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Disruptive Technology and its Effect on Industry Leaders



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Setpoint provides lean industrial automation equipment customized for specific manufacturing processes.

Disruptive Technologies and its Effect on Industry Leaders

Leading companies almost always maintain their lead when confronted with sustaining technologies—so why do they often fail when confronted with disruptive technologies? We're not talking about poorly managed or unlucky companies, but those held up as a shining light of quality progressive management—the kind that business professors use as examples of management excellence, that invest aggressively in sustaining technologies, and listen and respond to their customers' needs. This white paper examines why industry leaders often don't keep pace with small up-start companies with significantly fewer resources and lesser reputations, and eventually lose market dominance or fail altogether.

What is a disruptive technology?

To be considered disruptive, a technology must disrupt the existing market and have these five traits:

1. Be straightforward and simpler than existing products
2. Offer lower performance than the existing state-of-the-art product
3. Offer lower profit margins than existing products
4. Incite little or no interest from current customers
5. Be commercialized first in emerging and insignificant markets

What is a disruptive technology?

Interestingly, it is usually one of the leaders that pioneers and develops the disruptive technology that eventually brings it down. Below are three examples of companies that didn't pay attention and adapt to a new technology: 1) the computer

hard disk drive industry where in the last 30 years companies have been born, matured, risen to dominance, and then “died” in unreasonably short life spans, 2) The motorcycle industry where a small, relatively insignificant Japanese manufacturer of delivery scooters accidentally took on the giants, Harley Davidson and BMW, and came away with a huge market share, and 3) the steam shovel industry that missed the boat when hydraulics appeared on the market, even though it took 30 years to happen. It’s not because these companies were poorly managed, or didn’t listen to their customers—they fell behind because they were well managed and made every effort to satisfy their customers.

Example 1: Hard disk drive industry

The first mass-produced computer hard disk drive available was the 14-inch drive, suitable for the only type of computer available at the time—a mainframe. New sustaining technologies, materials, head designs, and motors came along and, through it all, the leaders remained. Then, quietly and almost unnoticed, the 8-inch drive came upon the scene and it met all the qualifications of a disruptive technology: lower performing with lower profit margins, no known market, and of no interest to the mainstream customers, the mainframe manufactures. Thus, as with most disruptive technologies, the leading manufacturers ignored it while several up-start companies started manufacturing these drives for the emerging mini-computer market. As time went on, the performance of the 14-inch drives outpaced the needs of the customers. As the performance of disruptive 8-inch drives advanced, they intersected with the needs of the customers, which were still far below the capabilities of the 14-inch drives. This intersection hit the industry like a missile, separating the customers from the leading manufacturers, who by that time were two or three years behind the curve. All lost their dominance and nearly all failed.

As you might guess, the same thing happened when the 5.25-inch drive began to disrupt the 8-inch market and then again with the transition from 5.25- to 3.5-inch drives. One company—Quantum—the leading manufacturer of 8-inch drives, not only survived, but became a dominant leader in a disruptive market even though they missed the 5.25-inch market. They were still in business and successful with

other products when the 3.5-inch drives appeared. In 1983, several Quantum engineers started a company to capitalize on the emerging 3.5-inch market. Quantum financed and retained 80% ownership of the new company, Plus Development Corporation, which, in a short time, emerged as a leader in 3.5-inch drives just as Quantum's 8-inch drive market evaporated. Quantum abandoned its 8-inch drive program and purchased the remaining 20% of Plus Development Corporation, changing the name to Quantum.

What caused some companies to “miss the boat” on disruptive technologies? Were they poorly managed? Did they lack vision? No. The failure was more a result of their excellent management and appropriate response to customers' needs. Each of these companies undoubtedly investigated their customers' needs and found no use for the disruptive technologies. After all, why would a mainframe manufacturer want a little 8-inch drive that was lower performing and more expensive? The problem was that the 8-inch drives were not initially sold to “their customers.” They were sold to the manufacturers of another disruptive technology—mini computers.

Example 2: Motorcycle industry

The motorcycle industry had several dominant players, such as Harley Davidson and BMW, after World War II, with most competing in the large, fast, powerful road bike market. At that time, Honda was making small motor scooters that were used as delivery vehicles in Japan, where people were trying to recover and rebuild from the war. Since Honda wanted to market a large competitive motorcycle for sale in the United States, they sent three representatives to California. They sold a few of their big road bikes, and then ended up eating all their profits on warranty. After several months of failure, one of their representatives decided to lift his spirits by taking his 50cc scooter riding in the hills east of Los Angeles. A few people saw him riding in the dirt and asked where they could get a little scooter like his. He made special arrangements to have a few shipped overseas for these new friends. Then more people wanted them. At one time, Sears tried to buy these small bikes from Honda to list in their catalog, but Honda was only interested in selling large road bikes. What they had not realized is that they had accidentally created a new disruptive market. The dirt bike had been born. After realizing that their road bikes were

doomed to failure, sales of the little bikes began to soar, and improvements were made. Harley Davidson saw this market and created a competing product, but their company value system would not let their product prosper. The dealerships were not interested in carrying the smaller, less powerful bikes because their customers had no interest in them, and because the profit margin was much lower. Resources were continually drawn away to their higher performing market. Of the former industry leaders, only Harley Davidson and BMW survived this market disruption.

Example 3: Steam Shovel Industry

In the 1930s, steam-powered, cable-operated shovels were the standard for earth-moving equipment in mining and industrial plumbing. These customers craved bigger and bigger shovels, and the industry stepped up to meet their needs. The industry leaders made the transition from steam to gasoline to diesel power, but hydraulics was not yet a well-developed technology. The first hydraulic shovel—called a backhoe because it was mounted to the back of a tractor—came on the scene in the 1940s and was much smaller and lighter than those required by the mainstream customers. The new market that meshed with the overpriced and poorly performing hydraulic backhoe was the residential construction market. Now, one man could dig small trenches for utilities in one tenth of the time it took to dig the trenches by hand. The disruptive technology was on its way. Not suitable to be sold to the mining industry, the backhoe continued to improve and grow in size and capability. Eventually, in the 1960s, the progress of the hydraulic shovels began to intersect with the needs of some of the larger cable-operated shovel users. The eventual results are history. The cable-operated shovel manufacturers were pushed out by the companies that by then had accumulated dozens of years of experience and expertise in working with hydraulics.

How can a company survive a disruptive technology?

What can a company do to survive a disruptive technology? Is there a method, or are companies simply doomed to an eventual failure from the beginning? Happily, there is a way to embrace the laws instead of fighting them to death. Clayton Christanson, author of *Innovator's Dilemma*, championed the idea of creating a spin-off company, which requires some specific qualifications and procedures: 1) The spin-

off company must be independently managed and free of the established values and personality of the parent company; 2) they must prepare to fail, perhaps more than once, and they must do it quickly before expending too much of their resources; 3) the company must search for the appropriate market for the disruptive product and not try to modify the product to suit the existing customer base; and 4) the company should be located far enough from the parent company to avoid interference and even most collaboration. Quantum used this method to survive the attack of the 3.5-inch drive, and IBM used it to become a major player in the desktop PC market.

Attempts at creating spin-offs have had mixed results. The retailer Hudson used the principles properly when creating the indisputably successful Target to compete in the discount retailing market, but how many people remember Woolco—or for that matter, its parent, retail giant F.W. Woolworth? Woolworth's created Woolco as a spin-off to compete with K-mart and other discount retailers, and, at first, it was independent and successful. However, the strategy was to keep the two companies closely integrated. As the new discount company began to absorb the values and styles of the parent company, Woolco slipped farther and farther away from the core principles that had caused its success. Restating the question, "How many people remember Woolco?" The answer to that tells the rest of the story.

Every company has its own value system and "personality" independent from the values, capabilities, and personalities of its employees. These value systems and the needs of a successful company actually seem to make it impossible for a dominant company in any market to compete in a disruptive market. A large, successful company must maintain a certain profit margin to survive and "keep the doors open," and, the larger and more successful a company is, the higher the profit must be to satisfy investors, give raises and promotions, and continue on within their value system. All disruptive technologies offer lower profit margins with an unknown future. Therefore, any good manager would and indeed should make the decision not to invest in a product that promises lower margins when the company can invest in much higher performing products that please their investors, customers, employees, and managers. To do otherwise would be foolish and irresponsible. In addition, any manager who insisted on doing so would be committing professional suicide and would have to fight every inch of the way

against key stakeholders, and company values that he or she probably helped to develop.

A company must understand and embrace certain principles to compete in a disruptive market:

1. Customers control the resource allocation of a well-run company.
2. Small emerging (disruptive) markets can't satisfy the growth needs of a large company.
3. The customer base of a disruptive product is not only unknown, but unknowable.
4. The capabilities of an organization reside in its processes and value system, not necessarily in the capabilities of its employees.
5. The search should be not for product improvement, or how to market new products to existing customers, but how to find the right customers for the new product.

Now, imagine that you are a manager of a leading manufacturer. A talented engineer comes to you and says he has a great idea for a revolutionary widget. After investigating, you agree that it is revolutionary. "What kind of sales do you think we might be able to get out of this widget?" you ask. "Well, I'm not sure. I am no expert in marketing," replies the engineer. "Okay, who do you think will buy this product?" you ask. "Um, I don't know exactly, but some will surely need it," he replies. Having faith in your engineer, you decide to look into it some more. You tell your salespeople about it and they agree it is revolutionary. The salespeople talk to all of their customers all over the world, but their customers have no interest in it as it doesn't fit into their product lines. Finally, you have to make a decision. Are you going to invest resources into a product that has no customer base and no sales projections? You wouldn't be a very good manager if you did, would you? Maybe not, but one of your competitors will see the new product as a disruptive technology and will find that hidden new market. They will be a great success. And one day, their product will meet the needs of your customers better than your products will. Your company will be so far behind the curve by then that you may never catch up.

But, fortunately, you were respectful to your former engineer, so he might give you a job.

Conclusion

To summarize, leaders nearly always stay leaders in the face of sustaining technologies that extend and advance existing successful products. Their products continue to improve, and even exceed customer needs. This leaves a void. As the saying goes, nature abhors a vacuum. Someone will step in to fill that void with a simpler, lower performing and disruptive technology. The leaders will, of course, dismiss the insignificant idea, not necessarily out of ignorance, but because it simply can't meet the appetite for profit that a large company has. The existing mainstream customers will have no interest in the new product. Eventually, a new customer will be found, and the emerging market will begin to grow. As the old leaders continue to improve their product, even surpassing their customers' needs, and as the emerging technology improves, this newer, simpler technology will intersect with the needs of the mainstream customers. The customers are separated from the leaders and captured by the disruptive technology developers. By that time, it is nearly always too late for the leaders to catch up to the new market, and they are left to fade into history as Woolco. The only repeatable method for fighting this oft-repeated pattern of failure is to recognize a disruptive technology for what it is, and create an independent spin-off to develop a market for it. This company must be independent in location, management, habits, and values, or it will not succeed. This spin-off must also plan to fail at least once and as early as possible before expending too many resources.

Setpoint is the leader in lean automation equipment from concept to functioning completion. Following the Toyota Production System, Setpoint has successfully created custom solutions for a broad variety of industries for more than 18 years.