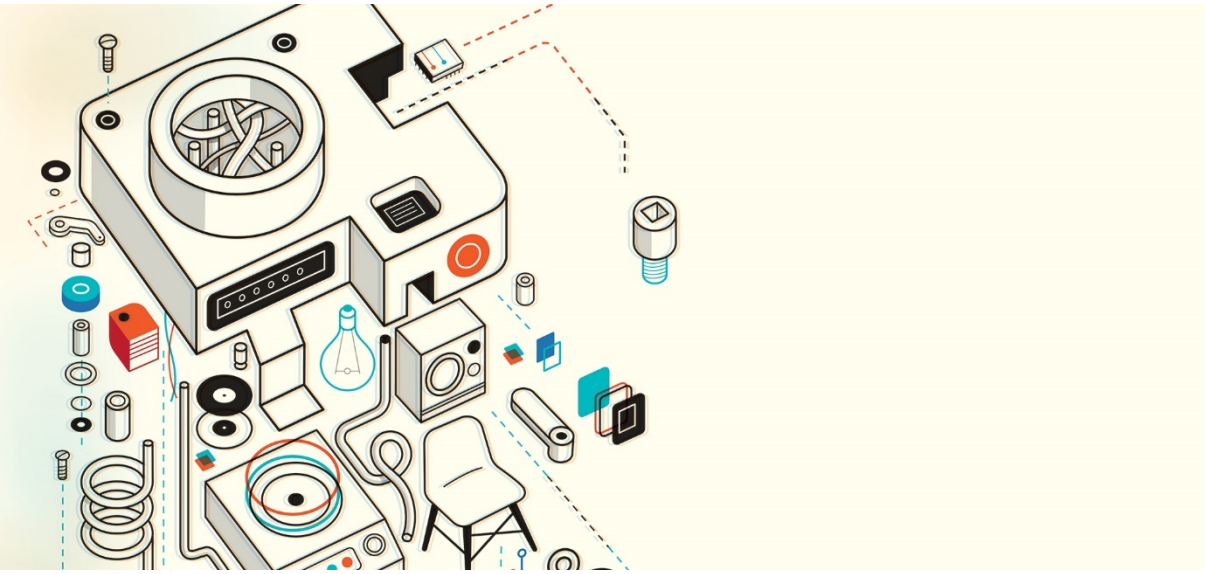


The Prius Approach

by Nathan Furr and Daniel Snow

Thomas Edison's lightbulb ushered out the gaslight era as completely as it ushered in the age of electric power. But the gas companies didn't fall victim to disruption immediately, and it could be argued they never entirely succumbed.

When Edison's invention first threatened gas lighting, incumbent firms borrowed the filament technology from the electric bulb to improve the efficiency of their gas lighting fivefold, starving Edison's new company of profits for 12 years and nearly bankrupting him. Experts in disruptive innovation point to that kind of move to bolster a doomed technology as the last gasp of a dying industry, and of course they're right: Edison and electric lighting prevailed in the end. But by the time the disruption was complete, gas companies, having bought themselves more than a decade of breathing room with their gas-powered lightbulb, had prepared a profitable exit into the adjacent heating business.

Responding to disruptive innovation may be one of the greatest challenges managers in established firms face. On the one hand, they've been warned that disruption can sneak up and quickly destroy their business. On the other hand, experience tells them that disruptions can take years, sometimes decades, to play out. And sometimes those that threaten—flying cars and robot maids, for example—never occur at all. Research shows that as many companies move too early to adopt disruptive technologies as move too late. Both approaches waste resources, squandering competitive advantage and critical growth opportunities. So how can leaders manage the uncertain transition period from one technology, service, or business model to a newer, sometimes disruptive one?

About the Research

Our research into hybrids, which is ongoing, includes a quantitative, longitudinal study of the automobile industry during the emergence of electronic fuel injection technology, specifically the manufacture of all carburetors and EFI products during this period. Our qualitative

research consists of mini case studies of 20 hybrids in 20 industries and a factor analysis, currently under way, of more than 300 hybrids in 75 industries.

In our research, we discovered that intergenerational hybrids are an effective but largely overlooked tool that managers can use to handle this difficult transition. Hybrids combine elements from a potentially disruptive technology with the current technology to create a new product, service, or business model that sits between competing innovation generations. Contemporary examples include hybrid electric vehicles, which combine elements from both internal combustion and electric engines (like the Toyota Prius), and hybrid cloud-computing architectures, which combine cloud and local computing (MS Office 365).

In examining companies that have successfully used hybrids to respond to disruptors, we've identified seven types of hybrids, each suited to a different strategic purpose. All of them can be used to help incumbents learn about the technical aspects of disruptive innovations and which customers those innovations might best serve—or perhaps never serve. (In this article, we use the term "disruptive" to describe any major, game-changing innovation.) Many hybrids can also be used to shape the development of an innovation or its adoption prospects in the market. While in the vast majority of cases a hybrid's purpose will be to buy time for the company to adjust to the new landscape, hybrids can occasionally be used as effective sustainable defenses to stave off disruption entirely. In the pages that follow we present a framework that managers of companies facing disruption can use to determine which hybrid to use when and how to avoid the pitfalls that trip up the unwary.

Since timing is everything when it comes to surviving disruption, we've divided the seven hybrid types into three broad categories, according to the immediacy of the threat of disruption. Generally, the more mature the disruption, the likelier it is that an incumbent will employ hybrids to shape how the innovation develops; the newer and more uncertain the disruption, the likelier it is that an incumbent will employ a hybrid primarily as a learning tool. To manage a hybrid effectively, you have to know why you're using it.

When the Disruption Is Already Well Under Way

When you're in the midst of disruption, you already understand the nature of the threat: The damage has begun, and customers have started to defect. As an incumbent, your goal is to extend the life of your current business and buy time to make competitive adjustments. You may also be seeking to retain defensible customer segments. Three types of hybrids may help with those goals.

Blocking hybrids.

Companies can temporarily raise the barriers to entry for a threatening technology by offering customers an appealing price/performance trade-off, as gas companies did with their hybrid lightbulb. Hard disk drive (HDD) manufacturers also used this approach when solid-state drives (SSDs) started to invade the market. At the time, solid-state drives were 3.5 times faster than hard disks—but 850% more expensive. So incumbent firms created hybrids that employed standard hard drives for general storage and solid-state ones for frequently accessed files. Although not as fast as SSDs (they were 2.5 times faster than hard disks), they were only 50% more expensive. That trade-off has been so attractive that many purchasers reversed course and have switched back from SSDs to hybrid hard drives.

While hybrid versions may not hold the SSD drives at bay forever, they have clearly delayed the disruption, allowing incumbent manufacturers more time to extract value from their existing assets, learn about SSD technologies, and prepare to make the leap to an all-SSD future.

It's important to remember that blocking hybrids are temporary and best used when the probability of disruption to your business is high, when the capabilities needed for production and the customers likely to buy the hybrid are similar to those in the existing industry, and—most important—when the hybrid offers significantly improved performance over the old technology.

Bottleneck hybrids.

In some cases, the march of a major innovation toward the mainstream depends on complementary technology. Adoption of electric cars, for example, depends on long-lasting, high-capacity batteries and the proliferation of charging stations. A disruptor can use a hybrid to get around the lack of such complements. The Chevy Volt, for example, is billed as an electric car, but it has a small gas engine to make up for the limited number of charging stations available to date.

However, two can play at that game. An incumbent can use a complementary technology to build a hybrid that temporarily extends the life of an old technology. For example, at the beginning of the digital camera disruption, it was easy to take a digital picture but much harder to turn digital files into physical prints. Kodak adapted its photo printer systems in an attempt to extend its "razor blade" business model by shifting from selling film to selling ink and paper.

Hybrids can be used to adjust to disruption or to stave it off entirely.

Bottleneck hybrids are stopgap substitutes for critical missing complementary technologies in an ongoing disruption. As such, they create value only for as long as the ecosystem bottleneck lasts. Kodak, for instance, gained only a few years before digital printing services became popular.

End-state hybrids.

While many disruptive innovations eventually take over an entire market, others will never be good enough to satisfy high-end or specialized customers. This leaves the door open for hybrids that combine features of the old and new technologies to create a permanent new product category. For example, the limited capabilities of most early digital cameras did not satisfy the high performance needs of many customers. Consequently, incumbents were able to take advantage of the stack of analog components—sensors, light meters, and light-gathering lenses—to create hybrid digital SLR cameras, which have become a major, permanent category, still dominated by incumbents such as Canon and Nikon.

End-state hybrids are most appropriate when the disruptive technology leaves an important performance dimension unsatisfied for a significant group of customers. If the hybrid employs a component that has value to customers and for which there is no substitute, it is very likely to become a permanent, profitable business.

When Disruption Has Just Begun

When a disruption is in its early stages, its direction and the extent of its impact are not yet clear. At this point, incumbents should focus less on buying time to make adjustments and more on building their knowledge. Bridging or niche hybrids can help them learn not just about the technology but also about customers' willingness to adopt the innovation, the distribution mechanisms needed to reach interested customers, and how to serve customers who might never adopt it.

Bridging hybrids.

Incumbents launch this type of hybrid to learn about a new technology they intend to employ themselves. The Toyota Prius, for instance, is a bridging hybrid that is helping Toyota navigate a long period of uncertainty about electric vehicles. Toyota has used the Prius to develop in-house electric technology and build a customer base that is primed to make the switch once electric engine technologies replace combustion engine technologies in the mainstream auto market. (If electric vehicles never fully come into their own, then the Prius will in fact be an end-state hybrid.) As an additional benefit, bridging hybrids also often allow incumbents to shape customer perceptions of the new technology, often in their favor, much the way Toyota has shaped perceptions of electric vehicles as reliable, fuel-efficient alternatives to combustion engine cars.

When bridging hybrids require capabilities or business models new to the incumbent, they may need to be protected in a separate business unit to avoid the well-known distortions created when new technologies compete for resources with an existing business model.

Niche hybrids.

Leaders may choose to respond to long, uncertain periods of disruption by serving groups of customers whose needs are not yet met by the disruptive technology. If bridging is a way to forge a path for companies to move from the old to the new technology, niche hybrids form a path for customers to move from the old offerings to the new ones.

For example, while cloud computing has proved to be a significant disruption to enterprise computing, many companies are not comfortable with the security of the cloud. Hybrid cloud services, which combine some cloud services with local computing hardware to handle sensitive data, have become a major and enduring niche and are likely to remain so until security concerns are fully addressed.

In a similar way, the immensely successful Microsoft Surface is a hybrid tablet/PC that satisfies the needs of customers who like the small size, weight, and convenience of a tablet but require the software functionality of a personal computer.

Niche hybrids are most appropriate when neither the old nor the new technology fully meets the needs of a significant group of customers—but a combination of the two could. Niche hybrids may become end-state hybrids if they employ a technology that will not be used, or satisfy a group of customers that will remain unserved, when the innovation becomes mainstream.

When Disruption Is Still a Long Way Off

When disruptions are deeply uncertain, exploratory or optimizing hybrids are most appropriate. Companies use these hybrids to gain knowledge at a point when new technologies may combine in unforeseen ways to produce disruptive innovations—or may fizzle out—and when it's far too early to place substantial bets on any particular possible outcome.

Choosing the Right Hybrid

If disruption is under way, the challenge is to shape your company's position to that context. If it is further off, the goal is to learn about the new technology.

HYBRID TYPE	STRATEGIC PURPOSE	EXAMPLE
BLOCKING	**Temporarily block entry of new technology into key niches**	**Gas lighting with filament (between gaslights and electric lightbulbs)**
BOTTLENECK	**Overcome a key bottleneck in complementary technologies that limits adoption**	**Kodak's digital photo printers (when it was easy to take a digital photo but hard to turn the file into a print)**
END-STATE	**Create a new product category that endures beyond the disruption**	**Digital SLR cameras (with more sophisticated lenses than ordinary digital cameras)**
BRIDGING	**Learn about the threatening technology with intent to eventually adapt to disruption**	**Prius automobile (between gas and electric)**
NICHE	**Satisfy a customer group whose needs are not met by existing or disruptive technology**	**Microsoft Surface (combines a tablet's convenience with the sophisticated software of a PC)**
EXPLORATORY	**Explore alternatives among competing technologies to understand viability**	**Fotosetter (replaced slugs of a traditional typesetter with a camera)**
OPTIMIZING	**Significantly improve existing offerings by introducing elements of emerging technology**	**HIT solar cell (between conventional silicon technology and "thin film" alternatives)**

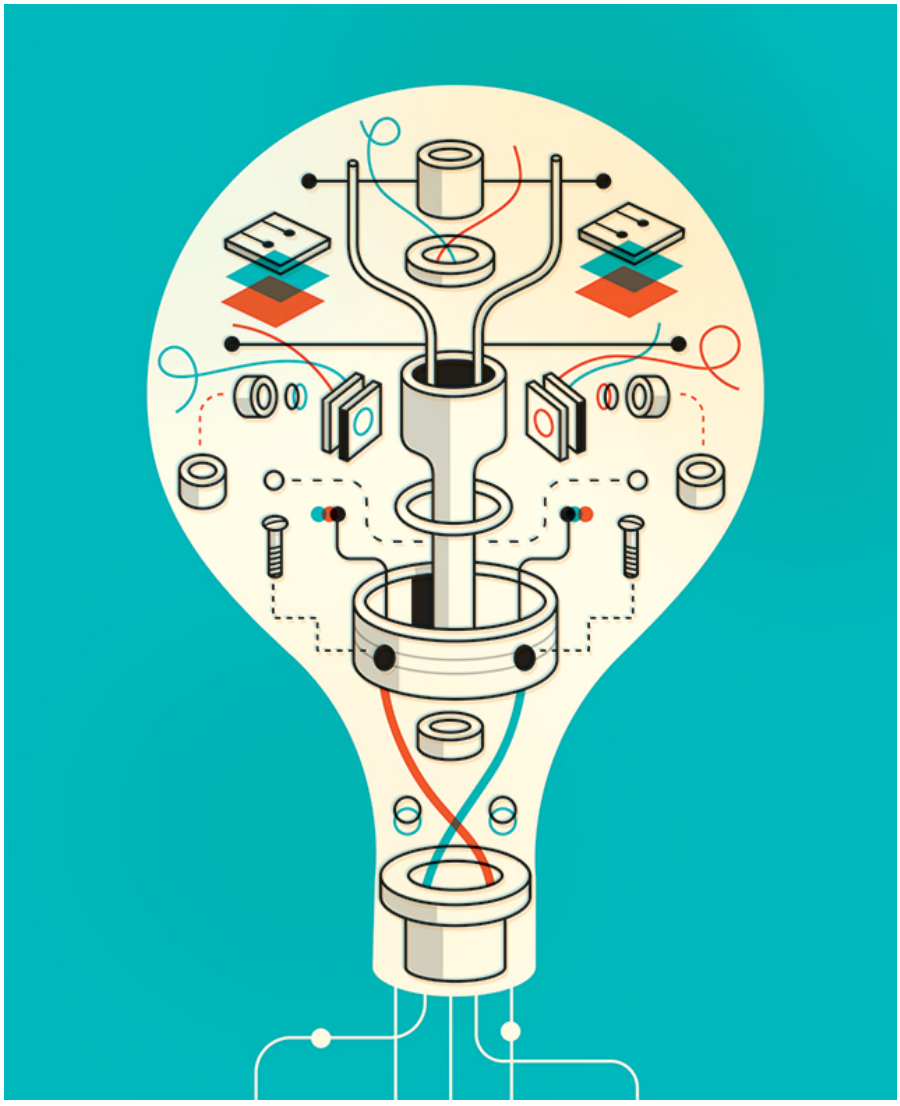
Exploratory hybrids.

These hybrids are used as probes to understand a new technology, often when there are competing alternatives. They are meant to explore the future, rather than to form a bridge to it—to develop a working knowledge of how a technology operates and of how customers might respond—although as the course of a disruption becomes clearer, they may eventually evolve into bridging hybrids. In the printing industry, for example, when analog phototypesetting initially emerged as a radical alternative to "hot type" (whereby lines of type were cast as "slugs" of molten lead, covered in ink, and pressed onto paper), the new optical technology offered dramatic improvements. But at first it wasn't clear how receptive

customers would be to the lower-quality technology, which was not yet able to provide a range of fonts or to space out the words and letters at anything near professional quality. Before committing one way or the other, many hot-metal typesetters produced hybrid hot metal/photo machines, such as Intertype's Fotosetter, which worked essentially the same way as a traditional typesetting machine except that the metal slugs were replaced by a camera that photographed each row of characters separately. As clumsy as it appears in retrospect, the hybrid, invented in 1947, allowed the incumbents to learn about the new technology while extending the dominance of hot-metal typesetting for another 25 years.

Optimizing hybrids.

These are frequently used when it's too early to tell whether a disruptive innovation will catch on, but some element of the new technology can be combined to significantly improve the old technology. For example, in solar energy, the dominance of crystalline silicon-based technologies has long been threatened by competing alternatives, particularly amorphous silicon, which converts a lower ratio of sunlight to electricity than crystalline silicon does but at a significantly lower cost (because it uses an ultrathin layer of semiconductor material rather than the thicker, expensive crystalline cells).



While the debate about whether the “thin film” alternatives would disrupt the industry played out, some manufacturers combined the best of both technologies into a hybrid cell consisting of a silicon wafer with a thin layer of amorphous silicon that converted a much higher percentage of light than crystalline silicon alone.

Optimizing hybrids work best not only when the threat of disruption is far off but when emerging technologies can be combined with existing ones and the hybrid is targeted at the existing customer base.

Implementing a Hybrid Strategy

On the face of it, matching up the right hybrid to your company’s particular competitive situation seems relatively straightforward, but a good deal of judgment is required. Here’s a four-step process for implementing a hybrid strategy.

Step 1. Identify the type of hybrid you need.

To determine which type of hybrid is appropriate to your situation, first assess how near or far the threat of disruption is to your business and then map out your strategic goals for launching the hybrid. Is it intended to help you learn about a new technology or develop new capabilities? To gauge customers’ willingness to adopt a potentially disruptive innovation? Is its purpose to shape the future of your industry or market, and if so, how? Is it meant to bring existing customers along the path toward acceptance of the innovation? To create new demand among new customers? To preserve profits for a time? To create and lock in an ecosystem? Answering these questions will help you match the type of hybrid to your situation and strategic goals.

The biggest mistake companies make at this stage is underestimating how imminent the disruptive threat is. As a result, we’ve found, they develop long-range bridging or exploratory hybrids rather than either shifting to the disruptive innovation itself or creating a blocking hybrid to buy more time to consider an alternate path. While it is also true that even exploratory hybrids generate learning that has value, moving too late often squanders opportunities or cedes competitive advantage.

Step 2. Analyze your capabilities.

Next, determine what capabilities you need to produce the hybrid. Of those you don’t currently possess, identify which are critical to the hybrid’s value and thus should be developed in-house and which can be acquired externally.

Consider, for example, the challenges involved in developing the digital SLR camera. The incumbent camera makers possessed many of the necessary capabilities (camera design, optics, distribution) and were missing some others, notably the SLR optics technology and the digital sensor technology. But how critical was each? Maybe digital sensors would become commodity items sold by many competitors while quality optics retained their unique value—or maybe the opposite would be true. In making the call about which to develop in-

house, incumbents also needed to recognize the importance of integration. If they went outside to get components, they needed to be able to absorb them into a hybrid.

As you assess your production capabilities, you also need to determine whether you can bring the hybrid to market through existing business operations or whether a new business model is required. Hybrids that leverage existing capabilities and fit into existing business models may be easier politically and operationally to develop, but strategic goals may be better served by developing new capabilities and business models. For example, another of Kodak's hybrids, the APS, which encoded digital information into film, was enthusiastically accepted by fellow film manufacturers Fuji, Agfa, and Konica because it preserved something close to their existing film-based business model. However, while the hybrid extended the life of the old business a short while, it did little to help those firms learn about the digital-imaging future they knew they'd have to confront.

Step 3. Allocate resources.

The appropriate allocation of resources depends on your situation: If developing the hybrid will require additional technological capabilities, you'll need to increase R&D investment; if you're targeting new customers, you'll need to boost marketing funding; a new business model will require investment in a new sales force and distribution channels.

Companies can go astray by authorizing a hybrid but failing to provide the necessary resources. This can be not just unfortunate but tragic. Our research shows that half-hearted investments in hybrids can lead to false negatives about impending technological threats or untapped market potential. Companies leave themselves similarly vulnerable when they slap together a hybrid but don't invest in the critical capabilities needed to develop high performance.

Organizing for Hybrids

A company's existing capabilities can be both an asset and a liability when developing a hybrid. If an initiative is anchored too deeply in the existing organization, chances are that development efforts will be commandeered to protect the status quo rather than employed to adapt to a disruption. At the same time, cordoning off the initiative from the rest of the company also closes it off from a rich store of experience and knowledge. The best way to produce a hybrid is to use a hybrid organizational approach.

Start by analyzing the need for "tethers." Ask yourself, How might different parts of the hybrid organization benefit from being tethered—or untethered—to established functions in the company?

For example, in developing the Volt, Chevy's hybrid unit was closely tethered to the body design and aerodynamics groups, because they had skills and technology that were applicable to both hybrids and conventional vehicles. However, the carmaker chose to untether the Volt from the drivetrain group, to allow new capabilities and innovative ideas to flourish. If at some point the Volt were to require a new business model, the hybrid unit should also be untethered from sales or finance.

For example, in the transition between carburetors and electronic fuel injection, many incumbent automakers produced a hybrid that incorporated electronic fuel feedback system

(FFS) controls. This was a critical component that they did not already possess. Not accurately recognizing its importance, several companies chose to purchase FFS controls and graft them onto their carburetors rather than developing the technology in-house. This short-sighted decision, in combination with the production of a lower-performing hybrid, led many of these firms to stumble in making the transition to EFI. In fact, our empirical study of the automobile industry shows that the incumbents that developed higher-performing hybrids (relative to other hybrids) not only survived the transition but outperformed their competitors after the disruption.

Step 4. Map the product life cycle.

In the fourth step, it's essential to carefully map out the life cycle of the hybrid. Is it meant to be permanent or temporary? If temporary (as is most often the case), what business or new offering does your company eventually need to shift to in order to stay competitive, and in what time frame?

The key challenge here is to recognize that the vast majority of hybrids will be stopgaps of some sort. This may be easy to understand intellectually, but we've found that companies can get as attached to hybrids as they are to their original offerings. Since it's often easier for an organization politically to accept a hybrid than to move to a disruptive innovation that destroys the existing business model, the temptation to consider only permanent alternatives is very high.

We've observed that this dynamic takes two forms. First, companies get so attached to temporary hybrids that they fail to use them as a stepping stone to adoption of the new technology. Second, companies choose to develop end-state or niche hybrids as a sustainable, permanent business, even though the market it serves is too small to make up the business lost to disruption. Rather than using the hybrid to buy time for a graceful adjustment to changing market conditions, firms embark on a doomed attempt to preserve the margins of their current business model. This flight upmarket to an unsustainably small niche is the classic mistake incumbents make in the face of disruptive threats.

A different problem arises with hybrids whose purpose is primarily to enable learning (optimizing and exploratory hybrids, as well as most bridging hybrids). It's important that these hybrids be treated as experiments and not permanent new businesses.

Ultimately, our research shows that firms that try to learn about and embrace the future do better than those that try to preserve the old business model. They get the most strategic value from their hybrid efforts in the present and are well-positioned to transition successfully to the next generation.

Incumbents might revel in stories like the cautionary tale of upstart MIPS Computer Systems, which came to market in 1984 with a revolutionary new microprocessor that used something called "reduced instruction-set computing," or RISC. A classic disruptive innovation, it was both simpler and less costly than the prevailing CISC (or complex instruction set computing) microprocessing chips made by market leader Intel. As MIPS and Sun Microsystems gathered momentum with RISC, industry pundits began to talk about imminent disruption. But rather than ignore the threat or concede the market, Intel responded in 1995 with the Pentium P6, which was essentially a CISC–RISC end-state hybrid that combined the best attributes of both technologies. Most chips in computers today are made this way.

Two points stand out about this story. The first is the timing: The gap between the introduction of the disruptive RISC technology and the success of the hybrid defense was a full nine years. While some disruptions are certainly swift and complete, many more play out over years or even decades, giving strategists, product developers, and executives time to plan a considered response.

Second, this Goliath-over-disruptive-David story is dramatic partly because it is so rare. Most hybrids will not become major new product categories. That is not their purpose. At their core, hybrids are temporary tools that offer an alternative to the binary yes/no decision to bet the farm on a disruption and help you to bridge the long, uncertain span of a discontinuity. Used well, our research suggests, they can be good sources of profit and stepping stones to survive and prosper in the next generation.

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