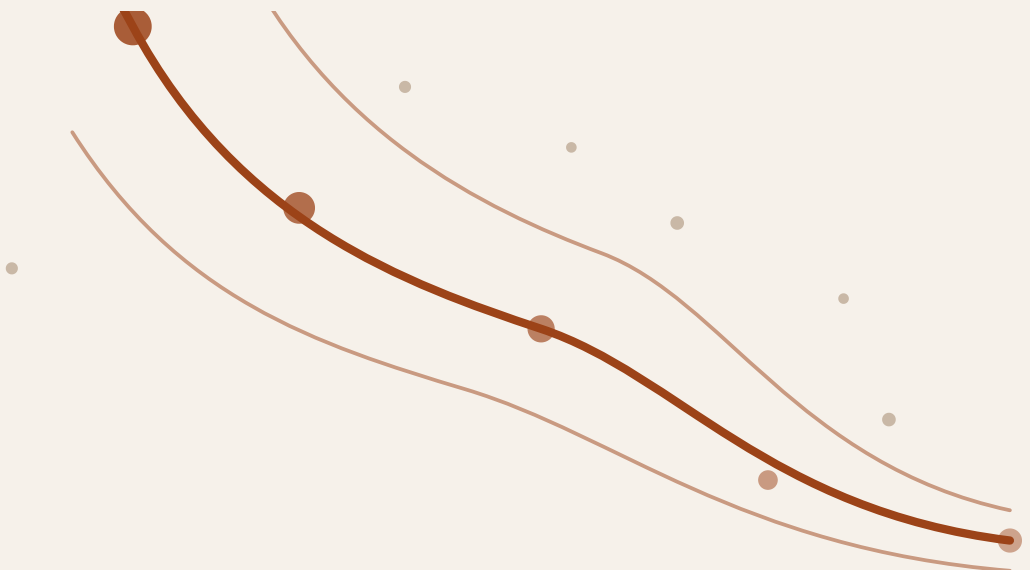


Innovation Management

From scattered initiatives
to a sustained organizational capability

Dr. Omar A. Alsamani



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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:

- 1 Translate a challenge question into requirements against which any proposed solution can be measured.
- 2 Design idea-generation sessions that separate expanding from narrowing and avoid the obstacles of group work.
- 3 Recognize fixation on the first solution and use methods to break it.
- ε Explain the bias against new ideas in evaluation, and design evaluation that limits it.
- 0 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.

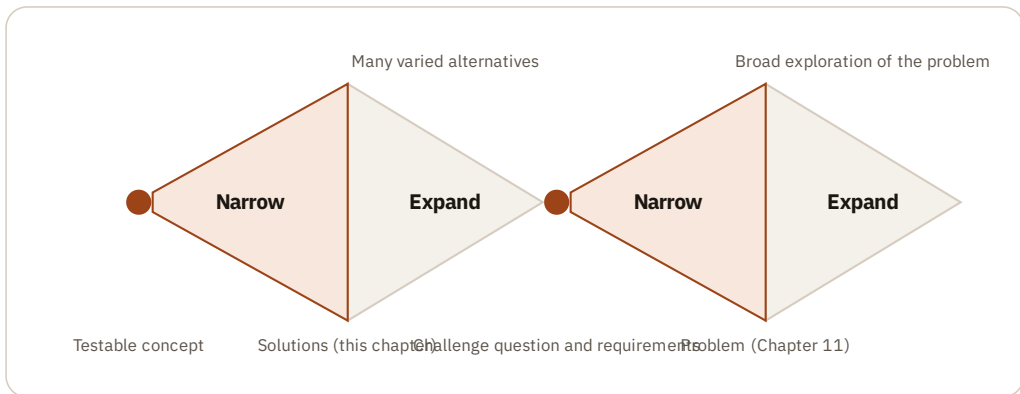


Figure 12.1 The alternation of expanding and narrowing: once to understand the problem, and once to develop the solution. Prepared by the author, drawing on the concepts of divergent and convergent thinking in Guilford (1967).

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

Chapter references

- Berg, J. M. (2016). Balancing on the creative highwire: Forecasting the success of novel ideas in organizations. *Administrative Science Quarterly*, 61(3), 433–468.
<https://doi.org/10.1177/0001839216642211>
- Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), 84–92.
- Diehl, M., & Stroebe, W. (1987). Productivity loss in brainstorming groups: Toward the solution of a riddle. *Journal of Personality and Social Psychology*, 53(3), 497–509.
<https://doi.org/10.1037/0022-3514.53.3.497>
- Doshi, A. R., & Hauser, O. P. (2024). Generative AI enhances individual creativity but reduces the collective diversity of novel content. *Science Advances*, 10(28), Article eadn5290.
<https://doi.org/10.1126/sciadv.adn5290>
- Gick, M. L., & Holyoak, K. J. (1980). Analogical problem solving. *Cognitive Psychology*, 12(3), 306–355. [https://doi.org/10.1016/0010-0285\(80\)90013-4](https://doi.org/10.1016/0010-0285(80)90013-4)
- Girotra, K., Terwiesch, C., & Ulrich, K. T. (2010). Idea generation and the quality of the best idea. *Management Science*, 56(4), 591–605. <https://doi.org/10.1287/mnsc.1090.1144>
- Guilford, J. P. (1967). *The nature of human intelligence*. McGraw-Hill.
- Jansson, D. G., & Smith, S. M. (1991). Design fixation. *Design Studies*, 12(1), 3–11.
[https://doi.org/10.1016/0142-694X\(91\)90003-F](https://doi.org/10.1016/0142-694X(91)90003-F)
- Mueller, J. S., Melwani, S., & Goncalo, J. A. (2012). The bias against creativity: Why people desire but reject creative ideas. *Psychological Science*, 23(1), 13–17.
<https://doi.org/10.1177/0956797611421018>
- Osborn, A. F. (1953). *Applied imagination: Principles and procedures of creative thinking*. Scribner.
- Ulrich, K. T., Eppinger, S. D., & Yang, M. C. (2020). *Product design and development* (7th ed.). McGraw-Hill Education.

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.

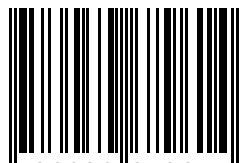
It rests on three pillars: a clear, high-priority problem; motivated people whose needs are met; and a system that connects them and turns effort into repeatable results. It combines international research evidence with the Saudi context, and pairs each chapter with a tool that can be used in a real 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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