

DESIGN  
RESEARCH  
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# Bringing Clarity to the “Fuzzy Front End”

A Predictable Process for Innovation

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## What’s so Fuzzy?

The early stages of product development are routinely described as the “fuzzy front end” of development. This is when businesses go through the process of discovering what to make, deciding whom to make it for, understanding why to make it, and defining the attributes for success. While Design Research can make contributions throughout the many stages of business activity, the processes and tools of Design Research are central to developing the necessary insights for answering these very strategic questions.

The fact that the business community uses the term “fuzzy front end” to describe how corporate strategy for development is generated is quite revealing. Management perceives the process as ill-defined, random and mysterious; the impetus for new products often comes from a wide array of sources, and the way these products get manifested is not considered predictable. While the processes for incremental improvements and evolution are taken for granted in most companies, achieving “significant innovation” is considered a high-risk venture depending on individual genius and luck.

While the tools of Design Research are regularly employed to create new products, our profession has not done a good job of presenting a coherent framework to describe how Design Research can actually drive an organization’s innovation strategy. Customer-focused innovation processes can be highly effective at producing breakthrough products, but researchers need to articulate how their work can turn the “fuzzy front end” into a predictable process for inventing the future of the organization, and advocate its value to senior management.

## What Senior Management Really Wants

25 years of dealing with senior-most management have taught me that most care more about the results that successful new products produce (increased revenues, higher margins, distribution clout, etc.) and less about the processes and tools that generate innovative products and services. That makes sense when you look at how they are evaluated and compensated. There are always exceptions — passionate CEOs that are deeply involved with the design of their products. But it’s a lot more likely to find CEOs focused on their stock price or other financial metrics than on the processes of research or design.

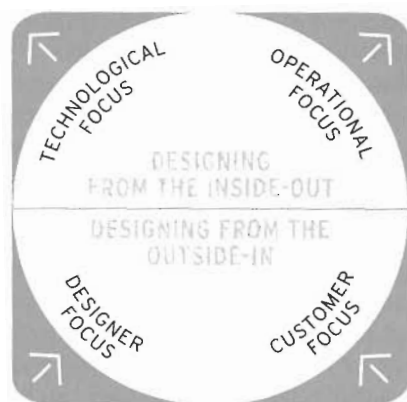
As we advocate for the use of Design Research and describe what it is we do, we need to connect to those results that senior management cares about. Senior management funds development initiatives while making trade-offs with competing organizational needs. What are the results they want?

Management needs to preserve the core of the enterprise by maintaining and growing it in a way that limits risk and maximizes return. Design Research provides the means to optimize product performance and appeal, while reducing risk. But they also need to identify the path for new growth. Design Research can help identify the next new platform for generating revenue, or “The Next Big Thing” through customer-based innovation processes. Design Research processes can actually lead to breakthrough discoveries capable of transforming the future of the organization. In this article, I’ll focus on defining the role of Design Research in the front-end innovation process.

### Be Humble

While customer-based innovation is an excellent way to manage innovation, it is not the only effective way. Many companies have been extremely successful without ever studying a customer or hiring a designer. Some of my clients have generated literally hundreds of billions of dollars in revenue without this competency. For many, the traditional sources of inspiration for innovation have been technology or a focus on operational excellence. These sources emphasize an inwardly-focused “inside-out” approach to development, and are capable of generating competitive advantage.

Design Research emphasizes the user or customer as a source of inspiration for innovation. It also uses design thinking, design processes and creative design expression as means to discover new, effective ways to compete. By focusing on satisfying customers’ needs, we look externally and take an “outside-in” approach. Many of us believe this is the most efficient and sustainable way to



Where does design come from?

invent solutions that customers care about.

Without technology, the product won’t work. Without operational excellence, the product won’t be profitable. Without design, the product won’t evoke desire. And without consumer relevance, the product won’t sell. Some perspective from each area is required to make a successful product. Design researchers should value the contributions of other disciplines and be humble about their own. The point is to develop great breakthrough products and inspire others to help you get them to market—not to be dogmatic and win the debate over how to do it.



Typical "Fuzzy Front End"

## The Plumbing Metaphors

The common view of the fuzzy front end looks like a cloud raining on a funnel. Some vague mixture of ideas, trends, user requirements, etc., swirl around in a cloud. Some of these ideas and influences drop into a funnel and get reduced into a product that (magically) emerges out of the end of the funnel. From there it enters the new product pipeline, passing through what is commonly known as a "stage gate process" that allows management to review the product's progress periodically and determine if it meets their criteria for additional development resources.

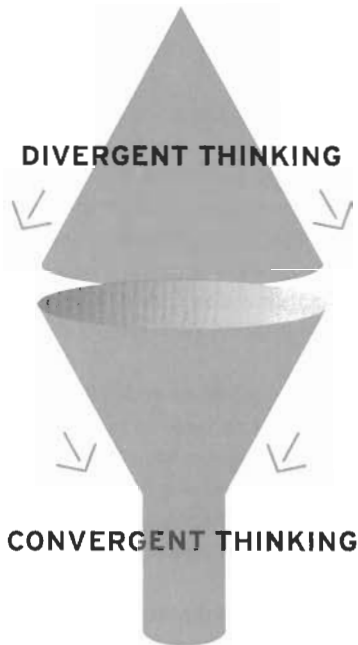
No wonder people call it "the fuzzy front end!" There is no model here for how information and insight can lead us to reliably positive outcomes. Versions of the funnel metaphor have been used for years. It may be useful for describing the increasing focus and refinement that ideas go through, but it is clearly inadequate to describe a logical process—the elements that go into the funnel are too random and its inner workings are obscure.

What typically goes into the advanced development funnel in most companies today? The reality of business tends to force inputs into the funnel that are reactive and tactical; e.g., the demands of your biggest retail customer for a specific SKU, the favorite half-baked technology of the hour, the rush program needed by sales, a vague notion of a product concept, finished working prototypes submitted by others, actual products on the market from a corporate acquisition, and of course, the CEO's pet project. There is nothing wrong with these inputs, but they are not likely to lead to a real innovative solution because they are so internally focused. The outcomes of these inputs tend to be incremental improvements rather than breakthrough products. I characterize the mindset that produces them a "fire, ready, aim" approach.

## The Goal of Advanced Development

There are many possible objectives for an innovation program, but most companies have expectations that go beyond the tactical improvement or evolution of existing products. They desire real invention—the development of transformative products that disrupt the rules of the current marketplace. While these new products create discontinuities that allow for significant competitive advantage, breakthrough products are not easy to achieve. They require us to take an approach to advanced development that allows us to understand what others don't.

In applying Design Research to innovation, our goal is to develop a unique, proprietary understanding of who the customers are and what they want and



Innovation requires divergent thinking before convergent thinking

need, to identify the right problems to solve, and to identify the right questions to ask. This won't happen without a systematic and rigorous approach to defining the inputs to the funnel.

### **Diverge Before You Converge**

Rather than simply responding to the inputs that are thrust upon the development group, we need to create the process, time and budget to do divergent thinking before we start filtering and prioritizing ideas and designing solutions. This is the "ready, aim, fire" philosophy. We must allow the time to think more deeply and broadly about our business and products than we normally do.

Deeper inquiry into our product category is critical. Typical market research initiatives tend to broadly characterize the market behavior and be more focused on tactical issues. We aren't looking for "low-hanging fruit"; we are looking to find what everyone before us has looked for and missed. Research needs to be designed for discovery, not to track existing conditions and assumptions.

Broader thinking also helps us to break out of the current mindset. Looking at contiguous categories can reveal new opportunities.

When we are focused on the existing business, it can be difficult to plan and fund explorative research that looks toward the fringes. But discovery research is about finding new frontiers. We often use expert interviews when studying a category, and we find that our most productive and enlightening experts are outside the category. Their perspective and frame of reference are unique—exactly what we need to challenge more entrenched thinking.

Understanding what others don't involves original thinking. It is unlikely we will develop a proprietary perspective by rushing through routine data collection methods and analysis. Using new methodologies can make it clear to management and the development team that the purpose is new learning and insights.

This early phase of development involves contextual research. Contextual research involves any data that help us assess the internal business context, the external market environment, or the definition of the customer. It can include a wide range of traditional and non-traditional research methods. Business context information usually includes corporate strategy, business unit input, alliances and partnerships, technology roadmaps and product roadmaps. The market environment deals with social/cultural trends, political trends, regulatory trends, competitive trends and design trends. Defining the customer is done via segmentation studies, lifestyle segmentation, subject explorations, attitude and usage studies, ethnographic studies, and psychographics and demographics.

Many large organizations routinely collect such information, but it is often dispersed throughout the company and not easily accessible to advanced development. For example, business context information might reside in a central

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### CONVERGENT THINKING

PRIORITIZES OPPORTUNITIES AND EMPHASIZES CUSTOMER NEEDS AND DESIRES. FOCUS IS ON CREATING COMPELLING CONCEPTS WITH HIGH PROBABILITY OF SUCCESS-IN-A TIME- AND COST-EFFICIENT PROCESS.



strategic planning group, or more likely, it exists at the divisional level and spread out among several individuals in product or marketing groups (70 DON AND PETRICK). The challenge is to collect this information in order to enable the development team to get a holistic view of the business. I advocate having advanced development groups be responsible for collecting these data, and if necessary, generate data through primary research activities. This creates situational awareness where it is needed most: with the people responsible for inventing the future of the company.

### It's Not the Pixels, It's the Picture

Having the information isn't enough to make much of a difference. Advanced development should (but rarely does) take the contextual information and synthesize a clear point of view about what the future will look like. This can be a fuzzy generalization. It is an honest attempt to forecast the forces of change and articulate how our company, our market and our customers will be different. From this work, we should be able to identify what is important, and perhaps what aspects might be missing.

Design researchers should be equipped to lead the development of the POV. With our training and analytical capabilities, we should be able to understand the context and communicate these using frameworks as well as narrative and visual tools.

### Time to Get Expansive

Once a clear POV is established, the development team should generate a list of significant opportunities. Opportunities are not product concepts or solutions at this stage; they identify potential problem areas to focus on. They should identify customer or market needs that we can choose to pursue. A wide range of opportunities that extend or expand the current business activities should be examined. This is the phase to encourage expansive thinking, out-of-the-box thinking, dangerous

thinking, with the willingness to revisit previously considered and rejected opportunities. Remember, the objective is to innovate and create breakthroughs. There is usually plenty of pressure to produce incremental evolutionary ideas during the normal course of business. This is where Design Researchers can help the company stretch.

At the end of this process, the team and management are presented with a range of opportunities that can now be assessed in terms of how they align with the core competences, assets and strategic interests of the company.

### DIVERGENT THINKING

- DISCOVERY & OBSERVATIONS
- FORECASTING POV
- IDENTIFY OPPORTUNITIES

## Start the Convergence

At this point we should have 30 to 40 new opportunities identified in our innovation portfolio. (If we have only identified 5 opportunities, it usually means we haven't dug deep enough to get beyond the obvious, close-in ones.) These become inputs into the development funnel, joining the more immediate tactical opportunities that are thrust upon us by the existing business environment.

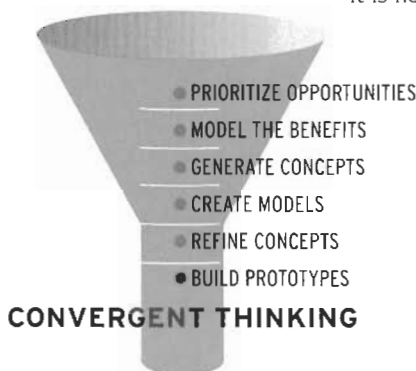
It is now time to prioritize the opportunities so we can determine which ones to focus our limited resources on. The criteria for evaluating and selecting opportunities will differ for every company. Obviously, we want to select opportunities that play to our strengths and to choose battles we can win. We must have the necessary competencies and resources to succeed, and we need to balance a range of competing priorities to support the needs of the enterprise.

This is when the organization must deal with risk. It is critical to get buy-in from senior management at this point and to make sure we connect to their strategic issues and aspirations. If advanced design activities are not linked directly to senior-most management (usually the only people in a large organization willing and capable to accept risk-

taking), the only opportunities that will move forward will be safe, close-in, easy to execute ideas.

Real innovation is inherently risky and involves change. Design Research provides the rationale for the organization to understand why considering a change is worth the risk. Almost all people and organizations resist change, only embracing it when required to for survival. Innovation is threatening, requiring new ways of thinking, working, manufacturing, distributing, communicating and selling. This creates discomfort for people, and generates internal "corporate antibodies" that fight innovative ideas [D212 LOCH](#). Groups tend to seek stasis or a status quo, not reinvention. This means senior management must intervene to overcome these tendencies. It also has implications for how much autonomy and distance advanced design groups should have from the core business.

One of the factors that limits the success of companies' innovation initiatives is they either don't declare which areas of opportunity are critical priorities to be focused on, or they take on too many opportunity areas. Innovation requires significant resources, and focus is essential. There may be hundreds of innovation initiatives going on simultaneously across a large organization, each one siphoning off scarce resources. When we manage innovation as a portfolio of opportunities, we can assure that there are a few big ideas capable of sustaining the future growth of the company. The role of Design Research in this phase is to facilitate management's declaration of the development risks they want to take on. The



Convergent Process Steps

biggest contribution we can make is to help the company discover their next big thing—the next platform for growth.

### **Model the Experience**

Once we have defined areas of opportunity that are aligned with the business and have management's support, we should define the benefits that are expected and desirable in the product category. Research that explores the emotional benefits and psychological satisfactions of a product or service can start to define the necessary ingredients of a successful user experience. We are looking for which parts of the user experience to focus on and enhance (to delight users), and which aspects we can minimize (to reduce irritation or inconvenience).

Critical attributes and benefits should be explored before solutions are generated. If we launch into a creative phase assuming we know what the essential ingredients of a successful product are, there is a good chance we will get it wrong. There is even a bigger chance that we will frame the problem/opportunity in the same way it has been approached before, limiting the possibility for an innovative solution. If we are just cranking out the next improvement or subtle evolution of an existing product, it is likely that we, in fact, do know enough to start designing. Nothing can be more blinding than the assumption that "we already know" the answer—it can almost eliminate the possibility of a breakthrough concept.

Modeling the benefits helps us to identify the principles for design success and the appropriate metrics for assessing the quality of the product concepts and designs that follow. This will provide the development team with guardrails to keep them solving the right problem.

### **Facilitate Creative Concept Generation**

Now we know what problem we want to solve and the basic criteria for success. It is time to start envisioning possible solutions. Design researchers can support the creative process by helping define the product with conceptual tools and research stimuli.

One of the most efficient and effective ways to generate concepts is to create user scenarios [70 DON AND PETRICK](#). Such scenarios create a script of the user experience that defines examples of who is using it, what they are using it for, why they are using it, when they are using it, and how they are using it. This can be done quickly with simple text and illustrations. User scenarios provide excellent stimuli for Design Research. They focus the respondent on what the product will do for them, what it will feel like, how it might fit into their life.

Concepts can also be articulated in positioning statements. These statements typically are comprised of a couple of sentences that capture the premise of product and are used as marketing shorthand. Testing positioning statements at this early

stage of design can help determine if the innovation will be easily understood and communicated—another important component of successful innovations.

### **Help Create Models**

Now is the time to get physical fast. Designers should be translating the concept into physical or experiential models at this point in the process. Design Research can provide critical input by conducting evaluative research on the product experience during design.

We don't have to wait for final prototypes to test. The experience of the product can be simulated in discrete components. For example, we can separately model the interaction with a control panel for usability testing, and create different models for product appearance or handling issues. By being closely integrated with the development team, design researchers can provide real-time input to help expand the creativity of the whole team.

### **Refine the Models**

By providing continuous customer input, Design Research can help arbitrate between alternative concepts and guide refinements. Remember, this is advanced development—we are generating viable product concepts, not commercializing them yet. Research needs to be scaled appropriately with the anticipation that additional testing for refinements and validation likely will follow during the commercialization phase.


Our biggest contribution in this phase is to help kill bad or mediocre ideas. Initial descriptions of concepts and scenarios that elicit enthusiasm from customers in early stages have a way of becoming compromised. The realities of what is technically feasible chip away at the appeal of the concepts. One of the responsibilities of a design researcher is to help the team realistically assess how the concept is performing, and to take a stand when it is time to on to more promising products. Few things are as expensive to a company as developing and commercializing mediocre products. Don't wait until a doggy concept takes on a life of its own; have the courage to kill it early.

### **Build Prototypes**

At the final stage of the advanced design process, prototypes are developed to embody the concept. How refined do they need to be? Only refined enough to enable management, internal audiences in the business units, and strategic partners understand what the concept is and why it is worthy of commercialization. Going too far this early in development can waste resources; not going far enough may keep people from grasping the potential.

Advanced development teams often underestimate the importance of selling the innovation to the organization because they have been living with the concept and consumer's response to it for several months or more. The bigger the innovation, the more selling is required for company to accept it. Remember, most



innovation is threatening, requires change and business risks  LOCH.


The design researcher can play a critical role in helping the team lay out a coherent and compelling story. We can communicate the source of the inspiration for the idea, what needs and desires it fulfills for customers, and why customers think it is exciting and valuable. Just as we are responsible for killing bad ideas, we need to be responsible for making sure great ideas get just consideration, even when they are controversial as breakthrough products always are.

### The Innovation Process in Action

How could a company use this approach? Let's take a real example from a company that manufactures windows.

**Discovery Phase** We might start by making a few simple observations about consumer or customer behavior; for example: *"Builders don't put on window screens on our windows until the house is sold because they detract from the aesthetics of the home."*

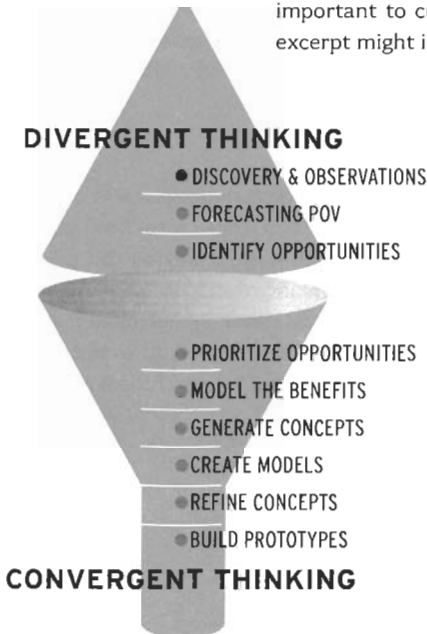
**Forecast Phase** We would write our POV to predict what we believe will be important to customers in the future based on our trend information. A small excerpt might include: *"People will increasingly want to bring the outside into their homes, and will place greater value on the quality of natural light and the view that windows provide."*

**Identify Opportunities** Searching for problem areas and "empty quadrants" that offer the potential for novel ideas  TOW. Our goal is to generate a large number of possibilities beyond the normal scope unusually considered. One such opportunity might be: *"We could make insect screens for windows less offensive (or more attractive) by decreasing their visibility and allowing in more natural light."*

**Prioritize the Opportunities** We assess the potential of the full range of opportunities we might focus on. *"We sell many millions of window screen units a year within our existing distribution system, and have an installed base of many hundreds of millions . . . yet window screens are an undifferentiated commodity that is seen as a necessary evil. If we could capture a higher margin by offering a differentiated product, this could generate significant revenue and would certainly be a problem worth solving."*

**Model the Benefits** Knowing that this is an opportunity with business potential, we can then model the benefits.

Based on research, what are the compelling attributes and benefits we should be trying to deliver? *"For any user of any window, the benefits should be a less visible screen, allowing in more light, more ventilation, fewer bugs, with less need to remove screens for winter seasons, etc."*



**Generate a Product Concept** Now we have the basics to generate a product concept. *“Let’s create an invisible insect screen! We can describe it in a positioning statement and test it.”*

**Create Models** Now design starts to accelerate. We create models of product configurations that deliver the desired attributes and benefits. *“We identify more than 15 ways to apply technology to accomplish the desired result. We simulate a few of the best and test with a range of audiences like builders, architects, designers, consumers.”*

**Refine the Concept** We continue to support the team to refine the concept. *“We focus on the ‘science of invisibility,’ material science, IP opportunities, supply chain issues, mounting systems, category analysis, etc., making sure that the concept still delivers the attributes.”*

**Prototype** Finally, the team builds a prototype. *“We create prototypes and test them. The result? We achieve magic! An invisible window screen that is differentiated, has a high volume potential, high margin potential, is proprietary with valuable IP, and is exciting to customers, the company, and the channel too. This product is disruptive and has the potential to transform the category. Design Research is used to tell the story to senior management who considers commercializing it. The prototypes are held up to the industry, the press and the shareholders as proof of the company’s leadership in innovation.”*

## **Conclusion**

While success can be generated by exploiting new technologies and or creating new operational efficiencies, deriving our inspiration from a focus on customers is more efficient and predictable. The practices of Design Research and the unique skill sets of Design Researchers are invaluable in uncovering big innovation opportunities, and for leading the efforts of advanced development teams. With the customer as our guide, there is no need for “the fuzzy front end” to remain fuzzy. Design Research might be the key for reinventing the future of the business.