



THE SIX DISCIPLINES OF INNOVATION

Improving the Odds, Accelerating the Process
& Reducing Risk for Enterprises & Startups

Dr. Phil Hendrix

Director immr and Gigaom Research analyst

Whitepaper Sponsored by THINK Interactive

2014

TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
PITFALLS THAT CAUSE INNOVATIONS TO FAIL	5
AN OVERVIEW OF THE SIX DISCIPLINES.....	7
THE SIX DISCIPLINES EXPLAINED	8
THE IMPORTANCE OF CUSTOMER NEEDS	9
UNCOVERING CUSTOMER NEEDS – FRICTION, SHOULD & WANTS.....	10
HOW UNMET NEEDS CREATE MARKET OPPORTUNITIES	11
EMPATHY – KEY TO GAUGING CUSTOMER NEEDS	12
GENERATING SOLUTIONS & CRAFTING VALUE PROPOSITIONS	13
DESIGN – THE HEART OF INNOVATION.....	15
UBIQUITOUS DESIGN	16
THE DISCIPLINES OF DESIGN.....	17
PROTOTYPING – SHOWING TRUMPS TELLING.....	18
VALIDATING INNOVATIONS.....	19
VALIDATION RESEARCH	21
CALIBRATING DEMAND FOR AN INNOVATION	22
READINESS TO ADOPT: PRIOR BEHAVIOR & WILLINGNESS TO CHANGE	23
BUILD, PILOT & SCALE	24
AGILE DEVELOPMENT.....	26
CONCLUSION.....	27
ACKNOWLEDGMENTS	28
ABOUT THE AUTHOR	29
ABOUT THINK	30
REFERENCES.....	31

INTRODUCTION

To a large degree, the success of enterprises as well as startups depends on their skill at innovation. By developing compelling new products that satisfy and delight customers, businesses that succeed at innovation are [rewarded](#) with a virtuous spiral of lower marketing costs, a loyal following, superior margins and high growth. In light of its importance, not surprisingly innovation is a top priority in product and service companies, both B-to-B and consumer. Unfortunately, as evidenced by the abysmally low success rate of new products and services, few companies excel at innovation.

A number of difficulties account for the lackluster results. First, innovation is shrouded in a litany of jargon. There is incremental, radical, breakthrough, disruptive and even game-changing innovation – not to mention innovativeness, creativity and a host of related concepts. With so many variations and connotations, critics [argue](#) that the term innovation has lost much of its meaning and urge that definitions be made explicit. Heeding this advice, throughout this discussion we use “innovation” to refer to the process and resulting outputs.

Even more vexing than the various meanings are pitfalls that make innovation unpredictable, especially for startups and inexperienced teams. The process of innovation is similar to a maze, with many potential wrong turns and trial-and-error, resulting in wasted time and effort, and very often failure. Teams tasked with innovation often have limited experience, particularly with emerging new technologies.

Making the process even more challenging, innovations must compete with products already in the market, as well as new products competitors are bringing to market. As with sports teams competing in the playoffs, skill and experience can make all the difference in terms of performance and results. A playbook is important as well.

Over the last 10 years a great deal has been learned about what it takes to be successful at innovation, much of it from startups. Fortunately, the learning [applies](#) to enterprises, as well. This whitepaper highlights the pitfalls that cause innovations to fail and describes the six key disciplines that determine whether teams succeed or fail at innovation. While there’s no guarantee,

INNOVATION

The process of conceiving, creating and commercializing a new product or service

INNOVATIONS

Materially new products or services brought to market.

teams that master the disciplines can dramatically improve their odds of success, reduce “dead ends” and lower the risk of failure.

The pitfalls are present and disciplines applicable in enterprises as well as startups, in product and service categories, and in B2B and B2C businesses. For a given team any of the disciplines can be a “weak link,” so assessing internal capabilities and knowing when to leverage outside expertise and assistance are also important. Meant to serve as both a guide and a resource, the white paper provides links to readings and perspectives that should be useful for entrepreneurs, as well as enterprise teams and their sponsors.

PITFALLS THAT CAUSE INNOVATIONS TO FAIL

In general, innovations fail due to assumptions and missteps in the process. The most significant are shown to the right. Several pitfalls that undermine teams' efforts stem from misreading customers' needs, in particular misjudging their [readiness to adopt](#) or buy. Others reflect missteps in the design and development of the innovation or the value proposition that accompanies it. Since customers evaluate the performance and benefits vis-à-vis existing and competing solutions, delivering on the value proposition plays a vital role.

To avoid these pitfalls teams must intimately understand customers, translate the learning into a compelling value proposition and deliver on the promise in ways that are clearly superior to competitors' offerings. Like so many other things, innovation is "simple but not easy."

Why Innovations Don't Succeed

Customers

- Weak Need[s]
- Content with Status Quo
- Resistant to Change

Value Proposition

- Product Missing Key Feature[s]
- Value Proposition Lacking
- Barriers Impede Adoption

Execution

- Not "Materially Better"
- Competing Solutions Outmatch
- Customer Acquisition Costly

WHY INNOVATIONS FAIL

Overestimate Customer Unmet Needs

The intensity of customers' needs determines in part how likely they are to adopt an innovation. Those with more intense needs are more likely to adopt and vice versa. Generalizing from personal experience or projecting from early adopters, teams often overestimate needs, market size and likelihood of success.

Customers Content with Status Quo

In response to researchers' questions, customers will often express dissatisfaction with existing products. When an innovation is introduced, however, the status quo may turn out to be adequate and as a result customers unlikely to switch.

Customers Resistant to Change

Innovations are new-to-customers and sometimes new-to-market. Due to the newness, many customers may be reluctant to adopt them because of skepticism about claimed performance, perceived risk and persistence of [habits](#).

Key Feature [s] Missing

The success of an innovation can hinge on getting a key feature right. Failing to include or deliver on a key feature can eviscerate demand. Likewise, adding in features that are not valued can add to the complexity, "[cognitive overhead](#)" and even "[feature fatigue](#)" among customers.

Value Proposition Lacking

A value proposition informs and persuades customers why they would be better off adopting an innovation vs. alternatives, including the status quo. If the value proposition fails to provide a compelling case based on benefits, competitive advantages and other criteria, the innovation is doomed.

Barriers Impede Adoption

Barriers that slow adoption include (i) lock-in and contracts with an existing product or service supplier; (ii) perceived risk; (iii) compatibility with complementary products; and (iv) cost of [learning](#), installing and using.

Not “Materially Better”

Innovations are often new and untried solutions. With physical or digital products, despite proclamations of “new and improved,” customers may not notice or regard the difference between the innovation and status quo as materially better.

Competing Solution(s) Outmatch

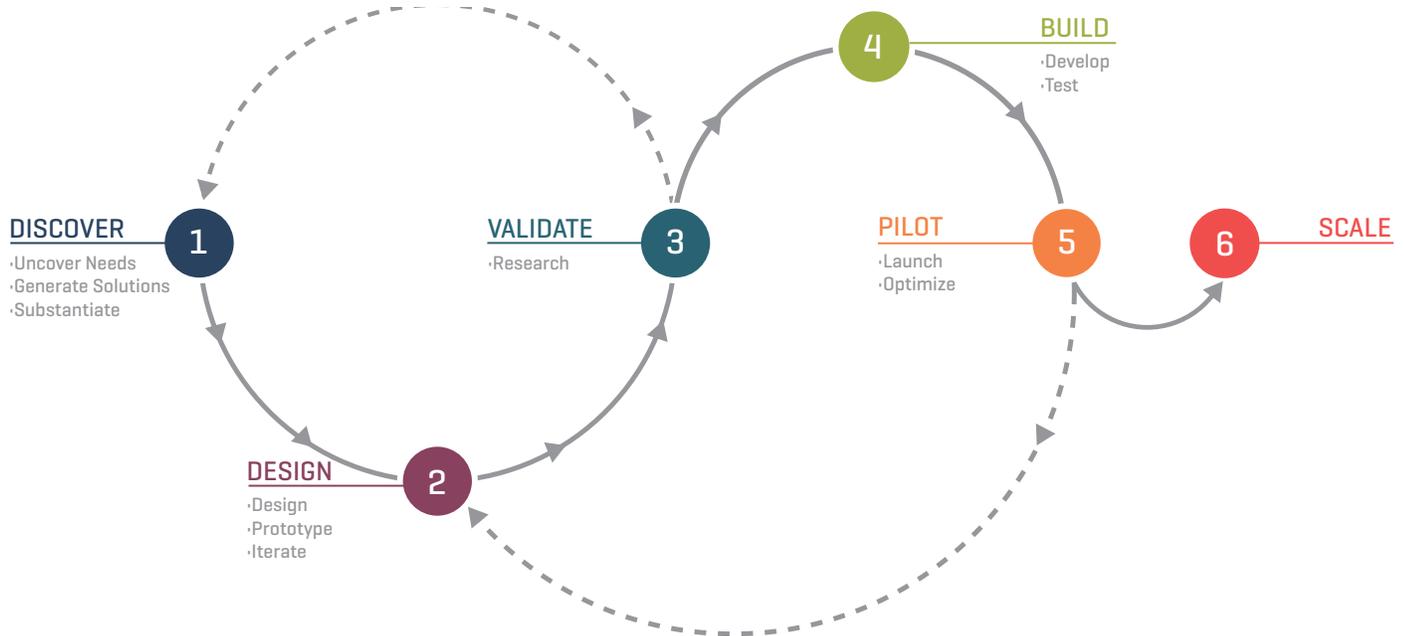
When considering adopting, customers compare an innovation to [the status quo](#) and to competing alternatives. Given the rapid pace of innovation, particularly in mobile and digital, competitors can quickly match or leapfrog an innovation.

Customers Acquisition Costly

Especially for innovations that are new-to-customers or new-to-market, the resources required to attract and acquire customers (e.g., for marketing, sales, [onboarding](#) and related activities) can be substantial and easily underestimated.

Successful innovations are also boosted by favorable word-of-mouth and referrals, which fuel customer interest and adoption. As customers advocate, the cost of customer acquisition drops. Few innovations achieve these “network effects” but when they do the impact is significant.

AN OVERVIEW OF THE SIX DISCIPLINES



Innovation requires substantiating customer needs, designing and developing solutions, and ultimately executing on a strategy that unlocks market demand. The six key disciplines and related sub-disciplines are explained on the next page, but first several important observations:

- While the diagram above may suggest an orderly process with smooth transitions between steps, innovation is typically a non-linear, iterative process, especially between Pilot and Design. As suggested by the dotted line between Pilot and Design, “perpetual beta” is not uncommon.
- Embedded in each of the disciplines, feedback and [validation](#) are especially critical in the early phases – missteps in Discover and Design are costly, resulting in “pivots” or failure.
- As teams work through innovation, different paths may be taken. Lean startup proponents, for example, advocate building an MVP (minimum viable product), then launching, gathering feedback and iterating.
- While the scope, complexity and timetable for innovation vary, both startups and enterprises attempt to “learn fast” (not to be confused with “fail fast”). For example, startups in the Y-Combinator accelerator are required to build a ready-to-ship product within 6 weeks. Google Ventures runs [design sprints](#) which span just 5 days. In Georgia Tech’s [Flashpoint](#) incubator, focused on “startup engineering,” startups are expected to launch within 4 months.
- By practicing the six disciplines innovation teams can avoid the pitfalls above and dramatically improve the odds of success – however, the challenges and risks are still formidable.

THE SIX DISCIPLINES EXPLAINED

Explained below are the six key disciplines of innovation, along with the “sub-disciplines” that comprise each. The first three disciplines – Discover, Design and Validate – are discussed in detail. Given their importance, customer needs and value propositions are also examined closely. The remaining processes – Build, Pilot and Scale – are briefly introduced in the final section.

1 DISCOVERY

- **Uncover Need(s)** – Discover customers’ unmet needs (gap between current and ideal – frictions, should and wants).
- **Generate Solutions** –Formulate solutions and value proposition(s) that satisfy customer needs uncovered by the team.
- **Substantiate** – Calibrate “intensity” of customers’ unmet needs; test, refine and that converge on value proposition(s).

2 DESIGN

- **Design** – Specify features and functionality; design UI (user interface), interactions and UX (user experience).
- **Prototype** – Develop representations of product that allow team and users to view, experience and evaluate.
- **Iterate** – Gather feedback from users and team members incorporating and repeating process until design converges.

3 VALIDATE

- **Research** – Confirm that users value and are committed to adopting and using the solution when available.

4 BUILD

- **Develop** – In collaboration with design team, develop product and supporting infrastructure consistent with “final” design.
- **Test** – Confirm that feature / functionality, user interface (UI) and user experience (UX) satisfy users and scale with usage.

5 PILOT

- **Launch** – Price, position and introduce products into channel(s); design and implement sales, customer onboarding and support.
- **Optimize** – Execute experiments to find combinations of features, price, incentives, and other elements that maximize results.

6 SCALE

- **Scale** – Engage users, trigger network effects and build out scalable platform to support growth.

THE IMPORTANCE OF CUSTOMER NEEDS

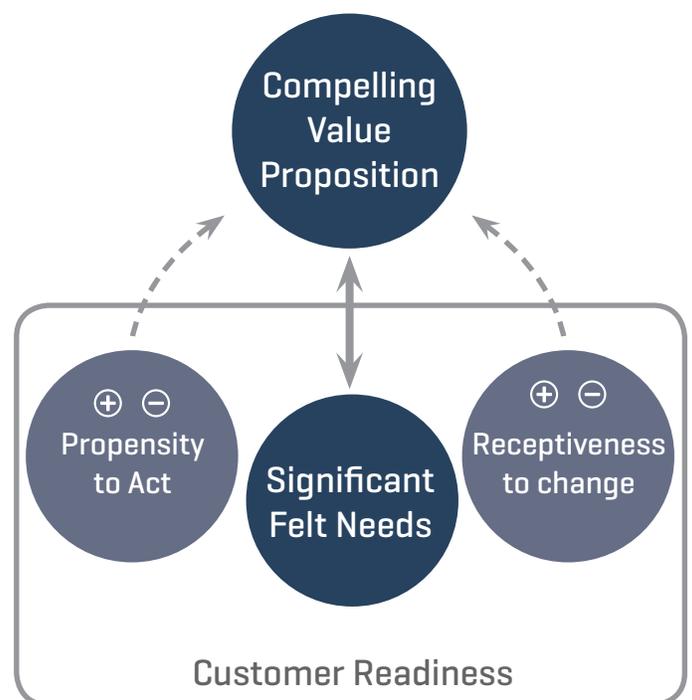
Two factors largely determine the nature and extent of demand for an innovation. First and foremost is the value proposition – as explained in the next section, a value proposition includes the innovation itself, of course, plus key elements that inform and persuade customers to adopt. The second factor is the **importance** or intensity of customers' unmet needs. It is difficult to say in advance which of these two factors is more important.

A truly innovative product accompanied by a compelling value proposition can trigger significant demand, even for moderate needs. Likewise, if the need is intense, demand for an innovation can be significant even if it only moderately improves on the status quo. Of course, when a compelling value proposition meets significant unmet needs, the results can be explosive, as illustrated by the iPad, Airbnb and a handful of others.

While entrepreneurs, investors and businesses aspire to breakthrough innovation, most often success results from a series of incremental innovations. As Will duPont, founder and President of THINK, points out successes over time also build capability and confidence to pursue bolder initiatives.

Two other factors can slow adoption. One is customers' openness to change, which can range from reluctant to eager. When customers are eager for change, the market is likely to open up more rapidly and vice versa. A related factor that can slow adoption is customers' propensity to act. Behaviors such as complaining, modifying or adapting a product, and searching for, trialing or switching to a new product indicate whether a customer is predisposed to act or not. Innovations often fail because many customers are complacent.

Factors Shaping Demand for an Innovation



In contrast, so-called **lead users** – customers who have taken matters into their own hands to devise better solutions – are prime targets for early adoption. Understanding customer needs and gauging market readiness are key tasks for teams. When customers' needs and readiness are favorable, the market is ripe for innovation.



UNCOVERING CUSTOMER NEEDS - FRICTION, SHOULD & WANTS

Most discussions of customer needs focus on pain points and rightfully so - customers are often motivated by a desire to avoid or minimize time, risk, uncertainty and other negative experiences. However, in addition to pain points and hassles, two other categories of needs also motivate customers: shoulds and wants. Since a combination of needs typically drives customers' behavior, compelling value propositions address not just one, but multiple needs from the categories below.

- **Frictions** - Frictions consist of outcomes and consequences customers wish to avoid or eliminate altogether. Customers value solutions that minimize these undesirable experiences. For example, customers spend time in activities that they don't enjoy, such as shopping and updating software. Customers also purchase products and services that they later regret, such as timeshares, exercise equipment, books and even movies. Users routinely endure hassles and regularly assume risk, sometimes unknowingly, due to incomplete information ("Did I get the best price?"), market power of sellers and for other reasons.
- **Shoulds** - The stuff of New Year's resolutions, shoulds include goals that customers aspire to, but typically require sacrificing in the present to accomplish in the future. Examples include activities like wellness, health and fitness, saving, conserving energy and other eco-friendly behaviors.
- **Wants** - With wants, more is better, at least until the customer reaches satiation. Wants include biological and hedonistic (pleasure, fun) needs as well as higher level needs such as acceptance and recognition.

Three Categories of Customer Needs

	FRICIONS Minimize, Eliminate, Avoid	SHOULD Satisfice	WANTS Maximize
BAD OUTCOMES UNCERTAINTY ANNOYANCES COST RISK TIME		GREEN FITNESS SAVINGS SOCIAL EDUCATION	FUN FOOD ACCEPTANCE RECOGNITION ENTERTAINMENT

HOW UNMET NEEDS CREATE MARKET OPPORTUNITIES



Needs vary in kind and intensity across individuals and time – for instance, for a single parent juggling expenses, the budget is likely tighter at the end of the month; always important, peers’ opinions are paramount to teens when socializing and shopping. To investigate market opportunities, teams employ a process known as customer discovery, the purpose of which is to uncover customers’ unmet needs. Common missteps include overlooking relevant needs that are material and misjudging the importance of customer needs, usually assuming they are more significant than they actually are.

While any of the customer needs may prompt interest, consideration and even purchase, for innovations uncovering various types of needs and calibrating their intensity serve as the foundation for the team’s work. For the three categories, the scales to the right illustrate how intensity of the corresponding needs varies.

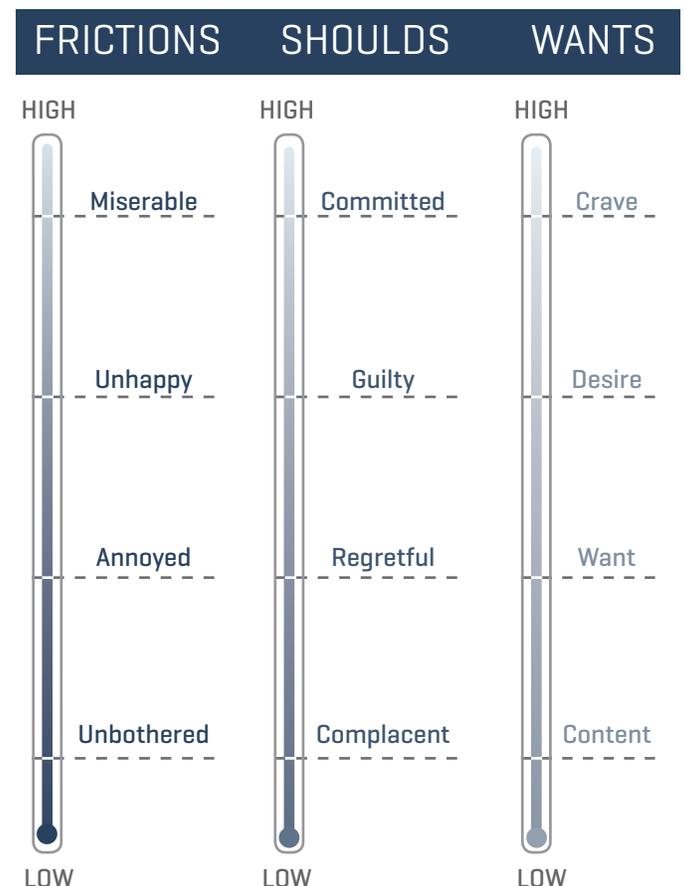
For an innovation to succeed, customers’ needs must reach or exceed a threshold that prompts consideration and adoption. Unfortunately, there is no absolute threshold. For example, if it happens often enough mere annoyance can heighten interest in alternatives.

All things being equal, higher intensity needs represent more favorable opportunities for innovations and vice versa. As Des Traynor, co-founder of Intercom, observed, “it’s easier to make things people want, than it is to make people want things.”

While reliability, features functionality and other rational needs are important, Michelle Berryman, Director of User Experience at THINK, reminds us that customers desire more. With products at parity, people are increasingly seeking experiences that are pleasurable,

rewarding and memorable. Pleasure can stem from the physical (shape, symmetry), psychological (novelty, challenge, familiarity) and social (involvement, identity), as well as deeper, higher-level needs (aesthetic, ethical, meaningful, etc.). Uncovering customers’ emotional needs, while challenging, ultimately provides invaluable guidance that can lead to the design of truly memorable experiences.

Uncovering Customers’ Unmet Needs



EMPATHY – KEY TO GAUGING CUSTOMER NEEDS

In view of the importance, uncovering and substantiating customer needs is a crucial task for teams working on innovation. Observing, interviewing and gathering artifacts help uncover customer needs, both functional and emotional. Other ways of calibrating intensity are suggested below. Selecting the right **informants** is also critical.

In each of the need categories – frictions, shoulds and wants – the most critical skill is empathy, which allows team members to understand customers’ circumstances and gauge how they feel. An even higher standard is what Lionel Mohri, Design Strategist with Intuit, refers to as “**deep empathy**” – knowing customers better than they know themselves, as exemplified by Apple.

While a complete discussion of methods is beyond the scope, useful references include **Interviewing Users** by Steve Portigal, **Mental Models** by Indi Young, plus other posts listed in References. The methods used to elicit and substantiate needs do vary by type of need.

- **Frictions** – Some experiences that are time consuming, inefficient, costly and even risky can be identified through observation. However, the frictions may not **register** with customers and even if they do, some individuals may not be bothered by them. Therefore, probing to determine how customers feel about experiences is important. Having customers keep a **diary** in which they record not just activities but their feelings about experiences is also useful.
- **Shoulds** – Because needs in the “should” category – fitness, health, eco-friendly lifestyles, etc. – often go unmet, they can be a source of regret, embarrassment and even guilt. As a result, customers may be reluctant to openly discuss and responses can be biased by socially acceptable answers, making it difficult to gauge

the importance. Establishing rapport with a customer and maintaining an open, non-judgemental demeanor become even more critical. Focusing on behaviors – what individuals have done in the past, options they have tried, etc. – is generally more reliable, but this is especially true for gauging importance and customers’ commitment to shoulds.

- **Wants** – Calibrating the intensity of wants, across customers and within customers, is more difficult in part because wants are, by definition, **insatiable**, e.g., more is better. Therefore, focusing on behaviors that reflect wants – frequency, involvement and engagement – is more revealing than what individuals say. In a similar vein, inviting customers to share artifacts they enjoy or even cherish can yield useful insights. Despite the prevalence of “**like**” in the popular vernacular, teams should listen for expressions and behaviors that reflect more intense feelings, such as desire, yearning and even “**love**.”

While challenging, calibrating the intensity of customers’ needs as well as the obstacles that make it difficult for individuals to achieve their goals is vital. At one end of the continuum, customers who are unbothered, complacent or content represent a challenge for anything less than a significant innovation, while customers with more intensely felt needs represent opportunities for even modest innovations. Likewise, customers who are ready to adopt (e.g., open to change and predisposed to act) represent market opportunities that are ripe for innovations. The ability of team members to observe, listen and empathize with users is key to uncovering and substantiating market opportunities.

GENERATING SOLUTIONS & CRAFTING VALUE PROPOSITIONS



To generate solutions and craft value propositions, a number of methods and tools are available, including ideation, design thinking, co-creation, crowdsourcing and open innovation. A brief description of key methods is provided below. Two especially useful resources are the [Design Thinking series](#) by Jeanne Liedtka (Darden School of Business) and colleagues and [101 Design Methods](#) by Vijay Kumar of the Institute of Design, Illinois Institute of Technology.

Open innovation and co-creation can be quite powerful. For example, in collaboration with one of its co-innovators, Virgin Atlantic recently introduced [Taxi2](#), a service that makes it easy for passengers on a flight to find others who are a good match for sharing a taxi at their destination. Companies from [LEGO](#) to Clorox are also leveraging open innovation.

METHODS FOR GENERATING INNOVATIVE NEW SOLUTIONS

Design Thinking

Although definitions vary, Design Thinking encompasses skills and practices employed by individuals trained in design-related disciplines. Core to the discipline are questioning, sketching, making quick models, visualizing, experimenting and acting. Through this iterative process, solutions are proposed, critiqued and refined. While the terminology has become part of the vernacular, Design Thinking requires practitioners with a variety of design-related skills and experience to be truly effective.

Co-Creation

In Co-creation – a special case of Open Innovation – customers are involved not just in discovery but also in helping to identify, design and evaluate solutions. For years companies have sought and successfully leveraged insights from “lead users” (customers who care about the category and have improvised and developed innovations of their own). More recently companies like Coca-Cola have engaged a wider spectrum of customers to propose solutions. Using online platforms, these efforts employ gamification and other incentives to engage a diverse group of participants and encourage novel ideas, input and feedback.

Ideation

Ideation is the process of generating ideas through divergent and convergent thinking, both individually and in groups. Among the tools are unstructured methods, such as brainstorming and its [variations](#), [creative exercises](#) such as [Gamestorming](#), and structured methods such as [Systematic Inventive Thinking](#) (SIT), which evolved from [TRIZ](#).

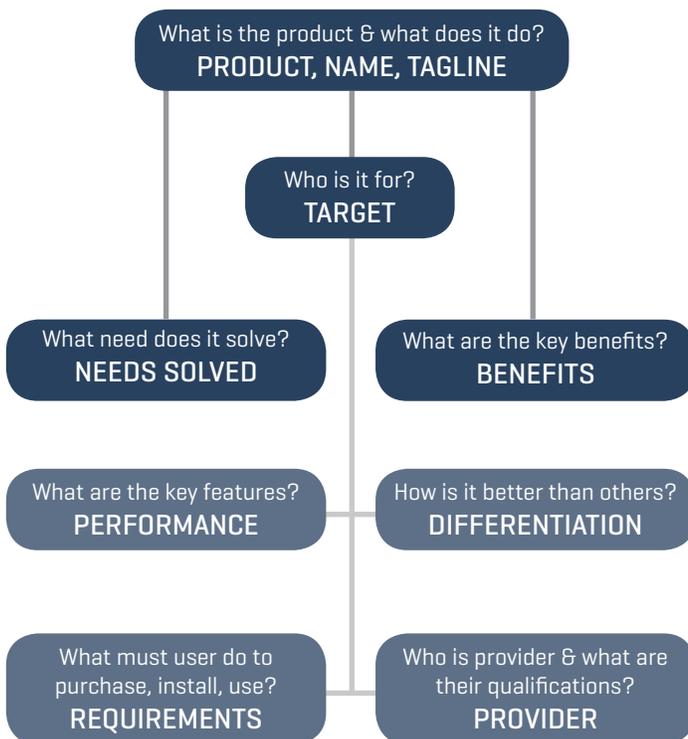
Open Innovation

[Open Innovation](#) involves recruiting and engaging individuals and companies external to an organization to contribute ideas, develop solutions and share in the rewards. Often contributors have specialized expertise in areas closely related to the project. The main advantage of open innovation is a broader, more diverse set of perspectives and contributions. The process requires identifying, recruiting, coordinating and compensating participants for their contributions. Intellectual property can be a sticky issue that must be cared for. In the digital arena, Sears, Home Depot and other companies have employed hackathons in which employees and independent developers generate new solutions, win cash prizes and other incentives for a reward.

THE ROLE OF VALUE PROPOSITIONS

As Harvard marketing professor Ted Levitt and others have observed, customers buy products and services for their benefits – more specifically, to accomplish a goal or a specific task. However, in evaluating and deciding whether to even consider an innovation, particularly one that is new and unfamiliar, customers require additional information. Based on testing concepts and new products in many different categories, a consistent set of questions emerges that customers generally want answered before deciding to adopt. A Value Proposition answers the 10 questions shown below.

10 KEY QUESTIONS



Three elements – Product Description, Need(s) Solved and Benefits – are at the core of the Value Proposition. The next three elements – Target, Name and Tagline – communicate the essence of the product to customers. Customers interested in the product will require information on Performance and Differentiation, while for those serious about the product Requirements and Provider must be answered.

To gauge customers' preliminary interest in a concept, specifying the product, needs met and benefits is sufficient. For more accurate estimates of demand and market size, all elements should be specified – otherwise, customers are left to fill in the blanks and their suppositions may or may not be accurate.

Developing and honing Value Propositions represent critical tasks for innovation teams.

- Propositions force the team to explicitly articulate their hypotheses re: (i) which customers the product is designed for (Target); (ii) what is important to those customers (Needs and Benefits); and (iii) what the innovation must do to win in the market (Performance and Differentiation).
- By developing and testing multiple Value Propositions, the team can evaluate and critique alternatives, eventually testing combinations that present the best opportunity for the innovation.
- Value Propositions provide much of the information that customers need to evaluate and reveal their level of interest in an innovation. With prototypes, this information allows customers to more accurately answer “would you buy?” the innovation at various price points, providing the data needed to size and validate market opportunity prior to building and launch.

DESIGN – THE HEART OF INNOVATION

In many ways design is at the heart of innovation – it shapes everything the customer experiences, from look and feel to interactions, features and functionality, and even the unboxing experience. Paul Adams, formerly of Facebook and now Product Manager at Intercom.io, distinguishes **four layers of design**: (i) the Outcome(s), or what the product enables users to do; (ii) the Structure, which specifies the necessary components in the system and how they relate to and connect with one another; (iii) the Interaction, which deals with the UI (User Interface) and specifies how users interact with and manipulate the system; and (iv) the Visual, which encompasses layout, look and feel, colors, iconography, etc.

Design represents the most visible and, in many ways, the most important innovation discipline. Exposure to and experience with well-designed, even beautiful products from Apple, Square and other leading companies raises users' expectations and reduces their tolerance for anything less. The following examples illustrate the importance and impacts of design.

- Before getting acquired by Intuit in 2009, Mint was a startup developing a new personal financial app – as an unknown, the solution had to overcome a great deal of skepticism. Credibility was critical, so Mint's **design team** devoted extraordinary efforts to make people feel comfortable, to exude security, to respect customers, and to build a tool that was “effortless” to use, high standards that few products meet. The team also built a real-time data importer to import transactions from different accounts, eliminating what was a laborious, time-consuming task for customers. Finally, designing for the casual customer meant forgoing features that more expert users wanted. With the acquisition, Intuit acknowledged Mint's success and provided even more credibility and reach.
- The team of ex-Apple designers at Nest is revolutionizing home thermostats, a largely moribund category ignored by consumers, by developing products that offer connectivity, feedback and other benefits unmatched by competing products. Since their products are on display in the home, the visual appeal sets them apart even further. Nest is now extending its **design expertise** to other products for the home, including smoke alarms. Recognizing the team's ability to design amazing products, Google **acquired** Nest earlier this year for \$3+ billion, positioning Google to compete even more effectively in connected devices and the Internet of Things.
- Square designed and introduced an incredibly simple and elegant mechanism that allowed merchants to use smart phones and tablets to process credit card transactions. Beyond the design itself, Square radically **simplified** every customer interaction, from sales to onboarding and even customer support, offering a compelling package at a price point that fills a significant need for small and now even mid-size merchants.

As these examples suggest, companies are leveraging design to create compelling innovations and disrupt stagnant markets.

UBIQUITOUS DESIGN

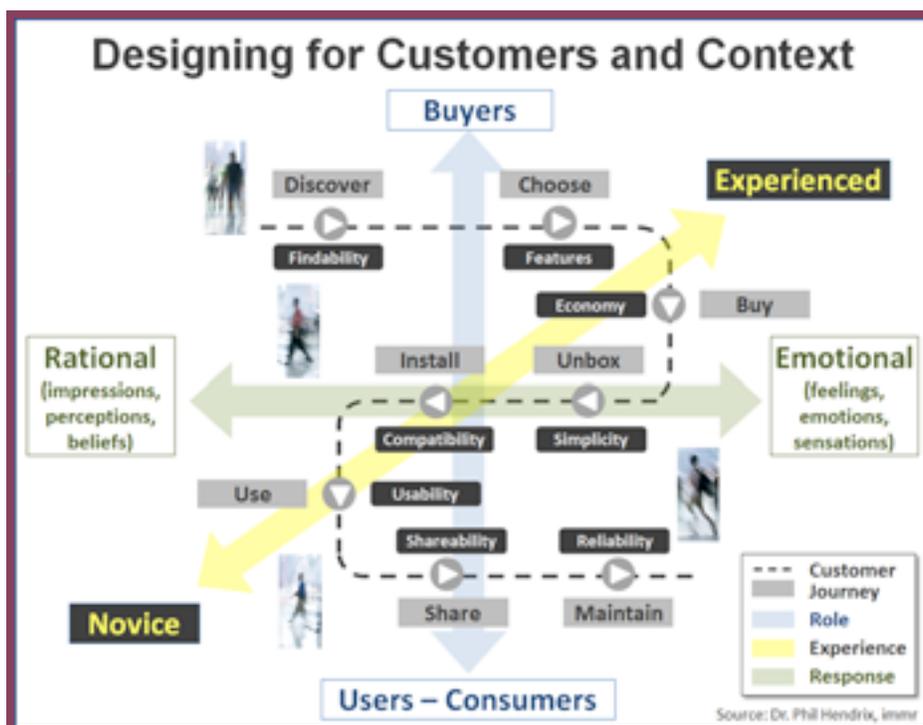
Much of design focuses on the solution – e.g., features, functionality, interface, look and feel, etc. Given the importance of usability and usefulness, the focus is justified. Customer experience encompasses more than use, however – as shown below, the journey includes pre- and post-purchase activities. Spanning these activities, design plays a much more **ubiquitous role**, shaping or determining branding and iconography, packaging, point-of-sale, unboxing, installation, and even the cost and maintainability of a product. Design must also accommodate various customer roles as well as context

For instance, customers for an innovation may differ on a number of dimensions, including:

- **Role** – within a family or household, various individuals may assume the role of shopper, user, influencer, etc. Solutions may need to be designed with each in mind.
- **Experience** – design(s) may need to accommodate users that range from novices to experienced
- **Context** – design(s) must often accommodate different environment(s) in which the product will be used, including home vs. work; indoor vs. out-of-home; mobile vs. stationary; and others

In addition to roles and context, designing for response is another important consideration.

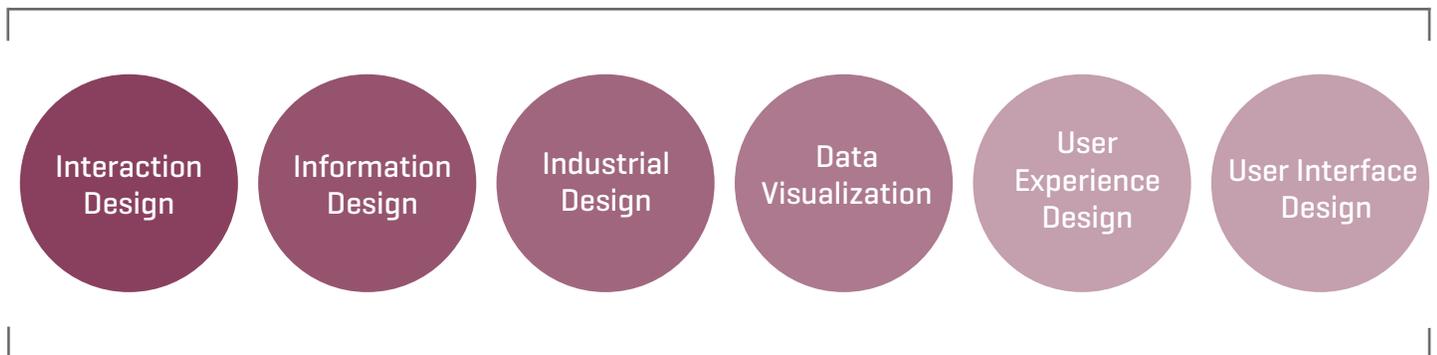
Individuals’ responses include such “rational” or cognitive reactions as impressions, perceptions and beliefs as well as emotional (feelings, sensations, etc.). Going beyond the rational, design can evoke various **emotional reactions**, creating distinctive, memorable experiences. Finally, design for sharing, either in use or social media, is increasingly important. As THINK points out, design must be **integrative and holistic**.



THE DISCIPLINES OF DESIGN

While companies such as Apple view design as a core competency, given the complex mix of skills required most companies turn to outside firms with expertise in user experience (UX), interaction design (IxD), user interface (UI), and other design specialties shown below. As Input Factory co-founder Luke Wroblewski observed, “anything that can be connected to the internet will be” – given the emergence of “connected devices,” THINK points out that skills and experience in designing both physical and digital products are required.

DIGITAL



PHYSICAL

PROTOTYPING – SHOWING TRUMPS TELLING

Varying from low-fidelity, easily produced sketches to high-fidelity, realistic simulations of a product, prototypes are a critical tool for innovation teams. In the Discover phase, sketches help convey ideas within the team and allow users to react to proposed solutions. In Design, enhanced prototypes can be mocked up to illustrate layout, look and feel and other properties. Well suited for user testing and Validation, more realistic prototypes allow users to interact with and actually experience products. With high-fidelity prototypes, companies can better gauge user experience and perceived value of a product before expending the time, cost and effort required to build.

PROTOTYPE

A graphical or physical representation of a product meant to convey its properties.

Prototyping tools have proliferated – last year Smashing Apps, for example, [reviewed](#) more than 30 prototyping and wireframe tools for digital products and mobile apps. Fortunately, these tools allow individuals with limited programming experience to mock up high-fidelity, interactive prototypes. While designers have their [preferred tools](#), the most important consideration is to [match the tool](#) with the application. In addition to the digital prototyping tools, [3d-printing](#) capabilities are dramatically lowering the cost and time required to produce prototypes of physical products.

As development costs have declined, teams are tempted to bypass prototypes and move directly from Design to Build. However, taking the time to prototype and validate solutions allows the team to prioritize and focus resources on solution(s) that have the highest potential. Prototyping and lean methodologies are quite [complementary](#).

	Low Fidelity ←	→ High Fidelity	
	Rough Sketch	Rudimentary Prototype	Functional Prototype
Description	Drawing (2- or 3-D) depicting concept, "basic" elements	Refined representation, showing features, look and feel some functionality	A realistic working model that allows users to interact with a "live" product
Interaction Supported	None	Limited	Selected inputs, pre-programmed outputs
Primary Applications	<ul style="list-style-type: none"> • Explore, capture ideas • Convey to team • Illustrate concept to users • Elicit reactions, suggestions 	<ul style="list-style-type: none"> • Illustrate functionality, look • Demo layout, interaction • Gather specific feedback • Test, refine designs 	<ul style="list-style-type: none"> • Experience "hands-on" • Assess usability • Calibrate users interest likelihood of adoption
Skills, Tools, Required	Basic drawing, sketching skills, paper and pencil	Refined drawing and software skills Mock-up software	Advanced drawing, modeling and software skills Simulation software
Examples			

VALIDATING INNOVATIONS

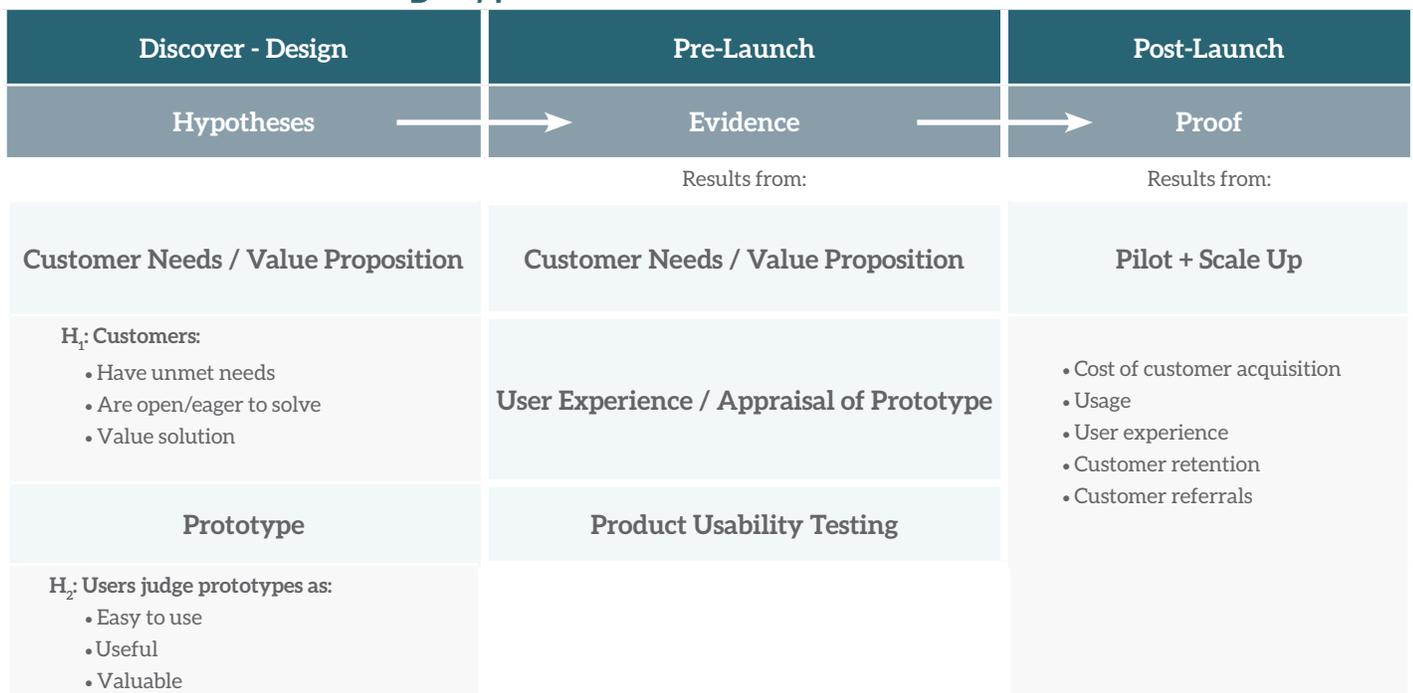
Gathering and incorporating feedback are included in each of the disciplines of innovation. For example, teams conduct research to substantiate customer needs; to gather feedback from team members and users and guide subsequent iterations of design; and as the solution is being built, to confirm that the UI and UX are working as expected.

There is an even more significant role for Validation, which justifies including it as separate discipline. In addition to the above applications, Validation tests the key hypothesis that customers will buy (adopt, use, etc.) the innovation, given the value proposition on the drawing board, providing much needed evidence before the team invests in and proceeds with implementation.

As teams substantiate customer needs, design solutions and develop prototypes, two paths are available to test and validate key hypotheses.

- 1. Pre-Launch** - Produce prototypes to test versions of the product with a sample of users. The prototypes can be low-fidelity (sketches), medium fidelity (digital mockups with limited interactivity) or high-fidelity (interactivity closely mimicking the actual user experience)
- 2. Post-Launch** - Build and launch one or more versions of the innovation in a pilot program, observe results, gather feedback and refine based on learning from initial user experiences. This approach has been popularized by “lean startup” proponents.

Testing Hypothesis: Pre- and Post-Launch



While each of the approaches has pros and cons, in our experience the two are quite complementary.

- The Pre-launch approach – systematically validating the innovation before building and launching – has the benefits of (i) confirming customer need and demand; (ii) enabling testing of a wide range of features and versions; (iii) prioritizing features, particularly “must haves;” (iv) estimating and avoiding mistakes on such critical issues as pricing; and (v) uncovering hurdles such as user understanding that could slow or even cripple adoption. Among drawbacks, it is difficult for users to estimate frequency of use. Finally, as we have argued [elsewhere](#), sloppy research leads to invalid projections, a concern addressed in the next section.
- By building and launching the product, the Post-launch approach has the benefits of observing what customers and users actually do. During the testing phase, user feedback and actual usage reveal which features are useful and which ones are not; confirm which types of users are using the product most often; and a host of other key insights.

Again, it isn't a question of one or the other but how to use the two approaches together.

VALIDATION RESEARCH

Especially with really new products, pre-launch validation research can be inaccurate, leading to errors and faulty guidance. Most often, for reasons shown in the table below, research overstates customer interest and likely response.

Incorporating the following recommendations avoids many of these problems, yields more accurate measures of likely adoption, and provides valuable guidance for the team as it moves into building and launching the innovation. To obtain more accurate insights and projections:

- Develop high-fidelity prototypes that allow respondents to fully experience the product.
- Develop and make available to respondents Value Propositions that specify all 10 elements (including Requirements and Differentiation).
- Provide FAQs (frequently asked questions) about the product.

- Using these materials, survey a representative sample of respondents from the target population.
- Employ research methods that are “[incentive compatible](#)” to insure that respondents’ answers to questions more closely match what they would actually do.
- Using variations of the scales shown previously and below measure all four of the factors that drive adoption: intensity of customer need(s), desirability of the value proposition(s) and customers’ openness to change and propensity to act.

Incorporating these steps dramatically improves research projections. However, while research reduces risk and speeds determination of solutions more likely to be successful, these results are no substitute for actual market response. Proof requires actually building and launching.

Why Research Generally Overstates Customer Interest

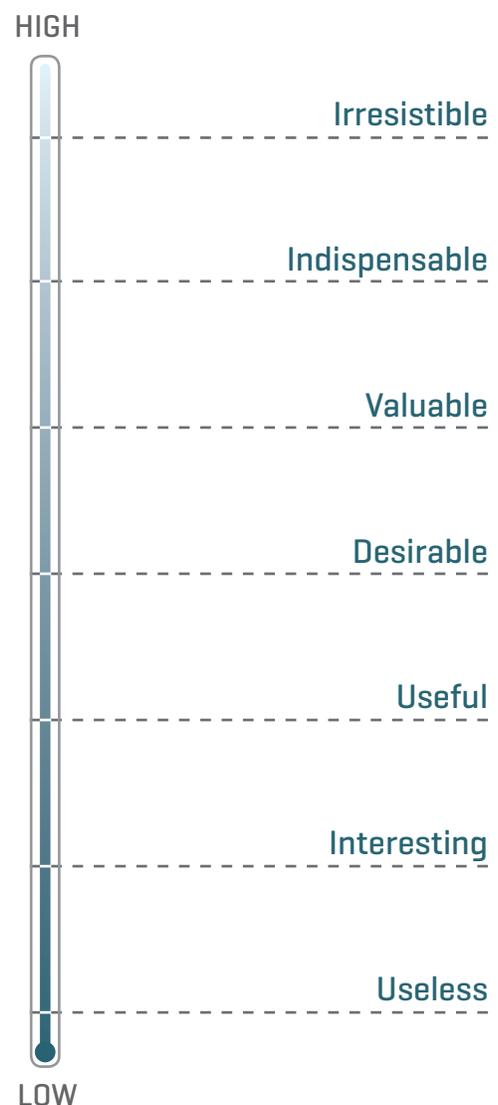
Challenge	Explanation	Resulting Errors	
		Overestimate	Underestimate
Concept Description / Prototype	Description fails to convey design, aesthetics		✓
	Respondent unable to assess user experience	✓	
	Drawbacks not shown or apparent	✓	
Respondent Motivation	Respondents pay more/less attention to task	✓	
	Respondents not motivated to be “accurate”	✓	✓
Information Available to respondents	Alternatives unavailable for comparison	✓	
	FAQs unanswered (requirements, quality, etc.)	✓	✓
	Reviews, social signals unavailable	✓	✓
Biases	Budget constraint not present	✓	
	Other ‘real world’ buying hurdles absent	✓	

CALIBRATING DEMAND FOR AN INNOVATION

As argued previously, whether or not customers adopt an innovation depends in large part on significance of their unmet need and their view of the value proposition. Readiness to buy, as reflected in prior behavior, and openness to change also play an important role.

Variations on the scale shown to the right are useful to calibrate how customers view a value proposition – “interesting,” of course, is a low threshold and not very predictive. Moving up the scale, a useful innovation combined with a significant need can translate into significant demand. Ultimately, of course, the goal is to gauge likelihood of adoption under various scenarios, especially feature combinations and price points. In general, when a compelling value proposition satisfies a significant need, (i) more customers are likely to adopt; (ii) adopters are willing to pay more and (iii) marketing costs will be considerably lower.

Calibrating Customers’ Appraisal of Value Propositions



READINESS TO ADOPT: PRIOR BEHAVIOR & WILLINGNESS TO CHANGE

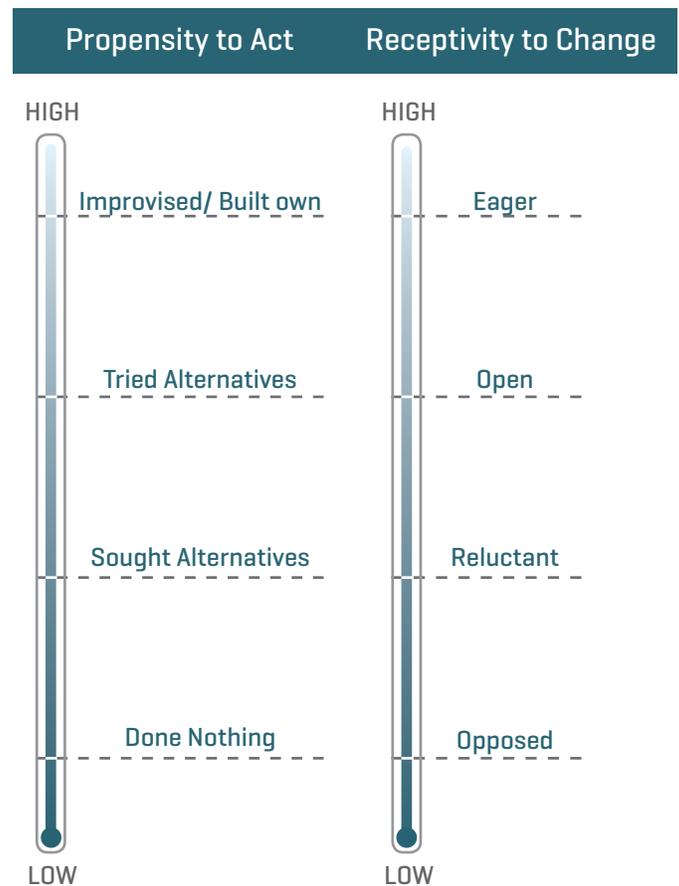
Most innovations fail, or at least fall short of expectations, because of inertia – not enough customers are willing to exert the effort, try a new product, switch from their existing brand, etc. Therefore, it is important to understand customers’ readiness to adopt, or put differently, the brakes that might slow adoption.

Using measures like those shown below reveals:

- How open is the customer to switching from the status quo? Are there any barriers or other considerations that would make it difficult or unlikely for them to change?
- How many customers have exhibited behavior(s) that suggest they are dissatisfied with the status quo? If most have done nothing and are complacent, then there is a good chance they may adopt only after the market for the product has matured, if then.

As noted previously, a compelling new innovation, like the iPad, Nest and a few others, can override these brakes, generate a great deal of excitement, ratchet “wants” up, and achieve rapid adoption and even adulation in the market. In general, however, finding that customers have done little to resolve a need or that most are reluctant to change from the status quo should sound an alarm for an innovation team.

Customers’ Propensity to Act & Receptivity to Change



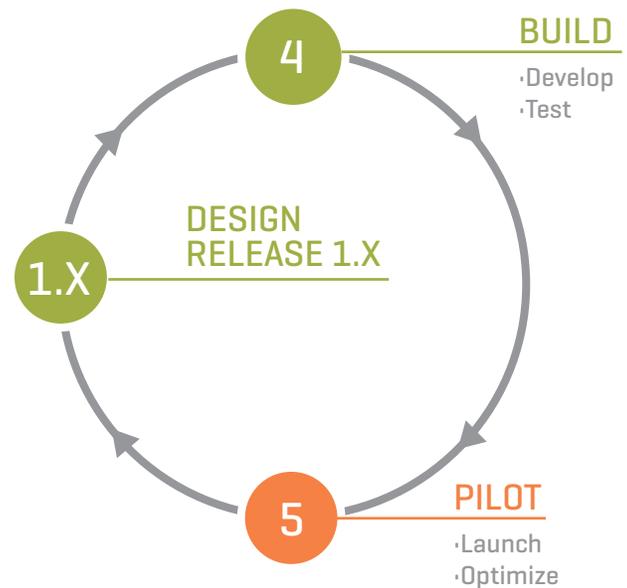
BUILD, PILOT & SCALE

As discussed above, innovation represents a set of hypotheses about customer needs, potential solutions and market opportunities. Developed and refined in Discover and Design, the hypotheses forge one or more Value Propositions tested using the tools and methods described under Validation. However, even with the most realistic prototypes and rigorous methods, hypotheses remain just that – assumptions about customer needs, what they value and how they will respond when innovations are introduced into the marketplace. Regardless of the evidence, proof requires building, introducing and observing how customers behave when given the opportunity to adopt, buy and use.

As the team advances from Discover and Design to Build, Pilot and Scale, the skills, resources and investment shift as well. While core members of the team, especially designers, remain involved, developers with engineering and programming skills move to the fore. Depending on the complexity, the team building a mobile or digital solution may include front-end developers, back-end engineers, system architects and other technical specialists. As with designers, competition for individuals with these skills is intense so companies typically turn to outside firms for their talent, resources and experience.

As with the other disciplines, testing is integral to Build, Pilot and Scale. Indeed, one of the most significant developments in innovation over the last decade is the emergence of lean startup philosophy introduced by [Steve Blank](#) and extended by [Eric Reis](#). At its core is an iterative loop of build, measure and learn. This process, shown below, is an on-going, continuous cycle.

The Build – Measure – Learn Loop

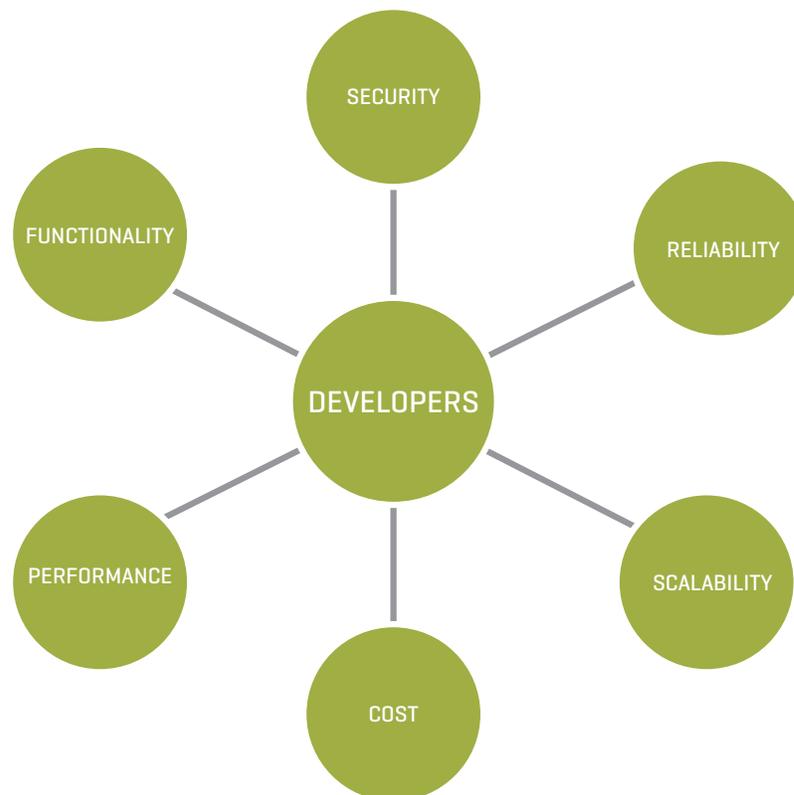


Key lean principles include:

- Focus on “minimum viable product” for early releases.
- Prioritize features and functionality by release.
- Avoid forcing too many features and functionality into single release.

Ideally, the main hypotheses from Discover and Design are confirmed, leaving the team (designers and engineers) to focus on what Dan Saffer refers to as “[microinteractions](#)” – features and improvements that make the product even more intuitive, easy and even “pleasurable” to use. Of course, in practice that is often not the case. The learning loop can prompt the team to revisit their hypotheses about customer needs, design and the Value Proposition, and ultimately lead to a more substantial mid-course correction, known as a “pivot,” in some form or fashion.

In the Build phase the development team works together with the design team to deliver on the six success factors outlined below. Given the importance of aligning the perspectives and work of designers and developers, agile development is briefly described.



- **Security** – programming secure, compliant solutions that prevent data leakage, intrusions
- **Functionality** – implementing features and functionality for target devices
- **Reliability** – building products that are defect- and bug-free
- **Performance** – building products with latency and execution times that meet targets
- **Scalability** – architecting solutions to maintain availability and performance under peak loads
- **Cost** – using open source and other tools to reduce the cost of initial and subsequent releases

AGILE DEVELOPMENT

When building and introducing an innovation, time-to-market is often crucial. As a consequence, developers are typically working to meet tight deadlines, while still delivering defect-free solutions. To rapidly produce high quality software solutions, leading developers have embraced and practiced with almost religious fervor a methodology known as agile development.

Instead of building an entire application at once, agile development divides the process up and builds each component separately, usually in parallel. Using a process called [Scrum](#), projects are implemented in a series of iterations or bursts of activity appropriately called Sprints. Instead of a few milestones spread far apart, agile development involves frequent milestones and reviews. This iterative process requires that Design and Develop teams work closely together, testing features with end-users, incorporating their feedback, and presenting final work products to clients for approval at intervals as frequent as weekly.

Agile development offers a number of [significant benefits](#):

- By capturing and incorporating team and user feedback after each Sprint, agile allows faster adjustments, yields much higher quality and avoids surprises and rework later in the process.
- Releases are put into the hands of users for testing at each cycle, insuring that any problems with usability or other issues surface and get resolved by the development team early on.
- Because the client team is an active participant in the process, agile development insures alignment between the team's vision for the solution, user requirements and the solution that gets built.

- Teams skilled in agile methods significantly reduce development time, speeding time-to-market.
- Agile development teams deliver on time and on budget – the only variable component, which is determined together with the client, is the solution that gets built through the iterative process.

While the philosophy and methodology are quite powerful, agile development is a discipline honed through practice – disciples are not just proponents of agile, they are highly skilled practitioners. Given the need to deliver defect-free solutions within a short time frame, agile is an ideal methodology for developers working on innovations. Leading developers view agile as a core capability and rely heavily on the methodology in their work. For more information on agile methods, see [Guide to Agile Practices](#) by the Agile Alliance.

Teams skilled at innovation are also leveraging staged releases, A/B testing and larger controlled experiments to accelerate learning and converge on solutions that improve usability and delight customers. In addition to the innovation itself, many other aspects, from onboarding to channels, social media and others determine the rate of adoption and market acceptance. An emerging practice known as “growth hacking” is especially important. These and other topics are covered in detail in a forthcoming whitepaper.

CONCLUSION

There is near universal agreement that innovation is challenging, with the outcome difficult to predict. Working through the twists and turns can be frustrating for entrepreneurs, teams and executives. Few companies are satisfied with either results or the process. In many companies there is a crisis of confidence and capability.

As management consultant Peter Drucker [noted](#), innovation is a discipline that can be learned and practiced. There are six key disciplines that determine whether teams succeed or fail at innovation. Successful teams learn to develop insights and test hypotheses about customers, market opportunities and value propositions. These disciplines allow organizations to reduce risk, improve the odds, and boost confidence.

To summarize, key points presented in this whitepaper include:

- Customer needs represent both starting and end-point for innovation – as one successful entrepreneur noted, “it’s easier to make things people want than it is to make people want things.”
- Empathy for customers is an important skill for team members and “deep empathy” even more valuable.
- Substantiating customer needs and validating proposed solutions separate successful innovation efforts from those that fall short or fail altogether.
- Customer needs are multidimensional – frictions, shoulds and wants all represent opportunities for innovation, as do both emotional and rational dimensions of needs.
- Customer responses to an innovation range from indifferent to enthusiastic – customers with intensely felt needs are likely to respond favorably and readily.
- When customers are content with the status quo, an innovation must offer a bigger advantage to get customers to notice, or care enough to switch. While possible, delivering significant improvements is more difficult.
- Customers adopt more than the innovation itself – they are motivated by the benefits, persuaded by the advantages, and prompted by calls to action. Articulating and refining these and other elements of value propositions for an innovation is a vital team effort.
- Customers vary in terms of their openness to change and propensity to act. Gauging market readiness is necessary to properly plan sales and marketing and budget for the cost of customer acquisition.
- Design determines customers’ initial impressions, user experience, and even the vividness of memories of products and services. By giving shape and meaning to distinctive new solutions, talented designers are a key source of competitive advantage for innovation efforts.
- The emergence of “connected devices” places a premium on design skills and experience with physical and digital products.
- Prototypes bring ideas to life and enable users to provide reliable feedback to innovation teams. The benefits of prototyping far outweigh the cost, time and effort.
- Validation is crucial, particularly in the early stages of innovation. Pre-launch validation saves time, reduces risk, and helps the team confirm key decisions as it advances through the process.
- Executing on the value proposition via innovation pilots yields important learning. It allows teams to test and refine hypotheses. The pre-launch steps maximize the chances and reduce the time it takes to achieve success.

ACKNOWLEDGMENTS

This whitepaper is sponsored by THINK, a leading interactive agency based in Atlanta.

The author would like to thank the leadership of THINK – especially Will DuPont, founder and President; Chris Wilson, founder and Managing Director; Daniel Davenport, Director, Strategy; Michelle Berryman, Director of UX; Zach Pousman, Director, Strategy – for their support. While THINK’s input, feedback and expertise greatly shaped the whitepaper, the opinions and views expressed are those of the author.

Proper Citation and Availability

Please reference the whitepaper as follows:

Long version:

The 6 Disciplines of Innovation, Dr. Phil Hendrix, immr (whitepaper sponsored by THINK), March 2014

Short Version:

The 6 Disciplines of Innovation, Dr. Phil Hendrix, immr
Copies of the report can be downloaded at:

www.immr.org/6-disciplines-of-innovation.pdf

www.thinkinc.com/6-disciplines-of-innovation.pdf



ABOUT THE AUTHOR

Dr. Phil Hendrix is the founder and director of [immr](#) (research and consulting firm), an analyst with [Gigaom Research](#), and advisor to startups in digital and mobile. Addressing market opportunities for disruptive new products and services, Dr. Hendrix helps clients develop compelling value propositions, validate product-market fit, and accelerate growth. Within the digital landscape, Phil focuses on innovation enabled by mobile, location, context, and data + analytics. Before founding immr, Phil was a partner with DiamondCluster (now PwC strategy group) and principal with Mercer Management Consulting (now Oliver Wyman). Previously, he was a professor at Emory University and the University of Michigan, where he also received his PhD.

As an analyst, Phil focuses on disruptive technologies, especially mobile, and implications for companies across industries. He is a regular contributor at leading industry conferences, including GigaOm's [Mobilize](#) and [Structure: Data](#) conferences, [Street Fight](#) (hyperlocal), [ad:tech](#), [iMedia Summit](#), Social-LoCo and others. His current work focuses on innovation, mobile (shopping, M-commerce) and content.

As a consultant and advisor, Phil has led significant engagements with startups and Fortune 100 clients in mobile, consumer electronics, financial services, transportation, insurance and others. He works closely with management and project teams on key issues, including market sizing, segmentation, positioning, and branding as well as innovation, user experience, and customer retention. Over the course of his career, Phil has helped clients conceive and successfully launch dozens of new products, services and businesses.

Before founding immr, Phil was a partner with [DiamondCluster](#) (strategy and technology consultancy, now the strategy group of [PwC](#)), founder and head of IMS (Integrated Measurement Systems), and a principal with Mercer Management Consulting (now [Oliver Wyman](#)). He has held faculty positions at Emory University and the University of Michigan, where he taught courses in marketing, research, and buyer behavior for MBAs and executives. While at Michigan Dr. Hendrix also held a joint appointment as a research scientist in the [Survey Research Center](#), Institute for Social Research.

Additional perspectives and reports prepared by Dr. Hendrix are available at [immr](#), [Slideshare](#), and [GigaOm Research](#).

Dr. Hendrix can be reached at:

Website www.immr.org

Twitter https://twitter.com/phil_hendrix

E-mail phil.hendrix@immr.org



ABOUT THINK

THINK - A digital innovations and experience design company

THINK Interactive is a digitally focused agency of thinkers, inventors and makers. For the last 20 years, we have helped brands solve fascinating, complex business and marketing problems. We have worked with our clients to uncover new ideas and execute award winning initiatives for the connected world. THINK helps brands create and distribute digital experiences that become ever-present and indispensable in the daily lives of their customers and employees.

We focus on:

- Building innovative digital products, utilities and platforms
- Designing beautiful, frictionless experiences across all screens
- Distributing, marketing and tracking initiatives across a brand's entire digital ecosystem

Website: www.thinkinc.com

Twitter: twitter.com/thinkinc

Facebook: THINKInteractive

E-mail: ddavenport@thinkinc.com

REFERENCES

101 Design Methods: A Structured Approach for Driving Innovation in Your Organization Paperback, Vijay Kumar, Oct. 2012. <http://www.amazon.com/101-Design-Methods-Structured-Organization/dp/1118083466>

11 Customer Development Anti-Patterns, Giff Constable, June 4, 2013, <http://giffconstable.com/2013/06/11-customer-development-anti-patterns/>

12 Tips for Early Customer Development Interviews (Revision 3), Giff Constable, Dec. 6, 2012, <http://giffconstable.com/2012/12/12-tips-for-early-customer-development-interviews-revision-3/>

26 Resources to Help You Master Customer Development Interviews, Zach Bulygo, Oct. 15, 2013. <http://blog.kissmetrics.com/26-customer-development-resources/>

Applying lean startup theory in large enterprises, Haydn Shaughnessy, Feb. 2014. <http://research.gigaom.com/report/applying-lean-startup-theory-in-large-enterprises/>

Customer Development Interviews How-to: What You Should Be Learning, Cindy Alvarez, Feb. 23, 2010. <http://www.cindyalvarez.com/communication/customer-development-interviews-how-to-what-you-should-be-learning>

Demand: Creating What People Love Before They Know They Want It, Adrian Slywotzky and Karl Weber, Oct. 2011. <http://www.amazon.com/Demand-Creating-What-People-Before/dp/0307887324>

Designing for Emotion, Aaron Walter, 2011. <http://www.abookapart.com/products/designing-for-emotion>

Designing for Growth: A Design Thinking Tool Kit for Managers, Jeanne Liedtka and Tim Ogilvie, June 2011. <http://www.amazon.com/Designing-Growth-Thinking-Managers-Publishing/dp/0231158386>

Eager Sellers and Stony Buyers - Understanding the Psychology of New-Product, John Gourville, June 2006. <http://hbr.org/product/eager-sellers-and-stony-buyers-understanding-the-p/an/R0606F-PDF-ENG>

Hooked: How to Build Habit-Forming Products, Nir Eyal and Ryan Hoover, December 2013. <http://www.amazon.com/dp/B00HJ4A43S>

Innovation Prowess: Leadership Strategies for Accelerating Growth, George Day, 2013. <http://www.amazon.com/Innovation-Prowess-Leadership-Strategies-Accelerating/dp/161363028X>

Inspired: How To Create Products Customers Love, Marty Cagan, June 2008. <http://www.amazon.com/Inspired-Create-Products-Customers-Love/dp/0981690408>



Interviewing Users - How to Uncover Compelling Insights, Steve Portigal, May 2013. <http://rosenfeldmedia.com/books/interviewing-users/>

Mental Models - Aligning Design Strategy with Human Behavior, Indi Young, Feb. 2008. <http://rosenfeldmedia.com/books/mental-models/>

Microinteractions - Designing with Details, Dan Saffer, Nov. 2013. <http://www.amazon.com/gp/product/1491945923>

Prototyping: a practitioner's guide, Todd Warfel, 2009. <http://rosenfeldmedia.com/books/prototyping/>

Solving Problems with Design Thinking: Ten Stories of What Works, Jeanne Liedtka, Andrew King and Kevin Bennett, Sept. 2013. <http://www.amazon.com/Solving-Problems-Design-Thinking-Publishing/dp/0231163568>

The Designing for Growth Field Book: A Step-by-Step Project Guide, Jeanne Liedtka, Tim Ogilvie and Rachel Brozenske, Jan. 2014. <http://www.amazon.com/Designing-Growth-Field-Step---Step/dp/023116467X>

The Entrepreneur's Guide to Customer Development, Brant Cooper and Patrick Vlaskovits, July 2010. <http://www.amazon.com/dp/0982743602>

The Four Steps to the Epiphany: Successful Strategies for Products that Win, Steven Blank, February 2005. <http://www.amazon.com/Four-Steps-Epiphany-Steven-Blank/dp/0976470705>

The Lean Startup, Eric Ries, Sept. 2011. <http://www.amazon.com/dp/0307887898>

The New Killer Apps: How Large Companies Can Out-Innovate Start-Ups, Chunka Mui and Paul B. Carroll, Dec. 2013 <http://www.amazon.com/dp/0989242013>

The Open Innovation Revolution: Essentials, Roadblocks, and Leadership Skills, Stefan Lindegaard, June 2010. <http://www.amazon.com/Open-Innovation-Revolution-Essentials-Roadblocks/dp/0470604395>

The Power of Co-Creation: Build It with Them to Boost Growth, Productivity, and Profits, Venkat Ramaswamy and Francis Gouillart, Oct. 2010. <http://www.amazon.com/Power-Co-Creation-Growth-Productivity-Profits/dp/B004TE851E>

The Pursuit of Pleasure, Lionel Tiger, Sept. 2000. <http://www.amazon.com/The-Pursuit-Pleasure-Lionel-Tiger/dp/0765806967>

Tips for B2B Customer Development Interviews, Sean Murphy, Oct. 19, 2011, <http://www.skmurphy.com/blog/2011/10/19/tips-for-b2b-customer-development-interviews/>

Why Consumers Don't Buy: The Psychology of New Product Adoption, John Gourville, Nov. 2003. <http://hbr.org/product/why-consumers-don-t-buy-the-psychology-of-new-product-adoption/an/504056-PDF-ENG>