

# A BRIEF INTRODUCTION TO DESIGN THINKING<sup>1</sup>

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## Introduction

Within the context of new product development (NPD) and innovation, design thinking has enjoyed significantly increased visibility and, for many, increased perceived importance over the last decade. For others, however, this term can be fraught with confusion, questions of relevancy and, for some, the perception of a fad. Within that context, the objectives of this chapter include the following: First, I briefly describe the concept of design thinking and its role within NPD and innovation. Next, I provide and describe a simple framework of design thinking, followed by a summary of some fundamental principles of the “mindset” of design thinking. Throughout, I identify linkages with the other chapters in this book. While this chapter provides an overview of design thinking as well as some context, the remaining chapters in this book provide significantly more detail and a wide variety of specific examples. Thus, this chapter concludes with a visual overview of the book to help guide you to the specific ideas, tools, and practices most applicable to the NPD and innovation problems and opportunities that you and your firm are facing today.

## 1.1 The Concept of Design Thinking and Its Role within NPD and Innovation

*What is design thinking?* At its core, design thinking can be construed as a creative problem-solving approach—or, more completely, as a *systematic and collaborative*

<sup>1</sup>This chapter was adapted from “Understanding Design Thinking: A Primer for New Product Development and Innovation Professionals.” © 2014 College of William & Mary.

*approach for identifying and creatively solving problems.*<sup>2</sup> The term *design thinking* simply means that one is approaching problems, and their solutions, as a designer would. While this will be elaborated subsequently, an illustrative characteristic of the design thinking approach is that it is intentionally nonlinear. Designers, whether in the arts or industry, tend to explore and solve problems through iteration. They quickly generate possible solutions, develop simple prototypes, and then iterate on these initial solutions—informed by significant external feedback—toward a final solution. This is in contrast to a linear process, such as the traditional Stage-Gate™ new product development (NPD) process, in which prototyping is typically done toward the end of the process to reflect the culmination of the development phase and to explore manufacturability, rather than as a mechanism for gaining market feedback. A more thorough description of design thinking as a process and mindset follows, but first I address an important question for those involved with new product development and innovation: When is design thinking most applicable?

## When to Apply Design Thinking

Generally speaking, design thinking is best applied in situations in which the problem, or opportunity, is not well defined, and/or a breakthrough idea or concept is needed, that is, an idea that has a significant and positive impact, such as creating a new market or enabling significant revenue growth. Design thinking methods have been used successfully in different ways within business including new venture creation, business model design, and process improvement. While our focus is on applying design thinking to the challenge and opportunity of new product development<sup>3</sup> and innovation, this book also includes several chapters that address other contexts, such as business model design (Chapters 18 and 19).

Within the context of NPD, design thinking is very well suited to use in markets that are quickly changing and when user needs are uncertain, such as the emerging market for wearable biometric devices. However, design thinking is equally applicable in more mature markets as a means to identify new, latent customer needs and/or in an effort to develop significant or radical innovations (Chapter 17). Whereas incremental innovations are also critically important to most companies, they typically are bounded by well-defined problems or established customer needs, such as improving gas engine fuel efficiency. In those situations, a more linear, Stage-Gate process is still appropriate. Nonetheless, even in these situations there may be specific elements of a design thinking approach—specific tools or techniques—that can improve a project's outcome.

For the right situations, however, a design thinking approach is more likely to lead to better solutions that address the most important customer needs, and do so more efficiently than traditional NPD approaches alone. One of the reasons for this is that design thinking helps to avoid the trap of investing too many resources too early in a

<sup>2</sup>Given a focus on the customer's perspective, I refer throughout to "solving problems," but in the context of NPD, it would clearly make sense to also think of problems as opportunities.

<sup>3</sup>For simplicity, I refer to products, where products can be physical goods and/or services.

project toward developing a specific, single solution. Rather than placing such a “big bet,” design thinking encourages many “little bets” (Sims, 2013) about customer insights and possible solutions. Sims describes these little bets as “low risk actions taken to discover, develop, and test an idea.” These little bets make it more likely that a project team will quickly converge on solution concepts with the highest potential market success. At some point, of course, specifications need to be well defined and the product needs to be developed and, ultimately, produced. In this sense, another way to think about design thinking is as a clarifying lens on the oft referred to “fuzzy front end” of NPD, whereby a project begins with an iterative, design thinking approach, followed by a traditional Stage-Gate process after enough has been learned about customer needs and possible solutions.

## The Origins of Design Thinking

The methods and mindset of design thinking, although championed by progressive companies and design consultancies, draw from a wide field of disciplines including software development, engineering, anthropology, psychology, the arts, and business. Design thinking as it exists today has co-evolved across a variety of disciplines and industries. Over time—well over 50 years, and even longer depending on your perspective—the best and most generalizable methods and practices have emerged and converged in a quasi-Darwinian process of natural selection. These have been codified, integrated, documented, and championed by leading design firms (such as IDEO and frog) and academic institutions (such as Stanford’s d.school, and the Rotman School of Management), and have increasingly been adopted by industry and popularized by the media under the shared moniker of design thinking.

While this co-evolution and vetting of design thinking has led to a robust set of methodologies, it has also contributed to some confusion given the proliferation of tools, methods, books, seminars, and, more recently, online training available. Rather than getting lost in the details from the start, a useful way to learn about design thinking methods is through the lens of an organizing framework. Even here, however, there are a variety of frameworks to choose from, each with its own nuances and biases. To the novice, this, too, can be daunting. Given the time to explore these, however, it becomes apparent that there actually is significant consistency across these frameworks. In a sense, each of these has been a prototype framework—building on the ideas and lessons of its predecessors. In that iterative spirit, I propose a framework for design thinking in the next section that is intended to reflect the shared elements of existing frameworks, with the objective of retaining the most important elements of design thinking and their distinctions, while simplifying their depiction and terminology. At the least, this framework introduces the major elements of design thinking as efficiently as possible and facilitates an exploration of the rich content contained within the other chapters of this book. Further, it will make it easier to quickly navigate other design thinking frameworks in use and, in so doing, enable an efficient exploration of the vast library of tools, techniques, and advice beyond these pages.

## 1.2 A Framework of Design Thinking

There are literally dozens, if not hundreds, of specific design thinking–related methods and tools available, and this book will explore many of these. Learning about just a few of these and understanding how they are used together is likely more valuable than trying to experiment with them without any context. The following framework is intended to provide that context, by organizing these methods and tools based on their role or purpose.

Design thinking, as a *systematic and collaborative approach for identifying and creatively solving problems*, includes two major phases: identifying problems and solving problems. Both of these phases are critical, but in practice most people and project teams within companies are more inclined to focus on the latter, that is, on solving problems. We are naturally creative beings, and given any problem—however ill-defined—most of us can generate a set of ideas. Unfortunately, these often will not be great ideas, that is, ideas that are both original and that solve the problems with the greatest potential. One of the most powerful features of design thinking is its emphasis on identifying the right problems to solve in the first place. This is, therefore, a key element of the following framework, as indicated by the two phases of design thinking depicted in Figure 1.1: Identify and Solve. Next, I describe the purpose of each of the modes within these two phases, followed by a discussion of the iterative nature of the process as a whole.

### Discover

The purpose of the first mode of the design thinking framework (see Figure 1.2) is to Discover new customer insights. One of the challenges for many product development teams is that they are immersed in the world of products and, often, technologies. While that is clearly important expertise, it can limit their field of view and perspective; market information tends to get framed in terms of product specifications relevant to existing products. As a consequence, well-intended research, even when conducted with product users, is often unintentionally biased toward relatively minor modifications to

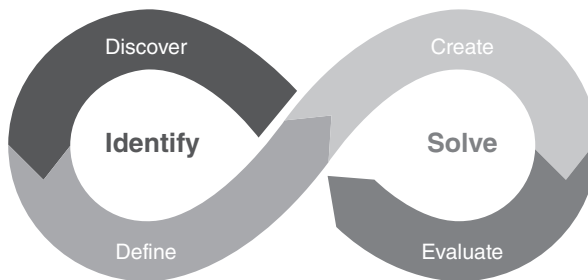


Figure 1.1: A framework for design thinking.

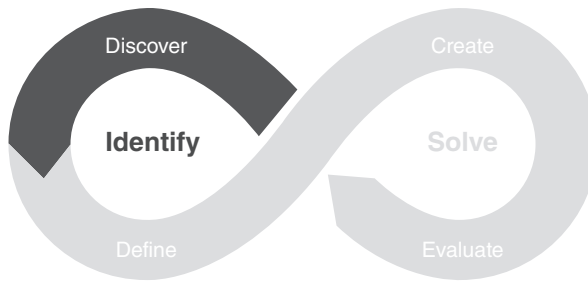


Figure 1.2: Discover mode.

existing products. Instead, a quest for breakthrough ideas often begins with an open exploration of customer<sup>4</sup> needs—especially latent, undiscovered needs that may be difficult to articulate—also referred to as customer insights.

So how does one identify customer insights that will inspire great ideas? While there are many specific methods, they generally are qualitative in nature and are intended to help the project team become immersed in their customers' context. This is typically described as a process focused on gaining empathy with customers, that is, developing an understanding of their context, experiences, and behaviors (Chapters 3, 4, and 7).

At some point during data collection, the project team needs to begin synthesizing the data that they have collected. This does not mean that their discovery work is complete. Indeed, the Discover mode is built on iteration between data collection and data synthesis, where data synthesis is the process of summarizing and deriving meaning from the data. Given the qualitative nature of the data (i.e., pictures, transcripts, audio recordings, etc.), the data synthesis process is very different than what is typically assumed with market research. Rather than relying on numerical data and statistics, the team needs to be able to translate qualitative data into specific customer insights. There is a variety of ways to do this, including coding transcripts, drafting personas and empathy maps of archetypical customers, and journey maps that describe the customer's current or ideal experience (Chapters 3 and 4).

Once again, while there are many different techniques available, an important principle of the Discover mode is to continually iterate between data collection and synthesis, that is, to attempt to synthesize insights throughout rather than wait until all data have been collected. This requires flexibility and patience but helps to ensure that the most appropriate methods are used as needed rather than rigidly prescribing exactly how the research will be conducted at the start of a given project. Once the team is confident that they have identified a set of significant customer insights to consider, then they are ready to proceed to the Define mode.

<sup>4</sup>For simplicity, I refer to customers throughout. These methods are not, however, limited to designing products for traditional customers. They are equally appropriate for any person or group that uses a product or service, or that is part of product or service creation and delivery, for example, a hospital nurse.

## Define

The Discover mode can be characterized by the development of an expanded understanding of the customer—their thoughts, feelings, experiences, and needs. In contrast, the Define mode (see Figure 1.3) is characterized by a distillation of customer insights and framing of specific insights as well-defined problems to solve. At this point in the process, the team should have an inventory of synthesized information about their customers and their contexts. The challenge is to identify the needs and insights most worthy of pursuit through the next phase of the process. Toward that end, these needs and insights are often framed as discrete “problem statements” to use in the next phase as a basis for idea generation, the initial activity within the Create mode. These problem statements generally are short statements that describe the customer type, an unaddressed need, and the insight that explains why the identified need is especially worthy of addressing. For example:

- A busy parent of teenagers (customer type) ...
- ... needs a way to reconcile and integrate the dynamic schedules of all members of the family (the need) ...
- ... because the lack of reliable, up-to-date information about conflicting schedules is leading to missed activities and unnecessary stress (the insight that clearly explains why the need is worth addressing).

Next, the team needs to converge on a subset of these problem statements to address in the next mode: Create. Multivoting is one of the skills that is most useful at this point. While there are different ways to vote for ideas, or problem statements in this case, the intent is to take advantage of the evolving wisdom of the group that has collectively benefited from participation in the Discover mode (which depends on consistent team membership throughout the project).

## Create

The purpose of the Create mode of design thinking (see Figure 1.4) is to develop a concept or set of concepts that can be shared with the target market for feedback and that, through iteration, can be improved upon. While customers can respond to an idea on their own, the best feedback will result from their engaging with a rough prototype of a

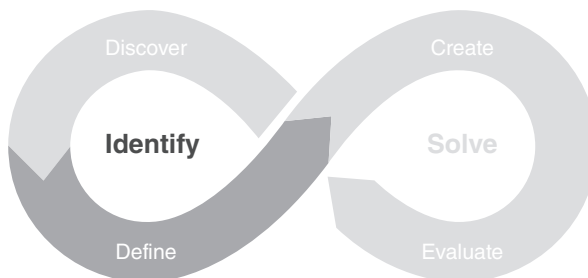


Figure 1.3: Define mode.

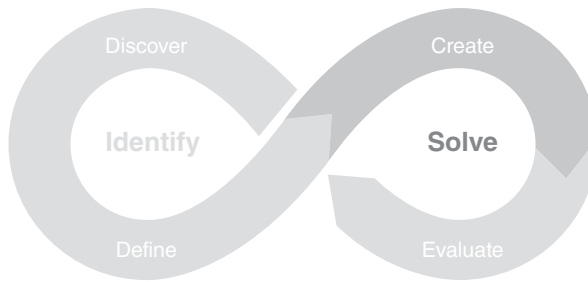


Figure 1.4: Create mode.

concept since a good prototype can provide an experience to respond to and another opportunity for designers to observe actual behaviors. Thus, the two primary activities of the Create mode are idea generation and prototyping. Although these will be described in sequence, in practice they are, once again, highly iterative in nature.

The first major activity within the Create mode is idea generation. There is a wide variety of tools and techniques available to do this (Chapters 5 and 6). Next, after grouping and refining ideas, the team can again use some form of multivoting to converge on the most promising ideas. At this point, it is appropriate to consider a broad set of criteria. A simple schema to consider might include (a) desirability (from the customer's perspective), (b) feasibility (the ability to deliver the product), and (c) viability (the ability for sustained business benefit, either financial or strategic). It is important, however, to remain focused on the identified customer insights and to avoid filtering ideas too much based on other criteria, since the idea is still nascent at this point and can be improved upon during the next activity, prototyping.

When practitioners of design thinking talk about prototypes, they are not referring to the camera-ready or fully functioning prototypes that appear in the popular press. Rather, they are referring to simple prototypes that provide a very basic experience of a product or feature of a product (Chapter 7). These are often referred to as “low-resolution prototypes” (d.school, 2014). These early-stage prototypes can be three-dimensional objects, a sequence of screen shots of a “software app” concept, or even a mocked-up service counter with actors as agents. One of the unique features of design thinking is that prototyping is used as another activity for exploring an idea—to accelerate and improve idea generation by considering different manifestations of the concept. Thus, a series of prototypes might be developed within the group before one or more are chosen to present to prospective customers for feedback.

## Evaluate

The final mode of the design thinking framework is Evaluate, as shown in Figure 1.5. The purpose of this mode is to get feedback on concept prototypes, and the ideas and assumptions embedded within them. Within the design thinking framework, we typically assume that much of this feedback will be used to iterate and improve upon the concepts, especially in the first iteration of the four modes. In other words, this is not

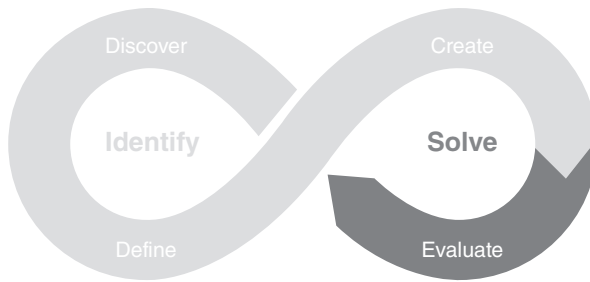


Figure 1.5: Evaluate mode.

the “final step.” This will be elaborated on subsequently, but for now it is important to appreciate that the purpose of the feedback is initially as a mechanism to learn more rather than merely to validate.

There are typically two types of activities conducted with this mode. The first is to share prototypes with potential customers to gain feedback. To get the most valuable feedback, the prototype should be used to help simulate an experience for the user rather than serve as a prop for presentation. After the team has collected sufficient feedback, they proceed with a process of synthesizing the feedback. This activity is similar in spirit to the data synthesis completed during the Discover mode, with the obvious difference being that users now have a tangible solution concept to respond to. The objective is, however, quite similar: to gain further insight in addition to converging on the most promising solution or elements of a solution. Depending on the synthesis of the feedback, the team then decides where to go next in the design thinking framework. The ultimate objective, of course, is to move beyond concept prototyping to full development of the product or service. The assumption within design thinking, however, is that this is likely to occur only after multiple iterations of one or more of the modes of design thinking, to which we turn next.

## 1.3 Design Thinking as a Nonlinear Process

Thus far, I have presented the modes of design thinking as a linear sequence of activities. This is likely the easiest way to learn about these modes and, in practice, the first iteration of these modes will typically proceed as they have been described above: Identify (Discover and Define) and then Solve (Create and Evaluate). However, design thinking is not intended to be a linear process, nor would that be desirable in most situations. Instead, the design thinking approach is to create potential solutions as quickly as possible—knowing that our knowledge is incomplete and that these solutions will be incomplete and potentially flawed—and then use these initial solutions as a means of learning more, of developing more refined insights, and creating better solutions.

Thus, design thinking is best understood as an iterative approach to problem solving, rather than as a sequence of steps—hence the use of the term *mode* as opposed



to *step*. The number of iterations depends on the project and is, to a certain degree, unknowable at the initiation of a project. This is a judgment call, based on the objectives and constraints of the project, as well as the perceived progress of the work. Deciding how to proceed on a given project is one of the key tasks of the team and its leader throughout the project. This includes deciding when to shift to a different mode and when, ultimately, to move beyond concept evaluation within the design thinking framework into a more traditional, linear product development process once the concept has been sufficiently described and evaluated.

At first glance, the lack of predefinition of which modes to use at a given point in the project, to what degree, and in what order may seem unnecessarily complex and at odds with the logic and efficiency of traditional Stage-Gate development processes. In the right situations, however, this approach provides important flexibility, increasing the odds of arriving at great solutions, while minimizing wasted time and effort. This requires a fundamental shift in mindset, a point to which we turn to next.

## 1.4 The Principles and the “Mindset” of Design Thinking

At this point, it is likely evident to the reader that design thinking is as much about a way of thinking and doing as it is about process. Process is clearly important, and there are specific, tested tools to consider within each mode, each with its own set of inputs, outputs, and well-defined activities. Beyond process, design thinking is also about mindset, where mindset can be thought of as an integrated set of beliefs and attitudes.

Several chapters in this book will address the mindset and principles of design thinking, as well as the implementation of design thinking in the firm (Chapters 8–14). However, I share below some common themes that can serve as an initial primer. Becoming familiar with these should enable a flexible approach to exploring the wide variety of topics addressed throughout the remaining 24 chapters of this book, collectively illustrated in Figure 1.6. In that spirit, some common principles of the design thinking mindset and philosophy include the following:

*People-centric:* A shift from a product and technology-centric orientation to a primary focus on the values, experiences, and needs of people; although products and technologies are clearly critical to ultimately addressing customer needs, they are viewed as enablers of solutions that follow from customers’ needs.

*Cross-disciplinary and collaborative:* Using teams with a wide variety of backgrounds and training, and with team members that are open to the different perspectives and abilities of a diverse team. While team membership should be relatively consistent throughout the project, it may be wise to occasionally include participants external to the organization—such as customers, suppliers, and other subject matter experts—for select modes or activities.

*Holistic and integrative:* Although details are important, design thinkers are also able to see and consider relationships, interactions, and the connections between seemingly disparate ideas.

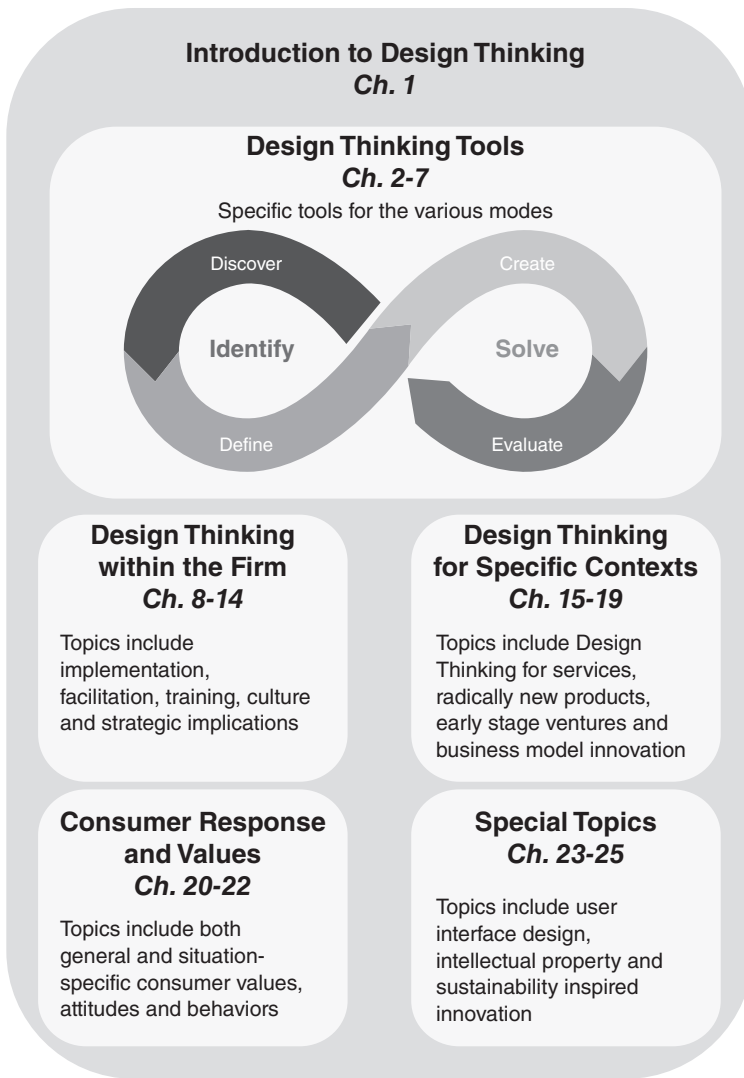


Figure 1.6: A brief guide to the chapters in this book.

*Flexibility and comfort with ambiguity:* Design thinking is best suited to addressing ambiguously defined problems and opportunities, and requires great flexibility with respect to both content and approach (e.g., through as-needed iteration of modes and phases).

*Multimodal communication skills:* A willingness to communicate and work in various modalities, including verbal, visual, and tactile. Design thinkers sketch and create prototypes, without being constrained by a perceived lack of ability or skill. And, last but not least ...

*Growth mindset:* A willingness to test ideas, concepts, and prototypes in an effort to learn, unhindered by a fear of failure.

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