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Thinking about Design

Dogs flew spaceships!
The Aztecs invented the vacation!
Men and women are the same sex!
Our forefathers took drugs!
Your brain is not the boss!
Yes! That's right!
Everything you know is wrong!

—The Firesign Theatre, *Everything You Know Is Wrong* (1974)[1]

Samuel Arbesman believes that over the course of a lifetime, much of what one knows will lose relevance. It will either be shown to be incorrect, or it simply won't have any purpose, as the overall context will change so much that many "facts" will essentially become useless. In the fascinating book *The Half-Life of Facts: Why Everything We Know Has an Expiration Date*, he describes a kind of myopia that affects our understanding of knowledge and the world we live in. He calls this condition *shifting baseline syndrome* and describes it as follows[2]:

> This condition . . . shifting baseline syndrome . . . refers to how we become used to whatever state of affairs is true when we are born, or when we first look at a situation.

His point is that it's easy to take the ways things are for granted. We assume they have always been this way and will likely remain that way in the future. This can fool us into believing that there is some objective logic or rationale for why things are the way they are and that we can reliably build on that interpretation. A healthy counterview to shifting baseline syndrome is that the world is in constant flux and probably a lot less linear and serial than we think. What exists today is circumstantial, driven by influences we may not see, and therefore should not be assumed as being the right, or only, way to look at things.

What does shifting baseline syndrome have to do with design? One of the hallmarks of the designer mind-set is a natural curiosity about why things are the way they are. Which assumptions should be explored because they might be more limiting than beneficial? What emerging information and practices can be acquired and used to expand our understanding of how the designs of tomorrow will be different from those of today? This should be relevant to business as well because design helps create the value that businesses bring to their customers.

For our purposes, the important point is that things have not always been as they are today, and the current relationship between business and design is stuck in the past. It doesn't necessarily represent the best approach moving forward.

Kjetil Fallan is a faculty member at University of Oslo, in the Department of Philosophy, Classics, History of Art and Ideas. In *Design History: Understanding Theory and Method*, he makes the point that the current state of design may not be an optimized one[3]:

> Although the world never was as simple and neatly defined as it might appear in retrospect, there can be little doubt that the massive changes in industrial structures, manufacturing technologies, market organization, consumer behaviors, communication technologies, visualization techniques and so on over the past few decades are of vast importance for the restructuring of design practice.

We agree. Certainly the rate of change of nearly everything over the past few decades has accelerated greatly. The kinds of work and the nature of the problems that designers work on have shifted as a result. We find it useful to look further back than the past few decades to understand what has led up to the situation today and why this recent increase in the frequency of change is so important for what business and design do together in the future.

Over the past few centuries there's been a transition in the objectives of design and who provides it. In fact, an entire field is devoted to design history. We're not

going to review the theories and approaches here. It's a worthwhile subject we recommend perusing sometime, and it's certainly relevant to the practice of design analysis. But we couldn't do it justice and still focus on more relevant issues, such as the future of how business and design work together, in a single volume. That said, a little perspective is useful, especially for those who are less familiar with design.

But before we look back, we should make sure that we all have the same view of what we mean when we say *design*. To have a meaningful discussion of how business and design should be looking at each other's worlds and working together, we need a common understanding of design and the role it plays to realize that what we take for granted about design has not always been the case.

As we consider design and what is changing in the role that design plays in business and everyday life, we will also point out the emerging importance of time. With the increased rate of change in technology today, products have increasingly shorter life spans. Services deliver time-based value, and that value must be evident to people to make them feel like they should continue to pay for it. Likewise, businesses look to translate their brand values into lasting relationships with customers that not only allow a business to exist, but with luck, allow it to grow. In fact, we see the role that time plays in design as being a large component of experience design. The benefit is that a deeper consideration of time across multiple interconnected areas of a business and customer relationship allows for better leverage of systemic qualities that design can provide and the ability to plan for options without the cost of fully committing to them—all with one common objective: keeping the customer engaged by providing value.

The Duality of Design

Look at this book—the texture and size of the pages, the words on the page, the diagrams, and the cover art (or the e-book reader you are holding and the way that it allows you to flip "pages" and change the size of the type to better suit your eyesight). Every aspect of what you see was designed. Now look around the room you're in (or the vehicle, if you are travelling). Consider how many discrete objects there are and how many people and how much time was involved in creating them. We live in a designed world, yet we rarely think about it.

Some believe that design is responsible merely for why things look the way they do. Every human-made object we encounter in our lives has an appearance, and at some point in the process of creating it, someone made a decision—intentionally or not—that would affect how it would look. Most of us are familiar with (and may actually use) the phrase *form follows function*. Even many things that we think of as being in their "natural" state have been visually altered to look the way they do, and in many cases, this is highly intentional (for instance, when we see meat, sugar, rice, leather, landscapes, and people, we take it for granted that they are always in their natural state, but they aren't; perhaps we should be slightly uncomfortable in the way the form/function model gets applied these days). It's pretty easy for us to form an intuitive sense about what design is, based on the fact that we can see it all around us. Even so, we can forget that *everything* is designed, not just designer furniture and fashion clothing. With so many examples like these, it's easy to think that design as it relates to appearance is what determines the cost of things, especially because the most expensive things seem to have very conspicuous designs. We are delighted when we find a more ordinary object—a tea kettle, an iron, a broom—that strikes us

as "designed" but is very affordable, perhaps not much more expensive than other "nondesigned" variations of the same product. Many businesses have become successful by realizing this and providing affordable design.

This role of arbiter of appearances is an important one for design to play for a very simple reason: We are visual animals. Sight is the predominant way that we relate to the world around us. We may be attracted by a wonderful smell, but we would rarely eat anything without first looking at it. When we hear something, we look to see where the noise is coming from to understand the significance of the noise—should we investigate, ignore, or run like hell?

Although we develop the sense of hearing very early in development, we see well before we can use or understand language. We may first learn of many things through words, written and spoken, but it's all the more real when we see whatever it is for the first time. For humans, seeing is believing. And our natural cognitive reaction to seeing something is to focus on the object to derive meaning from what we see.

So attributing the reasons that things look the way that they do to design is useful. Certainly one role of design is to make objects have more value within their context of use (this includes functional, financial, cultural, and social contexts). But it's not the full picture. It suggests that design is a final step; a wrapper, or a container, or the presentation. In this position, design occurs toward the end stages of the process of planning and making objects. This is only half the story. *Design* is not just a noun; *design* is also a verb—a process. It is the thinking and the actions that go into producing the final design. A good way to understand the importance of this noun/verb connection is through procedural description, so here's a scenario:

Imagine you are housesitting for a friend who has a small woodshop in his basement. He knows you're the creative sort and has encouraged you to build something. He has left three blocks of wood on the worktable for you. Each block of wood is a 12-inch cube; one is white pine, one is bird's-eye maple, and one is cedar. Under the worktable, you also find a fully stocked toolbox, a tape measure, and some glue. There's a complicated-looking table saw in the corner, along with some other machinery that you aren't quite sure about. After turning the saw on for a second, the noise quickly convinces you that having all of your fingers properly attached to your hand is probably a better idea than fooling around with dangerous machinery.

Your mind begins to wander through things that are made of wood and stops with . . . a box. A box should be pretty easy. You think that maybe a jewelry box would be nice. You'll give it to your significant other and maybe even buy something nice and sparkling to put inside for extra points. You choose the maple block, which has a beautiful grain. Deciding that you'll cut it into sections from which you'll construct the box, you get to work. Your phone buzzes with a text from your significant other, but you justify not responding for now: You are in the middle of a labor of love. After a lot of labor and not much progress or love, you realize that the maple is extremely hard. You persevere. But as you continue, you realize it's really difficult to keep the cuts even, and you aren't too happy with the results. You begin to rethink things and are pretty convinced the effort with this block is going to produce something a whole lot less impressive than you imagined. Even so, one hour and a ruined block of wood later, you are undaunted with your original mission of building a box.

Starting again, you grab the cedar block and try cutting it. The saw goes through quickly, and your cuts are much better. Before you know it, you have a bunch of 12 × 12 × ¾-inch boards. The wood is not as pretty as the maple, though. You wonder if a jewelry box is the best thing to make. Maybe a cigar box (for yourself) would be a better choice than a jewelry box (for your other half). Besides, this way you won't

have to also buy a piece of jewelry. You realize that you need to cut some of the pieces down into smaller sizes so the box doesn't look like a 12-inch cube. After (somewhat randomly) deciding that it will be 12 inches long by 4 inches high by 6 inches deep, you set out to cut the pieces up into sides, a top, and a bottom. Now you begin to put the pieces together to form the basic box.

Do the sides bookend the front and back or vice versa? After brief consideration, you decide that the sides will bookend the front and back. But how will you attach them? Looking around you see some small wooden crates on the floor. Inspecting them, you notice that the sides are held together with what look like small nails. You see some small nails in the toolbox and decide that these will do. As you maneuver the boards in a way that allows you to drive the nail to join the first side to the front, you swing the hammer and gently tap the nail. The wood splits.

No worries; you have extra pieces that you can cut to replace the split one. Rather than make the same mistake again, though, you decide to use the drill and screws, thinking this will prevent splitting. After a while, you realize that you can't drill a hole through the side and into the edge of the front at the same time, so you do it one at a time. As you're screwing the pieces together, you realize the holes are in slightly different places in relation to the board edges. Although you've joined the two pieces together, the edges are not flush. You still have more wood, so you take some measurements and cut some more pieces. This time, the two boards are joined and flush (or at least close enough)!

Your phone buzzes again. Another text from you-know-who, but you're on a mission and ignore this one, too. You continue until you have all four sides of the box joined together. Excited, you now get ready to put the bottom on. This should be easy because you can lay it on top of the sides and then drill through the edges of the sides to ensure a good fit. Unfortunately, you cut the bottom and top to be 12 × 6 inches and now realize that the box is actually 13.5 inches long (the sides each added ¾ inch to the length). None of the wood is long enough (12 inches maximum length), so you decide that the bottom will be "inside" the sides.

As you try to move forward with this plan, you realize that the inner dimensions are not 12 × 6 inches but 12 × 4½ inches (the front and back each now take up ¾ inch of the original 6-inch width). You cut 1½ inches off the bottom, apply the glue to its edges, and then place the box so that the bottom is now inside. Now you see that the last saw cut wasn't exactly straight, leaving a bit of a gap. No problem. Glue will fill that, and as you squeeze glue liberally into the gap, you remember a line you once heard—glue, putty, sandpaper, and paint make a carpenter all that he ain't! Once it dries, you plan to drill through the sides and into the bottom and set the screws. Happy with your progress, you decide to go upstairs and relax while the glue sets.

After rewarding yourself with a refreshing drink for doing such a good job, you return to find that the glue has set. You also find that the box is now stuck to the worktable. You start prying and pushing the box to free it, and then—*snap!*—one of the sides breaks along the grain, which you now realize is probably running the wrong way. You hadn't really thought about the grain and strength of the wood when you cut the block. At this point, cursing, you throw it all away. A second block of wood is wasted, and the better part of the day is gone. But armed with your new experience, and perhaps a little obsessed, you start anew and grab the white pine block.

Your phone rings, and you see it's your significant other again, calling this time instead of texting and ticked that you didn't reply earlier. You let it go to voice mail because now you've hit your stride.

By now, you know a lot more about what to do and, more important, what not to

do, so it goes much faster and you're ready to put the top on only a few hours later. Of course, finishing this is a little tricky. You hadn't thought about the fact that the hinges need to be recessed or the lid won't lay flat. You go with the only other option and put them outside on the back of the box. Not as nice looking—they stick over the top a little—but it's done! Your new humidor is finished. You make a little humidifier by placing a damp sponge in a plastic container you found in the kitchen, with a few holes poked in its lid and sides, and adding that to your humidor.

Back at home a few days later, you notice black stains have formed in the wood of your handmade box. Mildew! You realize that the mildew-resistant cedar may have been the best choice after all and are annoyed that the cedar box broke. Giving up your fantasy of quitting your day job and opening a little wood shop to make and sell your handmade boxes, you decide to treat yourself and purchase a well-made humidor.

Now you have learned something about production and design. If you were more experienced at using the tools and going through the process, it would have been easier. You have the appreciation for the craft. And, if you had known what you wanted to make before you started, you could have planned the entire process in advance, including the box dimensions, type of wood, joinery techniques—every aspect could have been thought through. You could have computed all the measurements and set the order of assembly, all based on the end goal, the materials available, and your craft skills. You could have even considered different approaches to the size and construction, weighing the trade-offs between them and the relative merits of each finished product before you started.

You realize that you could have and should have designed the box before you produced the final outcome in order to increase the odds of having something useful and desirable. With the knowledge you now have, you know exactly how each aspect of the design (appearance) would have related both to the process of making the box as well as its value to someone once made.

Although this example may seem overly contrived, it does illustrate the duality and interdependence of each side of the concept of design. It also illustrates that underestimating the importance of design as a process can lead to problems. Appreciating this duality is critical to understanding how business can get the most out of design and why the current relationship between the two often doesn't produce the level of value that it could. When business provides an incomplete description of what is needed or design is not familiar enough with the process and the implication on what kinds of questions should be asked, the results may be rather disappointing. It's easy to underestimate how long the right solution will take when important information only becomes available after some level of effort has already been made.

This scenario is also illuminating in another way. It illustrates a subtle but very important nuance. The intention of the effort—the choice of what to make, for whom, and why—shifted during the course of the scenario, but only as a result of mistakes being made. This occurred largely because of the lack of a good design, which would have ensured that the process produced the right outcome. The final product and its overall effect on you and your partner were larger than just a box of dubious quality. The outcome was arguably even less successful than no box at all. The process of making the box and the usefulness of the finished product existed inside other processes and relationships that weren't fully considered.

Matthew B. Crawford writes about the value of craft and how modern production processes remove the connection to making value that people once had. He sees the process of work as important to the quality of the output because of the information

one gains and the resulting knowledge that arises during the process. In his book, *Shop Class as Soulcraft*, he writes[4]:

> Knowing what kind of problem you have on hand means knowing what features of the situation can be ignored. Even the boundaries of what counts as "the situation" can be ambiguous; making discriminations of pertinence cannot be achieved by the application of rules, and requires the kind of judgment that comes with experience.

When we start thinking about the role of design in producing value for paying customers, the duality in the concept—process and outcome—starts to apply itself to a range of different areas, many of which are beyond the scope of the specific designed object. The problem is that it's really difficult to think through all of the different vectors and relationships that can help us understand the importance of each and the interdependencies between them. This is often because we aren't aware of them until after it's too late, and their absence is what brings them brings them to our attention.

The essence of this challenge is touched upon by the design historian Hazel Conway as she shows how easy it is to lay out the different avenues that connect design and object[5]:

> Another confusion lies in the interpretation of the word "design." When we talk about the design of a lamp, for example, we may be concerned with the mental processes and the drawings and models that eventually result in that particular lamp; we may be concerned with the production process, the form and material of the lamp and how it is used; we could also be concerned with how the lamp was marketed, advertised, packaged and sold.

If you believe that design is important because it affects customers' overall perception of value—which it does—then design is a much more complex concept to fully manage. That's because now every objective requires the right process, outcome, and understanding of the larger context in which it will exist. This is a key point and is foundational to the experience design approach we put forth in this book. Unlike pure innovation, which may be targeted at identifying emerging or unrealized needs, and unlike design thinking, which grounds the design criteria in the real world of the user needs and behaviors, experience design incorporates all disciplines of and approaches to design into an awareness of how to build systems that support customers in receiving value by recognizing that it's never just about the single object or the current project requirements and parameters.

Modern businesses have many moving parts required for delivering value to customers, and experience design can become a way to see how these efforts relate to one another. It provides a framework for looking at how they reinforce core brand values and how decisions, which need to be made in the process of design, can have a further reaching effect than simply what the product looks and feels like.

But why is it so easy to ignore even the basic duality of design? Why is there a tendency to believe that letting business priorities dictate design objectives produces a better outcome than asking someone with a maker/designer mind-set to solve the problem in a viable way? We believe that the evolution of the relationship between business and design has a lot to do with it.

Design: The Evolutionary Advantage

The propensity to design is in our human nature and has probably been there for a long, long time. Many theories on human intelligence, the evolution of the brain as the source of and reason for our unique form of consciousness, take the point of view that there is an advantage to being able to model different scenarios in our heads before committing ourselves to actions. In essence, we are probably hardwired for design. But it gets even more interesting.

When you think about design and what's involved in designing, it's natural to think about the role that the hand plays. If it's the craftsman's eye that determines what excellence is in a product, surely it's the craftsman's hands that make it happen. Frank Wilson is a neurologist who treats people who have sustained work-related hand injuries. He has been fascinated with the hand-brain relationship in human evolution and the role this relationship has played in defining the world we live in today. In his book, *The Hand*, he lays out this story, in which he ties the development of the hand and the systems required to control it to our success as bipeds, the ability for toolmaking and technology, and the development of language—essentially making the point that our humanness is as much related to our hands as to our brains.

Wilson clearly believes that the hand-brain connection is an important aspect of our humanity, writing[6]:

> I would argue that any theory of human intelligence which ignores the interdependence of hand and brain function, the historic origins of that relationship, or the impact of that history on developmental dynamics in modern humans, is grossly misleading and sterile.

The importance of the hand to design is clear. Earlier, we said that sight is extremely important and perhaps the primary way that we receive our world. Another primary way that we exercise our minds in an attempt to interact with our world is through the use of our hands. It's true that we interact based on our presence, our voice, our hands, and the rest of our bodies, but the multipurpose tool that gives us the most bang for the buck is the hand.

Wilson is not alone in seeing the hand-brain connection. Lewis Wolpert, a professor of Biology Applied to Medicine at University College in London, believes that humans are unique in our ability to make tools based on observation, planning, and iterative refinement. Although other animals may use tools, most only do so by taking existing objects and using them with very little if any modification. And the tools are generally not reused, nor is tool use taught; rather, it is mimicked in most cases.[7]

He sees that there are a few interesting implications arising from this observation. One is that the "technology" of a tool can be shared, passed down across generations, and improved. The other is his hypothesis that the ability to identify and model cause, effect, and implication, which is needed for tool building (and design for everything from a scenario for stealing bananas to developing computers), is also the same mechanism on which belief systems are built. Belief systems will resurface later in the book as we discuss business, design, and the emergence of modern branding.

The Maker/Designer

It seems fairly plausible that humans have evolved the way we have largely based on internal mechanisms that allow us to think, share, build, and control our world via this bidirectional world-hand-brain connection. As a species, we shape the things that shape our existence.

And throughout much of this time, grappling with the duality of design while balancing the process and end goal was the responsibility of the maker. Much of what was produced by people for themselves and others was based on an intuitive "design" that was influenced primarily by the materials, the most efficient ways of working with these materials, and the requirements of end use (utility and durability). Any additional aesthetic choices reflected broader social and cultural values and possibly the tastes and personality of the maker. The maker's identity became a useful symbol of value, but often these were not outwardly visible as being separate from attributes related to function and social/cultural values. A maker's mark might have existed on an unobtrusive spot somewhere on the product.

For things that required time and specialized knowledge to produce, there was an advantage to finding someone who could produce it faster and better than one could do for oneself. Sometimes producing specialized things involved a division of labor, such as different workstations for different stages of production of stone tools and weapons.

We have come a long way since groups of early humans sat together and shared the task of chipping stone into weapons—or maybe we haven't. Wilson discusses the universal way that this division of labor approach works in his book. He makes this point in a way that brings amusing stereotypes to mind[8]:

> Silicon Valley designers and engineers conceptualize, design, test, and perfect electronic machines in a process that is indistinguishable from that seen in Aborigines in stone and tool manufacture . . .

Enabling skilled craftsmen to benefit from knowledge guilds and similar craft-centric organizations functioned as a way of both leveraging the knowledge through the labor of others and protecting proprietary techniques. The labor-for-knowledge value exchange also helped transfer skills from person to person when media channels and educational institutions didn't exist to fill that role for the masses. (Another probable benefit of this structure was that the most knowledgeable and experienced workers could also push the technology forward, through experimentation, while the less skilled workers produced the bulk of the work that paid the bills.) A scalable maker/designer approach was a predominant way to produce things of value for others.

We admit that this is a very coarse-grained overview that doesn't consider centuries of social, cultural, political, and economic change, but there are some pragmatic reasons why a smart design-minded species would evolve into this kind of structure for managing design expertise in the creation of value.

First, to have production and design sensibilities reside in the minds of different individuals requires the ability of those individuals to communicate aspects of design. For much of human history, communication technologies have been somewhat limited—not everyone could read or write. If design is to be something that can be shared beyond the process of making, it has to be communicated in some way. You had to know how to read or write. You had to have time and access to materials used

to record the knowledge, and others needed time to assimilate the knowledge and then practice it to a degree that allowed it to be perfected, thereby reaching the level of consistency necessary to ensure the application of the design produced value.

In *Antifragile*, Nassim Nicholas Taleb describes how a lot of the "engineering" details used by the ancients weren't necessarily formally documented. He explains that because so much resided in undocumented decision making, Roman bridge designers and their families were forced to live under the bridges they constructed; after all, no one would want to live under a bridge unless they were fairly certain it wasn't going to collapse on top of them.[9]

With the invention and evolution of the printing press, the ability to record and distribute information became more efficient. But it would be a while before printed information would have a large impact on the role that design played and how this would affect the maker/designer.

Second, the processes for making things were still largely manual. This meant the quality was dependent on the individual craftsman. There was no way to formalize the craftsman's knowledge and skill and embody it in a set of rules and behaviors that would allow it to be produced at large scale with the same level of quality across craftsmen or even from one piece to the next. This would not come into play in meaningful ways until the Industrial Revolution.

Third, and perhaps most important, the size and nature of markets was different. A good portion of the population did not have the means to acquire things beyond what was needed for mere subsistence. Transportation was not highly efficient, so producing more than could be sold locally was not economical if people in other markets made the same thing. There was neither demand nor a financial advantage for having design exist separate from the maker. Without some form of consumerism and the ability to mass-produce, the maker/designer was the optimal configuration. There was not enough need to differentiate, nor was the speed of consumption high enough to justify trying.

Splitting the Maker/Designer

During the Industrial Revolution, a series of technological advances streamlined the processes of manufacturing and production. Although these shifts happened over the course of a century and over two distinct waves of change, there were impacts to the maker/designer model of effectiveness.

In discussing the differences between craft and mass production, Matthew B. Crawford writes[10]:

> The craftsman is proud of what he has made, and cherishes it, while the consumer discards things that are perfectly serviceable in his restless pursuit of the new.

The first change that came about was that more products could be produced with the benefits of economy of scale, arising from more efficient means of generating power, better control over the replication of quality, and more throughput capacity in manufacturing. Manual labor was replaced with machines. It became easier to produce products, and once the knowledge of the maker/designer was instantiated in mechanical processes, the means of production became the main source of value for business (as opposed to the knowledge needed to produce a specific product).

Another shift was that the craft skills that were needed for production of one kind of product were often also fungible to other products. The skills needed for making a wheel for a wagon or other conveyance were similar to those needed for making a bicycle wheel. And Crawford points out that as the automobile began to replace these other forms of transportation, craftsmen who had the best all-around mechanical skills moved from producing one kind of product to producing another. In addition, the design and creation of the new production processes became a focus of many of the skill types who were once focused on designing/making end products themselves.

Two vectors of evolutionary change were now set in motion. The first: Access to capital would allow someone to buy the knowledge and means for production, without requiring very much in the way of experience from a maker/designer background. This meant that competition was now going to be driven by access to capital and to markets, not just knowledge of craft and level of quality. Second, it put any decision about what role design played, and why, into the hands of people who were weighing other considerations, such as profits and growth, as well—and often, these other factors were considered to be of equal or higher priority than design.

There were many areas in which the maker/designer mentality was still considered a high priority and key to how products were made and why people would want them. But even in these areas, there was a split between what was needed to make a product—and make it easy to manufacture—versus what was needed to make a product more valuable or desirable to a consumer. As Kjetil Fallan describes it, this split in maker/designer thinking can be categorized based on who benefits the most from the thinking[11]:

> When engineers design cog wheels to go in the power transmission of a drill or disc brakes for a car, it would seem material more at home in the history of technology than in design history. However, when engineers design drills or car bodies their work is of more immediate interest to design history. It may seem that the crux of the matter is the degree to which the object as an entity interacts directly with the users.

Back to our earlier discussion about how we interact with the world—presence, eyes, voice, hands. If the customer can't see it, doesn't need to touch it, and doesn't ask about it, why spend time on design? When it's the guts that most people don't see, don't understand, and rarely worry about, it's considered technology and sits within the primary objectives of business control. When it's things that people see, interact with, and make decisions about, it's design. And when production and design are separated, business can be tempted to buy design whenever and wherever it makes the most sense. Often, this dichotomy seems clear, and business confidently decides to go without external input from design. In our experience, it's almost never as simple as it may first appear. And often, the customer's experience is tied to a deeper connection than the surface appearance.

Information Accelerates Change

Another interesting and underappreciated shift that began to happen during the 1800s was the role that information began to play and how this ushered in the advent of consumerism. (It also set the stage for how crucial the increasingly rapid rate of

information would be to business and what business would begin to look to design to provide.)

For instance, in discussing the changes in women's fashion during the Victorian era, Hazel Conway notes that what a woman wore was a strong indication of her class and status. As such, working-class women who aspired to hold a higher station would try to dress in a way that suggested they were more than they really were. The upward compression on those at the top meant that they needed to be wearing something new and different to reaffirm their position. As a result, people began to look at fashion trends circulating in print, in order to understand what they should be looking for.

Conway writes, "The proliferation of fashion journals at this time, with the minutest nuance of change being recorded, meant that ideas could rapidly be disseminated."[12]

While information's role in setting tastes and defining what sells certainly didn't start here, clearly the relationship between information and demand gets a healthy boost, as both the means to produce and distribute information in faster and more economical ways became available. In *A Publisher's History of American Magazines,* Peter Hutchinson points out that between 1800 and 1900, the literate population in the United States increased by a factor of 20. In 1800, only 13 magazines were published in the United States, compared with 3,500 in 1900, and more than 8.2 billion copies of magazines and newspapers were printed in 1900 (which, based on the 1900 census, equates to more than 100 for every citizen).[13]

As it becomes easier to produce products for markets with economies of scale and as it becomes easier to inform and affect consumers' understanding of what's available and what choice makes the most sense, those who control the capital to fund both sides of the supply/demand curve are now in a position to determine what gets made, for whom, and why. From this position, it's easy to assume control of how design is being used to identify, create, and deliver value—to the point where design can now be guided in terms of what is needed where and what criteria will be used to evaluate the outcome.

Codifying Design as Separate from Making

During the latter half of the nineteenth century, more and more products could be made in more economical ways. Much of the core value for a product could be produced with the necessary production knowledge instantiated in an optimized manufacturing process. Design implementation no longer required a maker/designer, at least not for products that could effectively be mass-produced. But not everyone was happy with the kind of aesthetic choices available through these manufactured products.

The concept of the balance between form and function is often attributed to William Morris, who owned a design business that, ironically, provided decorative ornamentation for church interiors. Morris was a founder of the Arts and Crafts movement that started in the 1860s and influenced art and ornamentation through the 1910s. Although the Arts and Crafts movement was largely a reaction to industrialization and its effects on the aesthetic and decorative choices being made in factories, its focus was on restoring a more natural influence to the hands of the craftsman, who was able to meld the nature of the material with art that reflected the mainstream cultural values (including the elevation of the natural world). The movement had an international influence on design, although it was not fully

concerned with form and function in regard to economic value or the functional value of products.

At the same time that form and function became a topic that an end user might consider when purchasing a product, others involved in production and design were interested in how the rules and characteristics of form could be systematized toward true production and use value, thus moving away from the province of fine arts.

The Bauhaus movement in Germany (beginning after World War I and running until the beginning of World War II) took some of the philosophical underpinnings of the Arts and Crafts movement and began to express them in slightly more utilitarian ways. The founders of the movement were interested in bridging many disciplines involved in production and design as well as fine art. One of the goals was tying the process of design and manufacturing to ownership and use. By using design as a way to optimize form and function as well as production, the common man would be able to more broadly enjoy the fruits of design. The choice of form was no longer tied only to decoration and ornamentation but also directly to what made a product better to use and easier to produce.

This movement produced some very influential thinkers and practitioners. It also helped formalize design systems—that is, which formal elements and attributes were important and why and the different ways in which the elements of design could be systematically considered and managed. Modern book design, modern typefaces, modern product design, and modern architecture—many aspects that we take for granted today as being what design is about—came into use during this time. In fact, the Bauhaus style was often referred to as international style, because the aesthetic choices were not tied to specific cultures or historical influences of fine arts. Graphic design, which is primarily concerned with information, meaning, and effective communication in two-dimensional media (think print), was greatly influenced by this movement.

The formalization of design systems as knowledge that could be applied, separated from, and considered even before the actual production of a product began allowed the design professions to be freed from having to make things in order to influence them. Designers could consult or design in abstract, becoming more like the modern designer of today: often having a set of highly perfected skills and looking for a problem to apply them against. It also meant that business could begin to evaluate what aspects of design they believed were most appropriate, because the design and production were now only as integrated as the business and product required them to be. Suddenly, design was much less connected to production.

The Modern Brand

We mentioned that information was accelerating the rate of change in many ways, especially in regard to how people learned about products and prevailing tastes. Information about design processes and techniques could be captured and communicated. Those who were buying and using products could now see options before deciding to buy. Although advertising had been around for quite a while, there was a host of new, financially viable vehicles to promote new products, including published magazines, newspapers, catalogs, and so on. An emerging connection between business, production, demand, and the rise of consumerism set the stage for an interesting shift in how information drove markets and how business used design.

Brands have been around for a long time. People often used symbols that stood for their products or their lineage, which may have had a relationship to the creation and purveyance of certain products. But modern branding really came into its own in the twentieth century. The ability to economically put a message in front of a consumer; the emergence of products that you could buy, rather than make yourself; and the pursuit of profits based on the economies of scale provided by manufacturing and communication began to suggest that creating a reason why someone should buy your product (as opposed to a competitor's) were good things.

As Crawford describes it[14]:

> Consumption, no less than production, needed to be brought under scientific management—the management of desire. Thus, there came to be marketers who called themselves "consumption engineers" in the early decades of the twentieth century.

In describing the rise of modern advertising and branding and the role they play in giving context and meaning to society, James Twitchell makes a connection between the dynamics of religious belief systems and the mechanisms behind brand building. In his book, *Adcult USA*, he talks about early pioneers of advertising in the twentieth century as having been very familiar with the practice of religion. Some had even been clergy or divinity students.[15]

What seemed to click for these early pioneers of positioning and messaging was an understanding of belief systems and how, once established, such a belief system became a very powerful force for affecting people's behavior. The more universal a value provided by a belief system's foundation, the more powerful it could be in motivating a person to do specific kinds of things. And people seemed to respond to being asked to operate on blind faith if the belief was strong enough.

If you remember our discussion of value in the Introduction, we talked about three types: tangible, intangible, and aspirational. The tangible value of almost anything can easily be demonstrated by comparing what it's supposed to do with how capable it is of performing that feat. But intangible and aspirational value are often abstract, represented through ideals to be taken on faith until you're able to realize them for yourself (and implicitly, in your own subjective way).

These ideals represented by brands were tied into social and cultural needs and aspirations. People were interested in profiting from the advantages of technology, living the good life, and being happy and prosperous. Brands could represent their ideals and values into design attributes that could be layered onto products. By "layered" we mean that changes to the appearance and secondary features could be made without significantly affecting the process or cost of production (it could just as easily stop at the packaging and advertisements). Although design wasn't literally translating these into specific components of utility in the product, it could help make the brand differentiation visually "real" and apparent, and advertising was the perfect vehicle for carrying the message.

This was the new area of value that became important for driving consumerism and taking advantage of the ease of production unleashed during the Industrial Revolution. And there was a nice tie-in to other areas of culture that were commonly used in conveying these kinds of intangible and aspirational ideas: the graphic and fine arts. With channels of communication available to businesses and a public that was beginning to look at the media in these channels for cues on how to think, act, and buy, the modern brand began to take shape. Here, design played a role in

developing something for business that was not tied to the process of making products, because what was being designed were ideas, concepts, values, and principles in the abstract. Although they referred to the product, the design of the presentation of this information had little to do with the design of the product.

The choices of how to portray these kinds of ideals had little pragmatic constraint. The designer could work with a system of design components that were highly flexible but capable of being combined in specific ways to create very unique and eventually proprietary design systems or brand identities. The values of the brand were to be represented by the choice of elements and their systemic application by a designer, who needed no real or practical knowledge of the product or how it worked or was produced. The people buying design didn't need to have that knowledge either. Yet this relationship between business and design could be very powerful. For instance, although Coca-Cola was established as a brand before this transition began to happen in full, Coke did leverage this shift. We still experience the power of this every year. The modern version of Santa Claus, the color of red used then (and still today), and to a certain extent, the consumerism inherent in the modern version of this holiday were all inspired by ads commissioned by the company for its brand. As Hazel Conway describes it, we are aware that this is happening, yet we are unaware how deeply this may affect us[16]:

> In the streets, in the shops, reading the papers or magazines, or watching television, advertisements designers hope to have a direct effect on us, and this we recognize. Their indirect effects are, however, much more subtle and not nearly so easy to recognize, yet our perception of ourselves, our surroundings and our society are affected by them.

This represents a fundamental shift away from the maker/designer model in which the duality of design was mediated through individual decisions based on how the needs of the two sides (process/final artifact) should best be served. Now business was in the driver's seat and could use a more scientific approach to streamlining production and driving demand, with brand being the emerging point of focus for the consumer. In this situation, design's biggest effect would be felt in how the brand was brought to life and used; the decisions about product were no longer open and flexible, and consumers' attention was often diverted away from the pragmatic tangible value of the product in favor of the intangible and aspirational value of the brand.

Where There's Brand, There's Consumerism

With the end of World War II, a lot of new technology was making its way from the military industrial complex into consumer products. There was also a lot of manufacturing capacity and a lot of people who were entering the workforce, both to help the supply side and to be paid salaries to drive the demand side. Consumerism finally had all the right pieces to fully take off.

Add to this new and more effective channels of mass media, and you have the perfect situation for business. With new materials and design disciplines such as industrial design, you could now create basic models that used the same manufacturing process and components but evolved through a series of small design changes, each one an improvement on the previous. Design could leverage the

business's brand values to create incremental change in appearances and features for products, which helped business create consumption cycles in which the consumer could gratify the entire range of value (tangible, intangible, and aspirational) on an ongoing basis. In many cases the only thing that really changed was how design was appealing to the intangible and the aspirational. The fact that the process of making things was optimized for cost of production, and not necessarily product durability, certainly helped (and consumers began to suspect that some products even had built-in obsolescence). Because the target of brand belief was deeper than rationality, the whole mechanism could become instilled in society to the point where the advertisements and branded products weren't serving preexisting needs as much as defining what was important and desirable. It's quite a feat for a business to not only have the means for producing supply but also have access to the means for producing demand. When you can connect the two, the nature of the market changes. Customers become consumers on a treadmill, with increasing opportunities to acquire more value of all kinds.

We feel compelled to highlight a couple of interesting points that arise out of this state of affairs—points that differ from what existed in previous centuries. For starters, technological change affected how business and design worked together, enabling a separation between design and production. Second, the role that design played in creating or enhancing value when business chose to use design. And third, the question of what to make, for whom, and why could now be decided without consulting design—until after the fact—by convincing people that they should buy something because of its subjective value.

This state of the relationship between business and design was relatively well optimized for its time, but it wasn't the only road to take, nor was it the best. We arrived there largely because no one really had to think about it along the way. As Samuel Arbesman would say, "We are not well equipped for slow change."[17]

Acceleration through Technology

The latter half of the twentieth and beginning of the current century saw a new wrinkle in the collaboration of business and design. The development of computing and network technologies, along with the general growth of the economy, created new areas within the service economy. In addition, services previously provided by people could now become productized as software. The Internet created a new channel for connecting media and services to consumers. Many services shifted to IP-based networks. All of this led to new areas of design, specifically, the emergence of interface and interaction design.
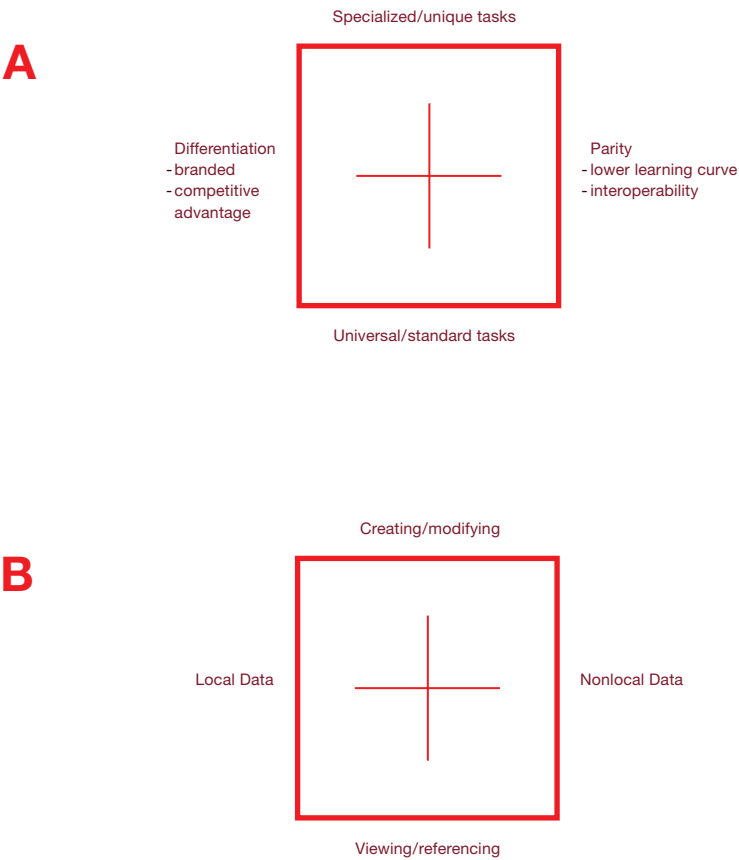
The three new kinds of business concerns in which design became involved were digital media (websites, content), digital services (applications, e-commerce, media services), and digital marketing (ads, e-mail, microsites). Suddenly, the business and the customer could actually interact directly in real time through the final designs of any digital product or service. This shift also altered the relationship of the process and outcome of design, because the role that time plays became much more important to consider. Figure 1.1 shows just some of the variables that need to be considered before design can even begin to create a service experience that would work for customers.

Unlike a physical product, a digital product (or service) had a lot of the content and controls presented visually through a screen. Because the screen contents were
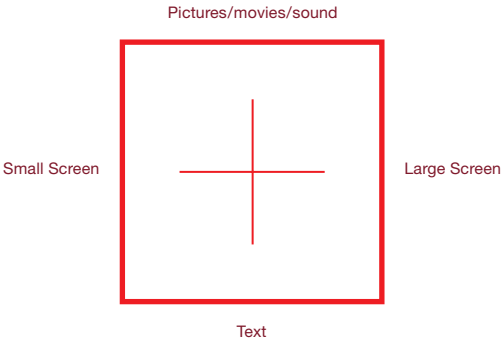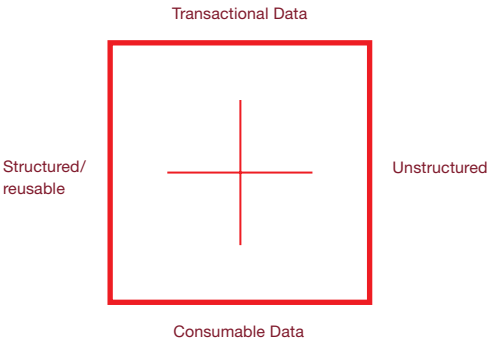
Figure 1.1
Five Basic Areas Digital Design
Takes into Account

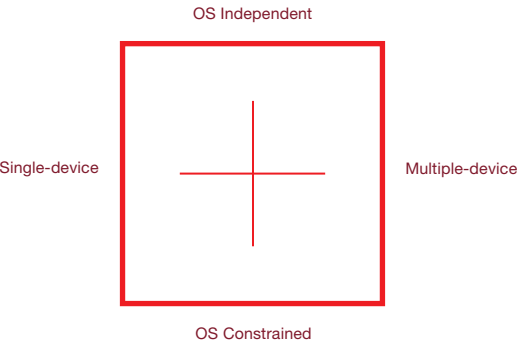**A**

Specialized/unique tasks

Differentiation
- branded
- competitive
  advantage

Parity
- lower learning curve
- interoperability

Universal/standard tasks

B

Creating/modifying

Local Data

Nonlocal Data

Viewing/referencing

C

Pictures/movies/sound

Small Screen   Large Screen

Text

D

Transactional Data

Structured/   Unstructured
reusable

Consumable Data

E

OS Independent

Single-device   Multiple-device

OS Constrained

generated by the hardware inside, what was on the screen could change over time. In addition, many of these products had a lot of features and capabilities that were provided by the internal components (not how the product was physically used), which meant that users had to invest time in learning what was there and how to use it. When these products and services also provided a bidirectional flow of data from the product to someone else and back again, the nature of the value provided could change over time. Finally, because of the technical architecture of digital products and services, not only could products have their value proposition "updated" over time, but the options for different kinds of solutions could change as new technologies changed what was possible. When a current standard of efficiency for a product becomes outmoded, it's very difficult to build a case for staying with it.

When computing systems first began to utilize graphical user interfaces, one of the emerging concerns was that there needed to be some kind of mediation between the system and the user that acknowledged the human way of experiencing the world. User-centered design was the approach suggested, and a lot of design for the digital medium was evaluated for usability as a primary criteria. With the combination of this user-centricity and the relative novelty of the problem space (and scarcity of experienced practitioners), the business side began to allow—and in some cases rely on—design to provide the maker/designer benefits.

With several decades of experience under their belt, many businesses began to invest in taking some of the management and development of the digital channels and services in-house, at least at the data and core service level. New tools allowed for certain areas of design to be executed by anyone willing to learn how to use them. And the proliferation of options and examples for how these tools could be used allowed for novelties that were of more interest than strict adherence to the user-centric conventions of predictable usability. Businesses wanted design to create experiences that were much more dynamic and that differentiated their story by taking advantage of the medium in innovative ways. Often, a business would ask design to improve the user interface or create an innovative experience. In some cases, design staff for digital media were embedded in business's functional units, when benefits of a real maker/designer approach were needed. But despite all these variations in where design staff sat, it was still business that largely determined what, when, and why, often from very tactical perspectives. Design became a stage gate. In many cases, the relationship between a business and an external design partner was managed much the same way that an internal design staff was managed. In many cases, the choice to go outside was driven by capacity and access to particular levels of expertise, but it didn't necessarily change who made what decisions. In many ways this had to be because the outside partner was working with the internal teams to some degree.

There was also a new breed of business that needed design: the Internet start-up. These were marked by several characteristics. The first was the belief that change was inevitable and would sweep people up (as customers) without much need to convince them to "buy." This often meant that the value the business was providing was obscure, in some cases apparent only to the founders and their investors. A second characteristic that was largely present only during the first wave of these new entities was deep pockets. Start-ups had raised significant amounts of capital. (The "later waves" had almost the exact opposite situation: clear value proposition but little capital.) A third characteristic was that they needed an entire company (brand, product/service, marketing, customer relationships) built ASAP, because they were going to take the existing business world head-on, right out of the gate.

When the Internet start-up had capital, it could commission the best design practitioners. Whether the start-up made the decisions about the role design would play or left those decisions to the designer depended largely on the applied experience of the executive team. When the start-up had little capital, it usually tried to cherry-pick where and how design would be applied to the problem (often to the warnings and consternation of the designers). And when the nature of the technology or business model was so new, in many cases all the design effort was focused on convincing investors—as opposed to end customers—that this was something noteworthy to engage with or that not engaging would mean missing out on fantastic future value.

The shifts in the economy and the change brought about by network computing fueled financial interest in new business models. Design was thriving. During the second half of the last century and continuing onward, there would be a proliferation and diversification of design services. With each new branch in the channels used to reach the market and with each new technology, there was a richer flow of information between business and customer. Design responded with specialization of services, and business looked to maximize investments by finding the best-in-class to fill specific needs at lowest costs. In many cases there were value-added services that addressed business needs that were not tied to the design process and didn't require a finished design. These services made the implementation of the design easier by taking off-the-shelf approaches and making minor, superficial changes to make the output seem more "bespoke," or they assisted in the management of the process for which design was commissioned.

Although business has benefited from the changes brought about by technology, technology is changing the nature of business and the relationship between business and customer. Brands are no longer based on a one-way broadcast and reaffirmation of belief systems, and to a great degree, they are defined as much by the customer as by the business. Technology is rapidly changing the entire product/service life cycle, and as Chris Anderson points out in *Makers*, desktop production combined with the Internet's ability to collapse the idea-to-market telescope might just usher in a new industrial revolution that swings control back to the maker/designer.[18]

Implications

What we're trying to illustrate throughout this chapter is that there is a substantial difference between a maker/designer and a business that has taken on the making and designing of a product or service. This split becomes more structurally ingrained when design is also used to build beliefs and demand for value that is not experientially validated through the products or services it represents. And finally, as the touch points that operate between a business and its customers proliferate, design begins to specialize and to provide new value-added design services aimed at making the customer's life easier.

This creates one challenge that is of particular interest to us because it effectively ensures that the current relationship between business and design continues on the present course, a course that we believe should be reexamined. This is what we describe as a method of self-justifying a position of authority. Essentially it operates as follows: When a problem is poorly framed and presented for design to solve in a way that limits design's ability to solve the problem correctly, an ineffective solution reaffirms that design is not in a position to guarantee results and that it's perhaps a

subjective endeavor best managed by business. If an effective solution is delivered, it's simply proof that the business has chosen the right designer because business is a better arbiter of what design can do.

Buyers of design services want to see that those they hire can help them be successful. Because most design service providers live and die by the success of the work they do for their clients, it puts the designer at risk of doing a lot of work that may not get leveraged in the future. When your portfolio is filled with projects for companies that went out of business, it's hard to get hired, even if you were just following the clients' orders.

Although we're pointing out the inefficiencies in the way that business and design are now working together, we should be honest and acknowledge that we, and the design industry in general, have benefited a lot from these developments. There are many buyers of design services, and their needs continue to increase and change. We would not be in business today if the circumstances hadn't played out as they have. But what we continue to see is that although this may have benefited us, the same dynamic seems to be working against business. Design should be able to help business identify, create, and deliver more value to their customers. We also believe that this view of the world is useful for businesses, for practitioners delivering design services, and for maker/designers, whether they are part of a start-up or simply an entrepreneur with a 3D printer and a network connection to the market.