



## Understanding the links between technological opportunism, marketing emphasis and firm performance: Implications for B2B

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### ABSTRACT

The capability of firms to sense and respond to changes in technologies, called technological opportunism, is of growing importance to managers as a source of competitive advantage. However, exactly how technological opportunism impacts firm performance is still not clearly understood. Furthermore, the role of marketing in this relationship, if any, has yet to be examined. Understanding this relationship is critical for marketing managers not only for determining strategic investments of resources but also for demonstrating marketing return on activities. This paper explores the links between technological opportunism and firm performance. The results show that technological opportunism has a strong positive impact on key measures of performance such as firm sales, profits and market value. Importantly, marketing emphasis is the mechanism through which the technological opportunism–performance relationship is achieved. Finally, the impact of marketing emphasis on B2B firms is different than that for B2C firms, highlighting the importance of these activities for B2B marketing managers.

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Thriving, and even surviving, is becoming more difficult for firms in today's increasingly global, fast-paced, and economically treacherous business environment. The pace of change is daunting and many executives feel that their companies are falling further behind (IBM Global CEO Study, 2010). In particular, managers seem to be faced with an increasing number of technology disruptions in their businesses that can threaten competitive advantage (e.g., Benner & Tushman 2003; Chandy & Tellis, 1998; Christensen, 1998). This rapid advance of technology can place firms on the defensive, which can create reactionary decision-making that leads to investments that may not be correct for either the short-or long-term. As a result, firms can fall even further behind competitors. How can firms be more proactive with respect to technology?

One approach is for firms to become technologically opportunistic. Firms that are technologically opportunistic have a fundamental orientation toward sensing and responding to new technologies (Srinivasan, Lilien, & Rangaswamy, 2002). In this context, technological opportunism is a positive orientation that enables a firm to better compete in its markets. *Sensing* refers to how a firm develops an understanding of new technologies, keeping in mind that this knowledge is drawn from both inside and outside of the firm (Srinivasan et al., 2002). Firms that are strong in the sensing capability keep close contact across business functions as well as with external stakeholders. *Responding* is the firm's willingness and ability to take action in the face of technological change. On many occasions, this involves challenging

the prevailing industry view such as Federal Express, Google, TiVO, and Research in Motion, among others, have done (Wind, 2009).

Despite its potential implications for business, little has been done to expand our basic knowledge of technological opportunism and its impact (e.g., Mohr & Shoostari, 2003). One very important unresolved question is whether technological opportunism benefits firm performance (Srinivasan et al., 2002). Opportunism implies that firms are taking advantage of resources, assets, capabilities or relationships, among other things, that provide competitive advantage and thus enhanced performance. Alternatively, the nature of sensing and responding to technological change suggests an inherent degree of risk that may be detrimental to dimensions of performance. For example, firms may have high-cost research and development failures. Firms can also develop products that are too advanced for customer acceptance, which results in disappointing sales and profits (Dhebar, 1996). The Apple Newton, an advanced personal digital assistant concept from the late 1980s (pre-cursor to the Palm Pilot and Blackberry), fits the latter category. This study begins to fill in this gap in understanding of how technological opportunism impacts different dimensions of financial performance such as sales, profits and market value. This finer-grained view of performance helps to provide a more complete picture of its impact on the firm (e.g., Walker & Ruekert, 1987).

A second key question is whether certain firm mechanisms are in place through which the relationship between technological opportunism and performance occurs (Srinivasan, 2008). Understanding these mechanisms provides managers with a more detailed picture of how technological opportunism may benefit firm performance. Specifically, this study focuses how a firm's emphasis on marketing mediates the relationship between technological opportunism and firm performance.

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Marketing is a key link between internal and external stakeholders (Day, 1994; Moorman & Rust, 1999; Srivastava, Shervani, & Fahey, 1999). This suggests that the success of technological opportunism in delivering enhanced performance is dependent upon marketing's emphasis on its key resources, assets and capabilities with internal and external stakeholders. The value of marketing as an investment rather than an expense item is an ongoing debate (e.g., Day, 1994; Marketing Science Institute, 2008; Srivastava, Shervani, & Fahey, 1998). Furthermore, the manner in which marketing emphasizes its key resources, assets and capabilities is typically not well understood by managers (Vorhies & Morgan, 2003). Therefore, understanding this relationship is critical not only to the success of technological opportunism but also to marketing's role in the firm. Unfortunately, no academic marketing research has taken on this challenge in the context of technological opportunism.

Finally, this study begins to understand differences in the mediating effect of marketing emphasis, if any, for business-to-business (B2B) versus business-to-consumer (B2C) firms. Understanding and integrating advancing technology is critical to B2B firms (Easton & Araujo, 2003). Given the differences in how B2B and B2C firms approach their markets, this investigation is warranted to properly inform marketing managers.

The remainder of the paper is organized as follows. First, drawing on the resource-based view of the firm, the potential impact of technological opportunism on firm performance is discussed. Specifically, the relationship between technological opportunism and revenue, profits and firm value are explored. It is then argued that marketing emphasis mediates the effects of technological opportunism on these dimensions of performance. These proposed relationships are empirically tested using data from a survey of senior marketing managers in publicly traded U.S. firms coupled with financial performance data drawn from COMPUSTAT. Finally, the implications of the results as well as potential limitations and suggestions for future research are discussed.

## 1. Theory: resource-based view

The resource-based view (RBV) focuses on how firms can develop and sustain competitive advantage through effective use of resources and capabilities (e.g., Barney, 1991). Resources are stocks of knowledge, physical and intangible assets, human capital or other elements that a firm has ownership of or control over (Amit & Schoemaker, 1993; Capron & Hulland, 1999). Capabilities are complex bundles of resources that are demonstrated through firm-wide processes and help create competitive advantage (Amit & Schoemaker, 1993; Day, 1994). The unique capabilities owned or controlled by the firm create differences in performance among competitors that lead to competitive advantage (Amit & Schoemaker, 1993; Atuahene-Gima, 2005; Barney, 1991). Managers are therefore challenged to appropriately allocate resources and to build those capabilities that will deliver value to customers. Value then manifests itself in superior performance as measured by both market-based (e.g., market share, customer satisfaction, customer retention) and financial-based outcomes (e.g., return on investment, shareholder wealth) (Bharadwaj, Varadarajan, & Fahy, 1993; Hunt & Morgan, 1995). The sense and respond nature of technological opportunism suggests that firm need to make the investments in assets, skills, and processes such that the capability is in place across the firm. These resource investments as well as the resulting analysis of information and ensuing actions may vary over time such that some firms may be stronger in technological opportunism than others, supporting the resource-based view.

## 2. Technological opportunism and performance

### 2.1. Technological opportunism

Firms seek advantages in the market. Perhaps it is a unique resource, a complex process or a capability that creates this advantage. Sensing and responding to technological change is one way that firms can

potentially gain competitive advantage (Srinivasan et al., 2002). Firms that are technologically opportunistic are utilizing their resources to actively scan markets, often beyond those in which their products compete, for disruptive discoveries that will change the way firms do business (Srinivasan et al., 2002). Managers in these firms actively seek information, knowledge, signals, trends and other indicators that can create market advantages. Firms sense these disruptions through investments in resources, day-to-day activities, and formal and informal processes that are in place across functional areas, to create a firm-wide capability (e.g., Stern, McKee, & Rose, 2007). As a result, strong sensing firms are often one of the first in their industries to notice technological developments that may potentially affect the business. For example, those firms that correctly determined the significant impact of the Internet on business and consumer behavior gained time and knowledge advantages, among other benefits, which allowed them to act before competitors.

This strong sensing environment also allows firms to see potentially beneficial external relationships, such as joint ventures or alliances, which will create additional advantages. Reaching outside of the firm can provide benefits, for example, in the form of new innovations (Chandy, Prabhu, & Antia, 2003). Today's technological changes make it incumbent upon the firm to extend the view of external stakeholders to account not only for suppliers, customers, or venture partners but also third-party interest groups (blogs, virtual worlds, etc.). Collectively then, sensing plays an important role in technological opportunism.

Strong sensing provides firms with a more complete view of what might impact them (Weick, 1995). However, it is not enough for firms to simply sense disruptive technological changes. Technologically opportunistic firms must act on the knowledge. This requires proactive investments in such things as product development, manufacturing, marketing and external relationships. These investments help to build the processes that will speed the technological advances along throughout the organization. This positions the firm to act at the right time, in the right place, and in the right manner to capture competitive advantages. Innovation and new products are potential outcomes of technological change. Innovation that includes technological breakthroughs positions firms for additional market share or sustained market leadership (Chandy & Tellis, 1998; Sorescu, Chandy, & Prabhu, 2003). Technological opportunism creates a reinforcing mechanism, allowing for new resources and new marketing knowledge to be incorporated into future innovation activities (Chandy & Tellis, 1998; Chandy & Tellis, 2000).

Technological opportunism is related to, but different from, similar concepts such as organizational innovation or innovation orientation.<sup>1</sup> The concept of innovation centers around measuring "outputs" whether they are new product breakthroughs or new methods of conducting business (e.g., Deshpandé, Farley, & Webster, 1993; Han, Kim, & Srivastava, 1998). For example, Han et al. (1998) explicitly measure whether firms enacted certain innovations. Hurley and Hult (1998) look at the number of new ideas as a measure of capacity to innovate. Deshpandé et al. (1993) focus mainly on new product or service introduction timing when examining organizational innovation. Similarly, innovation orientation centers on the firm's "outputs" such as new products, patents and effort in research and development (Manu, 1992) or product newness/impact (Atuahene-Gima, 1996). Alternatively, technological opportunism can be thought of as the pre-cursor to actual innovation (Govindarajan & Koppale, 2006; Michel, Brown, & Gallan, 2008). A strong technological opportunism capability implies that a firm is innovative but it does not guarantee innovation as measured in "outputs" such as the number of new product breakthroughs. Theoretically, other obstacles may prevent a technologically

<sup>1</sup> In the interest of space, see Srinivasan et al. (2002) for a detailed discussion of the similarities and differences of technological opportunism with other related constructs.

opportunistic firm from introducing innovation into a market (regulatory obstacles, acquisitions, knowledge loss, etc.).

Technological opportunism is also conceptually similar to market orientation—gathering, disseminating and responding to market intelligence related to customer needs (Kohli & Jaworski, 1990). However, technological opportunism differs in two important ways. First, while market orientation focuses on customers and market intelligence, technological opportunism differs in that sensing is more widely distributed across a network of relationships (e.g., suppliers, government, emerging industries, education, etc.) in the hunt for impactful change. Second, responding to change is risky and may not result in benefits to the firm (De Luca & Atuahene-Gima, 2007; Srinivasan et al., 2002).

From this point, the relationships between technological opportunism and dimensions of performance are discussed as well as the potential mediating effects of marketing emphasis. The conceptual model is shown in Fig. 1.

## 2.2. Technological opportunism and revenue

The sense and respond activities allow technologically opportunistic firms to move more quickly than rivals to incorporate technological advances. This can create a reputation among customers as a provider of leading edge products and services that are the “must have” items (Gatignon & Xuereb, 1997; Wind & Mahajan, 1997). The cutting-edge reputational effects create the potential for technologically opportunistic firms to charge price premiums or generate positive word-of-mouth. Both of which can enhance revenue. It can also to turn noncustomers into customers through increased product trial, thus generating opportunities for additional revenue (Michel et al., 2008). A technologically opportunistic firm can also utilize its success and reputational effects to lock-in prime suppliers, partners or channels that want to be associated with this type of firm. This helps to create an advantage by sealing competitors off from these beneficial relationships. These actions can create additional size, scale, and channel advantages that also generate price premiums as the dominant market player. Putting these resources to work, technologically opportunistic firms can potentially generate more revenue than competitors.

Despite the potential benefits, there is also the possibility that technological opportunism may have a negative impact on firm revenue. The firm's products may be too advanced for the customer (Dhebar, 1996). As a result, not only may waste firm resources but also may result in a decline in revenues as customers fail to purchase products or services from the firm. Despite this potential threat to the revenue stream, greater negative outcomes likely outweigh the effects of “too advanced products”. For example, firms that fail to be technologically opportunistic may suffer a myriad of problems including complacency (Robertson, Eliashberg, & Rymon, 1995) and myopia (Atuahene-Gima, 2005). A complacent firm does not have the capabilities in place to sense or respond to technological change. Or, a competing firm may have the skills, resources and processes to sense change but it may not be able to act on the information, leaving it behind competitors. Myopic firms may not be complacent but are locked into narrow-minded thinking and thus do not see technological opportunities on the horizon (Levinthal & March, 1993; Srinivasan et al., 2002).

Again, these firms fall behind competitors as customers see the difference in products and services. If myopic firms are able to see the change coming, the resulting actions may be one of desperation to catch up (e.g., price-cutting that depletes revenue) rather than a clear investment in capabilities to support technological opportunism. Overall, this suggests that technologically opportunistic firms should be well positioned through its resource investments for higher revenues. Therefore, the following hypothesis is proposed:

**Hypothesis 1a.** There is a positive relationship between the degree of technological opportunism of the firm and its revenue.

## 2.3. Technological opportunism and profits

Technological opportunism may not necessarily have the same benefits for firm profits as it would for revenues. Firms that are actively seeking information on technological change are engaging in exploratory search that may not be efficient given the risk of the unknown (Katila & Ahuja, 2002). Firm resources may be applied to a number of different activities before the appropriate solutions are found, increasing expenditures. Profit may actually be lower than competitors who are less technologically opportunistic. Technologically opportunistic firms are the first to sense change and are likely to be first- or early-movers in markets, which naturally makes them experimenters (Lumpkin & Dess, 1996). This pro-active approach, which may include investments in building processes and assets that support technological opportunism, can distract these firms from appropriating profits from current products (e.g., Blundell, Griffith, & Van Reenen, 1999). It is also plausible that firms that move more slowly (e.g., second-mover) benefit from watching technologically opportunistic firms (Shankar, Carpenter, & Krishnamurthi, 1998). As a result, slower moving firms can apply resources to current business routines and capabilities with more efficiency, thus making them more profitable than technologically opportunistic ones (Leonard-Barton, 1992).

However, in responding or acting on the information, technologically opportunistic firms provide enhanced value to customers, which can also generate above average prices and margins (Pauwels, Silva-Risso, Srinivasan, & Hanssens, 2004; Wind & Mahajan, 1997). Two aspects in particular are of note. First, technologically opportunistic firms are less resistant to new ideas. Thus these firms are able to adapt more quickly to new processes and procedures, thus making better use of resources. This adaptability enables quick changes to incorporate new technologies into product development, manufacturing, marketing or other areas of the firm. The potential outcomes include increases in speed of product development, enhanced product features, or marketing excellence. These actions can result in products that customers' value and perhaps will pay price premiums to obtain. Furthermore, the flexibility and speed of adaptation keeps costs relatively low. That, coupled with potentially higher prices, creates potential for increased margins. Second, slower moving firms are potentially entering markets where the cost of brand awareness or distribution is increasing or prices are decreasing due to increased competition. Those slower moving firms may have to expend more of their resources to build assets and capabilities, thus reducing profits. A technologically opportunistic firm is constantly thinking of the future (Srinivasan et al., 2002). Thus, it has made these resource investments during times of reduced competition while enjoying higher prices. Thus, the technologically opportunistic firm can enjoy higher profits despite increasing competition. Overall then, the following hypothesis is proposed:

**Hypothesis 1b.** There is a positive relationship between the degree of technological opportunism of the firm and its profit.

## 2.4. Technological opportunism and firm value

Technological opportunism does not guarantee increases in market value. The nature of opportunism in this context contains a

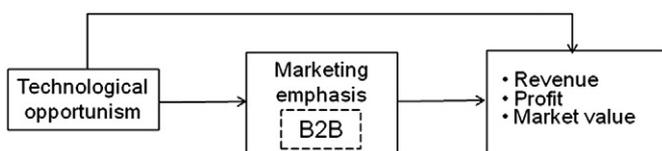


Fig. 1. Conceptual model.

certain degree of experimentation as compared to those firms that take on no risk. Experimentation also increases the risk of failure. New product failure rates are traditionally very high (Boulding, Morgan, & Staelin, 1997). High rates of failure are not something that the market typically values in firms. This raises the potential for technologically opportunistic firms to have lower firm values than competitors.

Yet, much emphasis is placed on whether a firm is actually creating value through its capabilities or is simply content with the status quo (Benner & Tushman, 2002). The goal of technological opportunism is to take advantage of changes that affect the status quo. In responding to technological change, one outcome is new product innovations. Innovations can enhance firm value (Chaney, Devinney, & Winer, 1991; Pauwels et al., 2004). Furthermore, pioneering innovations, which is what the market might have a greater propensity to expect from technologically opportunistic firms, have a greater potential to find new customer segments and to enhance cash flows (e.g., Moorman & Miner, 1997). These benefits—new customers, enhanced cash flow, first-to-market share advantages, customer satisfaction, among others—can result in higher market values. Finally, technological opportunism is not just about new products. Taking advantage of technology also means moving to the forefront of the industry in internal activities. For example, Wal-Mart's internal distribution system did not result in a new product but was a technological leap at the time, which continues to provide a substantial competitive advantage and a basis for high market value. Overall then, this suggests that the potential for increased market value outweighs the potential negative impact on market value. Therefore, the following hypothesis is proposed:

**Hypothesis 1c.** There is a positive relationship between the degree of technological opportunism of the firm and its market value.

### 3. Marketing emphasis

Marketing continues to find itself under scrutiny from executives as well as other functional areas (e.g., Yadav, Prabhu, & Chandy, 2007). Yet, marketing is uniquely positioned as the key link between a firm and its customers (Day, 1994; Moorman & Rust, 1999; Srivastava et al., 1999). That key link delivers two-way information flows between firms and customers, which is critical to a strong technological opportunism capability. As a result, whether marketing is actively engaged in utilizing its resources, assets and capabilities can play a key role in a firm's ability to sense and respond to new technologies.

Marketing develops key firm assets such as customer relationships, market research, channels or partners (Srivastava, Fahey, & Christensen, 2001). Activities such as understanding customer wants and needs, providing strong customer service, promotion, working well with partners or interacting with leading edge customers to capture new market trends help to develop these assets. Marketing activities, among other things, help to create efficiency advantages, to promote cross-functional coordination and knowledge sharing, and to sense market insights that can lead to innovation and new products. Furthermore, marketing speeds acceptance of new products derived from technological opportunism, which then increases sales and potentially profits and market value (Robertson, 1993; Srinivasan, Pauwels, Silva-Risso, & Hanssens, 2009). These marketing activities are also critically important to many of the functions and processes within most firms (Goolsby, 1992). It allows marketing to play a key role in driving decision-making in areas such as customer satisfaction initiatives, pricing and new product development (Homburg, Workman, & Krohmer, 1999). Marketing also reaches outside the firm to connect with other key constituencies such as distributors and alliance partners. Moving beyond the boundaries of the firm and integrating marketing activities into the business processes of business partners is beneficial to firm success (Morgan & Hunt, 1994).

Collectively these arguments suggest that the marketing is the vehicle through which technological opportunism impacts firm performance. Marketing acquires, develops and leverages, both internally and externally, its market-based assets (e.g., Barney, 1991; Hunt & Morgan, 1995; Srivastava et al., 1998; Srivastava et al., 1999). The firm then applies these market-based assets to processes in the firm to create capabilities that enhance shareholder value (e.g., Day, 1994; Srivastava et al., 1999). These assets, processes and capabilities will, in turn help to accelerate, enhance and reduce the volatility of cash flow for the firm. Without marketing placing a strong emphasis on effectively utilizing its resources, assets and capabilities, both the sensing and responding aspects of technological opportunism suffer as the key internal and external marketing touch points that drive ideas, customers, and cash flow are weaker than competitors. If the firm cannot sense and respond to technological change, revenues, profits, and firm market value will suffer. Thus, the following hypotheses are proposed:

**Hypothesis 2.** Marketing emphasis will mediate the relationship between technological opportunism and a firm's

- a) revenue;
- b) profit; and,
- c) market value.

## 4. Method

### 4.1. Data collection

A mail survey of senior marketing managers in publicly-traded U.S. firms was used to collect data, an approach that allowed respondents to complete the survey on their own time and return it without pressure. An Internet survey was another potential method. However, with corporate e-mail security filters in place at most companies, there was no way to judge non-response rates or failed transmissions from Internet surveys. Phone surveys were inappropriate due to the extensive interaction time required with each manager to obtain information as well as scheduling calls and gatekeeper issues.

To improve the face validity of the survey, in-depth interviews and pre-tests with a dozen senior-level marketing managers were conducted to develop and refine the survey instrument. The perspectives of reputable marketing scholars were also incorporated in survey development and refinement to further enhance face validity (Churchill, 1979; Ngo & O'Cass, 2009). Where it was possible, existing and established measures were used. The survey included questions relating to key constructs, as well as firm-specific and key respondent information.

A random sample of 1200 publicly-traded firms was drawn from a proprietary database maintained by a market research firm. The database includes full corporate details for approximately 600,000 companies with annual revenues of at least \$2.5 million. Focusing on publicly-traded U.S. firms permitted the collection and analysis of secondary data (e.g., sales, profit, and market value) to compare with survey responses.

The target respondent was a senior marketing manager who had extensive knowledge of the marketing function as well as an understanding of the firm-wide approach to the market. Past studies have demonstrated that knowledgeable senior managers can provide information as reliable and as valid as that obtained from multiple firm respondents (e.g., Atuahene-Gima & Murray, 2004). The senior marketing manager was identified by referring to the top member of the marketing team by title as listed in the database (O'Sullivan & Abela, 2007). The continued employment of each senior marketing manager was randomly confirmed through corporate web site inspections or phone calls to the company.

The survey was mailed to the key respondent at each of the 1200 firms in the sampling frame, along with a postage-paid return envelope. In the cover letter, respondents were encouraged to answer the questions truthfully noting that there are no “right or wrong” answers (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The recommended procedures for following up with potential survey respondents were used. Approximately 25% of the surveys were undeliverable mainly due to gatekeepers who prevented the questionnaire from reaching potential respondents or corporate policies that prevented them from completing the survey. One hundred and thirty-five usable surveys were returned yielding an overall response of 15%; in-line with the average top management survey response rate despite increasingly stringent corporate privacy policies (Thorpe & Morgan, 2007).

The sample contained both manufacturing (38%) and service (62%) firms. With respect to revenues, 27% of the firms were greater than \$1 billion, 45% between \$100 million and \$1 billion in sales, and 28% reported less than \$100 million. 23% employed more than 5000 people, 24% employed between 1000 and 4999 people, 16% employed between 500 and 999 people, 37% employed under 500 people. There were no significant differences on key measures from early versus later respondents (Armstrong & Overton, 1977). Also, no significant differences were found between respondents and non-respondents in terms of firm size or profits.

Key respondents held titles such as chief marketing officer, vice president and director. For purposes of validity, respondents were asked to provide information about their position, how long they have been in that position and how long they have worked at their firm. On average, survey respondents had held their positions for five years. Respondents indicated extensive knowledge of firm strategy (4.55/5.0 scale) and implementation (4.54/5.0 scale).

#### 4.2. Independent construct measures

*Technological opportunism.* Technological opportunism at each firm was assessed via seven items adapted from Srinivasan et al. (2002), each measured on a seven-point Likert scale format (1 = “strongly disagree”, 7 = “strongly agree”). All items loaded on one factor, explaining 61% of the variance ( $\alpha = .89$ ). Factor loadings ranged from .65 to .87 (See Appendix A).<sup>2</sup>

*Marketing emphasis.* Seventeen items adapted from Menon, Bharadwaj, Adidam, and Edison (1999) assessed marketing's emphasis (Appendix A). Each item was assessed using a seven-point Likert scale format (1 = “strongly disagree”, 7 = “strongly agree”). The construct is an index of the set of items of that conceptually represent marketing emphasis, and therefore is formative in nature (e.g., Churchill, 1979; Diamantopoulos & Winklhofer, 2001; Menon et al., 1999).

#### 4.3. Dependent construct measures

*Firm performance.* To create separation between the independent and dependent variables, objective data was collected for measures of firm performance rather than relying on survey respondents to also judge the degree of success of their firms (Podsakoff et al., 2003; Rindfleisch, Malter, Ganesan, & Moorman, 2008). Drawing on financial data from the COMPUSTAT database, measures of sales, net profit and

market value for each firm in the sample were obtained for the 2005 fiscal year.<sup>3</sup>

#### 4.4. Control variables

*Firm size.* Larger firms may be more advanced in terms of organizational processes and knowledge than smaller firms. Economies of scale and scope place allow for greater efficiencies, providing resources for technological opportunism (Klepper, 1996). However, larger scale/scope and advanced organizational development may create rigidities (Leonard-Barton, 1992) and competency traps (Levitt & March, 1988) that can inhibit technological opportunism as compared to smaller firms. Firm size is measured by the natural logarithm of the number of firm employees reported in COMPUSTAT.

*Firm age.* Age of the firm in years is controlled for given that younger firms might have less time to develop the necessary processes, personnel and knowledge to be technologically opportunistic. Alternatively, organizational inertia may prevent older firms from achieving this same goal (Klepper, 1996).

*Manufacturing versus services.* Research suggests that manufacturing and service firms require different resources, skills, cultures and organizational structures, implying potential differences in performance outcomes (Brouthers & Brouthers, 2003; Vargo & Lusch, 2004). This control was dummy-coded (0 = service firm, 1 = manufacturing firm).

*Business segments.* More business segments can create distractions for managers as they attempt to allocate resources to be technologically opportunistic. The number of reported business segments for each firm in the sample was drawn from Compustat.

*Years public.* Publicly traded companies undergo more detailed scrutiny and the managerial desire to make earnings estimates or please shareholders may result in a less technologically opportunistic approach. Alternatively, longtime publicly-traded firms may be more technologically opportunistic. This control variable was operationalized as the number of years as a publicly-traded firm for each firm in the sample.

*International business.* The challenges of doing business globally can distract firms that attempt to manage technological opportunities in foreign countries while balancing domestic customers. This control was dummy-coded based on reported revenues by geographic segment (0 = less than –20% international revenues, 1 = equal or greater than 20% international revenues).

*Market turbulence, intensity of competition and technological turbulence.* Given the different industries in the sample, I controlled for environmental factors (e.g., Menon et al., 1999). First, market turbulence creates constant, often rapid, changes in customer preferences that affect demand. Firms must be able to sense and respond to technological changes. If customer preferences change little over time, then the need is minimized because it requires intense resource investment with higher risk (Sorescu et al., 2003). Second, in intensely competitive markets, firm-specific advantages are short-lived as competitive and environmental pressures quickly undermine any resource value or heterogeneity (Foss, 1998). Finally, a turbulent technological environment places the emphasis more on innovating and future ideas and less on exploiting current ideas.

Market turbulence, intensity of competition and technological turbulence were assessed via scales developed by Miller (1987) and validated in the literature using the recommended criteria (Han et al., 1998). For this study, a seven-point Likert scale format was used (1 = strongly disagree and 7 = strongly agree as the anchors). Respondents are asked the degree to which they agree with each

<sup>2</sup> To provide support for technological opportunism as a separate construct from related ones, the survey included a measure of organizational innovativeness (Deshpandé et al., 1993). The five items for organizational innovativeness were measured on a seven point scale and loaded on one factor ( $\alpha = .92$ ; Average variance extracted (AVE) = .75). The squared correlation between technological opportunism and organizational innovativeness was .46, which is less than the AVEs of both variables, indicating that the two are empirically distinct.

<sup>3</sup> Models were also run using five-year moving average of each dependent variable to account for potential fluctuations in single-year performance. The results of all models are substantially similar. An anonymous reviewer is thanked for this suggestion.

**Table 1**  
Descriptive statistics and correlations.

Measure	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Technological opportunism <sup>a</sup>	4.50	1.11													
2. Marketing emphasis	4.57	0.77	.49												
3. Sales (log)	5.69	1.84	.07	.31											
4. Profit <sup>b</sup> (log)	3.33	2.06	.23	.35	.85										
5. Market value (log)	6.18	1.78	.20	.31	.74	.79									
6. Age of firm	51.70	44.59	-.24	.03	.29	.23	.22								
7. Number of employees (log)	.09	1.95	.03	.22	.85	.65	.68	.27							
8. Manufacturing/services <sup>c</sup>	–	–	.09	-.04	-.03	-.01	.01	-.11	-.06						
9. Business segments	1.81	1.34	.03	.15	.34	.24	.28	-.05	.36	.10					
10. International focus <sup>c</sup>	–	–	.11	-.02	.30	.31	.34	-.09	.30	.34	.42				
11. Years public	11.66	7.37	-.07	.16	.38	.18	.30	.17	.38	.00	.29	.16			
12. Market turbulence	4.21	1.16	.15	.12	.03	.05	.07	-.01	.07	-.02	.11	.11	-.04		
13. Competitive intensity	4.41	1.32	-.11	.14	.03	-.05	-.09	.22	.08	-.30	-.18	-.13	.01	.15	
14. Technological turbulence	5.08	1.25	.38	.22	-.01	.12	.07	-.02	.08	-.25	-.03	.06	.04	.18	.25

Note: Correlations over  $\pm .17$  are significant at  $p < .05$ .

<sup>a</sup> Construct reliability, average variance extracted and range of loadings are .91, .61, and .65 to .87 respectively.

<sup>b</sup> Some firms had negative profit in the latest fiscal year and natural logarithms of those numbers cannot be calculated. As a result, 113 of 135 observations are used for this variable. Sales, profit and market value are drawn from Compustat.

<sup>c</sup> Dummy coded variables.

item. There are four questions each related to market turbulence, technological turbulence and intensity of competition. An average score was created for each control for each firm (Appendix B).

#### 4.5. Common method bias

The Harman one-factor test for common method bias yielded five factors with eigenvalues greater than 1.0, with a total explained variance of 70% and no one factor dominated (Podsakoff & Organ, 1986). In further support, a marker variable (respondent identification number) was identified that is not theoretically related to at least one other variable in the study (Lindell & Whitney, 2001; Podsakoff et al., 2003). The marker variable was not significantly related to any of the model variables. Finally, the independent variable consisted of subjective measures while the dependent variables were drawn from objective financial data, creating separation between the independent and dependent variables (Podsakoff et al., 2003; Rindfleisch et al., 2008). Collectively, these outcomes suggest that common method bias is not a serious problem.

## 5. Analysis and results

Means, standard deviations and correlations are reported in Table 1. The hypotheses are tested using regression analysis. The control variables were included in each regression. Multicollinearity was not a problem (i.e., all variance inflation factors were less than two).

### 5.1. Effect of technological opportunism on performance

The results are reported in Table 2. H1 stated that technological opportunism should have a positive effect on firm performance. A separate regression was run for each of the dependent performance variables. Technological opportunism has a significant positive effect on firm revenue ( $\beta = .21, p < .05$ ), profit ( $\beta = .54, p < .01$ ) and market value ( $\beta = .34, p < .01$ ), supporting Hypotheses 1a, 1b and 1c respectively. For the controls, firm size and age of the firm each had a positive effect on all of the dependent variables.<sup>4</sup> Interestingly, a

<sup>4</sup> With respect to revenue in particular, it might appear that if a firm is large enough that developing technological opportunism adds little to performance. Separate regression models with and without technological opportunism were run for each performance measure. Incremental F-test results show that including technological opportunism in the revenue ( $F_{1,124} = 6.04, p < .05$ ), profits ( $F_{1,124} = 15.37, p < .01$ ) and market value ( $F_{1,124} = 9.34, p < .01$ ) models explains significantly more variance than without it. An anonymous reviewer is thanked for this suggestion.

firm's level of international business has a positive effect on profit and market value.

### 5.2. Mediating effect of marketing emphasis

It was hypothesized that marketing emphasis mediates the relationship between technological opportunism and business performance. Following the Baron and Kenny (1986) approach, when the mediator is not considered, technological opportunism has a positive and significant relationship with all dimensions of performance (see Table 2). Next, there is a significant relationship between technological opportunism and the mediator, marketing emphasis. This relationship is significant and positive ( $\beta = .38, p < .0001$ ). Finally, Table 3 shows that the significant relationships found in step 1 become insignificant when the mediator is added to the analysis in each of the equations. Marketing emphasis mediates the relationship between technological opportunism and revenue ( $\beta = .32, p < .05$ ), profit ( $\beta = .62, p < .01$ ) and market value ( $\beta = .36, p < .05$ ), supporting Hypotheses 2a, 2b, and 2c. For the controls, firm size had a positive effect on all of the dependent variables. Again, a firm's level of international business has a positive effect on profit and market value. Technological turbulence had a significant negative effect on firm sales. Competitive intensity had a significant negative effect on firm value. Firm size positively impacted all performance measures.

Additional analysis was performed, using Sobel tests, to see if each of these mediator effects was significant. The Sobel test examines the combined effects of the path between a dependent variable and a mediator and the path between the mediator and the independent variable and is a more direct test of mediation (Sobel, 1982). As expected, the mediator facilitates the relationship between technological opportunism and firm sales (2.28,  $p < .05$ ), profit (2.60,  $p < .01$ ), and market value (1.98,  $p < .05$ ).

### 5.3. Post-hoc analysis: marketing emphasis—B2B versus B2C firms

There were eighty-one firms that were primarily B2B focused and fifty-four B2C focused firms. This permitted a post-hoc analysis of mediation tests to see if there are differential effects of marketing emphasis on the technological opportunism–firm performance relationship. The results are shown in Table 4. For B2B firms, marketing emphasis mediates the relationship between technological opportunism and revenue ( $\beta = .33, p < .01$ ), profit ( $\beta = 1.06, p < .001$ ) and market value ( $\beta = .60, p < .01$ ). Sobel tests were all significant. However, for B2C firms, no mediating effect is observed.

**Table 2**  
Effect of technological opportunism on firm performance.

	Revenue	Profit	Market value
Hypotheses	H1a: supported	H1b: supported	H1c: supported
Technological opportunism	.21*	.54**	.34**
Business segments	.03	-.04	-.05
Firm age	.01*	.01**	.01*
Manufacturing/services	-.15	-.16	-.23
International	.30	.81*	.65*
Years public	.04*	.00	.01
Log firm size	.74***	.62***	.54***
Market turbulence	-.05	-.12	.03
Competitive intensity	-.01	.00	-.18*
Technological turbulence	-.19*	-.16	-.09
R <sup>2</sup>	.75	.52	.54

\* p&lt;.05.

\*\* p&lt;.01.

\*\*\* p&lt;.001.

## 6. Discussion, limitations and future research

The goals of this paper were three-fold: (1) to build on the limited research on technological opportunism by examining the potential links with performance; (2) to investigate potential mediating effects of marketing in the technological opportunism–performance relationship; and, (3) to obtain an initial look at the potential differences in the mediating effect of marketing emphasis between B2B and B2C firms. Prior to this, no empirical research examines these relationships, despite the perceived knowledge gap in this area (Srinivasan et al., 2002).

### 6.1. Technological opportunism and firm performance

Technological opportunism is a strong driver of financial-based performance. In particular, it appears that technologically opportunistic firms can not only generate revenues but also be efficient enough to appropriate profits from their actions. These results encourage managers to invest the necessary resources to sense and respond to technological change. Furthermore, managers may feel more comfortable investing in technological opportunism if they know that their firms' profits will outpace the competition. That firm value is higher is surprising given the variety of industries in the sample. Many managers live in utter fear of the reaction of stockholders and

**Table 3**  
Mediating effects of marketing emphasis.

	Revenue	Profit	Market value
Hypotheses	H2a: supported	H2b: supported	H2c: supported
Technological opportunism	.09	.31	.21
Marketing emphasis	.32*	.62**	.36*
Business segments	.00	-.10	-.08
Firm age	.00	.01**	.01
Manufacturing/services	-.16	-.26	-.24
International	.40	1.04**	.77*
Years public	.01	-.01	.01
Log firm size	.72***	.58***	.52***
Market turbulence	-.05	-.13	.02
Competitive intensity	-.05	-.09	-.22*
Technological turbulence	-.18*	-.16	-.08
R <sup>2</sup>	.77	.55	.56
$\Delta R^2$	.02*	.03**	.02*

Note: The change in r-squared ( $\Delta R^2$ ) for the four dependent variables is the difference between the r-squared found in Table 2 and that found in Table 3. The asterisks denote a statistically significant change in the r-squared based on an F-test for each dependent variable.

\* p&lt;.05.

\*\* p&lt;.01.

\*\*\* p&lt;.001.

analysts should their firms miss earnings estimates or fail in a new market. This can result in a myopic focus on limiting risk and inefficiency. The results of this study suggest that technologically opportunistic firms are rewarded with higher market values. Higher market values can permit technologically opportunistic firms more freedom in the financial markets to raise additional funds to further secure this competitive advantage. Future research should investigate these relationships.

The positive financial-based results indicate that perhaps other dimensions of performance are positively impacted by technological opportunism such as new products or customer satisfaction and customer lifetime value. For example, the quality of new product introductions may be enhanced by technological opportunism. Knowledge gained from sensing and responding to new technologies (e.g., through customer touch points or channel feedback) feeds the development and deployment of new products (Frambach, Prabhu, & Verhallen, 2003; Gatignon & Xuereb, 1997). Technological opportunism may also impact key marketing outcomes such as customer satisfaction and customer lifetime value. The concept of close company–customer relationships (e.g., Vargo & Lusch, 2004) rings especially true here—enabling marketing to demonstrate its link between technological opportunism and performance. Managers have a tendency to focus on competitors as a primary source for technological opportunities. The results remind managers to examine the customer base as well as in the broader environment. Customers want firms to seek out and respond to technological changes that have an effect on the company–customer relationship as customers' value new and useful technologies (Chandy & Tellis, 1998; Li & Calantone, 1998).

Managers making the case for resource investments in processes that support or complement technological opportunism may find these results encouraging. It also provides support for the joint ventures and alliances from which firms obtain information that feeds a technologically opportunistic organization. Although this study was cross-sectional, there was a strong correlation between current revenue and profit to prior years (minimum ~.90 at p<.05 respectively going back to 2001). This suggests that technological opportunism may have longer-term effects on performance, reinforcing the resourced-based view. Future research should investigate this in greater detail.

Finally, through the lens of senior marketing executives, the value of technological opportunism as a key organizational driver of success is clearly seen as critical. That marketing executives understand and successfully contribute to a firm that is technologically oriented is encouraging. It is naturally expected that Chief Information Officers or operations executives recognize the inherent value of technological opportunism. That marketing is aware of, and helps the firm to act on, technological opportunities shows that this emphasis is widely communicated.

### 6.2. Marketing emphasis

The mediation tests revealed that marketing emphasis has a profound impact on the technological opportunism–performance relationship. Marketing not only focuses on the customer from a product or service perspective but also senses technological changes that could rapidly impact the firm. Furthermore, marketing is seemingly able to report information back to the key functional areas that act on technological changes, thus enhancing performance. Perhaps in technologically opportunistic firms, the typically functional silos that hinder cooperation and collaboration are much lower. That marketing can play a key role in technological opportunities also implies a sense of trust from other functional areas in marketing intelligence and analysis. Technological opportunism implies quickly sensing and acting on information. Firms could not achieve this if functional areas did not work together. Finally, this study included firms from different industries, suggesting that marketing's role in a

**Table 4**  
Mediating effects of marketing emphasis: B2B versus B2C.

	B2B firms (n = 81)			B2C firms (n = 54)		
	Revenue	Profit <sup>a</sup>	Market value	Revenue	Profit <sup>a</sup>	Market value
Hypotheses	H2a: supported	H2b: supported	H2c: supported	H2b: not supported	H2b: not supported	H2a: not supported
Technological opportunism	.09	.24	.15	-.01	-.03	.09
Marketing emphasis	.33**	1.06***	.60**	.25	.17	.03
Business segments	-.04	-.21	-.14	-.08	.08	.03
Firm age	.01*	.01	.00	.00	.01**	.01
Manufacturing/services	-.14	-.42	-.16	-.24	1.73	.24
International	.30	1.06**	.64*	1.04**	.82	.74
Years public	.01	.03	.04	.00	-.05	-.04
Log firm size	.76***	.59***	.49***	.77*	.67***	.60***
Market turbulence	-.08	.02	.07	-.02	-.12	-.01
Competitive intensity	.04	-.10	-.13	-.22*	-.25	-.43*
Technological turbulence	-.22*	-.37*	-.17	.02	.38	.11
R <sup>2</sup>	.90	.71	.66	.61	.53	.54
ΔR <sup>2</sup>	.02*	.09**	.04*	.01	.01	.00

Note: The change in r-squared ( $\Delta R^2$ ) for the dependent variables is the positive increase from the r-squared in the model without the mediator, marketing emphasis, to the r-squared with the mediator in the model. Considering space limitations, the B2B versus B2C models without the mediator are not shown but are available from the author. The asterisks denote a statistically significant change in the r-squared based on an F-test for each dependent variable.

<sup>a</sup> In the case of profit, n = 62 for B2B firms and n = 51 for B2C firms.

\* p < .05.

\*\* p < .01.

\*\*\* p < .001.

technologically opportunistic firm may be quite significant. Future research should evaluate in more detail the roles of other functional areas as well as relationships across, up and down organizational lines.

Firms that have a strong international presence appear to benefit more from technological opportunism than those that do not. This benefit largely holds for both the direct and mediating relationships. The results echo a call for research that investigates marketing in the context of relationships not purely based on data from Western companies (Luo, Sivakumar, & Liu, 2005). Future research should examine how international firms manage technological opportunism in different contexts. Perhaps those firms that have closely-located international operations may benefit more than those who are spread out across the globe. Alternatively, far reaching operations may allow those firms to sense and respond to technological change faster than firms that are geographically concentrated. These are interesting areas for future research.

The degree of technological turbulence had a negative effect on firm sales. Perhaps a firm that is technologically opportunistic may be initially distracted from appropriating sales from current products while pursuing the latest advances. However, technologically opportunistic firms have the investments in the skills and processes already in place, and may recover quickly in the market resulting in higher profits and firm value. Some support is found in this study in that technological turbulence did not significantly impact profits or firm value in a negative manner. The examination of these dynamics lends themselves to a future longitudinal study.

The multi-industry approach allowed for a limited investigation of boundary conditions. Interestingly, it appears that many types of firms can be technologically opportunistic. Prior research focused on specific contexts, such as e-business (Srinivasan et al., 2002). This study indicates that technological opportunism is a key aspect of a firm's approach within and across industries. Yet, the benefits of a detailed study of individual industries in the context of technological opportunism are warranted. For example, when the sample was split between manufacturing and services oriented firms, there was a differing impact of marketing emphasis on the firm value. Manufacturing firms seemed to benefit from much greater market values than services firms when marketing emphasis mediates the technological opportunism–performance relationship. Marketing managers in industrial firms should take note of these results, but more research is needed.

The results also suggest that firm size is a factor in these relationships. Prior research is mixed on firm size. Small firms tend to be more flexible and adaptable while large firms are seen as rigid (Leonard-Barton, 1992; Levitt & March, 1988). However, large firms have had time to develop processes and capabilities that more fully support technological opportunism. Furthermore, the reach of those large firms in terms of brand awareness, customer experience and the management of key relationships (e.g., alliances, suppliers) are likely to be more developed than small firms. This allows larger firms to sense and respond more quickly to technological opportunities than smaller firms. Similar to this study, Srinivasan et al. (2002) also find in a multi-industry context that larger firms positively influence the development of technological opportunism. For managers in small firms, one option may be to partner with larger firms in alliances that allow for broader reach and information flows to enhance technological opportunism. For managers in larger firms, size is an asset but one that must be effective to avoid myopia, inertia and silos that can damage technological opportunism over time. An interesting future research study might investigate the growth and/or deterioration of technological opportunism as a firm grows. Perhaps there is a point in a firm's development when technological opportunism should not be pursued.

This study also examined the impact of the technological opportunism–performance relationship on different measures (sales, profits, and market value). Prior research had not made this important link. Given the positive links, managers might inquire if one performance enhancement precedes the others. Although this study did not employ longitudinal data to answer this specific question, some insight is gleaned from the results. Technological opportunism is about sensing and responding to change. This implies a high level of firm reach and established processes to properly position for opportunities. The resource investments required to build this strength firm-wide may infringe upon a firm's profits in the near term. However, those same investments are creating the network and key relationships to reach customers, distributors, suppliers and key influencers, thus enhancing sales. Over time, scale efficiencies reduce the cost of the investments to support technological opportunism, theoretically increasing profits, all else equal. Depending upon the industry, market values may suffer in the short-term as firms grow and become successful enough to demonstrate benefits (e.g., successful new products) from technological opportunism. In highly speculative industries, investments in technological opportunism may be a signal to the market of future benefits, thus increasing market

value. In these latter cases, small firms in these industries may capitalize on market value without demonstrating profits, at least in the short-term. Investigating how these measures impact the firm at various stages of firm growth through a longitudinal study should be considered. Understanding these relationships would allow marketing managers to better plan resource investments over time.

#### 6.2.1. Marketing emphasis: B2B versus B2C firms

There were stark differences between B2B and B2C firms regarding the effect of marketing emphasis. Looking at the B2B firms, marketing emphasis mediated the technological opportunism–performance relationship for all three measures: revenues, profits and firm value. However, there was no significant mediating effect for B2C firms across the three performance measures. For managers in B2B firms, this lends credence to how marketing emphasis can enhance performance. Much is potentially at stake. B2B customers buying or switching behavior is partially dependent on perceptions and the pace of technology (Heide & Weiss, 1995). B2B also trends toward longer sales cycles, more complex selling approaches, and more stakeholders invested in buying decisions, among other differences from B2C firms. Interestingly, Furthermore, B2B customers are keenly focused on the day-to-day activities and actions in a relationship (Bolton, Lemon, & Verhoef, 2008). Thus, marketing managers should be reaching out across the organization, removing obstacles to information gathering and inject themselves into new product conversations with research and development and sales. For example, one can see the potential for marketing in its relationship with sales in B2B firms. In many B2B firms, marketing and sales are quite different (Gummesson, 2002). In fact, the sales-driven nature of B2B firms tends to crowd out marketing efforts, creating disharmony (Kotler, Rackham, & Krishnaswamy, 2006). For example, at IBM, the marketing function serves as a branding and communication effort in support of the large sales-driven function that is the primary customer touch point. Also, marketing and sales often struggle to communicate and coordinate, reducing marketing's influence (Biemans, Brenčić, & Malshe, 2010). This requires marketing to work harder to prove its worth (FitzHugh & Piercy, 2006). If marketing can better coordinate information flows between it and the sales function, the firm may be in a better position to sense and respond to change (Piercy & Lane, 2003).

Marketing emphasis did not mediate the technological opportunism–performance relationship in this sub-sample of B2C firms. One plausible reason is that B2C firms may already be emphasizing marketing activities given the more volatile, often non-contractual, nature of these company–customer relationships. Perhaps it is the perceived distance (e.g., retailing situations, franchises) between the firm and its customers relative to B2B that makes B2C marketing more focused on its activities. Activities such as advertising, branding and marketing research may be at the forefront of B2C marketing whereas in B2B, sales teams are the primary customer service and relationship touch points with marketing in a support role (Verhoef & Leeflang, 2009). B2C firms are also more inclined to take risks and seek out leading edge marketing techniques to engage wider audiences of customers. Furthermore, B2C sales cycles are often shorter with lower price points and typically less complex buying decisions than B2B. B2C marketing should be naturally emphasized so that the firm can react quickly to changes in technology. In this study, the mean of B2C firms for marketing emphasis was higher than that of B2B firms, also providing some support. However, a limiting factor in the post-hoc analysis of B2B versus B2C firms is the small sample size of eighty-one B2B firms and fifty-four B2C firms. Although the differences shed some light on marketing influence in the technological opportunism–performance relationship, future research should investigate them in more detail.

## 7. Conclusion

This study draws on a cross-industry sample of firms to provide insight into whether technological impacts performance. Hereto-

fore, no empirical study has examined this key relationship. Building on the resource-based view of the firm, technological opportunism has an impact on a number of financial performance measures that are of distinct importance to managers across the firm. Perhaps even more important, this study demonstrates that technological opportunism significantly affects performance only when marketing places a strong emphasis on its resources, assets and capabilities. Furthermore, B2B firms appear to benefit more than B2C from a strong marketing emphasis in the technological opportunism–performance relationship, although more research is needed. Managers should take note of how marketing can impact various activities, and in particular technological opportunism, across the firm. Marketing managers should find ways to utilize assets, processes and capabilities to improve the firm's technological opportunities. Future research examining technological opportunism and its key relationships is sorely needed to enhance decision-making.

## Appendix A. Technological opportunism and marketing emphasis scales

Items are scored on a seven-point Likert scale with 1 = strongly disagree and 7 = strongly agree as the anchors. Instructions: Please indicate the extent to which you agree or disagree with the following statements.

Construct	Items
Technological Opportunism	Sensing ( $\alpha = .83$ ):
	<ol style="list-style-type: none"> <li>1. We are often one of the first in our industry to notice technological developments that may potentially affect our business.</li> <li>2. We actively seek information regarding technological changes in the environment that are likely to affect our business.</li> <li>3. We are often slow to notice changes in technologies that might affect our business. (R)</li> <li>4. We periodically review the likely effect of changes in technologies on our business.</li> </ol>
Marketing Emphasis	Responding ( $\alpha = .78$ ):
	1. We generally respond quickly to technological changes in the environment.
	2. We lag behind the industry in responding to new technologies. (R)
	3. We tend to resist new technologies. (R)
	1. We interact regularly with customers in emerging market segments.
	2. We focus on developing new product/services for our customers.
	3. We have a broad range of products/services.
	4. We have extensive customer services capabilities.
	5. We focus on refining our existing products/services.
	6. We are flexible enough to respond quickly to changes in our markets.
	7. We work together to support the objectives of the marketing function.
	8. Our promotion/advertising expenditures are above industry average.
	9. We focus on specific geographic markets.
	10. Our products/services are found in lower priced market segments.
	11. We use innovative marketing techniques to reach our customers.
	12. Our market research skills are stronger than our competitors.
	13. We focus on capturing market share.
14. We apply knowledge obtained from other functional units to better serve our customers.	
15. We work well with other functional units in this organization.	
16. We take calculated risks.	
17. We are very efficient.	

(R) = reverse-coded.

## Appendix B. Market turbulence, intensity of competition and technological turbulence scales

Instructions: Please indicate the extent to which you agree with each of the following statements.

Construct	Items
Market turbulence* CR = .73 α = .65 AVE = .49 Range of loadings = .55–.79	<ol style="list-style-type: none"> <li>In our business, customers' preferences change all of the time.</li> <li>We are witnessing demand for our products and services from customers who never bought them before.</li> <li>New customers tend to have needs that are different from those of our existing customers.</li> <li>Our customers tend to look for new products all of the time.</li> </ol>
Intensity of competition* CR = .76 α = .70 AVE = .53 Range of loadings = .71–.75	<ol style="list-style-type: none"> <li>There are many "promotion wars" in our industry.</li> <li>Any offer that one competitor makes to the market, others can readily match.</li> <li>Price competition is a cornerstone of our industry.</li> <li>One hears of a new competitive move almost every day.</li> </ol>
Technological turbulence* CR = .82 α = .81 AVE = .64 Range of loadings = .59–.89	<ol style="list-style-type: none"> <li>The technology in our industry is changing rapidly.</li> <li>Technological changes provide big opportunities in our industry.</li> <li>A large number of new product ideas have been made possible through technological breakthroughs in our industry.</li> <li>It is difficult to predict how far technology will advance in our industry over the next several years.</li> </ol>

\*Items are adapted from Miller (1987).

Note: Items are scored on a seven-point Likert scale with 1 = strongly disagree and 7 = strongly agree as the anchors.

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