

Design Strategies for Technology Adoption

by Alonzo Canada, Pete Mortensen and Dev Patnaik

Innovation is one thing; success in the marketplace, quite another. Alonzo Canada, Pete Mortensen, and Dev Patnaik offer a framework in which design becomes the channel for uniting these two realities. Identifying five clusters of users—innovators, early adopters, early majority, late majority, and laggards—and numerous hands-on examples, this trio of authors advocates tailoring designs to the priorities of each group.



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In 1999, Honda introduced the Insight (Figure 1, on page 33), a car promising greater fuel economy than any automobile ever made. Years in the making, the Insight could travel up to 70 miles on a single gallon of gasoline, thanks to a revolutionary gas/electric hybrid engine. Despite the Insight's many innovations, the car was a flop, selling just 13,200 units before Honda pulled the plug in 2006.

The Insight's development team sought to incorporate every possible advance in fuel efficiency into a single car. In the process, they created a vehicle that was far too weird for most mainstream drivers. Honda focused on endorsing the technology as viable, proudly calling the Insight a "real-world product for the global market." But with two seats, an unproven aluminum frame, and a form seemingly borrowed from old Buck Rogers serials, the Insight seemed more like a bleeding-edge prototype than a product that was ready for prime time.

While Honda was working on the Insight, its arch-rival Toyota was developing its own hybrid car, the Prius, capable of 47 miles per gallon. Toyota recognized that the most important problem to solve was not how to maximize fuel efficiency, but rather how to

develop a car that would maintain the comfort of existing compact sedans but have significantly better fuel economy thanks to advanced engine technology. To highlight its improvements in fuel economy, Toyota kept most things the same when it designed the Prius. The vehicle looked virtually indistinguishable from Toyota's existing Echo model, an economy sedan targeted to younger buyers. Most elements in the initial design spoke to reliability and safety, not **advanced** technology. By keeping almost everything else the same, Toyota highlighted the primary benefit of hybrid engine technology—better gas mileage. To help drive that message home, the car manufacturer built in a computer display dashboard that provided continuous feedback about the car's remarkable efficiency. The Prius was a runaway success and would go on to sell more than 400,000 units in its first seven years in the United States alone.

Toyota and Honda were in competition to define a new technology, and Toyota won. On the face of it, technology played a central role in Toyota's success. Yet other factors were equally important in deciding that contest. One of the means through which Toyota succeeded was an effective design strategy. Design strategy is an emerging discipline created to help firms determine what to make and do, both immediately and over the long term. Design strategy is the interplay between design and business strategy, wherein design methods are used to inform business strategy, and strategic planning provides a context for design. While not always required, design strategy often uses social research methods to help ground the results and mitigate the risk of any course of action. The approach has proved useful for companies in a variety of strategic scenarios. As the Prius case shows, one particularly effective application of design strategy has been in helping to ensure the successful management of new technologies.

Many companies struggle with how to best bring new technologies to market. Like Toyota, some of these firms have developed targeted design strategies to drive the widespread adoption of new offerings. By drawing from adoption theory—the study of how new ideas spread to new audiences—these businesses tailor their offerings to meet the different needs people have

at various points in a category's lifecycle. Jump Associates has conducted extensive research into design strategies to drive adoption. We've developed six generic strategies that play best at different points in a technology's diffusion, from endorsing a new technology's viability to drastically economizing already successful technologies. This article will demonstrate how to implement an appropriate design strategy for adoption at a company and also explain the theoretical underpinnings of the practice.

From the cornfields to the concept lab Technology-driven companies, such as consumer electronics manufacturers, have concerned themselves for years with reaching early adopters—a small but influential group of users who are more likely to value new offerings than the rest of the population. Because of the social status of early adopters, other buyers who might not immediately recognize the value of a new product, service, or technology look to these folks to make their purchasing decisions.

As important as early adopters have been to the growth of the consumer electronics industries, adoption theory has relevance for every company. Adoption theory is a well-established



Figure 1. Though introduced within a year of one another and based on similar hybrid engine technologies, the Honda Insight and Toyota Prius could not have fared more differently in the market. The Insight barely sold 13,000 units and is no longer produced, while the Prius has hit 400,000 cars sold and counting. This is largely because Toyota best understood how to meet the needs of early adopters. Insight photo by Michael Pereckas under Creative Commons Attribution license. Prius photo by Keith and Shane Daly under Creative Commons Attribution Share-alike License.

body of research that owes its origins to communications theorist Everett Rogers's seminal work *Diffusion of Innovations*—the pre-eminent text on the subject. In that text, Rogers charts the rise and fall of ideas, technologies, products, and nations while teasing out the insights, psychographics, and principles needed to apply adoption theory to new fields. We'll briefly summarize key points from Rogers before explaining the field's implications for design strategy. Ironically, the roots of adoption theory are decidedly nontechnical. The subject was first created in the cornfields of Iowa during the 1940s.

In 1941, two researchers at the Iowa Cooperative Agricultural Extension, Bryce Ryan and Neal C. Gross, began to study the diffusion of hybrid seed corn. Introduced in 1928, it promised boosts in field productivity by as much as 20 percent. Thirteen years after its introduction, the economic benefits were clear. Still, some growers chose not to plant the hybrid product. Ryan and Gross studied the use of this new product to understand how social factors affected economic decision-making. They interviewed 259 farmers to find out when they first began to use hybrid seed corn and to learn why they had made the switch. For some, the change was immediate. In 1928 a small handful of wealthy, educated farmers who lived close to cities adopted the seed corn at once. By 1933, 10 percent of the studied farmers had implemented the new seed. By 1936, just three years later, 40 percent of the farmers had switched over, driven largely by early adopter farmers who shared the benefits of the new product with the wider community. By the time of the study, almost all the farmers in the region were hybrid seed users. In charting how hybrid seed corn gradually infiltrated this farming community, Ryan and Gross observed a pattern for diffusion, which they called the adoption curve (Figure 2, on page 35J).

Over time, the existence of this pattern has

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been shown across numerous disciplines and industries, always with similar conclusions: The adoption of new ideas follows a standard bell curve, and anyone who engages with a given innovation fits into one of five categories. Each of these groups has unique psychographic characteristics that cause people to be more or less likely to adopt a particular idea at a particular point in time. By understanding the needs of each group on the adoption curve, we can understand how to make an idea more appealing to different types of people.

Innovators

Innovators, comprising 2.5 percent of the population, are risk-takers who have the resources and desire to try new things. Rogers describes innovators as almost obsessively "venturesome," constantly seeking new ideas, often around the globe. Innovators care less about an idea's success or failure than they do about their need to believe that they are engaging with daring and risky new ideas or technologies. Therefore, while innovators are essential to introducing new ideas, their enthusiasm for both good and bad ideas tends to make their opinions irrelevant to most of the rest of the population.

Early adopters

Far more important to the spread of ideas are early adopters, comprising 13.5 percent of the population. More than any other group, early adopters differentiate by their propensity to see an unfamiliar solution and map it to their own situation. Because of this ability, they are often considered "the individuals to check with." Early adopters are concerned with maintaining respect in their social circles. They have a need to be perceived as "in the know" and credible, and therefore make judicious decisions. Simply by adopting a new technology, early adopters often help to reduce their peers' uncertainty about it. A strong foothold with early adopters is often a good sign that a new idea will ultimately be adopted more widely in a system.

Early majority

Contrary to the thinking of countless people creating technology-driven products, the vast majority of the population does not value novelty for its own sake. Instead, most of us care more about the benefit we receive from a new idea or technology. We are relatively slow to try new things. The early majority, making up 34 percent of the population, prefer to take their time in adopting new ideas. They adopt new ideas and technologies only if they see tangible benefits that fit into their lives. Members of the early majority often make decisions to try new things by looking to early adopters for guidance.

Late majority

Though members of the early majority won't adopt a new technology until they understand how it fits into their lives, they don't inherently distrust new ideas. By contrast, the late majority, comprising another 34 percent of the population, is openly skeptical of new ideas; the members of this group adopt in reaction to peer pres-

sure, emerging norms, or economic necessity. Because they tend to have limited economic resources, most of the doubt around an idea must be resolved before they will adopt it.

Members of the late majority may become motivated to embrace a technology or idea once they think they are the only people they know who haven't already tried it.

Laggards

The last people to adopt an innovation are laggards, who value tradition. Laggards often make decisions based on past experience. This is in part a social phenomenon, as laggards are often isolated from other social networks. Much as innovators associate with themselves and a few early adopters, laggards generally stick to their own. They are often economically unable to take risks on new ideas, which further prolongs the time they take to adopt something new. Any lingering uncertainty about an idea must be entirely eliminated before laggards will consider it.

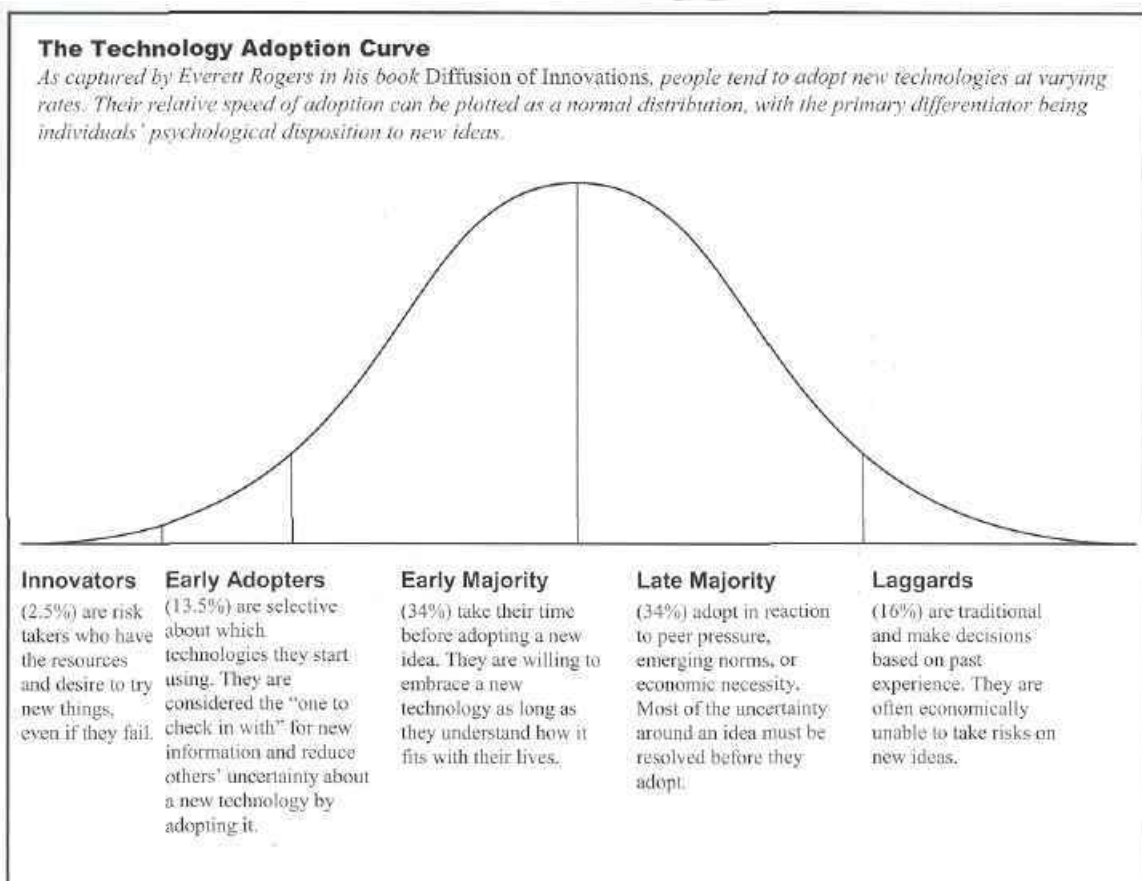


Figure 2. The adoption curve, first defined by Ryan and Gross in 1941, follows a normal distribution for people and time. All new ideas, products, services, and technologies can be viewed as going through an adoption process.

Design strategies to drive adoption

New ideas appeal to various groups on the adoption curve at different times for different reasons. Understanding the needs and values of innovators, early adopters, early majority, late majority, and laggards can help determine a set of design strategies that encourage the diffusion of a new product, service, or technology. Thomas Edison was a natural in this area. By examining how he commercialized electric power and the incandescent light bulb, we can better appreciate how those technologies diffused so rapidly—and why the venture was a long-term success.

The early adoption of electric light

Though popular history points to 1882 as the year the light bulb was invented, the basic technology had existed for almost a century. Prior to 1882, Edison himself ran the Edison Isolated Electric Company, which provided the homes of wealthy innovators with electricity and light from a proprietary on-site generation system. The reason we actually remember 1882 is because it represents the moment when Edison managed to push the unproven ideas of electric power and light along the adoption curve to the early majority (Figure 3).

Edison's initial electric lights were technologically unimpressive, casting 13 watts of light, imperceptibly brighter than the 12-watt gas lamps he sought to replace. And from a design standpoint, the new electric lamps looked almost exactly like those same gas lamps. Yet it's the very ordinariness of Edison's design that ensured its success. The simple design represented a sublime design strategy, one that reflected a decision to curate the technology and thus meet the needs of early adopters. Designing a product that matches the way people already think about a need, and then dramatizing a few key features that distinguish the new from the old, helps get early adopters on board with an idea. Since gas lamps were the dominant solution to the need to light up the inside of a building, Edison designed his electric lights to look and operate almost identically. While the specific solution of a light bulb powered by a centralized power source was unfamiliar to most people, virtually

everyone living in New York in 1882 would have been able to explain the benefits of interior illumination. The technology was new, but the form and function were decades old.

Edison's strategy for rolling out electric light was tailored to fit the way people of the era thought about interior illumination in terms of the design, as well as the function, of his initial light bulbs. It can also be seen in the opportunity for integration he noticed when determining how to wire homes for electric power. Recognizing that many commercial and residential landowners in New York had invested considerable capital in gas infrastructure to light their buildings, Edison chose to run his first electrical wires through existing gas lines, fitting directly into the system people already understood for the delivery of light. This sped adoption and cut infrastructure costs.

Edison also publicly endorsed the technology's possible benefits through the location of his first customers—financial institutions in lower Manhattan. Seeing the windows of the financial district aglow by night dramatized the technology to the metro population living across the

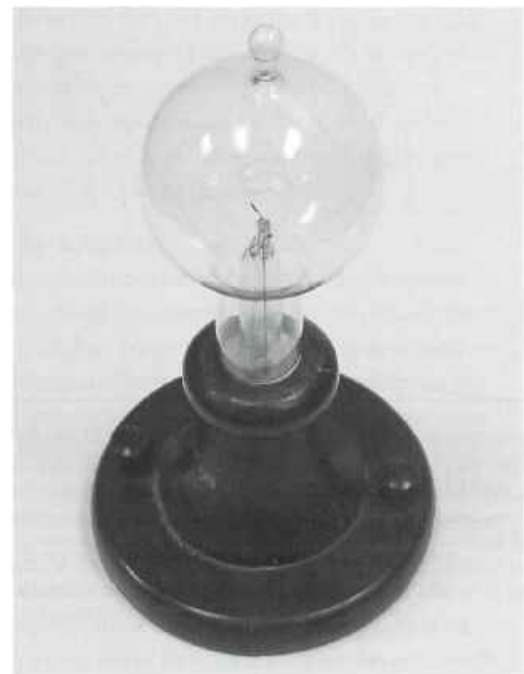


Figure 3. Thomas Edison designed his first commercial light bulb, shown above, to recall the form of existing gas lamps. This led the way in which people thought about the technology and put the focus squarely on the observable benefits of electric light.

Hudson River in New Jersey. Telling his story on the scale of a city skyline, Edison reached a large audience of early adopters, who then shared the idea with their local communities. By making deliberate design choices, Edison curated his radical innovation by designing it to resemble and function like existing offers, integrated the larger solution by leveraging existing infrastructure associated with the need, and endorsed the use of the technology by demonstrating its use in a visible location that had tremendous influence on the rest of the country.

Six strategies for technology adoption

Like Edison, firms interested in commercializing a new idea can use an appropriate design strategy to promote its adoption. Though Edison provides an excellent case study for how to drive a

new idea from early adopters to the early majority, other design strategies can drive further adoption at any phase of a new idea's diffusion (Figure 4). Depending on the situation, a company may choose to:

1. *Endorse*: Explain the benefits and function of a nascent technology to the world.
2. *Curate*: Create icons that are selective in their functionality.
3. *Integrate*: Provide solutions that fit into people's lives.
4. *Economize*: Drastically cut costs of production on already successful technologies.
5. *Play*: Find new ways to add value that don't depend on technical differentiation.
6. *Refresh*: Reinvent existing offerings and renew technical differentiation to reach new markets.

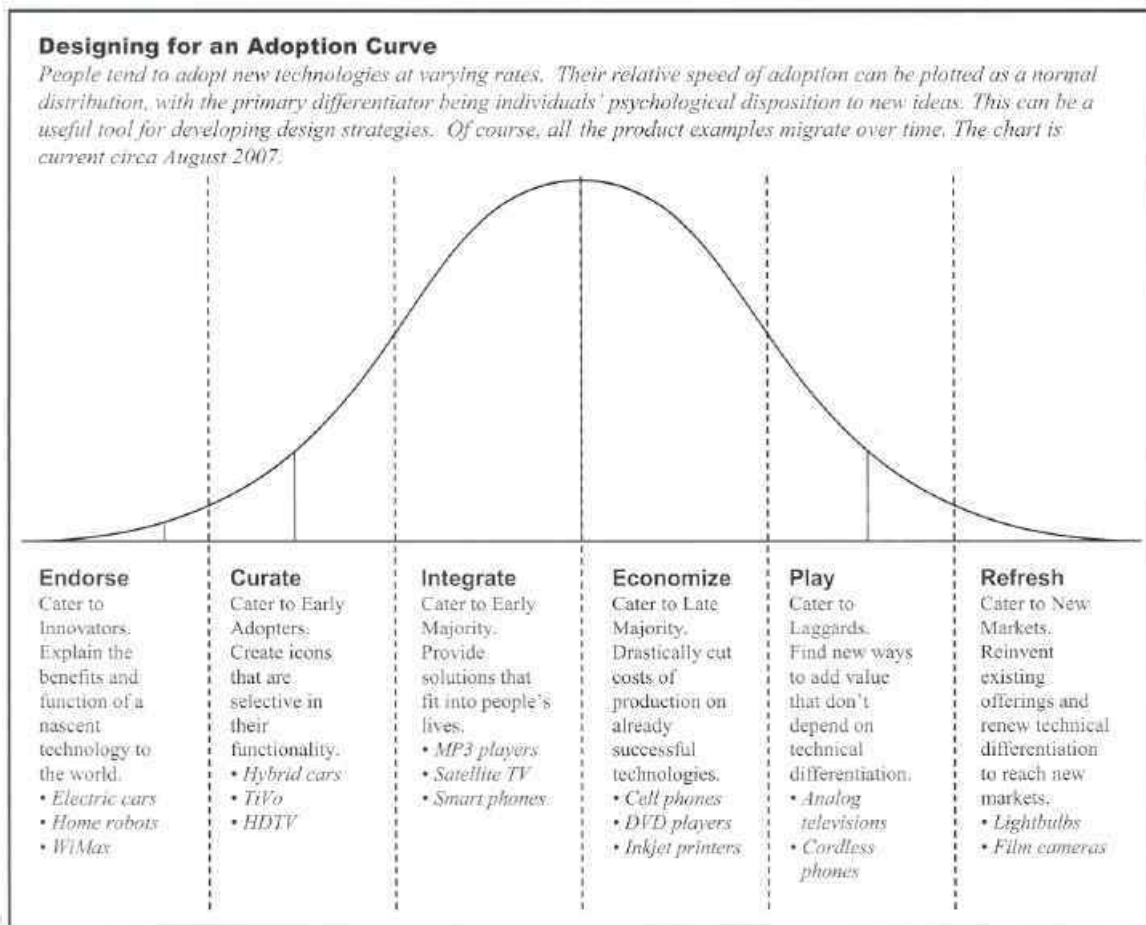


Figure 4. By studying the needs of people at different points along the adoption curve, Jump has developed six generic strategies to drive adoption, each of which targets success in a particular stage of diffusion.

Endorse

When first introducing a new technology to the world, companies often need to appeal to innovators and early adopters. They need to explain the nascent technology's functions and possible benefits to the world, while also proving its viability. At this stage, it's imperative to prove that the new technology is ready for prime time—that it complies with established regulatory standards, for instance. A company might produce an incredible new form of high-speed wireless Internet connectivity, but it will never get beyond the conceptual phase if it has the unfortunate side effect of disabling all cell phones

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within a five-mile radius. Because a new technology may be spotty in its performance, it's critical to design an offering that leverages its strengths and minimizes any potential glitches. That means constraining not just the feature set, but also the settings under which people

can experience those features. Designers seeking to endorse a new technology may find it most useful to choose a physical form that doesn't reference any prior art.

Alexander Graham Bell helped fuel the adoption of the telephone by installing the first commercial models at hotels. He did this for both technical and strategic reasons. From a technical perspective, it's a lot easier to install a hundred phones in one hotel, which all route to a front-desk operator, than to wire a hundred households in a village. Strategically, ensuring that most people's first experience of a phone would occur away from home meant reaching people when they were at their most adventurous.

Vacations represent a great new product adoption opportunity because people view travel as a time to experiment. Most importantly from a strategic standpoint, the phones Bell installed at hotels did only one thing—connect a traveler to a front-desk clerk. Bell chose a performance benchmark that would be easy to hit every time—carrying a voice from a hotel room down

to a front desk. In a few short decades, the telephone leapt from hotel rooms to most homes in the United States. Having proven that the telephone was ready for the world, Bell could then focus on increasing its capabilities and improving its reliability.

Curate

As a new offering begins to reach early adopters, companies can further adoption by selectively highlighting aspects of the new technology that demonstrate specific benefits and use. Curating is often achieved through iconic designs that are desirable because they emphasize easily understood and valuable functions. At this stage, clean and simple designs can often help a product to explain itself, and so it's no surprise that so many unfamiliar technologies have leveraged the formal clarity of Bauhaus Modernism and its intellectual successors.

When MP3 players were first introduced in 1997, the market was tiny, and initial designs either compromised storage space for the sake of portability or bulked up on size to allow more storage space. All of them offered a wide range of functionality, but they also required a power user's level of computer expertise. When it was first launched, the iPod was almost simplistic by comparison. The Apple design team ensured that users could convert music from their CD collections into Apple's iTunes software with relative ease. Whenever the iPod was connected, it would automatically load every song in the library. The physical interface was equally simple—an iconic scroll wheel that made navigation through long lists of songs a snap. Yet for all of its benefits, the first iPod was actually a very limited product. It worked only with Macintosh computers. Its hard drive came in only one size. It lacked features such as an FM tuner. Still, the product was iconic. It leveraged a simple geometric form. Rather than release a family of iPods at first, Apple released the one iPod—one model, one color, one size. The company wanted to send a clear message—it had nailed the formula for digital audio players. Designing for early adopters and the mainstream is a lot like being the curator of a museum. You need to select your pieces, have a clear point of view, and guide visitors through the experience.

Integrate

Unlike early adopters, mainstream users are often unable or unwilling to make the compromises needed to work with a new solution. Companies should therefore look for ways to integrate a technology into people's habits and routines as a product reaches the early majority. Products need to work the way people already work. They need to adapt, connect, or respond to other solutions around them. When appealing to the mainstream, making a product stand out is often less important than "how it will look in the living room." An integrating strategy can help a company take a new technology from novel niche to household name.

In the 1990s, Kodak found new ways to integrate disposable film cameras into the mature photography market. Although Fuji had established itself early on as the market leader, Kodak found a way to take back ground quickly. Rather than enter into a suicidal price war, Kodak realized it could create different kinds of premium disposable cameras by tailoring models to the activities in people's lives. The company developed a model for underwater use at the beach. It sold a wide-angle-lens version at the Grand Canyon. It started to package multiple cameras together for use at weddings. By contextualizing their use, Kodak's designers were able to integrate disposable cameras into the lives of ordinary people, many of whom already owned a traditional camera. Kodak was able to reclaim market leadership and drive the adoption of the technology. Firms sometimes find a single solution insufficient when following an integrating strategy. Often, accessories and ancillary products are needed to respond to a particular application. Flexible platforms may be required to support customization for multiple applications, customer targets, and channels. The ability to integrate a new technology into people's lives often serves the dual purpose of driving sales volumes while keeping margins high.

Economize

Once an offering achieves widespread adoption, companies can spur further market penetration by appealing to the late majority with cost-cutting and commoditizing strategies. Since the late majority often finds itself trying out a new offering solely out of peer pressure, it may be neces-

sary to create more economical solutions that reduce barriers to adoption. An economize strategy often suits a company in a mature category where the value of a technology is generally accepted.

IKEA has built its global brand on a strategy of designing to economize. The company's furniture is stylish, attractive, and almost inevitably derivative of a classic design. Their Karlstad Swivel chair, for example, looks like a slimmed-down (some would say dumbed-down) version of Arne Jacobsen's Egg Chair. But while Jacobsen's original was designed as an artistic, crafted object and continues to sell for more than \$3,000, the Karlstad was designed for manufacturability and retails for less than \$500. At \$500, there's not much Egg left in the Karlstad. This is what IKEA excels at. Its designers study great, high-end furniture designs, shrewdly identify which features people value most, and then find ways to manufacture and deliver the new version for a fraction of the original's cost. In the case of the Egg and the Karlstad, both chairs have high backs, a swivel base, and a comfortable foam frame. And while the Egg also has an innovative form and a wrap-around seat back, the Karlstad offers nothing else. While one can assume the quality of IKEA's swivel stand may not match Jacobsen's, it's equally likely that the Karlstad feels just as good to sit in. And that's the secret of designing to economize—not cutting corners arbitrarily, but analyzing successful high-end solutions in a market and figuring out which corners could be cut to create a true low-cost alternative.

Play

To drive adoption of a new technology beyond the mainstream, companies must find ways to appeal to laggards. This involves finding ways to create value that don't depend on technical differentiation. Often, the inherent familiarity of a widely adopted product can give designers an opportunity to do something different. Indeed,

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many designers thrive on bringing inventive forms to established categories, and making the familiar unfamiliar. In recent years, Italian design has made a name for itself through such play strategies.

In the 1970s, the Swiss watch-making industry, world-renowned for its precision and quality, was in crisis. Leveraging low-cost quartz technology, Asian manufacturers had begun to match the Swiss in technical precision for a fraction of the price. Swiss market leader SMH responded by changing the game. The near ubiquity of wristwatches meant that consumers were ready for a little bit of play. The launch of the Swatch brand in 1983 was marked by artsy, cheeky, and irreverent watch designs. Swatch played with watches by positioning them as

fashion accessories, not finely tuned timepieces. Over time, Swatch has continued to create new watch styles, soliciting well-known artists like Keith Haring to create whimsical designs that emphasize trend and fashion. An implicit message of the entire product line is that consumers should collect multiple watches to wear on differ-

ent occasions. The strategy was so successful that SMH went on to rename itself the Swatch Group, and the company is now the world watch leader in both revenue and market share.

Refresh

Once a technology has reached near-universal adoption, it's incumbent upon existing players and new entrants to reinvent the category. This can mean finding ways to refresh an obsolete technology, often by identifying a novel use for it.

By the early 1990s, digital compact discs effectively replaced vinyl albums as the dominant medium for recorded music. While most people were happy to have pop- and hiss-free CDs, a small but significant audience never stopped using records. Unlike the rest of us, hip-hop and electronic music DJs still use turntables. Since DJs use record players to mix, cut up, and

loop existing music tracks into new songs, they have requirements that are very different from those of the mainstream consumers who used to purchase phonographs. Responding to this shift in the market, companies such as Technics have designed turntables to better handle reverse spins, audio fades, and variable speeds. Needles designed for DJs are both more durable and more precise than their mainstream predecessors. These professional models fundamentally work in the same way as every phonograph ever made, but they can handle far greater strain and make it easier for a DJ to be an artist in his or her own right. By identifying a novel use for an obsolete technology, a handful of companies have enjoyed considerable success catering to a refreshed category.

The strategies in practice

Multiple companies in the same market can succeed by leveraging the same technologies at different points in their diffusion. The three top American computer brands, for example, follow drastically different strategies. Apple is the quintessential curate company—for decades, its entire business model has been based on taking nascent technologies and wrapping them in iconic and easy-to-understand packages. Apple tends to do less well, however, when a technology reaches the integration stage, in large part because it involves compromises the company is unwilling to make. HP, by comparison, excels at designing to integrate. The company seeks to create ecosystems of offerings that have greater capabilities than any one component. There are many homes in which families connect their HP cameras to their HP computers that are connected to an HP printer that uses HP ink cartridges to deliver photo-quality prints on HP-branded paper. However, because of a commitment to these larger systems of products, HP's offerings are rarely the cheapest on the market. Dell Computer, on the other hand, has succeeded through economizing. Dell has found ways to drive the cost out of established technologies and replicate the look and feel of competitors. The company's competence in economizing a category has nonetheless failed to help it introduce new ideas or command sustainable price premiums.

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Each of these companies plays to its strengths by following a strategy best suited to its abilities—and each has a strategic goal to keep the product categories it operates in stuck at the point on the adoption curve where it succeeds most often. Apple constantly looks for new technologies that it can curate. HP looks for opportunities to integrate disparate solutions into a seamless whole. And Dell looks for new ways to economize already successful technologies. Each has a distinct vision for the technology industry and pursues it accordingly, and each has performed best when focusing on doing things its own way. As long as the bulk of a product category remains in these companies' sweet spots, these players continue to prosper.

Conclusion

Companies continually grapple with how to develop effective design strategies that will minimize the inherent risks involved with launching new products, services, and businesses. Understanding diffusion theory helps to frame the introduction of new offerings as an issue of adoption. This in itself is useful in determining where a new offering might be in its adoption cycle. Applying adoption theory to a firm's design strategy can empower managers to focus design activities on those goals likely to yield the quickest results. Rather than give up introducing new technologies to the market or relying on random luck for success in such endeavors, design managers can craft strategies that play to their strengths, minimize risk, drive adoption, and ultimately fulfill their companies' larger growth objectives. ■

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