responsibility questions answered at every stage

Tool	Location	The question it answers	Output
University innovation ecosystem diagnostic	Chapter 20	Where does the university stand on each dimension of its ecosystem?	A rating for each dimension, and two priority dimensions for action

The tools of Part Three form a single sequence for a given initiative: the problem card, then the concept card, then the value model canvas, then the experiment card, and finally the scaling readiness check. Around them sit the system-level tools, which give this path its environment, its decisions and its measurement.

Back matter

Glossary

The terms defined in the chapters of the book, with the chapter in which each definition appears. Entries are listed alphabetically.

Absorptive capacity Absorptive capacity	An organization's ability to recognize the value of external knowledge, assimilate it and apply it. Chapter 18
Academic engagement Academic engagement	Faculty collaboration with external organizations through joint or contract research or consulting, as distinct from the commercialization of research. Chapter 20
Academic heartland Academic heartland	The departments and colleges where teaching and research take place, as distinct from peripheral units. Chapter 20
Architectural innovation Architectural innovation	Linking known components in a new way. Chapter 1
Boundary-spanning activities Boundary-spanning activities	A team's activities with external parties: communicating with leadership, coordinating with other units and gathering knowledge. Chapter 9
Business model Business model	The logic by which an organization delivers value to those it serves and captures enough to sustain

	itself. Chapter 13
Business process innovation Business process innovation	A new or improved change in the way an organization operates in one of its business functions. Chapter 1
Campbell's law Campbell's law	The more a quantitative indicator is relied on in decision-making, the greater the pressure to manipulate it and to distort what it measures. Chapter 16
Certification Certification	Verification by an independent body that an organization's system conforms to the requirements of a specified standard. Chapter 5
Challenge question Challenge question	A formulation of a priority problem that specifies what is needed without imposing the solution. Chapter 4
Chief innovation officer Chief innovation officer	The person who leads the orchestrating unit and achieves results through units they do not head. Chapter 6
Collingridge dilemma Collingridge dilemma	The difficulty of controlling an innovation: it is easy to change while its effects are unknown, and hard to change once they become clear. Chapter 19
Componential model of creativity Componential model of creativity	A model that explains individual creativity through domain-relevant skills, creativity-relevant processes and intrinsic task motivation, within the context of the work environment. Chapter 7
Concept Concept	A description of a solution clear enough to be understood and tested, including its critical

	assumptions. Chapter 12
Convergent thinking Convergent thinking	Arriving at the most suitable answer among the alternatives. Chapter 12
Creative climate Creative climate	The patterns of behavior and feeling observed in daily work that encourage or hinder creativity. Chapters 8 and 16
Creative self-efficacy Creative self-efficacy	A person's belief in their ability to produce new and useful ideas. Chapter 7
Critical assumption Critical assumption	An assumption that, if wrong, brings down the whole initiative. Chapter 14
Culture-embedding mechanisms Culture-embedding mechanisms	The practices through which people learn the actual culture, such as measurement, rewards and responses to crises. Chapter 8
Decision limbo Decision limbo	The state of an initiative that is neither accepted nor rejected, and so remains suspended without learning or impact. Chapter 5
Decision rights Decision rights	Specifying who holds the authority to make each type of innovation decision. Chapter 10
Degree of novelty Degree of novelty	The novelty of a solution relative to a unit of reference: the organization, the market or the world. Chapter 1
Design fixation Design fixation	The pull of thinking toward the features of a known solution or the first solution proposed. Chapter 12

Disciplined collaboration Disciplined collaboration	Collaboration between units directed at a result whose value exceeds its cost. Chapter 6
Discovery-driven planning Discovery-driven planning	Planning that states assumptions explicitly and sequences the stages so that the most important are tested first. Chapter 14
Disruptive innovation Disruptive innovation	Innovation that starts at the low end of a market or in a new market, then improves until it competes with prevailing solutions. Chapter 1
Divergent thinking Divergent thinking	Producing multiple, varied answers to a single question. Chapter 12
Dominant logic Dominant logic	The way of thinking that the existing model imposes on the evaluation of new opportunities. Chapter 13
Dynamic capabilities Dynamic capabilities	An organization's ability to sense and seize opportunities and to reconfigure its resources and practices in a changing environment. Chapter 2
Ecosystem risk Ecosystem risk	The dependence of an innovation's success on partners and links in the adoption chain that the organization does not control. Chapter 18
Employee voice Employee voice	Employees' expression of ideas, suggestions and concerns with the aim of improving work. Chapter 3
Escalation of commitment Escalation of commitment	Continuing to invest in a failing course of action to justify the original decision. Chapter 10

Executive sponsor Executive sponsor	A leader who links the initiative to strategy, gives it legitimacy and resources, and removes obstacles in its way. Chapter 3
Explainability Explainability	The ability of those using an automated system to explain the reasons behind its decisions. Chapter 19
Exploitation Exploitation	Refining and deepening what the organization already knows in order to achieve efficiency. Chapter 3
Exploration Exploration	Searching for new knowledge and opportunities under uncertainty. Chapter 3
External realities External realities	The conditions surrounding the organization and how they change, in markets, society, legislation and technology. Chapter 2
Front end of innovation Front end of innovation	The phase before a project is formally launched, including identifying needs, exploring opportunities and generating ideas. Chapter 1
Front-loading Front-loading	Identifying and solving problems in the early stages, when change is cheaper. Chapter 17
Hard core and soft periphery Hard core and soft periphery	The distinction between what must remain fixed in an innovation and what can be adapted to each context. Chapter 15
Heavyweight team Heavyweight team	A team with a leader who holds strong authority and dedicated members, suited to innovation that requires integration across units. Chapter 9

Implementation climate Implementation climate	People's perception that using the innovation is expected, supported and rewarded. Chapter 15
Incremental innovation Incremental innovation	Innovation that builds on an existing offering or capability without changing its fundamental nature. Chapter 1
Influence without authority Influence without authority	A person's ability to move people who do not report to them, through reciprocity and partnership building. Chapter 6
Innovation Innovation	A new or significantly improved application that is adopted by users and creates value. Chapter 1
Innovation ambassador network Innovation ambassador network	People in different units who help colleagues articulate their ideas and connect the front line with the innovation system. Chapter 9
Innovation campaign Innovation campaign	A time-bound call for ideas on a specific challenge question, with a published mechanism for responding. Chapter 9
Innovation capability Innovation capability	An organization's ability to innovate repeatedly without depending on particular individuals. Chapter 6
Innovation implementation Innovation implementation	The consistent, actual use of an innovation by its intended users after the decision to adopt it. Chapter 15
Innovation inputs / outputs Innovation inputs / outputs	Inputs are the resources and conditions that enable innovation; outputs are its knowledge, technological and creative results. Chapter 2

Innovation lab Innovation lab	A unit dedicated to experimentation and to tackling complex problems with new methods. Chapter 6
Innovation management Innovation management	The practices and capabilities that steer the flow of opportunities, ideas and initiatives, and manage experimentation, decisions and resources through to the realization of value. Chapter 1
Innovation management system Innovation management system	The formal framework through which an organization manages the flow of opportunities and initiatives through to value, encompassing strategy, governance, roles, resources and measurement. Chapter 5
Innovation process Innovation process	The successive stages an initiative passes through, from opportunity to implemented solution. Chapter 5
Innovation strategy Innovation strategy	A set of interlinked choices that define why an organization innovates, where, with what ambition and by what means. Chapter 4
Innovation theater Innovation theater	Activities that resemble innovation in appearance without bringing about change in products, services or ways of working. Chapter 1
Institutionalization Institutionalization	Embedding an initiative in the organization's routine systems so that it endures without relying on the enthusiasm of individuals. Chapter 20
Intelligent failure Intelligent failure	An unexpected result of a small, well-designed experiment in uncharted territory that yields new knowledge. Chapter 8

Internal realities Internal realities	The organization's current state in terms of leadership, culture, structures, roles and skills. Chapter 2
Intrapreneurship Intrapreneurship	Entrepreneurial behavior by individuals within an existing organization to lead a new innovation. Chapter 1
Intrinsic task motivation Intrinsic task motivation	Being drawn to work by its interest and challenge rather than by an external reward. Chapter 7
Isomorphic mimicry Isomorphic mimicry	Adopting the forms of successful organizations without the capabilities that make them work. Chapter 20
Issue selling Issue selling	Employees' efforts to draw senior management's attention to issues they consider important and to shape how management understands them. Chapter 6
Job-relevant diversity Job-relevant diversity	Differences among team members in disciplines and expertise relevant to the problem. Chapter 9
Jobs to be done Jobs to be done	The progress a person seeks in a particular circumstance, enlisting a product or service to achieve it. Chapter 11
Lead users Lead users	People who face a need before others and expect large benefits from meeting it, and so innovate solutions for themselves. Chapter 11
Loose coupling Loose coupling	The condition of units that respond to one another while each retains its independence, so that what

	happens in one carries over only weakly to the others. Chapter 20
Maturity model Maturity model	A description of successive levels of capability, used to assess the current position and identify the next step. Chapter 16
Micro-credential Micro-credential	Formal recognition of specific competencies acquired in a short learning program. Chapter 20
Mimetic isomorphism Mimetic isomorphism	The tendency of organizations, under ambiguity, to imitate organizations they see as successful or legitimate. Chapter 20
Minimum viable product Minimum viable product	The smallest version of a product that allows the greatest amount of learning with the least effort. Chapter 14
Mission-oriented innovation Mission-oriented innovation	Mobilizing efforts and resources toward a specific, ambitious outcome. Chapter 4
National innovation system National innovation system	The network of public and private institutions whose interactions produce, diffuse and use knowledge in a country. Chapter 18
Not-invented-here syndrome Not-invented-here syndrome	Resistance to ideas and knowledge that come from outside the team or the organization. Chapter 18
Open innovation Open innovation	A distributed innovation process based on knowledge flows purposively managed across organizational boundaries. Chapter 18

Optimism bias Optimism bias	The tendency, when planning, to underestimate costs and risks and to overstate benefits. Chapter 17
Orchestrating unit Orchestrating unit	A unit linked to top leadership that connects the components of the existing system without owning their initiatives. Chapter 6
Organizational ambidexterity Organizational ambidexterity	An organization's ability to combine exploitation and exploration at the same time. Chapter 3
Organizational culture Organizational culture	The shared assumptions that a group has learned and passes on to new members as the correct way to think and act. Chapter 8
Perceived organizational support Perceived organizational support	An employee's belief that the organization values their contribution and cares about their well-being. Chapter 3
Pilot Pilot	A limited run of the solution in a near-real setting to test its value and adoption before scaling. Chapters 5 and 14
Problem finding Problem finding	The process by which a person identifies and formulates a problem before solving it; it is considered part of creativity. Chapter 11
Problem-driven iterative adaptation Problem-driven iterative adaptation	An approach that builds solutions locally, starting from problems, through experimentation, learning and continuous adaptation. Chapter 20
Procedural justice Procedural justice	The fairness of the way a decision is made, grounded in involvement, explanation and clear

	expectations. Chapter 10
Production blocking Production blocking	The drop in idea generation in groups because members must wait their turn to speak. Chapter 12
Prototype Prototype	A representation of a solution built to answer a specific question about its role, its look and feel, or its implementation. Chapter 14
Proxy measure Proxy measure	A measure used in place of the intended construct because the latter is hard to measure directly; it may carry hidden biases. Chapter 19
Psychological safety Psychological safety	A shared belief within a team that asking questions, raising objections and admitting mistakes will not bring punishment or embarrassment. Chapter 8
Public value Public value	What society and its members value in the outcomes of public services and policies. Chapters 1 and 13
Randomized controlled trial Randomized controlled trial	An experiment in which participants are randomly assigned to the solution or an alternative, in order to isolate the solution's effect. Chapter 14
Real options Real options	A logic that treats a small early investment as the right to scale up later or to stop with a limited loss. Chapter 10
Reference class forecasting Reference class forecasting	Estimating cost and duration by looking at what actually happened in similar projects. Chapter 17

Reframing Reframing	Formulating a problem from a different angle that reveals new solutions. Chapter 11
Relevance Relevance	The continuing connection between what an organization offers and the needs of its beneficiaries, now and in the future. Chapter 2
Responsible innovation Responsible innovation	Taking care of the future through collective stewardship of science and innovation in the present, grounded in anticipation, reflexivity, inclusion and responsiveness. Chapter 19
Results chain / logic model Results chain / logic model	A sequence linking inputs and activities to outputs, outcomes and impact. Chapter 16
Scenario planning Scenario planning	Sketching several plausible futures in order to test decisions against them. Chapter 4
Search field / Innovation arena Search field / Innovation arena	A priority area of opportunity that directs exploration efforts. Chapter 4
Servant leadership Servant leadership	A leadership style that makes serving followers and meeting their needs and growth an end in itself. Chapter 3
Solution requirements Solution requirements	What any solution must achieve to count as successful, regardless of its form. Chapter 12
Spending efficiency Spending efficiency	Achieving the greatest possible value with the available resources. Chapter 17

Stage-Gate Stage-Gate	A system that divides an initiative's journey into stages separated by decision points with predefined criteria. Chapter 10
Staged funding Staged funding	Funding an initiative stage by stage, with each tranche tied to passing a gate. Chapter 10
Stages of concern Stages of concern	The progression of adopters' questions and concerns from the self, to the task, to impact. Chapter 15
Strategic triangle Strategic triangle	A framework that links the success of a public initiative to the alignment of public value, legitimacy and support, and operational capacity. Chapter 13
Student innovator journey Student innovator journey	An extended path that connects the university's units around what the student needs at each stage. Chapter 20
Sustainability-oriented innovation Sustainability-oriented innovation	Intentional changes to an organization's values, products and processes that create environmental and social value alongside economic value. Chapter 19
The innovator's path The innovator's path	A model that reads an idea's journey from its owner's perspective, from thought to practice, together with its outcomes and its surrounding environment. Chapter 7
Three horizons Three horizons	Dividing initiatives according to their distance from the current business and their degree of uncertainty. Chapter 4

Total cost of ownership Total cost of ownership	The cost of a solution over its whole life, from purchase through operation to retirement. Chapter 17
Triple helix Triple helix	A model that explains innovation through the interaction of university, industry and government. Chapter 18
Unintended consequences Unintended consequences	Consequences of purposive action that the actor neither intended nor foresaw. Chapter 19
Value proposition Value proposition	The job a solution helps people get done, and why it is better than their alternatives. Chapter 13
Vanity metrics Vanity metrics	Numbers that look good in reports but do not indicate the value actually achieved. Chapter 16
Voltage effect Voltage effect	The decline in a program's impact as it scales from a pilot to wide implementation. Chapter 15
VUCA VUCA	A description of the environment along four dimensions: volatility, uncertainty, complexity and ambiguity. Chapter 2
Weak signals Weak signals	Early, ambiguous information about an approaching change. Chapter 4
Wicked problem Wicked problem	A problem that cannot be definitively formulated and that changes with every attempt to solve it. Chapter 11
Work environment for creativity	The enablers and obstacles within an organization that affect employees' creativity, particularly their motivation. Chapter 7

Work environment for creativity	
Workaround Workaround	A method people devise to cope with a problem that no one has solved for them. Chapter 11

Back matter

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How does an organization move from scattered initiatives that celebrate innovation to a sustained capability to produce it?

This book traces the path of innovation from the first signal to a solution adopted in practice that creates value, and analyzes the organizational foundations that make this path a settled practice: strategy, systems, culture, governance, teams and measurement, with people at the center.

It rests on three pillars: a clear, high-priority problem; motivated people whose needs are met; and a system that connects them and turns effort into repeatable results. It combines international research evidence with the Saudi context, and pairs each chapter with a tool that can be used in a real organization.

Its twenty chapters are organized in five parts: foundations; institutional foundations and people; the initiative journey; value and the ecosystem; and an application to the university innovation ecosystem.

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Dr. Omar A. Alsamani

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