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First-mover advantage in an Internet-enabled market environment: conceptual framework and propositions

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Abstract The competitive market environment has evolved from a physical market environment (PME) to an Internet-enabled market environment (IME) encompassing the physical and electronic marketplaces. At the same time, an increasing number of information products are available in both analog and digital forms. For information products in digital form, the IME also serves as a distribution channel. Such developments raise questions concerning the extent to which extant perspectives on first-mover advantage developed in the context of the PME hold in the IME, generally, and for information products specifically. We address this issue by developing a conceptual framework that focuses on selected sources of first-mover advantage delineated in the extant literature and advance propositions concerning sources that will have a greater or lower effect in the IME relative to the PME. A central message for first-movers in the IME that emerges from our conceptual analysis is to focus on achieving superior positions in resources that would enable them to get close to the customers fast, create switching costs, and retain them though ongoing investments in multi-faceted innovations. A second message that emerges for first-movers in the IME is they must take note of and make strategic adjustments for the potentially diminished significance of some traditional sources of first-mover advantage. These sources include spatial preemption, preemptive investment in capacity, and consumers' choice behavior under conditions of uncertainty about product quality. We discuss the implications for further conceptual and empirical work in this area of increasing significance.

Keywords Competitive strategy · First-mover advantage · Information products · Digital information products · Electronic commerce · Internet and marketing

Major changes, discontinuities, and disruptions in the competitive market environment often necessitate a critical reassessment of the applicability, transferability, relevance, and/or need for refinement of extant marketing perspectives. A relatively recent development is the emergence of the Internet as a major component of the competitive strategy of businesses. Concurrently, the market environment has evolved from a physical market environment (PME) to an Internet-enabled market environment (IME) encompassing the physical and electronic marketplaces. Another recent development is the increasing availability of information products in digital form. While the availability of information products in digital form (e.g., music and software on CDs) precedes the emergence of the IME, the Internet in recent years has also emerged as an important channel for their distribution (e.g., direct distribution of music and software over the Internet). Against this backdrop, we revisit extant perspectives on first-mover advantage, a topic that has consistently retained an important

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place in the strategy literature.[1] Specifically, we focus on the following issues:

1. The potential sources of first-mover advantage explicated in extant literature that are likely to have a (a) greater effect in the IME relative to the PME and (b) lower effect in the IME relative to the PME.
2. The moderating role of product form (digital vs analog) on sources of first-mover advantage that are likely to have (a) a greater effect in the IME relative to the PME, and (b) lower effect in the IME relative to the PME.

The conceptual analysis of the extendibility of extant perspectives on first-mover advantage, presented in this paper, makes an important contribution to the literature on first-mover advantage by demonstrating that the efficacy of certain sources of first-mover advantage change as the competitive market environment becomes Internet-enabled and information products are digitized. Specifically, our conceptual analysis suggests that network externalities, consumers' non-contractual switching costs, and technological leadership and innovations as sources of first-mover advantage assume greater importance in the IME. In contrast, consumers' choice behavior under conditions of information and consumption experience asymmetry, spatial resource positions and installed capacity diminish in importance.

The remainder of the paper is organized as follows. First we provide an overview of considerations that highlight the need for a critical reassessment of extant perspectives on first-mover advantage. This is followed by an overview of extant perspectives on first-mover advantage, the Internet-enabled market environment and information products. Third, in reference to six potential sources of first-mover advantage explicated in extant literature, we address the question of whether they are likely to be of greater or lesser importance in the IME than in the PME. To this end, we advance a conceptual framework and propositions. Finally, we discuss the implications of our framework and propositions for competitive strategy and suggest directions for future research.

First-mover advantage: the rationale for revisiting received wisdom

Figure 1 provides an overview of developments in the product-market space that highlight the need for a critical reassessment of the extendibility of the sources and degree of first-mover advantage to the IME and to products in digital form. The horizontal axis in Fig. 1 denotes *digitization in the product environment*. The vertical axis denotes *digitization in the market environment* and its evolution to an Internet-enabled market environment. Cell 1 in Fig. 1 denotes the frame of reference of extant literature on first-mover advantage. This cell shows the received wisdom on the sources of first-mover advantage in the context of a broad spectrum of products, including goods and services. Cell 2 highlights the rationale for reassessment of extant perspectives on first-mover advantage listed in Cell 1, following digitization of information products. For information products, digitization in the product environment denotes digitization of the product's core attributes (e.g., from music in analog form on cassette tapes to music in digital form on compact discs). Although not explicitly shown in the figure, for non-information products, digitization in the product environment also denotes the digitization of the information-based attributes of the product (e.g., a web site describing different option packages available for an automobile). Given that the marketing of digitized information products exclusively in the PME (Cell 2) represents an earlier time period (e.g., music and software stored on CDs and sold through bricks-and-mortar retail outlets), we focus primarily on Cells 3 and 4 which represent the current and evolving product-market environment. Cell 3 highlights the rationale for reassessment of extant perspectives on first-mover advantage listed in Cell 1 pursuant to digitization in the market environment for a broad spectrum of products. Cell 4 highlights the rationale for reassessment of extant perspectives on first-mover advantage listed in Cell 1 following digitization of both the market environment and the product environment for information products. That is, an environment characterized by the digitization of information products and the use of the Internet as a channel for their distribution (e.g., music from Apple's iTunes).

Conceptual literature on issues pertaining to first-mover advantage in the IME, besides being somewhat limited in terms of the range of issues examined, is characterized by competing views. For instance, Porter (2001) questions first-mover advantage on the Internet by pointing to two key difficulties involved in sustaining a first-mover advantage in the electronic marketplace. First, he argues that since switching costs are quite low, a later entrant who is "just a few mouse clicks" away can entice customers from the first-mover by offering a superior value proposition. Second, he notes that exploiting network externalities may not be as easy as firms may have originally envisioned. However, Downes and Mui (1998) and Tapscott (2001), among others, extol the virtues and importance of first-

[1] Consistent with the literature, we adopt a broad definition of the term, first mover—as the first entrant in a category to enter in a meaningful scale. Furthermore, much of the first-mover advantage is derived in cases where there is a reasonable gap in entry timing between the first mover and later entrants, so we focus on those cases. We explain these issues in greater detail in the subsequent section.

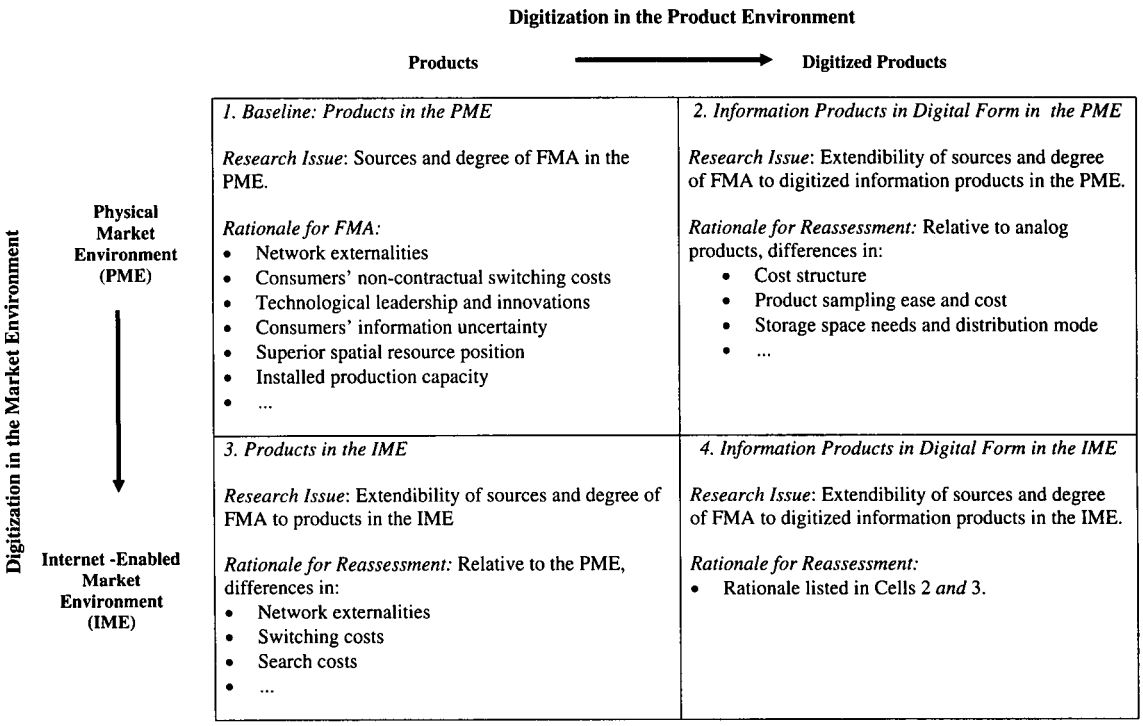


Figure 1 First-mover advantage (FMA): extendibility of extant perspectives to an Internet-enabled market environment.

mover advantage in electronic market environments. Amit and Zott's (2001) framework of how firms can create value in electronic market environments suggests that first-movers are presented with many opportunities to "lock-in" customers (see, however, Suarez and Lanzolla [2007] for a discussion of potential difficulties that may stem from environmental dynamism).

Emerging evidence from empirical and analytical studies on first-mover advantage in the IME is also mixed. For instance, Lieberman (2005) found that first-movers enjoyed a premium in market capitalizations only in markets characterized by network effects and when first-movers entered with patented innovations. However, first-movers generally enjoyed only a minimal survival advantage over other firms (for similar results in the online retailing context, see Nikolaeva 2007). Based on this evidence, Lieberman (2005, p. 28) concluded that "[t]he view that first-mover advantages are pervasive throughout the Internet sector is clearly incorrect." Geysken et al. (2002) investigated the financial consequences of adding Internet channels in the publishing industry and concluded that early followers have an advantage relative to pioneering firms. A contrasting conclusion is reached by Dewan et al. (2003) analytical framework, which suggests that pioneering firms, through customization efforts, can create sustainable competitive advantages and deter entry by other firms (see also Lee and Grewal 2004). Such contrasting views on the extendibility of extant perspectives on first-mover advantage to the IME attest to the need for further research.

First-mover advantage, the Internet-enabled market environment and information products: an overview

First-mover and first-mover advantage

While the terms first-mover and market pioneer are often used interchangeably in the literature, Chandler (1990, p. 132) notes: "It is important to distinguish first-movers from the inventors of a product or process and from the pioneers who first commercialize the innovation. In the main frame computers, for example, several pioneers invested in marketing the new machines on a national scale. But it was IBM's massive investments in the production, distribution and management of the System 360 that made it the industry's first-mover." Further, Chandler pointed out that often there can be more than one first-mover in an industry. We use the term *first-mover* to refer to the first firm to enter a market supported by sizeable investments in the production and distribution of the product, and the elapsed time between its entry and that of later entrants is of sufficient magnitude so as to allow the first-mover to achieve advantageous resource positions. We use the term *early movers* or *early entrants* to refer to multiple firms entering a market in short succession with sizeable investments in the production and distribution of a product and being able to achieve advantageous resource positions. For ease of exposition, we use the term first-mover in the remainder of the paper.

Lieberman and Montgomery (1988, p. 41) define *first-mover advantage* as "the ability of pioneering firms to earn

positive economic profits (i.e., profits in excess of the cost of capital)." In many industries and product-markets, on average, surviving first-movers or early entrants have been found to command a higher market share than surviving non-innovative late entrants (e.g., Lambkin 1988; Shankar et al. 1998; Urban et al. 1986). This observed pattern of relationship suggests that under certain organizational and environmental conditions, early entry can be a normative strategy conducive to superior marketplace and financial performance, due to the competitive cost and differentiation advantages associated with being a first-mover (Lieberman and Montgomery 1988; Kerin et al. 1992). However, extant research on the relationship between order of entry and survival is equivocal. While some studies report a higher failure (lower survival) rate for first-movers (Lilien and Yoon 1990; Golder and Tellis 1993), others report a higher survival rate for first-movers (Mascarenhas 1992; Robinson and Min 2002). Research focusing on situational contexts in which the survival risks are higher vs lower for first-movers provide additional insights into this issue (see, e.g., Srinivasan et al. 2004; Min et al. 2006; Suarez and Lanzolla 2007). Some studies highlight advantages for early followers over first-movers under specific conditions (e.g., Lilien and Yoon 1990; Shankar et al. 1999). A number of published works on first-mover advantage in the genre of integrative review articles (Lieberman and Montgomery 1988; Kerin et al. 1992), meta-analysis (Szymanski et al. 1995), and empirical generalizations (Kalyanaram et al. 1995) also provide valuable insights.

Internet-enabled market environment

Building on Amit and Zott's (2001, p. 495) definition of virtual markets and Varadarajan and Yadav's (2002, p. 297) definition of the electronic marketplace, we define the *Internet-enabled market environment* as a setting that enables buyers and sellers to exchange information, transact, and perform other activities related to the transaction before, during, and after the transaction via an information infrastructure network and devices connected to the network based on Internet protocol. Here, networks are construed broadly to encompass open and proprietary (e.g., extranet and intranet) networks, based on both fixed and wireless technologies. Also, buyers and sellers may choose to perform all or only a sub-set of purchase-related activities in the IME. That is, an IME does not automatically imply exclusive reliance on the Internet by buyers and sellers to perform all of the purchase-related activities.

Relative to the PME, several characteristics of the IME are noteworthy. The transactional environment is information rich, buyers' information-search costs are lower, and information asymmetry between sellers and buyers is diminished (see Ellison and Ellison 2005; Varadarajan and Yadav 2002; Yadav and Varadarajan 2005a, b). Researchers have shown a keen interest in exploring how consumers operate in, and are likely to be affected by, this new networked market environment. Extant work in the area, both conceptual (e.g., Alba et al. 1997; Peterson et al. 1997; Yadav and Varadarajan 2005a, b) and empirical (e.g., Lynch and Beck 2001; Pan et al. 2002), provides insights into the benefits that consumers may derive and market outcomes in an IME. These benefits stem largely from declining search costs (Bakos 1991; Brynjolfsson et al. 2003) and the ability of buyers to manipulate information in online decision-making contexts (Haubl and Trifts 2000). However, it remains unclear whether these new capabilities always result in superior consumer choices and favorable market prices (Pan et al. 2002; Spann and Tellis 2006).

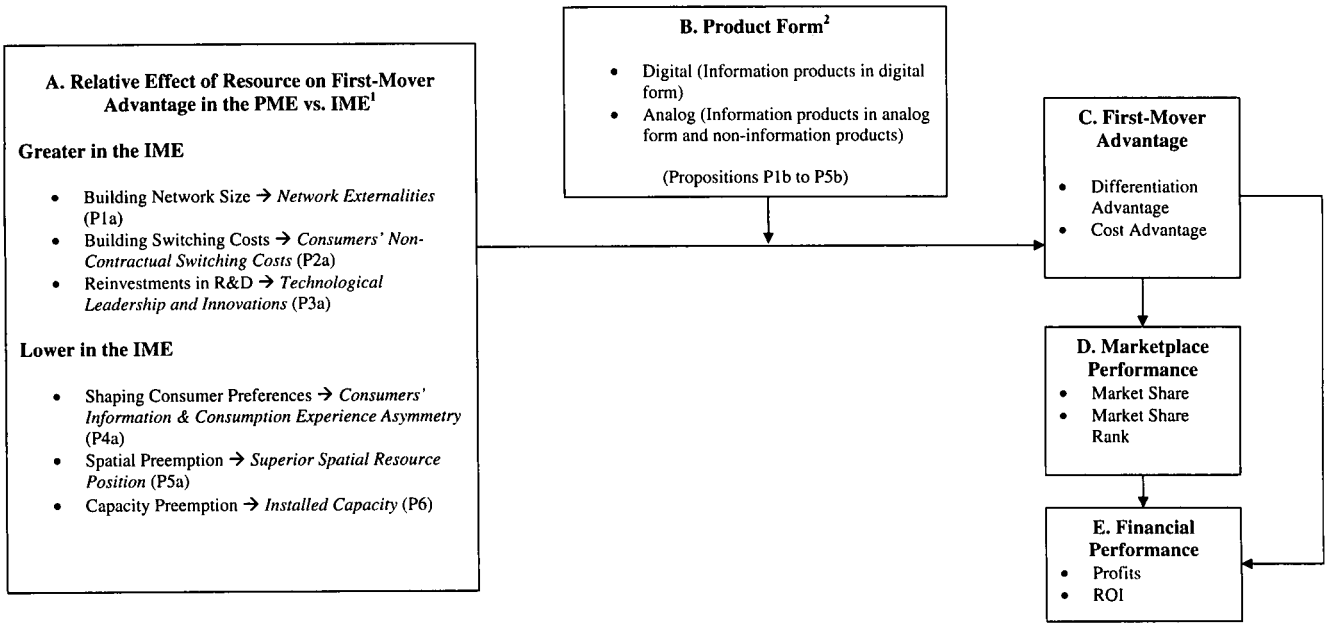
Information products

Shapiro and Varian (1999) view information as anything that can be digitized—that is, encoded as a stream of bits. While information refers to anything that *can* be digitized, information products can exist in digitized and non-digitized (i.e., analog) forms. The co-existence of information products in both analog and digital forms is quite pervasive (e.g., magazines and newspapers printed on paper and stored on CDs, and movies on videotapes and digital video discs). However, it is also conceivable that an information product in digitized form might eventually displace the analog version of the product (e.g., displacement of the printed encyclopedia by the CD and web versions).

Guided by the above perspectives, we conceptualize *information products* as products whose core attributes *can be* digitized (represented, stored, retrieved, and transmitted as packets of zeros and ones) and *digitized information products* as those whose core attributes *are* represented, stored, retrieved, and transmitted as packets of zeros and ones. While digitized information products are amenable to being *distributed* via the Internet (e.g., software and music downloads), this does not preclude their distribution via more traditional means (e.g., shrink-wrapped software copied on a CD and distributed through bricks-and-mortar and Internet retailers). Building on the foregoing overviews of first-mover advantage, the IME and information products, the next section presents a reassessment of extant perspectives on sources of first-mover advantage in the IME.

First-mover advantage in the Internet-enabled market environment: conceptual framework and propositions

Figure 2 presents a conceptual framework of first-mover advantage in the PME vs IME. Here, first-mover advantage (box C) is viewed as resulting from the combined effect of



Note: 1. Strategic actions of the first-mover are shown in regular font. Resources accumulated from strategic actions are shown in italics (also see Table 1). P1a to P5a, P6, and P1b to P5b denote propositions.
2. "Digital" refers to information products in digital form (since only information products are amenable to digitization). "Analog" encompasses both information products and non-information products in analog form.

Figure 2 First-mover advantage in the physical market environment (PME) vs the Internet-enabled environment (IME): a conceptual framework.

the resources delineated in box A. In the resource-based view of the firm, competitive advantage of a firm is understood as a function of the combined value and rarity of all of a firm's resources and resource interactions (see Lavie 2006). Here, *resources* refers to all assets, capabilities, organizational processes, firm attributes, information, and knowledge controlled by a firm that enable it to conceive of and implement strategies that improve its efficiency and effectiveness (Barney 1991). A firm's strategic actions or behaviors (toward which expenditures are incurred) lead to the accumulation of specific skills and resources. In some of the published works on first-mover advantage, specific actions or behaviors (e.g., spatial preemption) per se of the first-mover are characterized as sources of competitive advantage. Rather, it is the *resources* that the first-mover accumulates as a consequence of engaging in specific actions that are the sources of competitive advantage. In turn, this facilitates the achievement of superior marketplace performance and financial performance (boxes D and E in Fig. 2). Box B (digital vs analog) focuses on the moderating effect of product form. Specifically, whether the importance of a potential source of first-mover advantage in the IME is likely to be enhanced or diminished by the production and distribution of the focal product in digital form. Here, "digital" refers to information products in digital form (since only information products are amenable to digitization) and "analog" encompasses both information products in analog form and non-information products in analog form. In Table 1, we provide a list of strategic actions, the associated sources of first-mover advantage and the resulting propositions.

In each of the sections that follow, we first present conceptual arguments in support of the main propositions (P1a to P5a and P6) that focus on the relative effect of a resource on first-mover advantage in the PME vs IME. For some of these propositions, we provide a follow-up discussion drawing attention to the conditions under which a first-mover's strategic actions in the IME may not even translate into a first-mover advantage. As Teece (2006) argues, a first-mover's success in appropriating rents from its actions can vary considerably. Following each of the main propositions, we present conceptual arguments for a second set of propositions (P1b to P5b) focusing on the moderating effect of product form (digital vs analog). Furthermore, in the case of network externalities, to highlight the relevance of other contingencies, we also explore the moderating effect of a second variable (source of network externalities; see P1c). A more detailed discussion of the propositions and the underlying conceptual rationale follows.

Building network size → network externalities

Network externalities or *network effects* refer to a market exchange, industry standard, or product becoming increasingly valuable to its current and potential users as the installed base (i.e., size of the network) increases (Katz and Shapiro 1985; Frels et al. 2003). In general, the first-mover, by capitalizing on the opportunity to cultivate a large user

Table 1 Strategic actions and sources of first-mover advantage

Strategic actions	Potential sources of first-mover advantage	Propositions
Building network size	*Network externalities*: The first-mover's network being perceived more favorably by present and potential customers due to its larger size relative to those of later entrants.	P1a, P1b, P1c
Building switching costs	*Consumers' switching costs*: Customers preferring to remain with first-mover due to costs they will be forced to incur if they choose to switch to another firm (contractual, non-contractual, and/or staggered switching costs).	P2a, P2b
Reinvestment of slack resources in R&D	*Technological leadership and innovations*: Product, process, marketing, administrative and business model innovations.	P3a, P3b
Investments in shaping consumer preference formation	*Consumers' information asymmetry*: Consumers being more knowledgeable about the product offering of the first-mover compared to those of later entrants. *Consumers' consumption experience asymmetry*: Consumers satisfied with the performance of the first-mover's product offering choosing to remain loyal, to minimize risk.	P4a, P4b
Spatial preemption	*Spatial resource position:* The first-mover achieving a competitive advantage by preempting the most desirable spatial positions in the market, leading to entry deterrence and/or differentiation advantage(s).	P5a, P5b
Manufacturing capacity preemption	*Installed production output capacity:* The first-mover's installed production capacity acting as a deterrent to potential competitors entering the market (particularly under the scenario of the first-mover's installed production capacity being of the same order as the size of the market) or relegating followers to niche markets.	P6

The focus of this table is limited to strategic actions and resources whose effects on first-mover advantage in the PME vs IME, and moderated by product form (digital vs analog), are examined in this paper (see Fig. 2 and propositions). A number of other strategic actions and corresponding sources of first-mover advantage are mentioned in the literature (see Lieberman and Montgomery 1988; Kerin et al. 1992)

base, before the entry of competitors, can achieve a competitive differentiation advantage. That is, ceteris paribus, the first-mover's product offering will be viewed more favorably by current and potential users in light of the larger size of its network relative to those of its competitors.

The role of network externalities as a potential source of competitive advantage has been extensively explored in the literature (e.g., Betamax vs VHS format videocassette recorders [see Cusamano et al. 1992; Varadarajan 1999]; Nintendo vs Sega videogame systems [see Shankar and Bayus 2003]). *Direct network externalities* refer to the utility of a product to each user depending on the number of users of the product (e.g., telephones and fax machines). Products that are complementary to the focal product give rise to *indirect or complementary network externalities*. Competition between networks can exist at different levels such as: product (Word and WordPerfect), technology or industry standard (Windows and Mac OS), and market exchange (eBay and Yahoo! auctions). Network externalities can be product class/category-specific or firm-specific, depending on the compatibility of brands/standards in the market. They are firm-specific if each firm has a non-compatible technology platform as in the market for video games (e.g., Shankar and Bayus 2003). They can be product category-specific if there are multiple firms within each competing technology platform. For example, in the cell phone market, the offerings of some firms are based on the CDMA platform whereas the products of a number of other firms are based on the GSM platform.

Regardless of whether the network context is the market exchange, industry standard, or a product, network externalities as a potential source of first-mover advantage is likely to be of greater importance in the IME compared to the PME. Consider, for instance, the case of competition between market exchanges (*market maker networks* that bring together buyers and sellers). Sellers are more likely to list their products in the market exchange with the most buyers; buyers are more likely to buy in the market exchange that has the most sellers. Due to the reinforcing effect of the propensity of buyers and sellers to gravitate toward the largest market exchange, the first-mover has an opportunity to leverage network externalities to its competitive advantage (Lieberman 2005). Traditional constraints such as physical space that limit the number of buyers and sellers who can congregate in a market exchange (e.g., a physical auction site) do not apply to an electronic market exchange (e.g., an electronic auction site). Also, while the distance that buyers and sellers may have to travel to congregate will affect the size of the network of physical market exchanges, this constraint does not apply to electronic market exchanges. Finally, unmediated (face-to-face) interaction between buyers and sellers, a characteristic of physical market exchanges, constrains the days and times when exchanges can occur in the physical marketplace. Electronic market exchanges allow spatially separated buyers and sellers to transact with significantly increased freedom of time and place. Consequently, compared with physical market exchanges, we expect network externalities

to play a more influential role for building first-mover advantage in the context of electronic market exchanges.

Consider, next, competition between networks in the context of a product. Relative to the PME, the IME is more conducive for the first-mover to enhance network utility (the benefits that current and potential customers of the product derive from network size) through the accumulation, dissemination and utilization (i.e., organizational responsiveness) of information about transactions and interactions within the boundaries of its network to which it has privileged access. *Privileged access*, in this context, refers to the ability of first-mover to observe network behavior and capture information before later entrants. Privileged access to information about transactions and product-usage patterns can provide opportunities for identifying similar members, connecting new members to current members, and to strengthen and expand the network. To the extent that later entrants are at a disadvantage with regard to information access related to network members and network transactions in the IME, the first-mover is likely to maintain its competitive advantage. Therefore,

P1a. The effect of network externalities on first-mover advantage will be greater in the Internet-enabled market environment (IME) than in the physical market environment (PME).

Although, in general, the first-mover may have an opportunity to shape, influence, or establish the industry standards for a product to its advantage, certain caveats must be borne in mind. First, in certain instances, the industry standards might be set by a regulatory body. Second, rather than being set by either a regulatory body, the first-mover, or a dominant player in the industry, open industry standards might evolve over time as a consequence of the collective efforts of a community of users as evidenced by the movement toward open source in the software industry. Third, as pointed out by Srinivasan et al. (2004), if prospective customers were to adopt a "wait-and-see" attitude until uncertainties are resolved, the associated initial slow sales over a long period would provide a window of opportunity for later entrants. Fourth, in specific reference to indirect network effects, on the one hand, the relatively larger installed base of the first-mover, by attracting more developers of complementary and compatible products, can enhance the utility of the first-mover's product and speed adoption. On the other hand, if developers of complementary products were to adopt a wait-and-see posture, and defer committing to the first-mover's hardware platform until it has achieved significant market penetration, this could slow adoption of the first-mover's platform and offer a window of opportunity for later entrants (see: Srinivasan et al. 2004; Stremersch et al. 2007).

The implication of the first and second caveats is that under conditions of the first-mover not having an opportunity to shape, influence or determine the setting of the industry standards in its favor, the relationship between network effects and first-mover advantage will be weaker than otherwise. The third caveat also points to a condition under which the strength of the relationship between network effects and first-mover advantage will be weakened. The fourth caveat points to two alternative conditions under which the effect of network effects on first-mover advantage will be strengthened and weakened, respectively. However, it is important to note these caveats are applicable in both the PME and IME and are not unique to the IME.

Moderating effect of product form A number of considerations suggest that the effect of network externalities on first-mover advantage is likely to be greater for information products in digital form in the IME than for information products in analog form and for non-information products. First, typically, a consumer's use of certain information products in digital form is strongly driven by how many others use the product (e.g., portable document file). Second, information products in digital form are more useful with accessories than without them (e.g., the value of a portable document file writer increases when a compatible document reader is widely available). Third, information products in digital form can be produced and distributed fast, allowing quick realization of the benefits of network (for example, a picture taken by one user on a cell phone can be transmitted instantaneously to several others). Fourth, as a number of information products in digital form (e.g., word processing, presentation, and spreadsheet software) are characterized by low consumer demand for variety, a first-mover's network of users may be difficult to breach. Relative to the size and scope of the network for information products in the PME, the potential size and scope of the network for information products in digital form in the IME is greater. Therefore,

P1b. The greater effect of network externalities on first-mover advantage in the IME relative to the PME will be more pronounced for information products in digital form than for information products in analog form and for non-information products.

Moderating effect of source of network externalities The size of the effect of network externalities on first-mover advantage could differ by the strength of the network as derived from the source of network externalities—technological compatibility vs social group accessibility (Shankar and Bayus 2003). Customers of certain products or services, such as telecommunications and extranet networks, derive instant network externality-based benefit if the goods

or services used by other customers and prospects are technologically compatible. In the IME, because the ability to be connected to customers and prospects can be instantaneous and real time, such technology-enabled benefits could result in the rapid development of a strong user base than in a PME. If customers, however, predominantly derive network externality benefits from having access to a social group, the potential first-mover advantage for a firm in the IME may be smaller. Unlike in the case of technological compatibility, where instant transactional benefit leads to accelerated growth of the installed base, in the case of social group accessibility, the customer benefits and the growth of a user network may realize at a slower pace in the IME. These arguments lead to the following proposition (not shown in Fig. 2).

P1c. The greater effect of network externalities on first-mover advantage in the IME relative to the PME will be more pronounced for technology compatibility than for social group accessibility as the source of network externalities.

Building switching costs → consumers' non-contractual switching costs

Burnham, Frels and Mahajan (2003, p. 110) define switching costs as "one time costs that customers associate with the process of switching from one provider to another." *Non-contractual switching costs* refers to the costs that a consumer will incur when switching in a non-contractual setting—one in which the customer is not bound by a contract with the seller. Extant literature provides insights into the effect of switching costs on first-mover advantage (Robinson 1988; Makadok 1998). For instance, Makadok reports that first-movers in the mutual fund industry are able to enjoy a moderately sustainable market share advantage by creating non-contractual switching costs. The typology of switching costs delineated in Burnham, Frels and Mahajan [procedural (economic risk, evaluation, set up and learning costs), financial (benefit loss and monetary loss costs) and relational (personal relationship loss and brand relationship loss costs)] provide additional insights into the nature and scope of non-contractual switching costs.

Relative to the PME, the ease of switching in the IME highlights the importance of building non-contractual switching costs. At the same time, however, the IME offers firms additional opportunities to nurture customer loyalty. Case in point is the opportunity available to the first-mover to achieve a competitive advantage by investing in sticky features to build non-contractual switching costs. In the IME, a first-mover, by investing in sticky features such as personalization tools that customers perceive as providing valuable benefits, can lock in customers—increase the likelihood of their visiting its website, frequency of visit, duration of visit, and average purchase volume during each visit (Johnson et al. 2003; Manchanda et al. 2006). From the insights gleaned by analyzing information related to the above, a first-mover can develop a superior understanding of the evolving needs and preferences of customers, and utilize this insight to customize its product offerings. Also, relative to the PME, customization efforts in the IME can be significantly enhanced by personalizing information and the interactive experience. Furthermore, since personalization tools generally improve with the accumulation of transaction history, the ability of first-movers to glean valuable customer insights from accumulated transaction history over a longer period of time may enable them to retain the superiority of their efforts compared with followers. For example, Netflix's recommendation system and other personalization tools are widely viewed as a source of competitive differentiation advantage in the online movie rental industry. Therefore,

P2a. The effect of consumers' non-contractual switching costs on first-mover advantage will be greater in the IME than in the PME.

In the absence of reassurance that customers often derive from being able to touch, feel, and see products, and visit the seller's physical location, a strong brand name as a source of non-contractual switching cost is likely to be of greater importance in an IME compared to a PME. Indeed, brand image is significantly related to behavioral intentions in online environments (Bart et al. 2005). Therefore, in the IME, it may be more critical for the first-mover to engage in brand building efforts. However, in the absence of a legacy in the PME to build on, brand building efforts to develop non-contractual switching costs in the IME (e.g., a pure play Internet retailer) could be a costly endeavor.

Moderating effect of product form A number of information products in digital form are characterized by non-contractual switching costs. For instance, a consumer familiar with the use of the first-mover's word-processing, presentation, or spreadsheet software, would incur non-contractual switching costs by switching to a later entrant's software. The costs include the time and effort that must be expended in learning to use the new software. Compatibility factors might lead to incurring additional non-contractual switching costs on hardware. Furthermore, for information products in digital form characterized by low demand for variety, consumers' concerns over incurring non-monetary, non-contractual switching costs are likely to be higher. Therefore,

P2b. The greater effect of consumers' non-contractual switching costs on first-mover advantage in the IME relative to the PME will be more pronounced for information products in digital form than for information products in analog form and for non-information products.

Reinvestments in R&D → technological leadership and innovations

Innovations can be potential sources of first-mover advantage to the extent that patents and proprietary learning are deterrents to their appropriation by competitors (Banbury and Mitchell 1995) in both the PME and the IME. In the IME, recent developments relating to a number of marketing process innovations (e.g., Amazon.com's purchase facilitation with its one-click feature), and business process or model innovations (e.g., Priceline.com's business model) provide valuable insights into their patentability vs appropriability.

Organizational slack refers to resources in excess of those required to produce a given output (Nohria and Gulati 1996). Resources generated by superior performance may become slack resources readily available to managers within the organization (Cyert and March 1963) to experiment and learn (Levinthal and March 1993). Until such time competitors enter the market, the first-mover will be in a position to command high profit margins. Even after the entry of competitors, to the extent that consumers' perception of the risk of buying from the first-mover is lower than for later entrants, consumers may be willing to pay a higher price for the product offerings of the former (Robinson and Fornell 1985; Urban et al. 1986). This line of reasoning suggests that, all else being equal, the first-mover would be better endowed with slack resources to reinvest in R&D to sustain a superior position in technological leadership and innovations (product, process, marketing, administrative and business model innovations). For instance, Robinson and Chiang (2002) note that first-movers are more likely to engage in product development on an ongoing basis than later entrants.

However, it should be noted that during the mid to late 1990s, organizational slack had very little to do with venture funding of numerous Internet start-ups. Indeed, billions of dollars of venture capital were invested in start-ups, many with questionable claims (in retrospect) of first-mover advantage. Furthermore, even successful Internet start-ups (both first-movers and early entrants) often incurred losses for several years before becoming profitable. For these firms, the source of financial resources for continued investments in R&D to sustain a superior position in technological leadership and innovations was either additional infusion of funds by venture capital firms or going public, rather than slack resources. The above caveats notwithstanding, given the dynamic nature of the IMEs, and the faster rate of change, it is particularly important for first-movers to continuously innovate in multi-faceted ways to remain on top. In contrast, in the PME, the competitive advantage to the first-mover often comes from lowering costs by doing "more of the same" and achieving economies of scale across the value chain. Therefore,

P3a. The effect of technological leadership and innovations on first-mover advantage will be greater in the IME than in the PME.

Moderating effect of product form Information products in digital form can be redefined through incremental innovations to add customer value more easily and quickly than can information products in analog form. For example, the value of an information product in digital form such as Adobe's Acrobat PDF Reader software can be readily enhanced to include editing features by enabling a software code. Such enhancements allow the first-mover of an information product in digital form to innovate in the way it prices, sells, and organizes its product design, product support, and sales teams more nimbly than would be possible for information products in analog form. Google's rapid rise to prominence is attributed, at least partly, to its growing number of new online services that leverage Google's core online search engine technology. Therefore,

P3b. The greater effect of incremental innovations on first-mover advantage in the IME relative to the PME will be more pronounced for information products in digital form than for information products in analog form and for non-information products.

The limited scope of P3b (to the moderating influence of product form on the effect of incremental innovations on first-mover advantage) stems from the absence of an a priori basis to advance propositions in the context of innovation in other realms.

Investments in consumer preference formation → consumers' information asymmetry and consumption experience asymmetry

The effect of consumers' information asymmetry (consumers being more knowledgeable about the product offering of the first-mover compared with those of later entrants) and consumption-experience asymmetry (consumers possessing a greater amount of consumption expe-

rience with the first-mover's product compared with those of later entrants) on first-mover advantage have been highlighted in extant literature (Kerin et al. 1992). In general, under conditions of imperfect information about product quality, consumers tend to remain loyal to the first brand they encounter that performs satisfactorily. Even consumers entering the market for the first time, and confronted with the task of evaluating competitive offerings, are likely to seek ways of economizing on product information search and evaluation costs. One approach that first-time buyers may use to economize on evaluation costs is free ride on the presumed analysis of better informed consumers by buying the leading brand. Often the leading brand may be the one that has been available in the market for the longest time (Lieberman and Montgomery 1988). It has been shown that the manner in which consumers learn about alternative brands in the marketplace can create a memory and preference structure that favors the first-mover (Carpenter and Nakamoto 1989; Kardes and Kalyanaram 1993). Similarly, Boulding and Christen (2003) find that the first-mover generally benefits from factors that result in a lack of consumer learning in the marketplace.

The competitive advantage that a first-mover enjoys in the PME due to the repeat and first-time buyers economizing on product-information search and evaluation costs is likely to be less pronounced in the IME. Although search and evaluation in the IME would inevitably entail certain non-monetary costs (e.g., time), the requisite product-related information is often available at no monetary cost. In addition to instant access to information, the information infrastructure of the IME and its distinctive features such as recommendation agents vastly increases one's ability to store, retrieve, sort, filter, and distill information. Such capabilities greatly enhance the realized value of the underlying information and facilitate more effective comparisons across firms and their respective products. Indeed, consumers' ability to readily conduct such comparisons may account for the shortened duration of first-mover advantages reported in Nikolaeva's (2007) study of 460 online retailers.

The role of brand building in the creation of information asymmetry to sustain first-mover advantage is particularly relevant. Brands are intangible assets that firms can use to create competitive advantage. When brand importance is high in a market, the first-mover can create information asymmetry relative to the brand offerings of late movers by investing in brand building efforts and enhancing its brand equity. Furthermore, when the offerings in a market are fairly undifferentiated, brand equity can provide a source of advantage for the first-mover. The advantage a first-mover accrues through these actions will likely be lower in the IME than in the PME due to lower information search costs for consumers and lower information dissemination costs for the late mover (the cost of drawing potential customers' attention to the superiority of its product offering relative to that of the first-mover). It is possible that due to the absence of an opportunity to touch and feel products in the IME, the value of favorable consumption experience outcome with the first-mover can be greater than in the PME. In the aggregate, however, the net effect of other factors discussed above suggest the following proposition.

P4a. The effect of consumers' information and consumption experience asymmetry on first-mover advantage will be lower in the IME than in the PME.

Moderating effect of product form In general, the cost that a late entrant would incur in promoting trial and sampling of an information product in digital form will be considerably lower than the cost of promoting trial and sampling of an information product in analog form. Consider, for instance, an information product in digital form such as income tax preparation software. Here, the marginal cost that a late entrant would incur in order to allow prospective customers to try its product in digital form for free would be very low—tending towards zero. For instance, the late entrant can allow prospective buyers to use the income tax preparation software in the IME by accessing its web site to prepare their annual tax returns, and only if completely satisfied with the experience, require them to pay for consuming the product (i.e., prior to printing and/or electronically transmitting the completed tax return). In the online retailing context, there is evidence that first-movers of products with more digital characteristics do not enjoy any advantage beyond the initial years (Nikolaeva 2007). Therefore,

P4b. The diminished effect of consumers' information and consumption experience asymmetry on first-mover advantage in the IME relative to the PME will be more pronounced for information products in digital form than for information products in analog form and for non-information products.

Spatial preemption → spatial resource position

Spatial resource positions resulting from preemption of the most attractive physical spaces in the PME can be a source of competitive advantage for the first-mover. By preempting the most attractive locations in the physical space and/or the perceptual space (i.e., positioning in the perceptual space), the first-mover can achieve a competitive differentiation advantage. In certain instances, spatial preemption may also enable a first-mover to achieve a competitive cost advantage. Consider, for instance, the time period during

which banks began to offer ATMs as an alternative to interfacing with human tellers for processing financial transactions. A prescient first-mover would have had the opportunity to acquire or lease prime real estate for placing ATMs at prices below those that would prevail later in the evolution of the market. As the market for a resource such as strategic locations for placing ATMs became competitive, the price of the resource would have been bid up until it was equal to the future above-normal benefits that can derived from the resource (see Barney 1986; Bharadwaj et al. 1993).

In the IME, a firm may be able to achieve a short-term competitive differentiation advantage through preemption of the most attractive domain name and electronic storefront. For instance, information search engines and portals (e.g., Yahoo!) and Internet access portals (e.g., AOL.com), which also serve as gateways for accessing the websites of businesses in various product categories, differ in their relative market standing and attractiveness (e.g., number of subscribers, unique visitors, frequency of visits, and transaction volume per visit). A firm, through preemptive placement on a more attractive portal (e.g., an agreement for an exclusive listing in a particular product category), may be able to achieve a competitive differentiation advantage. However, as the supply of online space is considerably less restricted than that of physical spaces, the resulting competitive advantage are likely to be short-lived.

In the IME, firms can possibly create entry barriers and spatially preempt competitors by judiciously using both the online and offline spaces, primarily the online space. In an analytical model of competition between a direct marketer and traditional retailers, Balasubramanian (1998) shows that a direct marketer can act as a competitive wedge between retail stores. Furthermore, using both analytical and empirical models, Pan et al. (2002) show that, in equilibrium, multichannel retailers have higher prices than Internet retailers, suggesting that in the IME, spatial preemption cannot provide a price premium advantage. These results suggest that, in general, the likelihood of favorable outcomes from spatial preemption will be smaller in the IME than in the PME (for a similar conclusion, see also: Cattani et al. 2006; Liu et al. 2006). Therefore,

P5a. The effect of spatial resource position on first-mover advantage will be lower in the IME than in the PME.

Moderating effect of product form For physical products, the likelihood of later entrants being locked out of specific channels, due to shelf space constraints, is greater for products that are bulky (e.g., disposable diapers). Unlike physical products, digitized information products do not take up any physical space. Once the requisite infrastructure has been created, fulfillment activities pertaining to storage, product handling, and distribution can be automated and performed quite efficiently (see Anderson and Anderson 2002). It is possible that the number of slots available for *preferred placement* that might be available on the opening web page in an electronic marketplace setting such as a search engine, information portal or shopping portal may be limited. Nevertheless, it is less likely that a digitized information product would be locked out of the electronic marketplace simply due to space constraints. Therefore,

P5b. The diminished effect of spatial resource position on first-mover advantage in the IME relative to the PME will be more pronounced for information products in digital form than for information products in analog form and for non-information products.

Capacity preemption → installed capacity

Under certain conditions, the first-mover's installed production (output) capacity can be a credible deterrent to the entry of new competitors. A concept pertinent in this context is the *minimum efficient scale* of production (MES), "the smallest volume for which the unit cost reaches a minimum" (Oster 1994, p. 59). When the installed production capacity of the first-mover, MES, and the size of the market (S) are all of the same order of magnitude, installed production capacity can be a credible deterrent to the entry of new competitors. The IME significantly extends the geographic reach of firms because it bestows on competing firms a greater ability to market their offerings to prospective buyers farther from their principal base of operation (e.g., from national to global). In effect, competitors' assessments of market size and market potential are likely to be based on a significantly larger, more global market area. Holding MES constant, the increase in S implies that multiple firms can coexist in an industry. Therefore, the importance of the first-mover's installed production capacity as an entry deterrent will diminish in the IME.

The role of computer server capacity and information technology capacity in potentially creating an entry barrier, and a possible first-mover advantage in the IME, also merit assessment. In the IME, investments in server capacity will enable a firm to offer a wide selection of products, vast amounts of information, and a high level of customer service on its web site. However, investing in computer server capacity to serve a large market is unlikely to result in the first-mover being able to erect a deterrent to entry by late movers. Unlike investments in manufacturing capacity that can result in scale economy advantages, investments in computer server capacity are unlikely to

yield similar advantages to the first-mover. Investments in server capacity and information technology are typically non-proprietary, freely available to all competitors and characterized by low asset specificity. Hence, such investments are not a strong deterrent to entry by late movers. Fudenberg and Tirole's (1984) game theoretic analysis of over- and underinvestment in manufacturing capacity strategies by an incumbent firm also points to the lack of deterrence provided by such investments. Therefore,

P6. The effect of installed capacity on first-mover advantage will be lower in the IME than in the PME.

While P6 is advanced under conditions of "holding MES constant," it should be recognized that long-term technological advances can lead to significantly lower MES. However, in the short-term, our assumption of MES being constant is reasonable. Also, as Kerin et al. (1992) note, the installed capacity of the first-mover is likely to be a source of competitive advantage only under conditions of low demand uncertainty. The rationale being, under conditions of high demand uncertainty, the first-mover is less likely to make sizeable investments in manufacturing capacity to deter new entrants.

Moderating effect of product form While the number of units of an information product that can be produced in analog form may be constrained by natural limits (manufacturing capacity constraints), there are no natural limits to the production of additional units (copies) of information products in digital form (see Shapiro and Varian 1999). In other words, for information products in digital form, installed production capacity is not a meaningful concept. Hence, the concept of installed production capacity as an entry deterrent and potential source of first-mover advantage is not applicable in the context of information products in digital form in the IME.

Discussion

Implications for marketing practice

The critical reassessment of the extendibility of extant perspectives on first-mover advantage to the IME and to information products in digital form presented here can be valuable to managers in: (1) developing a better understanding of issues pertaining to first-mover advantage in the IME; (2) nurturing resources that are important from the standpoint of achieving competitive advantage in the IME, in particular, for digitized information products; and (3) focusing on developing competencies that might be critical for being successful in the IME and the development and marketing of information products in digital form. IAs argued in the previous section, given that the effects of certain sources of first-mover advantage explicated in extant literature are likely to diminish in the IME, sources whose effects are likely to be more pronounced in the IME (network externalities, non-contractual switching costs, and technological leadership and innovations) have important implications for marketing practice. A brief discussion follows.

Get close to customers fast: invest in building network size rapidly in the IME The proposition on the greater effect of network externalities on first-mover advantage in the IME than in the PME (P1a) highlights the importance of proactive efforts by the first-mover to build the size of the network (i.e., getting close to customers fast). Although many avenues are available to firms for rapidly building network size, privileged access to information about transaction and communication patterns in the network can play a significant role in this endeavor. Having exclusive access to this information can provide opportunities for identifying clusters of network members that have (1) similar needs, (2) an interest in interacting with each other, and/or (3) a potential for creating other synergistic advantages for the overall network. For example, in the initial years of online exchanges, eBay was quick to expand its network of buyers and sellers by letting them create a powerful value system in the form of a socially acceptable rating system. Similarly, MySpace and Linkedin rapidly locked in users by providing its members tools to recruit other members and then integrate them into the network.

Retain customers through continual multi-faceted innovations The proposition relating to the greater effect of technological leadership and innovation on first-mover advantage in the IME than in the PME (P3a) highlights the importance of making ongoing investments in product, process, and business model innovations to create and deliver value to customers. In specific reference to product-markets characterized by network externalities, through proactive development of value-added products and experiences for current and prospective network members, and thereby enhancing network utility, the first-mover can offer compelling reasons for customers to remain with its network. It is important for the first-mover must to recognize that in the IME, only through ongoing investments in innovations and enhancing the network's utility to users can it sustain the advantage associated with network size. The need for such innovations is crucial, but is often overlooked by those who advocate the strategic benefits of being first in the IME by solely invoking the network effects rationale. As pointed out by Schilling (2002), in addition to a firm's entry timing and installed base of users, its learning orientation also contributes to its success. In the absence of a

learning orientation, a late entrant may be able to overtake the first-mover by creating a stronger network through offerings that provide greater utility to users (Shankar and Bayus 2003; Srinivasan et al. 2004). However, in the IME, the first-mover has an opportunity to learn faster and preempt such strategic moves by later entrants than in the PME. As noted earlier, a prescient first-mover has the opportunity to leverage privileged access to information within its network to offer more precise and useful personalization and recommendations to its members. Later entrants may not be able to match this in the short-run due to the elapsed time between when they are able to observe network behavior and capture information, relative to the first-mover.

There are many successful examples of the adoption of such an approach. Google represents an example of a firm that is continually innovating its value proposition to its customers (advertisers) by constantly enhancing its paid search advertising model. It started with text search advertising, moved to video search advertising through its subsidiary YouTube, and then developed or acquired capabilities to broker ad placement in other media such as newspapers and radio. With its iGoogle initiative, the firm offered an extensive range of personalized information services that it could leverage for strengthening relationships with users of its search engine and for placing advertising. There are also examples of failures of firms that did not adopt such an approach. One such example is Prodigy, the first-mover in the online services space. Without continuous innovation, it was eclipsed by a later entrant such as AOL which constantly added a steady stream of incrementally innovative features. Of course, AOL itself subsequently faced a host of challenges that stemmed, at least partly, from lackluster innovations.

Leverage sticky features of the IME to create non-contractual switching costs The proposition on the greater effect of consumers' non-contractual switching costs on first-mover advantage in the IME than in the PME (P2a) suggests that a first-mover, by leveraging the sticky features of its website and the Internet to enable customers to manage their interactions with the firm with greater ease (at lower non-monetary costs), can create non-contractual switching costs in the IME. The first-mover can build on the switching costs by innovating in such a manner that its customers can effortlessly switch to the next generation of its own innovative products, relative to other competitive product offerings. Customer loyalty for services chosen online is greater than that for services selected offline, primarily due to the sticky features in the IME (Shankar et al. 2003).

Some first-movers have successfully used the IME's sticky features to increase switching costs and enjoy an advantage. For example, Amazon's one-click ordering system is a sticky feature that initially helped to lock-in its customers by simplifying order placement. Similarly, Netflix, the first-mover in the online DVD rental market, developed a sticky interface by offering personalized movie recommendations that leveraged customers' movie renting patterns and preferences. eBay's reputation system based on seller- and buyer-provided ratings is widely recognized as a sticky feature that has made it difficult for other online auction firms to mount a serious competitive challenge.

Implications for Future Research

Empirical testing Empirical testing of the propositions advanced here constitutes a logical avenue for future research. Two approaches to empirically test the propositions are possible. One approach is to elicit managers' perceptions and beliefs pertaining to first-mover advantages in the IME relative to the PME. Such an approach is consistent with Bolton (2006) and Song et al. (1999) and is reasonable given that digitization in both the market environment and product environment are ongoing, and objective marketplace data are difficult to obtain due to their proprietary nature.

In this approach, using a survey, managers could be asked to report whether the effect of a specific strategic action (e.g., network building efforts) on first-mover advantage would be more pronounced, less pronounced, or remain invariant in the IME relative to the PME. Alternatively, an experimental scenario-based approach could be used to create hypothetical competitive environments that varied systematically along two factors: market type (PME vs IME) and the first-mover's strategic action (e.g., relative emphases on marketing programs with the potential to create non-contractual switching costs for customers). Experienced managers can be asked to study the scenarios and indicate the likely relative performance outcomes for the first-mover (e.g., market share and return on investment) under different experimental conditions.

In reference to managers' perceptions and beliefs, the propositions can be tested as stated with the first-mover's competitive advantage as the outcome variable. However, extant research on first-mover advantage has largely focused on *identifiable* and *measurable variables* such as order of entry, market share, market share rank, financial performance and survival rate. All else being equal, competitive cost and/or differentiation advantage can be expected to result in superior marketplace and financial performance.

A second possible approach to test the propositions is a cross-sectional study of a balanced set of markets in both the IME and the PME. This approach would involve a combination of both hard data on variables such as sales, market share, installed customer base, profits of firms, and survey data on variables such as switching costs and consumers' information and consumption experience asymmetry. For example, firm resources can be measured by

hard data on variables such as assets, net income, and goodwill, while consumer information asymmetry can be captured by variables such as awareness of brands collected through survey data. The propositions can be tested by linear and log-linear regression models linking the appropriate variables in the propositions. Typically, a regression model would be adequate to test most propositions. However, for propositions involving spatial preemption arguments, a multidimensional perceptual mapping analysis of competitors together with a regression model would be most appropriate. Although such an empirical approach may not involve a comprehensive structural model, it would be useful to explore the face validity of the propositions.

Other future research issues The proposed conceptual framework (Fig. 2) and propositions focus on how the effects of specific resources of first-mover advantage are likely to be moderated by product form. A potential avenue for further conceptual enhancement as well as future empirical research is to explore the moderating influences of other contextual variables. n reference to the link between first-mover advantage and the resource-based view of the firm, Lieberman and Montgomery (1998) highlight the importance of both the *opportunities* available to early entrants to preempt potential sources of competitive advantage and *heterogeneity* in the ability of firms to identify and exploit potential sources of competitive advantage. In this paper, we focused on the opportunities available to the first-mover to preempt potential sources of competitive advantage. Addressing heterogeneity in the ability of firms to identify and exploit potential opportunities for achieving a first-mover advantage constitutes another potential direction for future research and enhancement of the proposed conceptual model.

Finally, the extent to which extant perspectives on late-mover advantages developed in the context of the PME extend to the IME represents another potential avenue for future research. Potential late-mover advantages include economies of scope, innovation, improvements in alignable attributes, consumers' variety-seeking behavior, learning from the first-mover's mistakes, first-mover's cost disadvantages, and the scope and speed of international market entry (see, e.g., Golder and Tellis 1993; Shankar et al. 1999). An examination of these and other mechanisms available to late movers to neutralize the competitive advantages of the first-mover in Internet-enabled environments represents a promising area for future research.

Conclusion

Extant literature offers conflicting views on first-mover advantage in the IME, ranging from an assertion that it is automatically bestowed to a complete dismissal of its relevance. The frenzied entry behavior of start-ups observed in the IME during the mid to late 1990s was, at least to some extent, fueled by the desire to be a first-mover under the misguided belief that it would automatically lead to a sustainable competitive advantage. It is also conceivable that metaphorical comparisons of developments in the electronic marketplace with nineteenth century events such as the "gold rush" and "land grab" may have contributed to entrepreneurial efforts to be simply first in the IME in specific product categories. However, the meteoric rise—and the equally dramatic fall—of a large number of first-to-market firms in the IME raised serious questions about specific strategic actions through which prescient first-movers can successfully achieve a competitive advantage in the IME. In some markets in the IME, first movers, nevertheless, have managed to maintain their market share leads over their competitors.

Against this backdrop, our conceptual analysis of the extendibility of extant perspectives on first-mover advantage makes an important contribution to the literature on first-mover advantage. Our analysis suggests that sources such as network externalities, consumers' non-contractual switching costs, and technological leadership and innovations assume greater importance in the IME than in the PME. In contrast, sources such as consumer choice under information and consumption experience asymmetry, spatial resource positions, and installed capacity play a diminished role in the IME than in the PME.

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References

Alba, J., Lynch, J. W., Weitz, B., Janiszewski, C., Lutz, R., Sawyer, A., et al. (1997). Interactive home shopping: Consumer, retailer, and manufacturer incentives to participate in electronic marketplaces. *Journal of Marketing, 61*(3), 38–53.

Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal, 22*(6/7), 493.

Anderson, P., & Anderson, E. (2002). The new e-commerce intermediaries. *Sloan Management Review, 43*(4), 53–62.

Balasubramanian, S. (1998). Mail vs. mall: A strategic analysis of competition between direct marketers and conventional retailers. *Marketing Science, 17*(3), 181–195.

Bakos, J. Y. (1991). A strategic analysis of electronic marketplaces. *MIS Quarterly, 15*, 295–310.

Banbury, C. M., & Mitchell, W. (1995). The effect of introducing important incremental innovations on market share and business survival. *Strategic Management Journal, 16*(Special Issue), 161–182.

Barney, J. (1986). Strategic factor markets: Expectations, luck and business strategy. *Management Science, 32*(10), 1231–1241.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Bart, Y., Shankar, V., Urban, G. L., & Sultan, F. (2005). Are drivers and role of online trust the same for all web sites and consumers?: A large scale exploratory empirical study. *Journal of Marketing, 69*(4), 133–152.

Bharadwaj, S. G., Varadarajan, R., & Fahy, J. (1993). Sustainable competitive advantage in service industries: A conceptual model and research propositions. *Journal of Marketing, 57*(4), 83–99.

Bolton, L. E. (2006). *Believing in first-mover advantage.* Working Paper, Wharton School, University of Pennsylvania.

Boulding, W., & Christen, M. (2003). Sustainable pioneering advantage? profit implications of market entry order. *Marketing Science, 22*(3), 371–392.

Brynjolfsson, E., Smith, M. D., & Hu, Y. (2003). Consumer surplus in the digital economy: Estimating the value of increased product variety at online bookstores. *Management Science, 49*(11), 1580–1596.

Burnham, T. A., Frels, J. K., & Mahajan, V. (2003). Consumer switching costs: A typology, antecedents, and consequences. *Journal of the Academy of Marketing Science, 31*(2), 109–126.

Carpenter, G. S., & Nakamoto, K. (1989). Consumer preference formation and competitive advantage. *Journal of Marketing Research, 26*(3), 285–298.

Cattani, K., Gilland, W., Heese, S., & Swaminathan, J. (2006). Boiling frogs: Pricing strategies for a manufacturer adding an internet channel. *Production and Operations Management, 15*(1), 40–56.

Chandler, A. D. (1990). The enduring logic of industrial success. *Harvard Business Review, 70*(2), 130–140.

Cusamano, M. A., Myllonadis, Y., & Rosenbloom, R. S. (1992). Strategic maneuvering and mass-market dynamics: The triumph of VHS over Beta. *Business History Review, 66*(1), 51–94.

Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm.* Englewood Cliffs, NJ: Prentice-Hall.

Dewan, R., Jing, B., & Seidmann, A. (2003). Product customization and price competition on the internet. *Management Science, 49* (8), 1055–1070.

Downes, L., & Mui, C. (1998). *Unleashing the killer app: Digital strategies for market dominance.* Cambridge, MA: Harvard Business School Press.

Ellison, G., & Ellison, S. F. (2005). Lessons about markets from the internet. *Journal of Economic Perspectives, 19*(2), 139–158.

Frels, J., Shervani, T., & Srivastava, R. K. (2003). The integrated networks model: Explaining resource allocations in network markets. *Journal of Marketing, 67*(1), 29–45.

Fudenberg, D., & Tirole, J. (1984). The fat-cat effect, the puppy-dog ploy, and the lean and hungry look. *The American Economic Review, 74*(2), 361–366.

Geyskens, I., Gielens, K., & Dekimpe, M. G. (2002). The market valuation of Internet channel additions. *Journal of Marketing, 66* (2), 102–119.

Golder, P., & Tellis, G. (1993). Pioneering advantage: Marketing logic or legend. *Journal of Marketing Research, 30*(2), 158–171.

Haubl, G., & Trifts, V. (2000). Consumer decision making in online environments: The effects of interactive decision aids. *Marketing Science, 19*(1), 4–21.

Johnson, E. J., Bellman, S., & Lohse, G. L. (2003). Cognitive lock-in and the power law of practice. *Journal of Marketing, 67*, 62–75.

Kalyanaram, G., Robinson, W. T., & Urban, G. L. (1995). Order of market entry: Established empirical generalizations, emerging empirical generalizations, and future research. *Marketing Science, 14*(3, Part 2), G212–G221.

Kardes, F., & Kalyanaram, G. (1993). Order-of -entry effects on consumer memory and judgment: An information integration perspective. *Journal of Marketing Research, 29*(3), 343–57.

Katz, M. L., & Shapiro, C. (1985). Network externalities, competition and compatibility. *The American Economic Review, 75*, 424–440.

Kerin, R., Varadarajan, R., & Peterson, R. (1992). First mover advantage: A synthesis and critique. *Journal of Marketing, 56*(l), 33–52.

Lambkin, M. (1988). Order of entry and performance in new markets. *Strategic Management Journal, 9*(Special Issue), 127–140.

Lavie, D. (2006). The competitive advantage of interconnected firms: An extension of the resource-based view. *Academy of Management Review, 31*(3), 638–658.

Lee, R. P., & Grewal, R. (2004). Strategic responses to new technologies and their impact on firm performance. *Journal of Marketing, 68*(4), 157–171.

Levinthal, D. A., & March, J. G. (1993). The myopia of learning. *Strategic Management Journal, 14*(8), 95–102.

Lieberman, M. B. (2005). *Did first-mover advantage survive the dot-com crash?* Working Paper, Anderson Graduate School of Management, University of California, Los Angeles.

Lieberman, M. B., & Montgomery, D. (1988). First mover advantages. *Strategic Management Journal, 9*(Special Issue), 41–58,.

Lieberman, M. B., & Montgomery, D. (1998). First-over (dis) advantages: Retrospective and link with the resource based view. *Strategic Management Journal, 19*(12), 1111–1125.

Lilien, G. L., & Yoon, E. (1990). The timing of competitive market-entry: An exploratory study of new industrial products. *Management Science, 36*(5), 568–585.

Liu, Y., Gupta, S., & Zhang, J. (2006). A note on self-restraint as an online entry-deterrent strategy. *Management Science, 52*(11), 1799–1809.

Lynch, P. D., & Beck, J. C. (2001). Profiles of internet buyers in 20 countries: Evidence for region-specific strategies. *Journal of International Business Studies, 32*(4), 725–748.

Makadok, R. (1998). Can first-mover and early-mover advantages be sustained in an industry with low barriers to entry/imitation. *Strategic Management Journal, 19*(7), 683–696.

Manchanda, P., Dubé, J. - P., Goh, K. Y., & Chintagunta, P. (2006). The effect of banner advertising on internet purchasing. *Journal of Marketing Research, 43*(1), 98–108.

Mascarenhas, B. (1992). Order of entry and performance in international markets. *Strategic Management Journal, 13*(7), 499–510.

Min, S., Kalwani, M. V., & Robinson, W. T. (2006). Market pioneer and early follower survival risks: A contingency analysis of really new versus incrementally new product-markets. *Journal of Marketing, 70*, 15–33.

Nikolaeva, R. (2007). The dynamic nature of survival determinants in e-commerce. *The Journal of the Academy of Marketing Science*, in press. DOI 10.1007/s11747-007-0018-4.

Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation. *Academy of Management Journal, 39*, 1245–1264.

Oster, S. M. (1994). *Modern competitive analysis.* New York, NY: Oxford University Press.

Pan, X., Shankar, V., & Ratchford, B. T. (2002). Price competition between pure play versus bricks-and-clicks retailers: Analytical model and empirical analysis. *Advances in Applied Economics, 11*, 29–61.

Peterson, R. A., Balasubramanian, S., & Bronnenberg, B. J. (1997). Exploring the implications of the internet for consumer marketing. *Journal of the Academy of Marketing Science, 25*, 329–346.

Porter, M. E. (2001). Strategy and the internet. *Harvard Business Review, 79*, 63–78.

Robinson, W. (1988). Sources of market pioneer advantages: The case of industrial goods industries. *Journal of Marketing Research, 25*(1), 87–94.

Robinson, W., & Chiang, J. (2002). Product development strategies for established market pioneers, early followers, and late entrants. *Strategic Management Journal, 23*, 855–866.

Robinson, W., & Fornell, C. (1985). Sources of market pioneer advantages in consumer g?ods industries. *Journal of Marketing Research, 22*, 305–17.

Robinson, W., & Min, S. (2002). Is the first to market the first to fail? empirical evidence for industrial goods businesses. *Journal of Marketing Research, 39*(1), 120–28.

Schilling, M. A. (2002). Technology success and failure in winner-take-all markets: The impact of learning orientation, timing, and network externalities. *Strategic Management Journal, 23*(5), 387–398.

Shankar, V., & Bayus, B. L. (2003). Network effects and competition: An empirical analysis of the video game industry. *Strategic Management Journal, 24*(4), 375–394.

Shankar, V., Carpenter, G. S., & Krishnamurthi, L. (1998). Late mover advantage: How innovative late entrants outsell pioneers. *Journal of Marketing Research, 35*(1), 54–70.

Shankar, V., Carpenter, G. S., & Krishnamurthi, L. (1999). Advantages of entering in the early growth stage: an empirical analysis. *Journal of Marketing Research, 36*(2), 269–276.

Shankar, V., Smith, A., & Rangaswamy, A. (2003). Customer satisfaction and loyalty in online and offline environments. *International Journal of Research in Marketing, 20*(2), 153–75.

Shapiro, C., & Varian, H. R. (1999). *Information rules: A strategic guide to the network economy.* Cambridge, MA: Harvard Business School Press.

Song, M. X., Di Benedetto, A. C., & Zhao, Y. L. (1999). Pioneering advantages in manufacturing and service industries: Empirical evidence from nine countries. *Strategic Management Journal, 20* (9), 811–836.

Spann, M., & Tellis, G. J. (2006). Does the internet promote better consumer decisions? the case of name-your-own-price auctions. *Journal of Marketing, 70*(1), 65–78.

Srinivasan, R., Lilien, G. L., & Rangaswamy, A. (2004). First in, first out? The effects of network externalities on pioneer survival. *Journal of Marketing, 68*(1), 41–58.

Stremersch, S., Tellis, G. J., Franses, P. H., & Binken, J. L. G. (2007). Indirect network effects in new product growth. *Journal of Marketing, 71*(3), 52–74.

Suarez, F. F., & Lanzolla, G. (2007). The role of environmental dynamics in building a first mover advantage theory. *Academy of Management Review, 32*(2), 377–392.

Szymanski, D. M., Troy, L. C., & Bharadwaj, S. G. (1995). Order of entry and business performance: An empirical synthesis and reexamination. *Journal of Marketing, 59*(4), 17–33.

Tapscott, D. (2001). Rethinking strategy in a networked world. *Strategy & Business, 24*, 1–8.

Teece, D. J. (2006). Reflections on 'profiting from innovation'. *Research Policy, 35*(8), 1131–1146.

Urban, G. L., Carter, T., Gaskin, S., & Mucha, Z. (1986). Market share rewards to pioneering brands: An empirical analysis and strategic implications. *Management Science, 32*(6), 645–659.

Varadarajan, R. (1999). Strategy content and process perspectives revisited. *Journal of the Academy of Marketing Science, 27*, 88–100.

Varadarajan, R., & Yadav, M. S. (2002). Marketing strategy and the internet: An organizing framework. *Journal of Academy of Marketing Science, 30*(4), 296–312.

Yadav, M. S., & Varadarajan, R. (2005a). Interactivity in the electronic marketplace: An exposition of the concept and implications for research. *Journal of the Academy of Marketing Science, 33*(4), 585–603.

Yadav, M. S., & Varadarajan, R. (2005b). Understanding product migration to the electronic marketplace: A conceptual framework. *Journal of Retailing, 81*(2), 125–140.