Successful Development and Commercialization of Technological Innovation: Insights Based on Strategy Type

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How can market leaders avoid the innovator’s dilemma and continually develop disruptive innovations to retain their leadership position? We argue that the capability to successfully develop and commercialize one type of disruptive innovation—technological innovation—is based on the interaction between a firm’s strategic orientation (Prospector, Analyzer, Defender) and (1) its selection of target market; and (2) the way it implements its market orientation. The insights offered by this framework assist in predicting whether a firm’s strategic orientation enhances or thwarts its ability to successfully commercialize disruptive innovations and also suggests the development of critical, yet contradictory, skill sets in order to remain successful over time.

How can industry leaders reinvent themselves by developing and successfully commercializing disruptive innovations that challenge their existing business models? Known as the innovator’s dilemma, Christensen (1997) argued that market leaders have difficulty diverting resources from the development of sustaining innovations, which address known customer needs in established markets, to the development of disruptive innovations, which often underperform established products in mainstream markets but offer benefits some emerging customers value. Further developments improve the new technology’s performance on the attributes mainstream customers do value, to a level where the new technology begins to cannibalize the existing technology. This progression reflects the classic S-shaped curve prevalent in the study of technological discontinuities (e.g., Chandy and Tellis, 2000; Shanklin and Ryan, 1987). The focus of this article is on these technological innovations, though distinctions exist between other types of innovations and their dimensions. For example, Govindarajan and Kopalle (2004) distinguish disruptive innovations further based on their radicalness, or new products based on a new technology relative to what already exists in the industry. Their empirical research shows that all disruptive innovations are not necessarily radical (e.g., Schwab’s discount brokerage business model), nor are all radical innovations necessarily disruptive (e.g., cordless phones relied on substantially new technology relative to wired phones but were not disruptive to the industry). Some can be both radical and disruptive (e.g., cellular phones).

Through his studies of disruptive innovations, Christensen (Christensen, 1997; Christensen and Bower, 1996; Christensen and Raynor, 2003; Christensen, Scott, and Roth, 2004) has spawned a substantial stream of research investigating many aspects of the innovator’s dilemma (e.g., Danneels, 2004). One component of Christensen’s arguments is that because incumbents listen too carefully to their customers, they are disrupted by industry newcomers that serve emerging customer segments. For example, Christensen and Bower (1996, p. 198) state that market-oriented firms cannot create disruptive innovations since “firms lose their position of industry leadership … because they listen too carefully to their customers.” At its heart, this issue ties to both the selection of a firm’s target market (emerging customer segments versus existing customer segments) as well as...
the way a firm implements its market orientation (e.g., listening to current customers’ articulation of existing needs or conducting proactive research on potential customers’ unarticulated needs; see also Henderson, this issue).

For those who study the successful commercialization of technological innovation, a logical question arises as to the overlap between Christensen’s work and the influential work of Geoffrey Moore in Crossing the Chasm (1991, 2002). Moore’s work highlights the difficulties firms face in commercializing new technologies, focusing on (among other things) the choice of the initial market segment to target and how to modify the initial marketing approach that was successful with early adopters of the product so that mainstream customers will also embrace the new technology. These issues were also identified in Danneels’s (2004) critique of Christensen’s (1997) work. For example, Danneels discusses the complexities in forecasting when mainstream customers will actually embrace the new technology and in selecting a target market for the new innovation when the firm has not previously served customers in that target market.

Given the commonalities between Christensen’s (1997) and Moore’s (1991, 2002) works in understanding the successful development and commercialization of technological innovations, one purpose of this article is to build links between Christensen’s influential work on the innovator’s dilemma and Moore’s work on crossing the chasm. A second purpose is to explore whether or not a customer–market orientation is a liability in developing disruptive innovations.

The common thread in this article binding these two somewhat distinct purposes together is our belief that a firm’s strategic orientation (in particular, based on the Miles and Snow [1978] typology of prospectors, analyzers, and defenders) offers useful insights for understanding why some firms are more successful at commercializing technological innovations than others. This typology is well validated and continues to receive quite a bit of empirical attention (e.g., DeSarbo et al., 2005; Hambrick, 2003; Vorhies and Morgan, 2003).

In particular, we examine how firm strategy (i.e., prospector, analyzer, defender) can explain success in commercializing technological innovations with respect to (1) the customer groups the firm targets; and (2) its approach to being market oriented. For clarity, it is important to realize that we are not offering a new classification of Christensen’s disruptive-sustaining innovation typology. Rather, we are suggesting that by overlaying the Miles and Snow (1978) typology of firm strategy onto the disruptive-sustaining innovation typology, additional insights regarding which firms are more likely to develop and benefit from sustaining or disruptive innovations may be gleaned.

**Market Strategy and Success with Disruptive Innovations**

Market strategy is concerned with how businesses achieve competitive advantage. Miles and Snow (1978) developed a comprehensive framework that addresses the alternative ways organizations define and approach their product-market domains and construct structures and processes to achieve success in those domains. They identified three archetypes of how firms address these issues. Prospectors seek to locate and exploit new product and market opportunities, whereas defenders attempt to seal off a portion of the total market to create a stable set of products and customers. Analyzers occupy a position between the two extremes by combining the strengths of both the prospector and defender to cautiously follow prospectors into new product-market domains while protecting a stable set of products and customers.

In conjunction with Moore’s (1991, 2002) and Christensen’s (1997) work, we draw on the market strategy implementation literature (e.g., Matsuno and Mentzer, 2000; Olson et al., 2005; Slater and Olson, 2001) and market orientation literature (e.g., Kohli and Jaworski, 1990; Narver and Slater, 1990; Slater and Narver, 1998) to refine our understanding of success in developing and commercializing technological innovations, as illustrated in Figure 1. Our argument is that, based on their specific strategy type, firms develop skill sets associated with success for some—but not all—types of situations in commercializing technological innovations. For example, firms that are adept at satisfying needs in the innovator and early adopter segments are most likely to possess the resources and capabilities to develop disruptive innovations. Moreover, these firms’ specific approach to being market oriented allows them to use innovative research techniques to discover customer knowledge that becomes the foundation for disruptive innovation. Conversely, firms that are successful at satisfying needs in mainstream markets are more likely to develop sustaining technologies or incremental innovations. Their more traditional approach to market
orientation is to listen to customers and to develop innovations based on customer feedback.

However, to be successful across a range of innovations (both sustaining and disruptive), firms must also develop skill sets of other strategy types. For example, a firm that tends to be more successful with late majority customers may need a more proactive approach to developing customer knowledge; new techniques of market research may help it avoid focusing myopically only on existing customers and may facilitate the development of disruptive technological innovations. In essence, the capability to develop contradictory skill sets is vital.

We first examine the relationship between selection of target market and strategy type and then explore the relationship between market orientation and strategy type.

**Selection of Target Customer Group**

A widely adopted perspective on the success of new innovations is the adoption and diffusion cycle, based on the work of Rogers (1995). The basic premise of the adoption and diffusion process is that there are different categories of adopters, each with unique characteristics and buying needs (see Table 1). These categories of adopters fall along a normal, bell-shaped curve, such that the bulk of the marketplace falls within the early-majority and late-majority adopter categories. Successful diffusion implies a smooth progression from one category of adopters to the next, which is necessary for a firm to create leadership in its industry.

Moore’s (1991) work built on research by Rogers (1995) and identified the existence of a chasm, or a gulf, between the visionaries (innovators and early adopters) and the pragmatists (early-majority, mainstream market). The idea of a chasm has been
empirically validated in work by Goldenberg, Libai, and Muller (2002). In their study of the pattern of diffusion of a large number of innovative products in the consumer electronics industry, they found that between one-third and one-half of the cases exhibited a “saddle” (i.e., a lull in sales after initial market take-off that stymied the steady adoption and diffusion process). Their work also showed that word-of-mouth effects among categories of adopters (i.e., cross-market communication) were the critical factor in determining the size and duration of the sales slump.

Some firms are able to reach only a small niche market of technology enthusiasts, whereas other firms are able to successfully commercialize their inventions by reaching a broader base of customers in the mainstream market as well. Moore (1991) argued that the chasm arises because (1) critical differences between visionaries and pragmatists make cross-market communication extremely difficult for technological innovations (e.g., Goldenberg, Libai, and Muller, 2002); and, more critically, (2) the marketing strategies firms use to effectively reach the early market for technology innovations do not speak to the very different needs of the mainstream market.

The question is to what extent a firm’s strategy type affects its ability to be successful at marketing to various categories of adopters, which is where the intersection of firm strategy and success in commercializing technology innovations becomes relevant.

Insights from Market Strategy

Because market segmentation and targeting are the foundation of market strategy, firm performance is determined, at least in part, by the match between target market selection and market strategy type. The importance of this match is highlighted in a recent study of technology-oriented businesses by Slater, Hult, and Olson (2005), who examined the performance implications of targeting customer adoption categories by strategy type. For prospectors, they found a positive relationship between targeting the innovator and early-adopter segments and performance and a negative relationship between targeting the early-majority segment and performance; this latter finding implies that analyzers may not have the capabilities to develop the innovations that technology enthusiasts value.

The findings from Slater, Hult, and Olson (2005) and related studies (Conant, Mokway, and Varadarajan, 1990; Slater and Olson, 2001), which suggest that different strategy types have resources and capabilities that enable them to successfully target different market segments, are quite consistent with Christensen’s (1997) work. Market-share leaders tend to be analyzers and defenders because those strategy types target the early- and late-majority segments of the market comprising approximately two-thirds of market demand. Of course, there is variation in the size of the categories based on the nature of the innovation and how its benefits are communicated, but the idea of a normal, bell-shaped distribution is widely accepted and has been confirmed by research using the Bass model (e.g., Mahajan, Muller, and Bass, 1990). Analyzers and defenders also have the marketing and operational competencies to succeed in those segments (Slater and Olson, 2001; Slater, Hult, and Olson, 2005). As Christensen notes, these market leaders are largely unsuccessful when attempting to introduce innovations into niche markets. One key reason for this is that defenders prefer predictability; as a result, they tend to be neither innovation nor technology oriented. In contrast, analyzers, though not as risk averse as defenders, prefer incremental innovation to disruptive innovation.

A critical implication arising from this intersection of strategy type and selection of target market is the idea that businesses must develop what are often contradictory resources and capabilities to be successful in appealing to a wide range of customer types. For example, for prospectors to appeal successfully to all categories of adopters, they must develop some of the resources and capabilities of analyzers. Similarly, for analyzers and defenders to avoid the innovator’s dilemma by successfully developing and introducing disruptive innovations that appeal to technology enthusiasts—customers in the early market—they must develop some prospector resources and capabilities. More specific insights related to these ideas are discussed in the conclusion section.
Market Orientation

Another key factor determining a firm’s ability to successfully develop and commercialize technological innovation is how it comes to understand customer needs. As noted at the outset, experts have essentially taken two views in this regard. On the one hand, Christensen (1997, p. 18) stated that established firms are “held captive by their customers” (i.e., they listen too carefully to them). As a result, Danneels (2004) points out that Christensen’s work has often been cited as an argument against a customer orientation. On the other hand, Slater and Narver (1998) drew on an extensive body of research concerning the nature and benefits of a market-oriented culture to argue that market-oriented businesses can avoid the innovator’s dilemma by being committed to understanding both the expressed and latent needs of their customers through the processes of acquiring and evaluating market information in a systematic and proactive manner and to continuously creating superior customer value. To what extent are these views of the value of being customer oriented at odds with each other? And to what extent does understanding of firm strategy inform this debate?

Recent research (Atuahene-Gima et al., 2005; Narver, Slater, and MacLachlan, 2004) has shown that a proactive market-oriented culture is more strongly associated with innovativeness and new product success than is a customer-led culture. A proactive market orientation involves a set of behaviors through which a business attempts to discover, to understand, and to satisfy the latent needs of customers. Atuahene-Gima (1995, p. 287) concluded that “market orientation is more strongly related to new product performance at the early stage of the product life cycle than at the late stage ... Such an environment seems to warrant greater market intelligence and information sharing within the firm.” Moreover, recent research by Govindarajan and Kopalle (2004) shows that firms able to develop truly disruptive innovations have a customer orientation focused on emerging customer segments rather than on mainstream customer segments. Indeed, a customer orientation focused on mainstream customer segments is shown to inhibit the development of disruptive innovations. Importantly, these two dimensions of customer orientation are not on opposite ends of a continuum but are independent of each other, suggesting that firms can develop both orientations simultaneously (see also Narver, Slater, and MacLachlan, 2004).

One implication from these findings is the need to distinguish between current and potential customers. Being customer oriented does not imply an exclusive focus on current customers. Instead, a customer-oriented firm can serve current customers and remain vigilant for unserved merging markets (see also Day, 1999; Chandy and Tellis, 1998). Further, as Danneels (2004) notes, if firms had a deep understanding of their customers’ needs—both expressed as well as latent and unexpressed (Slater and Narver, 1998)—then the more reactive, narrow notion of customer orientation would be rejected.

Insights from Market Strategy

We suggest that Christensen’s (1997; Christensen and Bower, 1996) and Slater and Narver’s (1998) positions are not necessarily in conflict with one another but rather are on different sides of the same coin and are resolved by understanding how a firm’s strategy type informs its specific approach to being market oriented. Defenders and, to a lesser degree, analyzers are much more likely to be constrained by two factors. First, the tyranny of the served market (Hamel and Prahalad, 1994)—or a tendency for firms to focus very specifically on solving existing customers’ needs with a current technology—obscures the possibility that customer needs may change over time and may be solved in radically different ways. Second, core rigidities (Leonard-Barton, 1992) result in preferences for information sources and existing views of the market, in turn strangling a firm’s ability to innovate. Analyzers and defenders listen too closely to customers, which can inhibit innovation, constraining it to ideas customers can envision and articulate and leading to safe, but bland, offerings. This may be due to a variety of reasons, such as customers giving marketers bad information. For example, during a marketing research project, customers may say they love a new-product idea but then not buy the product when it comes out on the market. Marketers may also need to ignore feedback about what customers say they do not want. For example, some products that met with initial customer resistance included fax machines and overnight express delivery. On the other hand, prospectors, by nature, possess corporate imagination (Hamel and Prahalad, 1991), which enables them to replenish their stock of ideas continuously; they have an ability to create a vision of the future consisting of markets that do not yet exist and based on a
horizon not confined by the boundaries of the current business.

Once again, analyzers and defenders must augment their skill sets with those more characteristic of prospectors. One means for doing this is to rely on novel types of market research to provide new types of insights for innovation. For example, customers may not always be able to articulate their needs; that is, they have needs of which they are not aware; the needs are real but are not yet in the customer’s awareness. If these needs are not satisfied by a provider, there is no customer demand or response. They are not dissatisfied, because the need is unknown to them. If a provider understands such a need and fulfills it, the customer is rapidly delighted. Based on this belief, useful information can be gleaned through observation of what customers do under normal, natural conditions.

The techniques overviewed in Table 2 offer insights based on how customers behave rather than on what they say (Leonard-Barton, 1995; Mohr, Sengupta, and Slater, 2005). If implemented correctly, customer-visit programs, empathic design, lead-user research, end-user (customers of customers) research, and targeting developing markets can reveal new pieces of information that may have a direct impact on developing innovative products or services.

### Conclusion

In order to successfully develop and commercialize disruptive innovations, not only does the firm need to conceptualize and develop the innovation in the first place; it must also be successful in reaching more than just a niche market of innovators–early adopters. In other words, it must overcome the innovator’s dilemma as well as cross the chasm. These two problems faced by all firms—but especially those operating in high-technology markets or driven by technological innovations—are related in that they both derive from the underlying skill set the firm brings to its marketing strategy.

### Table 2. Research Tools for High-Tech Markets

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<th><strong>Customer Visit Program</strong></th>
<th>Systematic process of visiting customers with a cross-functional team to understand customer needs.</th>
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<td>Benefits include:</td>
<td>• face-to-face communication to facilitate the transfer of complex, ambiguous, and novel information</td>
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<td>• field research that enables personnel to see the product in use, to talk to actual users of the product, and to gain a better understanding of the product’s role in the customer’s total operation</td>
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<td></td>
<td>• firsthand knowledge of customer’s problems and needs</td>
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<td></td>
<td>• interactive conversation that allows for clarification, follow-up, switching gears, and addressing surprising and unexpected insights</td>
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<tr>
<td></td>
<td>• interaction with multiple decision makers to learn about all of the players’ various needs and desires</td>
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**Empathic Design**

Based on the idea that users may not be able to articulate their needs clearly; focused on understanding user needs through empathy with the user world rather than from users’ direct articulation of their needs.

For example, users may have developed “workarounds”—modifications to usage situations that are inconvenient yet so habitual that users are not even conscious of them. Or customers may not be able to envision the ways new technology could be used.

Based in anthropology and ethnography, empathic design allows the marketer to develop a deep understanding of the current user environment, to extrapolate the evolution of that environment into the future, and to imagine the future need that technology can satisfy.

**Lead-User Process**

Collects information about both needs and solutions from the leading edges of a company’s target market and from markets facing similar problems. Lead users may have needs months or years before the mass market and, as such, are positioned to benefit significantly by obtaining early solutions to those needs. Customers that tend to innovate are lead users—customers that are well ahead of market trends and have needs that go far beyond those of the average user. In some cases, lead users may have developed a solution to their needs that marketers can then commercialize for other users.

**Research on Customers’ Customers**

Focuses on downstream markets to generate market intelligence; provides understanding of downstream customers’ preferences, allowing for new insights and avoiding surprises in the market.

**Target developing markets**

Provides a unique opportunity to inspire radical innovations with price-performance breakthroughs (Prahalad, 2004).

For example, a car being developed for the Indian market will sell for $3,000. While it lacks sophistication demanded by developed markets, the cost structure of parts and subsystems for this car pose a major disruption to suppliers of the major auto firms.
Firms typically become industry leaders (analyzers, defenders) by appealing to a broad base of customers in the marketplace (i.e., the mainstream market) and by continually meeting their needs for value over time. These firms are able to develop sustaining innovations based on customer input to continually hold their position of market leadership. But, paradoxically, these very skills put them at risk of being out-innovated by industry newcomers.

The root causes of the innovator’s dilemma are the tyranny of the served market and core rigidities most common to analyzer and defender firms. To solve the innovator’s dilemma, a firm must attack the root causes of the dilemma by developing new ways of looking at the world developing proactive market learning competencies such as the ones we described.

On the other hand, based on their ability to see opportunity from a fresh perspective, industry newcomers—or prospectors—are able to develop disruptive innovations that appeal to emerging market segments and to eventually supersede prior industry leaders. Whether or not these industry newcomers are able to successfully establish themselves in any industry depends critically on their ability to augment their skill set with the capabilities to serve mainstream customers as well. To penetrate the mainstream market, prospectors must expand their focus from the innovator and early-majority segments and must demonstrate clear advantage over existing solutions (Rogers, 1995). They must develop distribution systems that reach the mainstream market and offer their products at a lower price to reduce the financial risk associated with adopting the innovation (Slater and Olson, 2001). Not every prospector can develop analyzer-like marketing capabilities, nor should they. Often, it makes more sense for the prospector to ally with another organization already possessing these capabilities.

Blending the insights from market strategy with those from innovation management may illuminate why some firms succeed with disruptive innovations and others do not. Importantly, augmenting a firm’s capabilities based on other strategy types can be critical to ongoing success.

References


