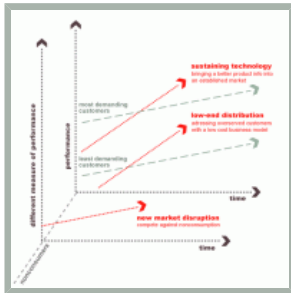


## disruptive innovation



### characteristics

author:	Christensen, Clayton M.
country:	United States
period:	1997
type:	model
role:	consultant, change agent and manager
activity:	analyse and design
topic:	strategic management, innovation & risk and technology & operations
abstr. level:	environment
perspective:	living
status:	for review
module:	innovation
comments:	2

### related models

buygrid framework
diffusion of innovations

### description:

Christensen's disruptive innovation model, published in 1997, provides an explanation for the inability of well-managed, industry-leading companies to stay atop of their industry when confronted with new, ground breaking technological innovations.

Clayton M. Christensen is an associate professor at Harvard Business School. His research and writing focuses on management of technological innovation, how new markets for new technologies can be found, and the identification and development of organisational capabilities.

Christensen was intrigued by the fact that time and time again market leaders were uprooted by new, 'trivial' technologies that turned out to be industry-changing. His study is based on a historical analysis of how industries evolve over time. He compiled data on developments in the electronics industry; chemical industry; mechanical industry (Mechanical Excavator Industry 1920-1970), software and hardware industry (disk drive industry 1961-1995), in manufacturing and in service industries.

Christensen identified two types of technology driven changes:

1. *Sustaining technologies* : these technologies continue the industry's rate of improvement in "product performance"
2. *Disruptive technologies* which disrupt or redefine "performance trajectories".

Most technological progress leads to "performance improvement" of existing products. These products become faster, cheaper, louder, smaller, etc. Customers can comprehend and embrace these innovations because they remain in line with current needs and expectations. Christensen regarded these kinds of developments as "sustaining in character". Market leaders lead the industry to embrace these innovations and exploited the benefits of these technologies.

In time, companies overshoot the ability of customers to absorb performance improvements by attempting to bring better products to the market than their competitors. The performance of the product improves faster than the customer's needs and expectations.

From time to time disruptive technologies emerge; innovative products that perform worse than established products. Established products get leapfrogged in their core functionality due to the faster performance improvements of these new products. Historically, such disruptive forces almost always toppled industry leaders.

Christensen listed two types of disruptive technologies:

1. *New-Market Disruptions* : disruptions that create a new "value network"
2. *Low-End Disruptions* : disruptions that attack the least-profitable and most over-served customers at the low end of the original value network.

A value network is the context within which a firm establishes its cost structure and operating processes. In this network the firm works with suppliers and partners in order to respond profitably to the common needs of a specific market segment. Consequently, the firm can only successfully commercialise their product in that specific market segment. If the firm, however, tries to target their product in a different market segment they may be incapable of successfully commercialising their product (e.g low cost airlines versus national carriers).

Christensen introduced a disruption diagram to visualise the difference between the two disruption types. His disruption diagram is made up of three axes:

1. Y-axis: represents the dominant product performance metric
2. X- axis: represents time
3. Z-axis: represents consumer segments with different needs.

The dimensions time and performance define a particular product which customers purchase. A customer purchases and uses this product for a specific purpose. An example of a time-performance trajectory is the increase of the USB flash drive's data storage capacity that went up from 8 MB in 2000 to 8 GB in 2007. The third or z-axis represents either new customers who previously lacked the money or skills to buy and use the product. In addition, it also represents customers whose needs can now be fulfilled because the product may be used for other purposes. As the performance of a mainstream product increases, it eventually surpasses the customer expectations and creates a vacuum into which simpler and more convenient customer offerings can flourish.

"Low-end Disruptions" use low-cost business models aimed at picking off the least attractive of the established firms' customers. At first, "Low-end Disruption" products perform far worse along one or two dimensions of performance that are particularly important to customers, but may migrate upwards into the mainstream market. New value networks create a shift in consumption and competition. Furthermore, they also define a different set of performance measures compared to than what was valued in the original value network.

These new value networks are created when "New-market Disruptions" take place. For each of these new value networks a new vertical axis, which represents a product's performance given a particular context, can be drawn in the diagram.

Different value networks can emerge and co-exist at various distances from the original value network. Products that come forth from a New-market disruption are more affordable to own and simpler to use compared to the original product. They enable a whole new group of people to own


simpler to use compared to the original product. They enable a whole new group of people to own the product and to use them in a more convenient way. As the performance of these new products gets better, they will start to attract the least-demanding customers from of the original value network and pull them into the new value network. A further increase of the performance will ultimately pull the more demanding customers out of the original value network.

Market leaders perceive little threat until the disruption is in its final stages and starts to draw customers away. By this time it is too late for the market leader to make the shift to the new technology and dominate the new value network.

#### assets:

 challenges from disruptive innovations  
ProvenModels • editor PM • version 0.2 • 41 KB

 disruptive innovation  
ProvenModels • editor PM • version 0.2 • 67 KB

 quick scan disruptive innovation  
ProvenModels • editor PM • version 0.2 • 88 KB

#### pros:

- The disruptive innovation model provides managers with insight about why leading incumbent companies fail to stay atop their industries when confronted with disruptive technologies. Failure can be assigned to a multitude of reasons, such as bureaucracy, arrogance, tired executive blood, poor planning, short-term investment horizons, inadequate skills and resources, and just plain bad luck. But not all companies stumble because of these weaknesses. The model provides insight why well-managed companies who are very competitive and listen to their customers, invest aggressively in new technologies, still end up losing market dominance.
- The model provides insight why firms with different value networks need different managerial decisions. Each value network has its own competition and customer demand which defines how organisations can earn their money, how their cost structure is shaped, the minimum size required to stay competitive and the minimum growth rate to go through the learning cycle. Managerial decisions that make sense for companies within a specific value network may make no sense at all when operating in another value network. Outstanding managers know when the circumstances are different and when to shift gears and adopt a different set of managerial decisions.
- The model helps managers to determine when an idea may become disruptive or not. Furthermore, it also provides guidelines to entrant and incumbent firms to commercialize disruptive technologies. Patterns in the disruption diagrams were shown to be empirically consistent, whether the technology was radical or incremental, expensive or cheap, software or hardware, component or architecture, competence-enhancing or competence-destroying.
- The model also makes managers aware of the (in) capabilities of their companies. Many companies have tried to develop new capabilities within established organisational boundaries by accumulating new resources, such as: hiring people with new skills; licensing new technologies; raising capital for expansionistic investment program; acquiring new production lines. But the accumulation of these new resources did not result into a success even when managed properly. Managers who see that the organisational capabilities are not suited to meet the new demands have three options available to them: 1. Acquire a different organisation whose processes and values are a close match with the new task; 2. Change the processes and values of the current organization; 3. Spin out an independent organisation and develop within the new construct new processes aimed at solving the new problem.

#### cons:

- Whether an idea fits the pattern of successful disruptive innovators remains hard to determine upfront. To assessment whether an idea is disruptive for all companies or whether it represents a sustaining improvement to other firms is difficult.
- Defending a companies core business from a disruptive innovation sounds very easy in theory, but in practice it can be very difficult. 1. Historically, most companies are willing to invest large sums on technologically risky projects when it was clear that their customers need the outcome of these projects. But when the customers did not need the outcome of the projects, the same companies were unable to allocate resources to execute much simpler projects with disruptive potential. As a result, these companies found it very difficult to invest adequate resources in disruptive technologies that their customers didn't want, until their customers want them. 2. The distribution of political power is another hindrance because it favours those parties that have benefited most from the existing value network. Managers related to the biggest and most profitable customers will pull the most political weight and will be able to divert resources to their own projects. This makes it more difficult to allocate the appropriate resources to potential disruptive technologies. 3. Another reason why it is difficult for firms to invest in disruptive technology is because they fear that they will cannibalise existing products.
- Some experts are skeptical about Christensen's model, because they argue that Christensen has selectively chosen case examples to support his framework (Cohan, 2000). All of Christensen's case studies are of disruptive technologies that did develop into a major market force. However, there are many disruptive technologies that fail to materialise (e.g., the Iridium global satellite phone system; see Finkelstein and Sanford, 2000).

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