

Competition

Understanding disruptive technologies: Who wins, who loses?

New technology can create entirely new markets and new segments within a market. MP3 technology facilitated the iPod revolution, for example, and improvements in LCD monitors enabled companies to target consumers with mobile computer needs. However, technological change may be most notable for the challenge it presents to incumbent firms. There are numerous examples of established firms misinterpreting the impact of new technology, leading to their own demise.

Why do firms fail when faced with new technology? Of several theories that attempt to answer this question, one of the most prominent is C.M. Christensen's theory of disruptive technology. Put simply, this theory posits that a new technology introduced by a new entrant, one that initially appeals only to a niche market, will disrupt (replace) a dominant incumbent firm's older technology when the new technology improves to meet the needs of the mass market. The attack of a new technology can succeed because managers of incumbent firms dismiss its first incarnation as inferior and ignore its development.

However, numerous researchers have found problems with Christensen's theory. In "Demystifying Disruption: A New Model for Understanding and Predicting Disruptive Technologies," Ashish Sood of Emory University and Gerard Tellis of the University of Southern California set out to, as Sood puts it, "infuse the existing theory with validity."

To this end, they developed definitions for types of technology, types of technological attack, the dynamics of

competition, and three "domains" of disruption (technology, firm, and demand). With this framework in place, the authors evaluated the impact of technology entry and the resulting hazard of disruption. They used data drawn from seven markets: electrical lighting, data transfer, computer memory, computer printers, display monitors, music recording, and analgesics. In these markets, the authors identified and examined 36 technologies over approximately 2,000 technology years. The authors used a correlated hazard model to test their hypotheses and predict future disruptions.

Hazard of disruption is low

Based on the empirical test, Sood and Tellis found that, contrary to Christensen's theory, incumbent firms introduce disruptive (replacement) technologies as frequently as new entrants. In fact, the incumbents produced more than half of the new technologies that superseded the previous dominant technology. In other words, *the hazard of disruption to incumbents from new entrants is significantly less than previous research had surmised.*

"The idea of an entrant disrupting a well-funded, giant incumbent makes for a good story," Tellis observes, "but such disruptions account for only a small fraction of all cases."

Managers also need to be aware of the three domains where disruption can occur: technology, firm, and demand. Technology disruption occurs when the new technology offers better performance than the dominant technology on the primary dimension of performance (resolution in computer monitors, for

example). Firm disruption occurs when the market share of a firm whose products use a new technology exceeds the market share of the largest firm whose products use the highest-share technology. Demand disruption occurs when the total share of products in the market based on a new technology exceeds the share of products based on the dominant technology. It is important to note that firms may delay disruption in one

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domain even after being disrupted in another domain. For instance, in the lighting market, incandescence sustained its dominance in the demand domain for many decades even though it was disrupted in the performance domain by higher performing technologies.

Dangers of complacency

Despite finding the hazard of disruption from new entrants is less than previously thought, the authors caution against incumbents getting too comfortable with regard to their ability to maintain technological dominance. "Entrants do disrupt," Sood points out, "often without the expertise, market knowledge, or resources of the established leaders. That is impressive. It also leaves no room for complacency on the part of incumbents." Another finding to keep

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in mind is that even though incumbents introduced more technologies and caused more disruption (replacement) than new entrants, many incumbents still lost market dominance and subsequently failed.

As to the question of why some firms fail in the face of new technology and others do not, Tellis offers this observation: “We suspect that the internal culture of firms is probably a key factor responsible for disruption rather than external threats from a new technology or market strategy.” Put simply, complacency regarding the potential appeal of new technology to customers is more damaging than the advent of new technology itself. “Survival often depends,” Sood notes, “on how well a company predicts its future trajectory on one or more dimensions of technology performance.” Firms that succeed in this regard are the ones that stay alive and healthy.

BY KIM ALAN PEDERSON



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In-store slack and unplanned purchases

While much research attention has been paid to item-level spending expectations (i.e., reference prices), a forthcoming study in the *Journal of Consumer Research* suggests that aggregate-level spending expectations are also strongly predictive of behavior.

Karen Stilley and J. Jeffrey Inman of University of Pittsburgh and Kirk Wakefield of Baylor University suggest that consumers’ spending expectations function as an implicit “mental budget” for shopping trips. This includes an itemized portion—the amount of money allocated to spend on items planned to the brand or product level—as well as “in-store slack,” the amount of money not planned for any particular product, but available for unplanned purchases.

They find evidence for their thesis in data from the Point-of-Purchase Advertising Institute (1995) and in a customer-intercept study in three grocery stores in Texas. In that field study, the researchers asked shoppers what items they planned to purchase, how much they expected to spend on the planned items, and how much they expected to spend on the total trip. After shopping, participants provided their receipts and answered questions about themselves and their shopping experience. More than three-fourths of the participants included room for unplanned purchases in their planning.

“Shoppers in the study indicated that they employ this strategy both because they anticipate ‘forgotten needs’ as well as because they realize they will encounter ‘unplanned wants’—with some respondents even explicitly indicating that they expected to make impulse purchases,” the researchers write. Consistent with prior studies, the shoppers were remarkably accurate when predicting how much they would spend. The average budget deviation (actual spending minus planned spending) was only .47.

Stilley and her colleagues also find that the impact of in-store slack on budget deviation depended on how many aisles the shopper visited and the shopper’s level of impulsiveness.

When consumers shop most aisles, the shopper’s level of impulsiveness helps determine how much they deviate from (overspend) their mental budgets. “Less-impulsive individuals who shop most aisles tend to spend the money available from in-store slack, but don’t exceed their overall budgets. In contrast, in-store slack leads to overspending for highly impulsive individuals who shop most aisles,” they write.

When consumers shop only needed aisles, they do not spend all of their in-store slack. While this may seem to be advantageous for the consumer, they may in fact be forgetting to purchase needed items. Future research is needed to explore whether failure to spend the in-store slack contributes to the consumer making an additional fill-in trip.

“In addition to highlighting the importance of encouraging consumers to shop more aisles, this article also affirms practices that retailers employ to encourage consumers to spend all of their mental budgets, such as to offer samples (increase desire) or reminder placards as they approach the checkout lines (cue forgotten needs),” the authors note.

Finally, more research is needed to determine whether in-store stimuli simply serve to redirect what items consumers purchase rather than generate incremental spending. “Brands may be vying for a fixed amount of money that consumers have allocated to be spent on unplanned purchases. The fact that most consumers do not exceed their mental budget despite making unplanned purchases suggests that different product categories function as substitutes (i.e., should I spend my in-store slack on ice cream or Parmesan cheese?).” Retailers need to carefully evaluate whether in-store stimuli are actually generating incremental sales at the store level.

From “Planning to Make Unplanned Purchases? The Role of In-store Slack in Budget Deviation,” *Journal of Consumer Research* (August 2010), forthcoming.