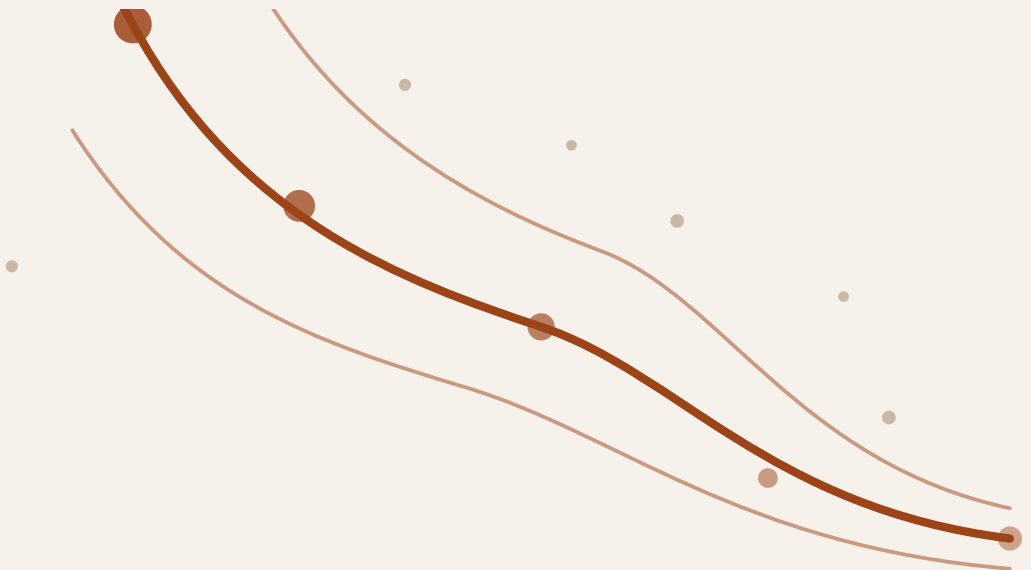


# Innovation Management

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From scattered initiatives  
to a sustained organizational capability

**Dr. Omar A. Alsamani**



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## **Innovation Management**

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# 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.

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## 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:

- 1 Distinguish between innovation as a means of spending efficiency and efficiency in spending on innovation.
- 2 Explain why the cost of change rises as a project advances, and the value of spending early on learning.
- 3 Calculate the total cost of a solution over its lifetime.
- 4 Explain why large projects overrun their budgets, and the methods for limiting such overruns.
- 5 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.

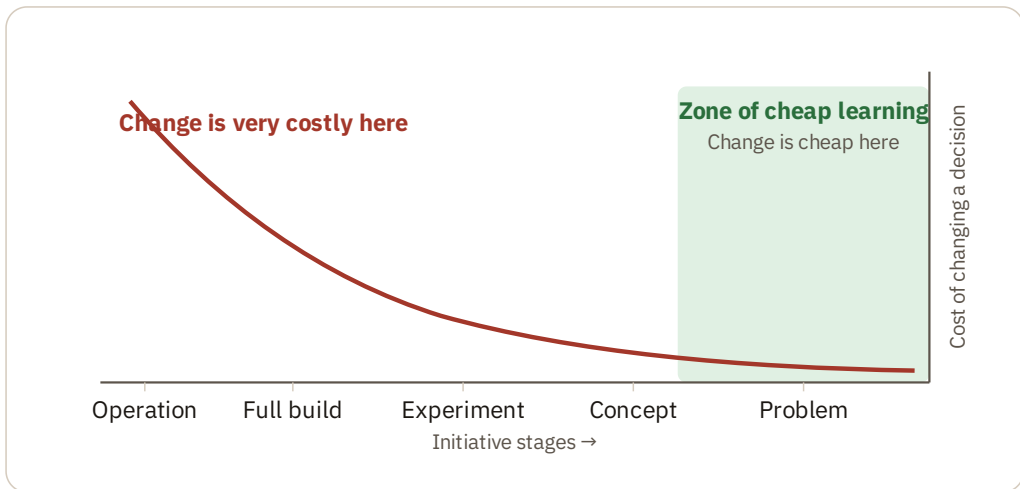


**Figure 17.1** The rising cost of changing a decision as an initiative advances. Developed by the author, drawing on Boehm (1981). The curve is illustrative.

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?<br>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.

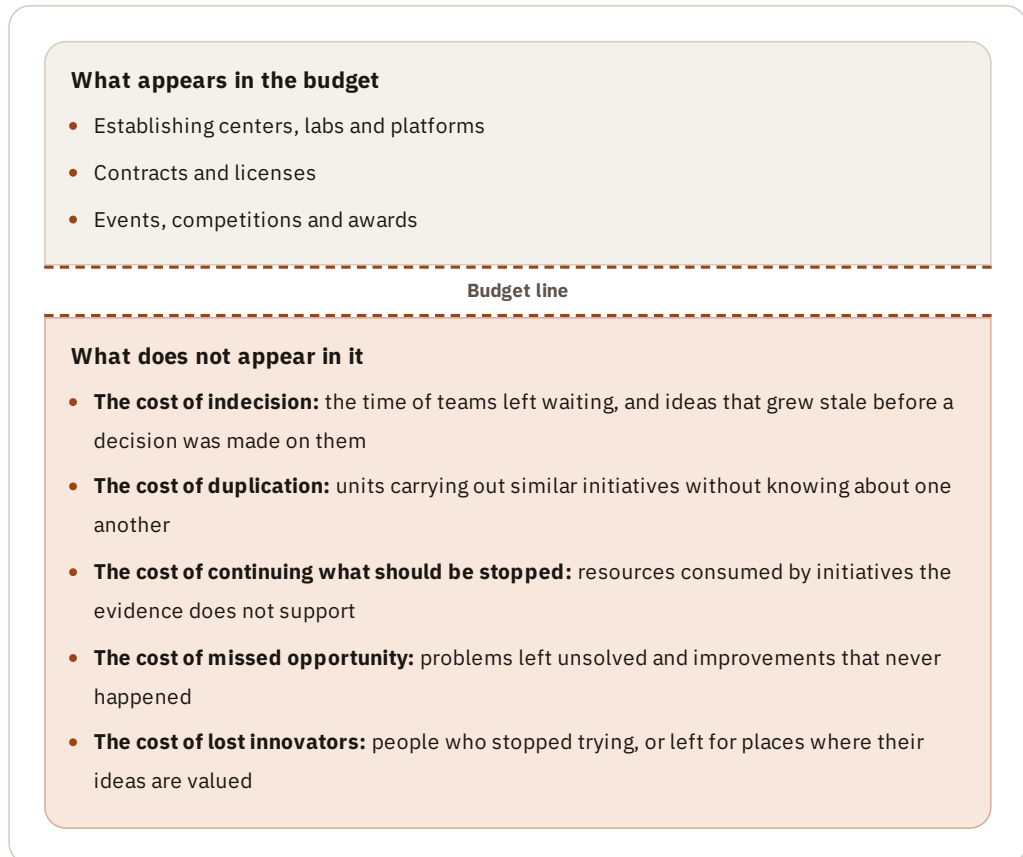


**Figure 17.2** Visible and hidden costs in innovation management. Prepared by the author.

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?<br>(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

|                                                                   |                                                                                                      |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Spending efficiency</b><br>Spending efficiency                 | Achieving the greatest possible value with the resources available.                                  |
| <b>Front-loading</b><br>Front-loading                             | Identifying and solving problems in the early stages, when change is cheapest.                       |
| <b>Total cost of ownership</b><br>Total cost of ownership         | The cost of a solution over its entire lifetime, from purchase through operation to decommissioning. |
| <b>Optimism bias</b><br>Optimism bias                             | The tendency, when planning, to underestimate costs and risks and to overestimate benefits.          |
| <b>Reference class forecasting</b><br>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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## **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.

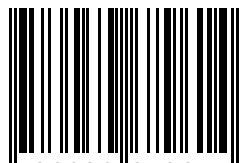
Its twenty chapters are organized in five parts: foundations; institutional foundations and people; the initiative journey; value and the ecosystem; and an application to the university innovation ecosystem.

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