Keep Calm and Manage Disruption

Just whisper the word "disruption" if you want to scare the life out of many business leaders. But contrary to some claims, disruption can be averted, and many businesses find ways of managing through it.

One strategy for dealing with a potentially disruptive competitor is to acquire it.

If you want to capture the attention of a business leader, say the word "disruption." At least, that was the reaction of Andy Grove, then the CEO of Intel Corp., when he first heard the disruption theory espoused by Harvard Business School professor Clayton M. Christensen.[1] Christensen argued that even when a company does everything right — for example, focuses on its customers — it remains vulnerable to competition from unexpected sources. Christensen had seen a pattern of market leaders being upended by entrants in the hard disk drive and steel industries, among others. Grove called Christensen's message "scary,"[2] and indeed, over the past 20 years, Christensen's observations have led to widespread fear and paranoia. In the minds of many executives, disruption is just around the corner, and the fear is palpable.

Seeing that fear has led some researchers[3] to question whether such emotion is justified. Using the examples of disruption that Christensen cited or anticipated, academics such as historian Jill Lepore, writing in *The New Yorker*, and Andrew A. King and Baljir Baatartogtokh, writing in *MIT Sloan Management Review*, have attempted to test the facts against the theory by looking at questions such as whether the claimed disruptions actually ended up causing businesses in their path to fail.[4] Although both analyses were more nuanced than determining that simple relationship, the researchers found that the claimed link between a disruptive innovation and significant trouble for established companies often did not hold up. This led them to conclude that the theory did not have a solid basis and that managers

could place less weight on such concerns.

However, just because the hypothesized link between disruptive technologies and the failure of a company is weak does not necessarily mean disruption cannot happen. Instead, my contention here is that two decades of managerial scholarship has revealed a set of reasons why that link might not be present strongly in the data. Specifically, contrary to some claims, disruption can be averted. Indeed, although disruption can happen, many businesses find ways of managing through it, and this can weaken any relationship between a disruptive event and the actual disruption. To be sure, facing disruption is no picnic. But it also isn't the existential threat that so many see it as.

Disruption in Perspective

One of the issues that immediately arises in discussing disruption is that the word "disruption" itself is overused. These days, everyone wants to be the disrupter, and somebody is constantly getting disrupted. Thus, before exploring how companies can manage their way around disruption, we should specify what the term really means.

The phenomenon of disruption is something that management theorists and scholars have pondered for decades. Ever since the economist Joseph Schumpeter tantalized us with the notion of "creative destruction" — that progress in innovation necessarily requires shedding the shackles of the past — we have wondered about the mechanics of the process. For although it is not a surprise when incompetent or complacent businesses go under (in fact, it can even be comforting), what draws our attention is the notion that companies *doing everything right* might also be caught in destruction's path.

Christensen's theory is the most recent instantiation of this idea. Although the overuse of the term "disruption" can be traced to how he used it in his popular 1997 book *The Innovator's Dilemma*, his interest was in understanding the failure of successful companies; indeed, the book's subtitle is *When New Technologies Cause Great Firms to Fail*.[5] For that is what disruption is: It arises when successful businesses fail precisely because, in the face of technological change, they continue to make the choices that made them successful in the first place.

Christensen identified a specific pathway by which such failure could arise. He argued that there was a problematic type of innovation — specifically, innovations that initially perform worse on some dimensions but rapidly improve along many dimensions. When such disruptive innovations emerge, successful companies that have paid careful attention to their customers' needs and continue to do so are vulnerable to competition from those that adopt the innovations. Moreover, this is not just an unconscious blind spot. Successful companies make conscious decisions to deemphasize or seemingly ignore those innovations until it is too late. They are stuck in an unenviable dilemma that prevents them from moving toward the new for fear of losing too much of the old.

The question here, however, is whether companies, when facing such disruption, can step back and

counter those effects. Here I will show that businesses have countered potential disruption through effective reactive management, often by investing aggressively in that new innovation after entrants had brought it to market or by acquiring the entrants.

The Risk of Disruption

Before considering ways of combating disruption, it is important to examine in more detail why, absent such management, disruption can lead to failure, or specifically why what otherwise might be considered competent or even excellent management can lead companies astray. It all starts with a particular type of technology or innovation that emerges in the marketplace. This *disruptive technology*, as Christensen referred to it, has two characteristics. First, it tends to underperform the established company's products in its ability to serve mainstream customer needs, although it may be attractive to a segment of customers that is underserved by established companies, thus providing a market opening. Second, the disruptive technology's products can grow into a threat by improving rapidly along dimensions that mainstream customers do care about. The threat to the established company becomes real as entrants attract its marginal customers. As entrants' offerings improve, the competition becomes more intense and, Christensen predicts, may leave incumbents unable to respond effectively until it is too late.

The computer industry's transition from minicomputers to personal computers in the 1980s offers a good illustration of how this occurs. During that period, large and medium-size enterprises favored minicomputers, but personal computers were starting to become a potentially lucrative market segment among households and smaller enterprises. At the time, Control Data was the largest independent supplier of 14-inch and 8-inch disk drives for minicomputers. When 5.25-inch drives first emerged as a viable option, minicomputer makers didn't want to make trade-offs for the sake of smaller drives.

Although size was a factor, the minicomputer manufacturers were more concerned with storage capacity and other performance metrics. As a result, new entrants pitched the 5.25-inch drives to the emerging personal computer segment. Seagate Technology aggressively developed a supply chain to produce 5.25-inch drives en masse; when established suppliers finally saw the potential of this segment, they were too late. Seagate acquired Control Data's disk drive business in 1989 to become a market leader in all hard disk drives, a position it has been able to maintain.

For most companies, uncertainty about which products on the fringe of their markets might turn into serious competition makes it difficult to respond; initially, at least, many of the products are unimpressive. Responding to disruption involves deviating from strategies that currently serve your best customers and taking on the established competition. Thus, companies may hesitate to jump the gun on technologies that are unproven and that then prove not to be important. That said, by waiting to see whether new technologies start to serve their best customers, established companies can formulate and implement responses. Failure is by no means inevitable. Below I will outline three responses to disruption that can be implemented once disruption is actually occurring: beating them, joining them, or outlasting them.

Strategy 1: Beat them.

The disruption we have discussed here essentially comes from the demand, or customer, side. It is not so much that a company is *unable* to respond to the competition that arises from what turns out to be a disruptive innovation; rather, it does not have the *incentive* to respond.[6] Although it may be difficult not knowing whether an entrant's innovation will become a threat, when the situation eventually becomes clear, the incentive also becomes clear: The established company must act to protect its market position.

Instead of doubling down on the old technology, one response is to do the opposite and attack by investing in the new technology. This strategy was advocated in the 1980s by Richard N. Foster, a longtime director at McKinsey & Co.[7] It involves marshaling resources (something incumbents often have more of than entrants) and aggressively investing in the new technology in an effort to control the technology as it improves in ways customers care about.

An example of this can be found with Microsoft Corp. and the "browser wars" of the 1990s.[8] In the mid-1990s, Microsoft introduced Internet Explorer to compete against Netscape Navigator, which at the time was the dominant product in the browser market. Microsoft did this by setting up a new division that was separate from its established Windows division. The new division had its own approach to the Internet, through the Microsoft Network, which controlled the Internet user experience and also the services it pitched to consumers. (AOL used a similar approach.) Microsoft wanted to guide consumers to applications that complemented its existing ecosystem.

It is not entirely clear how Netscape was able to gain traction before Microsoft got around to responding. Microsoft had consistently monitored developments in the Internet space, so it had to have been aware of what was happening. However, in 1994, Microsoft CEO and founder Bill Gates was still promoting proprietary services as the only profitable way to bring the Internet to consumers. By 1995, with Netscape taking off commercially and also providing interfaces with online applications that mimicked Microsoft's own approach with Windows, the danger was clear: Netscape was on the verge of owning a key complement to Windows that was beyond Microsoft's control.

Guided by an eight-page memo by Gates describing the threat, Microsoft took action. Over the next few months, it invested heavily in a succession of versions of Internet Explorer aimed at luring users away from Netscape. There were challenges: To begin with, Netscape had an open systems approach (making its browser available across different computing platforms), whereas Microsoft took a different approach; it favored Windows. What's more, Microsoft's organizational capabilities were mismatched with the challenge, and a structural realignment would take time. Thus, Microsoft opted to create a new division dedicated to defusing the Netscape threat. By 1998, the division had 4,500 employees. Although Microsoft has had subsequent up and downs, it continues to be the dominant market force in its traditional areas of personal computer operating systems and applications.

Strategy 2: Join them.

While aggressive investment can forestall disruption, another way to achieve this result is by acquisition. The idea here is for an established business to "wait and see" whether a market entrant's innovation improves and becomes a potential competitive threat. Then, instead of waging war, the existing player acquires the entrant's business and its set of products. In the process, the established company averts disruption.

This wait-and-see approach was one of the major strategies employed by market leaders in the hard disk drive space that Christensen featured in his early work. Christensen's study ended around 1995, just as Seagate Technology, the new market leader in 5.25-inch disk drives, faced competition from Conner Peripherals, which was selling 3.5-inch drives. However, soon thereafter Seagate acquired Conner and went on to become the biggest seller of 3.5-inch drives, which became the most successful type of drive. With this, Seagate has managed to remain a market leader in the industry to the present day. Seagate and two competitors — Western Digital Corp. and Toshiba Corp. — have for the past two decades acquired the other hard disk drive manufacturers.[9] Moreover, in 2015 Western Digital moved beyond hard disks and acquired SanDisk Corp., the leading maker of flash memory storage products (which many view to be a technology disruptive to hard disk drives).

Acquisition depends on the permission of the entrant. But there are good reasons why cooperative deals such as acquisitions or licensing agreements may be possible. When disruption is upon them, incumbents realize they will face stiffer competition in the future, so they have an incentive to neutralize the threat. However, there are advantages to disrupters as well. Even if they know they are on a better technological path than the incumbents, avoiding a prolonged intense period of competition is valuable and may be a common interest.[10] That said, there is a potential constraint on a cooperative deal: Disruptive technologies normally occur on technological trajectories that aren't consistent with the ones incumbent players are used to. Thus, the costs of integrating the old and new technologies are apt to be high. If the costs are *too* high, then cooperation may not be advantageous. However, if the costs, while significant, are not too high — and if they can be reduced as the disruptive technology improves and is better understood — an entrant may choose to compete initially with the incumbent, but as the technology becomes more proven, the opportunity for a cooperative deal may brighten. In principle, then, the disruptive technologies that are the least understood initially — but turn out to be the most promising — are the ones that begin with competition (with the entrant as a competitor) before switching to cooperation.[11]

My own recent research into the automatic speech recognition industry, with Matthew Marx of the MIT Sloan School and David H. Hsu of Wharton, set out to test this theory of "compete, then cooperate" as it pertains to disruptive technologies.[12] (See "About the Research.") We examined more than 50 years of startup strategies among automatic speech recognition companies. Although speech recognition technology (such as Apple's Siri, Microsoft's Cortana, and Google Voice Search) is embedded in today's mobile devices, previously the technology was deployed in more pedestrian settings such as call centers. As with disk drives, the speech recognition industry was made up of a mix of established

companies and new entrants. Whatever claims new products made about accuracy could only be evaluated over time.

In our examination, we found that for new technologies that fit Christensen's definition of ones that could lead to potential disruption, new entrants were indeed the first players to bring those technologies to market. An example is the move from speech recognition embedded in specialized chips or hardware units to technology that was strictly software. Software initially did worse on traditional metrics (such as vocabulary size and accuracy) but better on cost and convenience. We found that the best of these technologies improved over time on traditional metrics and thus were ones that might lead to disruption.

We used this classification to determine whether entrants that initially competed with incumbents using disruptive technologies continued to do so or whether they pivoted to cooperate with them later. A well-known case involves Siri, the speech-recognition-based "personal assistant" that was an independent app before Apple acquired it in 2010. Less well known is the namesake product of a startup called Vlingo Corp., which introduced speech recognition five years earlier in a mobile app that featured grammar-free speech recognition. Unlike existing technologies, Vlingo didn't confine users to a set of recognizable phrases but allowed them to speak freely. Although it was less accurate than previous technologies, it improved over time. Initially, Vlingo sought to embed the technology in mobile handsets, but the performance wasn't considered good enough. The mobile app was developed to demonstrate that consumers would embrace the technology and accept some trade-offs. The strategy worked, and licensing deals based on the original idea to embed the technology followed. (In 2011, Vlingo agreed to be acquired by Nuance Communications.[13])

Vlingo switched from competing to cooperating, but it wasn't the only company that shifted its strategy. We found that new-technology entrants that started out competing with incumbents were four times more likely to make the switch to cooperation than those with what turned out to be sustaining technologies.

On the incumbent side, we confirmed that companies could indeed use a wait-and-see approach with respect to potentially disruptive entrants and then join them later when their technology proved itself. So long as there aren't any other barriers to cooperation, this is a valuable option for established businesses. Moreover, although they may pay a higher price for such cooperation when a disruptive technology becomes proven, incumbents can save on the costs of reacting to, or acquiring, nascent startups that do not turn out to be real threats.

Strategy 3: Wait them out.

Incumbents can try to manage disruption by beating or joining the new market entrants, but as the Control Data example shows, they cannot wait too long. As technologies improve, entrants may become too strong to beat or too expensive to acquire. However, in planning reactions, companies should also assess what they have that entrants lack. It is rare that a disruptive technology allows an entrant to build

out all of the key elements in a value chain. Indeed, sometimes incumbents are in positions of leadership precisely because they have invested in value chain elements that are difficult to replicate. Under these circumstances, incumbents may be able to afford to wait disruption out and react on their own timeline.

Having key complementary assets can help established companies buy time. Although innovation may reduce the value of and necessity for such assets in some cases, in others, by design or sheer luck, this may not be the case. The typesetting industry provides a great example.[14] Typesetting is based on Gutenberg's introduction of hot metal type for printing from the 1400s. But in 1886, when Ottmar Mergenthaler invented the Linotype machine, keyboards became the main way of inputting text. Linotype used melted metal to create the type. Until 1949, this was the only method of typesetting; Mergenthaler Linotype and two other companies (Intertype and Monotype) dominated the industry. To say that this industry underwent dramatic technological changes in the twentieth century is an understatement, yet Mergenthaler's business for many years remained among the dominant players. How was this possible?

Mary Tripsas, the author of a 1997 study on typesetting, found the answer: fonts.[15] In 1949, hot metal gave way to a photographic process using a xenon flash, but just over a decade later the technology was overtaken again by the cathode ray tube, followed in the mid-1970s by laser typesetting. In almost every case, previous competencies were made redundant by a new technology, and the established businesses struggled to produce leading equipment for the next generation. Unlike disruptive technologies of the sort that Christensen has written about, the new entrants' products in typesetting technically outperformed those of incumbents. However, it was only in the transition from hot metal to photography that new entrants made significant market inroads; even then, one of the other incumbents (Intertype) was actually the first to market.

The problem new entrants faced was that they didn't have fonts, a key complementary asset. Without the fonts (which were proprietary and owned by Mergenthaler and the other hot-metal typesetters), they were unable to compete with established companies, particularly for sales to newspapers and publishers. Such customers' products had a look and feel that depended on the font they chose. In the late 19th century, Mergenthaler had invested in developing new fonts. By 1900, it had more than 1,000 typefaces, which established a high barrier for new entrants. Customers that wanted Helvetica had no alternative to purchasing from Mergenthaler, which gave it a critical advantage. The printing technology may have changed over the years, but the fonts endured. Thus, Mergenthaler had a means of slowing down the disruptive process and formulating a plan to control the rest of the process. By having a key complementary asset, Mergenthaler could wait out the disruptive period (sometimes for several years) before reasserting its dominant position. Even today, Mergenthaler's font library, now owned by another company, is in use.

Costly Options

The managerial reactions to disruption that I have presented here do not stop disruption but instead

allow incumbents to manage the consequences of disruption for themselves. Thus, they can survive disruptive events and continue on into the future. However, the options presented here are arguably very costly. Beating a disruptive entrant requires investment of significant resources, usually in excess of what the entrant invests in bringing the technology to market. After all, incumbents need to catch up and have to learn along the way. For Microsoft, meeting the Netscape threat was eventually successful, but the consequences in terms of organizational focus on products other than Windows and online services were steep. Moreover, even when Microsoft succeeded in dislodging Netscape as the leading Web browser, it took several years for the company to reintegrate its browser with its other businesses.16

Costly as it is to beat market entrants early, the costs of waiting and acquiring the entrants later are also high. Recall that the rationale for waiting was to let the entrant prove itself in the market before doing a deal that neutralizes the potential competitor. The problem, of course, is that it will be much more expensive for the incumbent to do that deal once the technology and competitive threat are proven. In part, paying out extra dollars saves the incumbent from preemptively buying a myriad of unproven technologies. But more critically, it can be costly to integrate the entrant into the incumbent's processes. To be sure, by waiting to understand the technology, the costs fall, but they likely still exist.

As the costs of managing disruption can be large, it is useful to consider when a company might choose between beating entrants and acquiring them. To beat an entrant requires incumbents to use any advantages they have to the maximum extent. Mergenthaler had unique assets that could buy it time. Microsoft had a large number of engineers at its disposal who could be easily redeployed. In each case, the company could combine resources or assets with the ability to manage time. For Mergenthaler, the challenge was to slow down customer attrition; for Microsoft, it was to accelerate the response. In each instance, the response undermined the entrant's position.

Considered in this light, acquisition appears to be an easier route. However, it isn't that simple. If an entrant is acquired but the disruptive technology is not integrated into the existing business, what is to stop another entrant from appearing on the scene and continuing the disruptive wave? Instead, for an acquisition to be effective, incumbents must have capabilities that allow them to integrate entrants properly. Specifically, they need to use the acquisition as an opportunity to develop the disruptive technology further and not suppress it. Just buying something and putting it on the shelf will not stop — and may even encourage — other disruptive entrants.

In this light, it is interesting to examine Facebook Inc.'s recent strategy regarding potential disrupters. Facebook acquired Instagram in 2012 for about $1 billion and WhatsApp in 2014 for around $19 billion. In both cases, Facebook chose not to integrate the acquisitions into its main Facebook products but left them as separate entities run by the founding entrepreneurs. To this day, each operates relatively independently. In essence, what Facebook did was to buy an option to control future competition: specifically, it ruled out future head-to-head competition with Facebook. But Facebook put off the costs of integration that might otherwise have been a barrier to a cooperative deal. It is too early to know whether this represents a new form of managing potential disruption, but it may well turn out to be an

efficient way of managing the costs of forestalling it.

For executives who have determined that the threat of disruption is real, the starting point should be to ask questions. Is the company able to redeploy its own resources to confront the disruptive threat? If not, is the company ready and willing to acquire resources externally that will allow it to meet the threat? While the message of this article is one of hope, these questions are not easy to answer, and the answers can be even more difficult to implement. They require management insight and effort. As Christensen and others who have considered disruption have long noted, complacency is the enemy.