

Online Market Entry: The Motivations for Imitation across Retailer Types

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Abstract

This study examines the motivations for imitation in retailers' online channel entry. Extant literature suggests that legitimacy and efficiency are the primary motivators for firms to imitate. We develop hypotheses which center on the belief that not all firm types would use the same motivator for deciding to imitate and enter the online market; legitimacy would be the driving force for some retailer types while efficiency would be the motivator for others. We test our hypotheses on a unique data collected from multiple sources. Our findings confirm that the motivators for imitation vary across retailer types.

Keywords: Imitative Behavior, Online Retailing, Legitimacy, Efficiency, Channel Entry.

1. INTRODUCTION

The question of incumbent entry into new industries has been the subject of various studies (Adner, 2002; Christensen, 1997). Yet some of the theories and empirical findings are difficult to reconcile. For example, if market pioneering is advantageous (Robinson *et al.*, 1994; Schmalensee, 1982), why do numerous empirical studies show initial low entry rates followed by a massive wave of entry (Geroski, 1995; Klepper, 2002)? Why would firms rush to enter a market when presumably the most attractive niches are already occupied by the early entrants? The presence of uncertainty and the fact that firms imitate each other under uncertainty (Lieberman and Asaba, 2006) can serve as the reconciliation link. Firms may imitate because they think that the first movers got it right and the market has potential, from which even later entrants can profit or they may imitate because of legitimacy concerns. The differences can give rise to distinct imitation patterns, which subsequently can answer questions about the path of diffusion of a new market or an innovation.

Scholars from different areas have studied extensively imitation (Lieberman and Asaba, 2006; Ordanini *et al.*, 2008). Sudharshan *et al.* (2006) even call it the best strategic response to the optimal introduction of a new generation product by a competitor. Many researchers (see Lieberman and Asaba 2006 for an overview) have argued that uncertainty about the adoption of innovations can result in imitative behavior.

The major contribution of the current study is the documentation of varied imitative behavior across distinct groups of firms. While prior research has looked at whom firms imitate, suggesting that firms follow their peers (Haunschild, 1993; Kraatz,

1998), the most successful or the largest firms (Haveman, 1993), their legitimacy-based group (Barreto and Baden Fuller, 2006), or different group leaders (Sudharshan *et al.*, 2014), we ask whether the motivation for imitation depends on the type of imitating firm. If distinct groups of firms exhibit different imitative behavior due to diverse motivations, then understanding the phenomenon would be useful in mapping the spread of an innovation. We start by first addressing what might be the main drivers of the imitative behavior of companies – a topic of the overview studies by Lieberman and Asaba (2006) and Ordanini *et al.* (2008). Then we focus the study on the following question: “Are there any differences between distinct types of firms in terms of their motivations to imitate in the context of market entry?”

Ordanini *et al.* (2008) investigated a variety of literature streams to understand the reasons why firms imitate. The two over-arching rationales that emerged from their detailed review are: risk reduction and search for effectiveness. These two rationales have a natural linkage to the well-established management literature concepts of legitimacy and efficiency. We follow the approach of Tolbert and Zucker (1983) linking legitimacy to mimetic isomorphism as firms perceive an innovation the more legitimate the wider it spreads. Since greater legitimacy reduces the risk of failure, firms imitate in pursuit of legitimacy. On the other hand, firms may imitate because of profit driven motives of improved efficiency.

A few studies have studied legitimacy and efficiency together (Lieberman and Asaba, 2006) and, in the context of order of entry, studied when one motivation is more important than the other (Tolbert and Zucker, 1983; Westphal *et al.*, 1997). While these two motivations are not mutually exclusive, in any one scenario, one motivation

dominates over the other. In our present research we empirically evaluate if imitation in online market entry is affected by any of these two concepts. We also evaluate whether the roles of legitimacy and efficiency might have different prominences in contexts other than order of entry.

Prior studies have equated efficiency with economic factors influencing adoption and legitimacy with institutional factors. That is, firms motivated by efficiency do not imitate, but only look at the profit potential of an innovation adoption. In the context of our study, we claim that based on differences in firm and strategic characteristics, companies would exhibit different imitation motives. To that extent, we agree with Kennedy and Fiss (2009) that social motives can co-exist with economic ones and we go a step further by applying Ordanini *et al.*'s (2008) framework that imitation (which has traditionally been considered as a social motivation for adoption) can also have economic drivers.

We situate our study in the retailing industry and the adoption of the Internet as a transaction channel. New industries typically emerge with new technologies and while they can open up market opportunities, they are also associated with great risk for incumbents. The emergence of the Internet presented such a situation to the retailing industry where the availability of a new technology created a new market – e-commerce. The U.S. online retail industry sales grew from \$ 42 billion in 2002 to \$ 53 billion in 2003 (an increase of 26%), and to \$ 210 billion in 2013 (a much slower average growth of 13% during 2003-2013) [<http://www.statista.com/statistics/273424/retail-e-commerce-sales-in-the-united-states>]. While this gives an overview of the online retail industry as a whole, a more granular view is obtained once we see the market shares of the clicks only

vs. the bricks and clicks categories of players in the online retail industry. The ‘clicks only’ sellers had a 42.3% market share and the ‘bricks and clicks’ sellers accounted for 57.7% of the market in 2012.

[<http://www.fticonsulting.com/global2/media/collateral/united-states/2013-us-online-retail-sales-forecast.pdf>].

During the early years, the future of the Internet for online retailing excited companies because of the profit potential of this channel. Such excitement was however dampened to a fair degree by the uncertainties associated with this novel mode of operations. Thus, many retailers embraced the “wait and see” approach that researchers have found to be typical of incumbents (Giarratana, 2008). But who waited, how much and what did they see?

The main questions we ask in our study are whether legitimacy and efficiency motivations can be distinguished empirically and whether these vary across different groups of retailers. Based on theoretical arguments discussed in the body of the article, we claim that the two imitation motivations can be distinguished by the slope of the effect of the number of prior adopters on the probability of online entry. For the purpose of estimating the effects, we gather an empirical sample of almost 500 US retailers. We develop a quantitative model to determine whether the probability of adopting e-commerce is significantly affected by the phenomenon of more and more firms entering the online market and whether the effect is different across heterogeneous firms. We split the sample into distinctive groups based on the extensive studies of these firm and strategic characteristics in the management and marketing literatures –de novo entry, firm size, scope, ownership, and channel fit. We do observe different effects across distinct

retailer types. Such knowledge is important because imitation patterns across diverse group of firms ultimately determine the spread of an innovation. Our study contributes to the overlooked topic of the potential pool of adopters and demonstrates how imitation is contingent on the different circumstances of a firm.

The rest of the paper is structured as follows. Section 2 develops the theoretical background for our study. In section 3 we draw from this theoretical framework to develop a set of hypotheses. In sections 4 and 5, we describe the details of our empirical data that we use to test our theory as well as our modeling methodology. Section 6 provides the results of our analysis. In section 7, we summarize our findings and discuss their implications.

2. THEORETICAL BACKGROUND

The subject of imitation has been discussed extensively in a variety of literatures. Ordanani *et al.* (2008) have done a very good integrative summary of these streams of literature. We draw on this hereafter to develop the focus of our theoretical framework for understanding imitation in the backdrop of e-commerce adoption.

Ordanani *et al.* (2008)'s review spans about six different streams of research. What is particularly interesting to readers is that the driving forces of these streams in fact represent a continuum. At one end is the Neo-institutional Theory and Mimetic Isomorphism literature; the primary driving force here is uncertainty, which relates to an end point of *risk reduction*. Towards the other end is the Decision-making literature with its thrust tending towards *search for effectiveness*. In between in this continuum are other

literatures such as Industrial Organization where the purposes of imitation center on the smoothing of rivalry competition. In this context it is worth noting that the review article on imitation by Lieberman and Asaba (2006) had identified the concepts of rivalry and information as the drivers of imitation by firms. However we believe that the subsequent review by Ordanini *et al.* (2008) is more comprehensive in scope and its range subsumes concepts such as rivalry and information among others. Therefore we agree with Ordanini *et al.* that the two over-arching rationales for imitation are risk reduction and search for effectiveness.

If we look a bit more closely at the imitation literature streams positioned towards the two ends of the continuum, we see how risk reduction and search for effectiveness can map on to the concepts of *legitimacy* and *efficiency*. Diffusion of new technologies among companies is also generally assumed to be guided by these two main motives (Grewal *et al.*, 2001). The Mimetic Isomorphism theory for instance, says that in the face of environmental uncertainty firms imitate to gain legitimacy in their field of operation (Oliver, 1997). Our present research focuses on the scenario where the nascent field of online selling had clearly created a situation of environmental uncertainty -- a fertile condition for encouraging firms to think about the importance of legitimacy.

On the other hand some theories from the Organization Learning perspective, conclude that firms observe the advantages and disadvantages that previous firms derived from their actions (in our research's context, an example of such an action will be the entry of certain firms into the online market with other firms watching to see how that turned out), assess them and then imitate them or not (Baum and Ingram, 1998; Feldman, 2000). Ordanini *et al.* (2008) also mention that the central thought from the Decision

Making literature is that if the decision process is expensive, imitation maybe an attractive option from the perspective of efficiency (Pingle, 1995). The evolving online market with its many new variables and situations exemplifies a situation where it would make sense for certain firms to decide to imitate in their search for enhancing efficiency.

In view of the above discussions, we utilize the two over-arching themes of *legitimacy* and *efficiency* to investigate the imitative behaviors of online firms. On the basis of this framework we evaluate how different categories of companies might be primarily driven by one or the other of these two motives to imitate and adopt e-commerce.

Next we briefly review some articles that talk about the two key concepts of legitimacy and efficiency; we also discuss how these two drivers might lead to different patterns of adoption – i.e., in the context of online market entry due to imitation. Following that we develop the logic for a series of hypotheses where certain firm types are likely to imitate due to legitimacy motivations while other categories could rely on efficiency motivation for imitation.

2.1. Legitimacy

Ordanini *et al.* (2008) suggest that in times of environmental uncertainty, firms imitate others to gain legitimacy. Similar sentiments have been expressed by many other researchers, e.g., (Westphal *et al.*, 1997). In fact this link between environmental uncertainty, risk reduction and legitimacy is a part of institutional theory.

Institutional theory lays emphasis on the role of social factors in driving organizational action (DiMaggio and Powell, 1983; Westphal *et al.*, 1997). These forces

are external to the organization and compel a firm to conform to what is the social norm, or what is normally accepted as the legitimate practice. The pressure to adopt in this case is external and may come from parent organizations, social pressure from other organizations with ties to the focal organization, as well as the wider environment (Burns and Wholey, 1993; Meyer and Rowan, 1977; Scott, 1995). These institutional forces lead to an isomorphic behavior where all firms start behaving in a similar fashion, with the result that they adopt business practices that are identical to each other (DiMaggio and Powell, 1983; Mizruchi and Fein, 1999). Over time, organizations become similar to one another without necessarily becoming more efficient (DiMaggio and Powell, 1983).

Tendency to imitate increases in the number of adopters of the innovation (Burns and Wholey, 1993; Chaves, 1996; Fligstein, 1991; Kraatz, 1998; Palmer *et al.*, 1993; Rao *et al.*, 2001). If a practice is common among peers, then it must be a credible practice. That is, an innovation is legitimate to the extent that relevant actors regard it as the standard way to do business. However, if very few firms adopt a practice, then it can hardly be called the standard way to do business. A practice would become the standard in an industry as more and more firms adopt it, i.e., legitimacy can only increase in the number of firms. Further, prior adopters increase isomorphic pressures as additional adopters increase the illegitimacy of non-adoption (Terlaak and Gong, 2008).

Rhee *et al.* (2006) discuss how organizations expect to gain *social* legitimacy through imitation under environmental uncertainty. DiMaggio and Powell (1983) argue that organizational attempts to deal rationally with uncertainty lead to isomorphic structures. In a related discussion, Rao *et al.* (2001) argue that the strongest test of social proof is to see if recent adoptions increase the rate of subsequent adoptions. Given that

conforming to social norms is closely related to the concept of legitimacy, we would argue that increasing rate of adoptions would be an indicator of legitimacy being the motive. In our present research, we are looking at the entrance of firms in the early years of online retailing. Since Internet retailing was a radical innovation, the period was marked by considerable uncertainty. For firms driven to imitate by legitimacy motives, associated adoption patterns should thus be expected to be increasing in density at an increasing rate.

We have already argued that when firms are driven by legitimacy motives, attractiveness of an innovation increases in the number of adopters (Rao *et al.*, 2001). To put it mathematically, attractiveness of adopting an innovation for a non-adopter is $\alpha + \beta D + \epsilon$, where D is the number of adopters, α, β are the response parameters and ϵ captures all the unobservable factors that influence adoption of a new innovation. Since the basic concepts of legitimacy and imitation argue for a positive impact of density, the parameter Beta will be positive. If we assume that ϵ is distributed extreme value, then the probability of adopting a new innovation by a non-adopter would be $\pi = \exp(\alpha + \beta D) / (1 + \exp(\alpha + \beta D))$. To study how this probability varies as D varies, we study the first derivative, i.e., $\frac{\partial \pi}{\partial D} = \beta \pi (1 - \pi)$. We can see that $\frac{\partial \pi}{\partial D}$ will be positive for all values of D and therefore, as the density of adopters increases, the probability of adoption by a non-adopter would also increase. To determine whether the probability increases at a increasing rate or decreasing rate, we calculate the second derivative,

$$\frac{\partial^2 \pi}{\partial D^2} = \beta^2 \pi (1 - \pi) (1 - 2\pi)$$

This expression would be positive if $\pi < 0.5$ and will be negative if $\pi > 0.5$. We are interested in periods of high uncertainty, which in turn is always high when an industry is

new. At this time, probability of adoption is low, and therefore the second derivative would be positive. This indicates that during periods of high uncertainty, legitimacy motives will lead to adoption rates increasing in density at increasing rates.

2.2. Efficiency

In contrast to the legitimacy perspective, the efficiency perspective is driven by an assessment of the costs and benefits of the innovation as perceived by the imitating firm. In other words, firms adopt an innovation because it improves the efficiency of their operations, and thereby positively impacts their profitability. In this situation, when confronted with a new process, a firm evaluates it in terms of its impact on its internal functioning (Aldrich, 1979; Utterbeck, 1971) and adopts it only if it yields technical value in terms of improved operational efficiency. While a firm learns of an innovation by observing other firms in the industry, the pressure to adopt in this case is internal to an organization. Whenever a new process or practice becomes available in the marketplace, firms evaluate it in economic terms to see if it can improve the functioning of the firm or can add value to the organization (Meyer and Rowan, 1977)

A firm may not know its relative abilities and need experience to learn about them, or more generally firms may have some information about their abilities but gain additional information from experience (Jovanovic, 1982). Rather than learning the value of a new practice by adoption and experimentation, a firm learns by vicarious learning, i.e., learning by watching the actions of other firms (Haunschild and Miner, 1997; Levinthal and March, 1993; Terlaak and Gong, 2008). Vicarious learning therefore reduces search costs and substitutes for a firm's own experience. There is considerable

uncertainty involved in adopting a new practice and success with the new technology is not assured. Because of firms' heterogeneity, some firms may need more observations in order to deduce if an innovation would be efficient. Therefore, information about the efficiency of a new practice should increase as the number of firms adopting it increases, but at a declining rate. This happens because of three reasons. First, we assume the law of the diminishing returns to information (Lenox and King, 2004) applies to vicarious learning. As more and more firms adopt a new technology, incremental information from the entry of similar actors declines as more of these actors enter. This is because the new information revealed by each new adopter is lower when many have adopted in the past (Rao *et al.*, 2001).

Second, some firms adopt innovations with the hope that these innovations would help them differentiate and increase their profitability. Differentiation is one of the available strategies for firms to increase profitability (Porter, 1996). E-commerce created the expectation of a new profitable opportunity. However, as the number of firms adopting the Internet increased, the competition between the different entrants increased and any differentiating advantage decreased. Porter (1996) also stresses the relationship between differentiation and operational effectiveness, which involves performing similar activities better than the competition. As a feature becomes common among competitors, it becomes harder to explore effectiveness advantages leading to differentiation. This phenomenon is reflected in prior research (e.g., Abrahamson, 1996; Abrahamson and Fairchild, 1999) suggesting that as total adoptions of a practice increase, some firms begin to reject the practice because adoption no longer provides differentiation effects and hence no competitive advantage. Thus, if companies are motivated to imitate looking

to differentiate themselves, this motive is valid only when the adoption is relatively rare. When adoption becomes common, differentiation stops being a leading motive causing imitation rates to decline. Therefore the efficiencies conferred by the Internet channel gradually declined with increased entry beyond a certain point.

Third, as the number of firms adopting an innovation increases, the amount of data available about other firms' experiences with the innovation also increases. A firm may learn about other firms that have successfully adopted a new technology and it may also learn about firms that have adopted a new technology and then abandoned it after some time. A firm involved in vicarious learning would be quite interested to learn why some firms fail and others succeed. Fortunately, firms also have information about the traits of different firms that have experimented with the new technology. This allows a firm interested in learning why some firms succeed and others fail to correlate relevant firm traits, such as, firm size, etc. to success/failure. An increasing number of adopters allows the relationship between firm characteristics and success/failure to be measured with greater certitude (Terlaak and Gong, 2008). As the number of firms adopting an innovation increases, the pool of potential adopters for whom the innovation would be useful declines as some potential adopters would learn from the experience of others that the new innovation is not for them. Therefore, we expect that the value of an innovation should increase with the number of firms adopting it but at a decreasing rate.

We have argued that when firms are driven by efficiency motives, attractiveness of an innovation increases in the number of adopters at a decreasing rate (Lenox and King, 2004). To put it mathematically, the attractiveness of adopting a new innovation for a non-adopter is $\alpha + \ln(\beta D) + \epsilon$, where D is the number of adopters, α, β ($\beta > 0$) are

the response parameters and ϵ captures all the unobservable factors that influence adoption. If we assume that ϵ is distributed extreme value, then the probability of adopting a new innovation by a non-adopter would be $\pi = \exp(\alpha + \ln(\beta D)) / (1 + \exp(\alpha + \ln(\beta D)))$. To study how this probability varies as D varies, we study the first derivative, i.e., $\frac{\partial \pi}{\partial D} = \frac{\pi(1-\pi)}{D}$. We can see that $\frac{\partial \pi}{\partial D}$ will be positive for all values of D and therefore, as the density of adopters increases, the probability of adoption by a non-adopter would also increase. To determine whether the probability increases at a increasing rate or decreasing rate, we calculate the second derivative,

$$\frac{\partial^2 \pi}{\partial D^2} = -\frac{2\pi^2(1-\pi)}{D^2}$$

Since π lies between 0 and 1, this expression would be negative for all values of π . This indicates that efficiency motives will result in adoption rates increasing in density at decreasing rates.

2.3 Risk Propensity

While legitimacy and efficiency are quite distinct concepts and have been developed in varying streams of past research, there is still at least one external variable that is linked to both these concepts. This relates to the concept of risk propensity of the firms and it affects legitimacy and efficiency in different ways. Diffusion theory postulates that adoption decisions are based on differences in firms' risk propensity (Rogers, 1983). However, the legitimacy and efficiency arguments imply two different types of risk. In the first case, the risk is related to not-imitating – firms that do not follow their legitimacy based group are at risk of losing their legitimacy, which eventually results in failure. This means that non-imitation is perceived as a threat and firms imitate in order to avoid

the threat of being illegitimate. Consequently, the majority of the imitators would have a lower propensity for risk. On the other hand, a firm imitating for efficiency reasons is driven by the opportunity to improve its performance. In this case, imitators would have higher propensity for risk. This is precisely the reason why studying imitation behavior in different groups of firms is important.

Massini *et al.* (2005) describe a similar scenario when they differentiate between innovators and imitators. The firms they refer to as imitators anchor their behavior in the prevailing behavior of their reference group, i.e. they start imitating when an innovation becomes more common. That would correspond to legitimacy motivations – firms are afraid not to be considered nonconforming to industry norms. This means that imitation is a threat prevention strategy. On the other hand, innovators anchor their aspirations in a group of innovators and they imitate the behavior of this small group. Naturally, this type of opportunity seeking behavior is more prevalent in firms with lower propensity for risk.

3. HYPOTHESES DEVELOPMENT

Heterogeneity among firms and contingency approaches have a long history of interest among researchers. For example, Terlaak and Gong (2008) argue that while the value of some innovations is universal, the value of others would vary across firms. Since the value of innovations varies across firms, we would expect the motivations behind imitation to also vary across firms.

Our theoretical premise from the previous section of the paper suggests that legitimacy and efficiency could be considered as the two over-arching themes for imitative behavior. Since different firm types are heterogeneous in nature, it may be that some categories of firms would place a greater emphasis on legitimacy as the driver for imitation while other firm categories might rely primarily on efficiency as a motivator.

We classify firm types by considering several factors that have been extensively researched in the management and marketing literatures – de novo, firm size, firm scope, and firm ownership. De novo firms are more agile and have organic structures, which makes them better equipped for exploration as opposed to extant firms, which are caught in competency traps (Ganco and Agarwal, 2009; Levitt and March, 1988). Would fluidity and competency traps lead to different imitation motivations? Similar questions arise related to the distinction between generalists and specialists as organizational ecologists describe generalists as structurally more inert and specialists as more fluid and able to change faster (Ganco and Agarwal, 2009). Haveman (1993) finds that firms imitate large and profitable organizations, but Terlaak and Gong (2008) suggest that adoptions by small firms can be more informative. Might this mean that large companies have different motives to imitate? These are some of the questions that guide our hypotheses development below.

3.1 De Novo vs. Extant Firms.

There is a considerable body of literature in economics and organizations, which investigates the differences between de novo and extant firms (see overview in Ganco and Agarwal (2009)). According to this literature, de novo firms are more agile, less inert

and better equipped for exploration (Levinthal and March, 1993). Exploration activities are mostly undertaken in search for efficiency. On the other hand, several researchers cited in Barnett and McKendrick (2004) have argued that extant firms tend to resist radical technological changes and prefer instead to engage in incremental innovations. This behavior can be interpreted as a sign that in their estimates, the technical value of radical innovations is not high enough, or in other words, not likely to lead to increased efficiency.

Terlaak and Gong (2008) discuss how the inferential accuracy of observing prior adoptions may be contaminated by the symbolic adoption of a practice. That is, in the presence of institutional pressures, some firms may adopt for legitimacy reasons as the technical value of the adoption is low for them. However, in the case of de novo online retailers, symbolic adoption is meaningless. Since this is their only line of business, it can be assumed that de novo firms have fully adopted the technology and have done so because they perceive technical value in the adoption. They have the daunting task of both acquiring resources in a new environment and making long-term decision regarding how to allocate the secured resources (Dobrev and Gotsopoulos, 2010). We therefore expect that de novo firms would be driven predominantly by efficiency motivations¹. An

¹ A few quotes from the book *The Everything Store: Jeff Bezos and the Age of Amazon* exemplify the exploration/efficiency motivations behind the entry of one of the early de novo e-tailers in the online marketplace. “Bezos interpolated from this that Web activity overall had gone up that year by a factor of roughly 2,300—a 230,000 percent increase. “Things just don’t grow that fast,” Bezos later said. “It’s highly unusual, and that started me thinking, What kind of business plan might make sense in the context of that growth?” ... Bezos concluded that a true everything store would be impractical—at least at the beginning. He made a list of twenty possible product categories.... The category that eventually jumped out at him as the best option was books. They were pure commodities.... There were two primary distributors of books at that time, Ingram and Baker and Taylor, so a new retailer wouldn’t have to approach each of the thousands of book publishers individually. And, most important, there were three million books in print worldwide, far more than a Barnes & Noble or a Borders superstore could ever stock. ... he investigated some of the earliest online bookstore websites, such as Book Stacks Unlimited ... and WordsWorth ... No one had yet figured out how to do a good job selling books over the Internet. As Bezos saw it, this was a huge, untapped opportunity.” (Stone, 2013, p.25-26)

extreme example of efficiency entry motivations is Overstock.com, which was launched in late 1999 with a business model of selling excess inventory (source: company website). This was the time when the first casualties of the dot com bust started appearing. Earlier that year, the famous *Barron's* article “Amazon.bomb” had made a splash. While sentiments to the online channel were cooling, Overstock.com followed with a business model capitalizing on selling some of the discounted inventory of retailers going out of business. That kind of behavior was the exact opposite of legitimacy seeking motivations.

In contrast, an extant firm may be driven by either legitimacy or efficiency motivations depending on its size, scope or competitive forces. For example, Borders' online entry was driven by legitimacy concerns as the CEO at that time did not believe in the profitability of the online channel (Dunne *et al.*, 2010). On the other hand, categories where consumer trust and product trial are important, extant firms tended to be among earlier entrants driven by efficiency motivations (Dinlersoz and Pereira, 2007). Hence, our hypothesis is:

H1: Imitation by de novo firms is driven predominantly by efficiency motivations.

3.2 Large Firms vs. Small Firms

Barnett and McKendrick (2004) call size the single most important characteristic determining a firm's ability to compete and survive. DiMaggio and Powell (1983) claim that large organizations are frequently imitated as their size proves that their strategies are successful. Large firms are subject to greater inertia and are generally slower in adopting

changes because of formalized behavior and reduced impetus to change (Hannan and Freeman, 1984). Large firms are also more insulated from competitive threats and for some time they may not recognize the need to adopt an innovation (Barnett and McKendrick, 2004). This means that they would need stronger motivations to adopt a radical innovation. In fact, because of their greater scale of operations, they have less concerns about market efficiency (Barnett and McKendrick, 2004; Meyer and Rowan, 1977). We would also argue that larger firms generally tend to be more visible in the landscape than smaller firms. This is because, given other things constant, larger firms are more likely to be connected to a large base of consumers and suppliers than smaller firms. In the middle of the Internet boom then, larger firms might feel the social pressure from these market players, who may be wondering why these firms are not participating in the new innovation. In other words we would argue that larger firms could be susceptible to legitimacy pressures because of this. In addition, the slack of resources found in larger firms helps them respond better to environmental change and take more risky actions (Baum and Shipilov, 2006), and thus they would be more likely to imitate due to legitimacy concerns. For all these above reasons, we feel that a firm may jeopardize its legitimacy by non-adoption. The previously mentioned example of Borders illustrates the attitude that many large retailers had regarding e-commerce adoption. Further, a CNET article from 1999 on Walmart's e-commerce re-launch efforts asserts that it is imperative for land-based big retail chains to jump on the e-commerce bandwagon in order to defend their market shares (Junnarkar, 1999). In sum, we would argue that large organizations would imitate when they face legitimacy pressures.

Small firms, on the other hand are more vulnerable to competitive threats and they may need to engage more often in explorative search. Because small firms have less slack, they are particularly interested in improving efficiency. Innovations can make a firm more efficient and profitable, but if not appropriate for a firm can also lead to losses, and therefore carry a level of risk (Milliken, 1987). While imitation reduces the level of perceived risk, firms still need to be careful how they evaluate the imitation option (Lieberman and Asaba, 2006). As legitimacy concerns may impose the adoption of an innovation of no particular technical value (Barreto and Baden-Fuller, 2006), legitimacy imitation stands to carry more risks than efficiency imitation. Since smaller firms have fewer resources, they would be less inclined to take risky steps and consequently more likely to imitate due to efficiency considerations. In a study on the factors determining adoption of e-commerce by SMEs, Grandon and Pearson (2004) find that external pressures (i.e. legitimacy) are the least important among a number of factors. This leads to our second hypotheses:

H2a: Imitation by larger firms is driven predominantly by legitimacy motivations.

H2b: Imitation by smaller firms is driven predominantly by efficiency motivations.

3.3 Generalists vs. Specialists

In a study of learning from experience, Barnett *et al.* (1994) found that generalists are less likely to learn from experience than specialists. They conducted an empirical study

of Illinois Banks, where they found that for specialists, the return on average assets (ROAA) increased with experience, but for generalists there was no increase in return on average assets with experience. This argument can be extended in the following way. Based on the above cited studies, as the ROAA increased with experience for specialists, we can deduce that specialists learn with the goal of increasing efficiency. And if they learn from their own experience with this goal, then it might be expected that they would apply the same objective to vicarious learning. Specialists also have a narrow scope of operations, which would mean that they would be more selective as to whom and why they imitate. It might be easier to infer the technical value of an innovation since specialists could very easily identify the competitors that are closest to them in a population of adopters. In this way, they would be able to collect more precise information about the outcome of prior adoptions. An interesting example is PartsAmerica.com, which was launched in 2000 as a partnership of two offline competitors – CSK Auto and Advance Auto Parts. Cooperation between competitors is not observed often and it is usually driven by efficiency considerations.

According to niche width theory, generalists cannot respond fast enough in fluctuating environments to operate efficiently, because they operate in several markets and adjusting their structures takes a lot of time and resources (Baum and Shipilov, 2006). Ingram and Baum (1997) also found that generalists are less likely to learn from experience than specialists. Combining these findings suggests that generalists by and large might be less susceptible to imitation. Generalists are less interested in learning because of their structure, which is composed of many units (Levinthal and March, 1993). As opposed to specialists, generalists might have a harder time to infer the

technical value of an innovation as they would have to examine a much broader scope of adopters. Because of the difficulties in extracting the technical value of an innovation, generalists would have less efficiency considerations in their imitation strategies. Based on the above discussion, we can only hypothesize that specialists would emphasize more efficiency motives in their imitation decisions. We test this hypothesis for online retailers:

H3: Imitation by specialists is driven predominantly by efficiency motivations.

3.4 Public Firms vs. Private Firms

Publicly traded firms are answerable to shareholders who are susceptible to media reports about online entry by other firms. These external, social factors play a greater role in the adoption patterns of publicly traded firms and therefore they are more likely to be driven by legitimacy motivations (Westphal *et al.*, 1997). Even if a public firm sees no operational advantage in adopting an innovation, the need to satisfy stakeholders may compel it to adopt the innovation. The earlier mentioned example of Borders' online adoption is suitable also in this case, because company shareholders were not happy with Borders' delayed response to Amazon's and B&N's online entries.

A private firm is answerable to no external agency and therefore under little pressure to conform to the external environment in terms of cognitive legitimacy pressures. On the other hand, as private firms are likely to have more restricted sources of capital, efficiency considerations would be more important to them (George, 2005). Therefore, we believe that in the online retailing industry also, privately held firms are

more likely to imitate due to efficiency motivations. An example is fast-fashion retailer Forever 21. It entered the online channel relatively late – in 2003. But it follows an interesting strategy which matches its international store expansion with its website expansion. In different countries, the retailer operates different websites. Thus, for the Chinese market it may follow Chinese retailers and for the Indian market, it may follow Indian retailers. Such a strategy is more easily explainable from the efficiency perspective rather than legitimacy pressures. To that extent we formulate the following two hypotheses:

H4a: Imitation by public firms is driven predominantly by legitimacy motivations.

H4b: Imitation by private firms is driven predominantly by efficiency motivations.

3.5 Product Fit to the Internet

The early years of the Internet were marked by an irrational exuberance when all online retailers were supposed to realize untold riches. As firms gained greater experience with the Internet, they realized that the Internet is just another distribution channel that is more appropriate for some product categories than others. Marketing researchers have conducted some research to identify categories that are suitable for online retailing. An early study of online purchasing behavior (Bhatnagar *et al.*, 2000) suggested that the Internet is less suited for products that are technologically complex, are expensive, have higher ego-related needs, and where touch and feel is more important. They conducted an

empirical study across eighteen product categories and found that consumer willingness to buy online varies widely across these categories in accordance with their hypotheses. Using the marketing definition of products as bundles of attributes, Lal and Sarvary (1999) classified attributes as digital and non-digital. Digital attributes are ones that can be communicated over the Internet at very low costs, and therefore consumers are more likely to purchase products online that are high on digital attributes. It can be then argued that the technical value of retailing on the Internet is likely to vary across product categories. If a firm does not retail products that have a good fit to the Internet, but still sets up an Internet based store, then it cannot be doing so to harness the technical value of the Internet. Such a firm probably adopts the Internet channel to appear to be legitimate. For example, high end designer labels resisted the online channel and they had to struggle with the inherent obstacles of e-commerce for a luxury brand and the risk of being perceived as out of touch with the times. Gucci is considered a pioneer in e-luxury and it launched its store in 2001. Two of the most defining characteristics of luxury brands are the richness of the shopping experience and exclusivity, both of which are very difficult to re-create or control online. While an online sale may increase short term profitability, its long term effect is questionable in view of the shopping experience and exclusivity. However, the presence of major luxury brands online raises the stakes for other brands for which it would be risky to be considered laggards. Thus, it is very likely that e-luxury as an example of poor channel fit is driven by legitimacy motivations.

H5: Imitation by firms with poor fit to the Internet is driven predominantly by legitimacy motivations.

4. DATA

We collected the data from a number of public sources. Initially, we looked at the Hoover's database (www.hoovers.com). From there, we extracted a list of brick and mortar firms that belonged to the "Retail Industry" category. Next from this list we excluded international retailers, wholesalers and distributors, equipment renting retailers, gas stations, jewelers, subsidiaries, and publishing houses. After we had a list of brick and mortar stores, we checked for each firm, whether they had an online store or not. For those firms that had an online store, in the next step we determined the date of entry into the online channel. The adoption is defined as the point in time when a retailer starts transacting with customers over the Internet. The setting up of an informational web page does not constitute an adoption. The adoption dates were obtained from company websites, annual reports, and the Lexis-Nexis business news database. This is a comprehensive collection of news stories from media sources around the world. After excluding sixteen firms for which we could not verify the adoption date, we arrived at a final sample size of three hundred and twenty three extant retailers. The earliest a firm had setup an online store was in January 1995. Our coverage period is from January 1995 to March 2003. Figure 1 shows a histogram of e-commerce entry by year.

The issue of efficiency vs legitimacy is relevant mainly during the introduction stage of the new innovation. During this stage, product/technology is brand new and untested; therefore uncertainty is very high. By the time a new product/technology reaches the growth stage, the product/technology has been accepted and uncertainties reduced substantially. While sales grow rapidly during both the stages, during the

introduction stage, sales grow at an increasing rate, and during the growth stage at a decreasing rate. When we study the US e-commerce growth rate, we find that it peaked in 2002 and then started falling down. Therefore, it is safe to say that in 2002, US e-commerce passed from the introduction to growth stage. We therefore stopped data collection in March 2003, as our primary focus is on the introduction stage of e-commerce.

We followed a similar procedure for information on entry of de novo entrants. The initial list of de novo entrants was obtained from Bizrate.com in 1998. This is when the data first became available on the Bizrate portal. This is a comprehensive shopping portal, which has been quoted as a reliable source of online retail data in a number of studies (e.g. Pan *et al.*, 2002; Srinivasan and Moorman, 2005). This list of de novo firms was updated every year after that till 2003. A study of the state of e-retailing in 2000 indicated that the top 100 e-tailers accounted for more than 80% of online retailing traffic (Engel, 2001) and these retailers are present in our database. The above data sources as well as prominent web sites and newsletters tracking e-commerce failures (f*~~ked~~company.com, thedailydeal.com) at that time gave us information about the firms that exited the online space.

There were 497 firms in the final sample. Descriptive statistics of the sample are presented in Table 1. There were 323 firms that have existing brick and mortar operations and there were 174 de novo firms that did not exist prior to setting up online stores. These firms were brand new businesses. There were 254 firms that were publicly listed and 243 firms that had private ownership. 113 firms were large and the remaining firms were classified as small. The total number of generalist firms is 151 and that of specialist firms

is 346. The number of firms that were selling products that were identified to have a good fit with the Internet was 169.

[Please insert Figure 1 here]

The dependent variable is the probability of adoption of the online channel for commercial purposes by retailers.

The density effect is captured by the total number of competitors at any point of time. To determine the total number of competitors existing in the online marketplace at any point of time, we determined the cumulative number of firms that had entered the online marketplace and the total number of online firms that had exited the online market till that point. The difference between these two terms gave us the number of online retail firms at any point between January 1995 and March 2003.

The Hoover's database provides information about whether a firm is publicly traded or not, whether a firm has a physical store, catalog or a TV channel, and retail categories. We visited the website of each of the retailers to obtain a list of the product categories sold by them. If a firm sold only one product category, we classified the firm as specialist, but if it sold more than one category, we classified the firm as generalist. For size, we collected yearly data whether the retailers belonged to the top 100 retailers published by *Chain Store Age* – the leading publication of the retail industry. We also analyzed the product categories to examine whether the product categories sold by a retailer are suitable for retailing online or not. Firms that sold software and music were classified as suitable for the Internet because these products are digital products (Lal and

Sarvary, 1999) that can be distributed via the Internet. This eliminates the shipping cost from not only the store to the consumer, but also from the manufacturer to the retailer leading to substantial price savings. Firms that sold books and computer hardware were also classified as suitable for the Internet because these are standardized products where touch and feel is not relevant. We also believe that consumers will prefer buying gift items over the Internet. Quite often, the gift-giver after making a shopping trip to purchase a gift has to bring the gift home to wrap it and then make another trip to the post office to mail the gift. All these steps can be avoided by buying gifts over the Internet as the Internet firm takes over the task of wrapping and shipping the gift.

To control for economic indicators, we use Nasdaq and the consumer price index. We would like to emphasize that these variables are not particularly of interest in the context of the phenomenon of imitation which is the primary focus of our current research. However we feel that since they are likely to affect online retail adoption, it makes sense to include these as control variables; since we consider these as control variables, we do not have any hypotheses associated with them.

[Please insert Table 1 here]

5. MODEL SPECIFICATION

The dependent variable is the probability that a firm will open an online store. This probability would depend on the attractiveness of the online environment. Let the attractiveness of opening an online store for firm i be $A_i + \varepsilon_i$. The first term captures the

role of those variables that can be observed by the researcher and the second term the role of unobserved random terms. A_i would depend on a number of factors, such that,

$$A_i = \bar{\Delta} \cdot \bar{X}_i + d \cdot D^e$$

Here, \bar{X}_i is a vector of all those factors that determine the attractiveness of online marketplace for firm i , and $\bar{\Delta}$ is a vector of corresponding parameters. D is the density of online firms, i.e., total number of online firms. This is the difference between all the firms that have setup online stores and the total number of firms that have exited the online marketplace. If the parameter e is 1, then the relationship is linear. If e is greater than 1, then the attractiveness of opening an online store is increasing at an increasing rate in density and if it is positive but less than 1, then it is increasing at a decreasing rate in density. The relationship between attractiveness of online store and density is non-linear. The random term is assumed to have standardized normal distribution, i.e., $\varepsilon_i \sim N(0,1)$. The retailer will open the online store if the attractiveness of the online marketplace exceeds some threshold value, that can be assumed to be zero without loss of generality.

$$A_i + \varepsilon_i > 0$$

$$\bar{\Delta} \cdot \bar{X}_i + d \cdot D^e + \varepsilon_i > 0$$

$$\varepsilon_i > -(\bar{\Delta} \cdot \bar{X}_i + d \cdot D^e)$$

Under these assumptions, the probability that a firm would open an online store would be given by the standard probit probability,

$$\lambda_i = \int_{-A_i}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-x^2} dx \quad (2)$$

The sample log-likelihood is maximized to determine the value of the different parameters. The sample log-likelihood function is non-linear in density, and therefore the

log-likelihood cannot be estimated by standard statistical software. A maximum likelihood routine was written to maximize the likelihood by iterative techniques.

6. EMPIRICAL RESULTS

We first carried out the analysis for extant brick and mortar firms and de novo firms. The results of estimation on brick and mortar firms are in Table 2A and the results of estimation on de novo firms are in Table 2B. For both the extant and de novo firms, the Nasdaq has no impact on a firm's decision to retail online. On the other hand, both the extant and de novo firms are positively influenced by consumer price index. Extant firms are not influenced by density. De novo firms on the other hand, were influenced positively by density ($p < .04$). The < 1 value of the exponent shows that de novo firms were driven primarily by a desire to improve efficiency of their operations. This supports Hypothesis 1.

[Please insert Tables 2A and 2B here]

To test Hypothesis 2a and 2b the data was split into two samples. One sample consists of large firms and the other sample consists of small firms. Results of calibrating the quantitative model on large firms are reported in Table 3A and the results of calibrating on small firms are reported in Table 3B. In the case of large firms, the parameters of Nasdaq and CPI are insignificant showing that neither of these factors play a role in large firms' decisions to setup online operations. The parameter of density is

positive and significant. The exponent coefficient is positive, greater than one and marginally significant. This indicates that large firms are driven by legitimacy motives in imitating other firms. Therefore, hypothesis 2a is supported. For small firms, both the consumer price index (CPI) and the Nasdaq are again insignificant, density has a positive influence on online entry. The exponent coefficient is positive and less than one indicating a concave relationship between density and attractiveness of the Internet for retailing. Thus as more and more competitors start retailing online, the probability of retailing on the Internet declines. This supports hypothesis 2b that imitation in small firms is driven mainly by efficiency motives.

[Please insert Tables 3A and 3B here]

We next tested Hypothesis 3 by dividing all the firms into categories, one of all the generalist firms and the other of specialist firms. The quantitative model was tested separately on the two groups of firms; empirical results from generalist firms are reported in Table 4A and results from specialist firms in Table 4B. Generalist firms are influenced by the Nasdaq, but not by the total number of online firms that have already started selling online. Therefore, overall generalist firms do not seem to imitate other firms. On the other hand specialist firms are positively influenced by the Nasdaq, the consumer price index and density. The significant positive coefficient of density indicates that specialist firms are imitating. The exponent of density is positive and less than one. Therefore, the rate of online entry by specialist firms are increasing but at a decreasing rate. These findings support Hypothesis 3.

[Please insert Tables 4A and 4B here]

We next tested Hypotheses 4a and 4b by splitting the sample based on the ownership of the firm, i.e., public firms and private firms. Results of calibrating the quantitative model on private firms are reported in Table 5A and results of calibrating on public firms are reported in Table 5B. A careful study of Table 5A would show that private firms are influenced by both the Nasdaq and the consumer price index. The coefficient of density is positive and significant, indicating that private firms are influenced by entry decisions of other firms. The exponent of the density term for private firms is positive and significant and also less than one. This indicates that private firms are driven by a desire to improve the operational efficiency of their business. Public firms are also positively influenced by both the Nasdaq and the consumer price index. The coefficient of density is again positive indicating the role of imitation in the decision-making of public firms. The exponent of density is positive and greater than 1. This indicates a convex (increase at an increasing rate) relationship between density and attractiveness of entering online retail space. Therefore, public firms are driven a by a desire to appear legitimate when they imitate other firms that have already entered the online marketplace. The findings of this analysis confirm Hypotheses 4a and 4b.

[Please insert Tables 5A and 5B here]

To test the last hypothesis, the sample was divided into two sub-groups based on whether the products that a firm sells have a good fit with the Internet channel. The quantitative model was first calibrated on the firms that sell products that have a good fit with the Internet and the results of this empirical analysis is reported in Table 6A. The quantitative model was also tested on those firms that do not sell products with a good fit to the Internet; these results are shown in Table 6B. We find that both types of firms are not influenced by either Nasdaq or consumer price index. What is interesting is that both kinds of firms are not influenced by the density of online firms in their decision to setup online retail operations. Therefore, Hypothesis 5 was not supported by our data.

[Please insert Tables 6A and 6B here]

7. CONCLUSIONS

In our present research we were motivated to develop an understanding of what drove imitative behavior for companies that entered the online retail industry. We theorized legitimacy and efficiency would be the main drivers for imitation. However we also recognized that the online retail industry is not homogeneous in nature and includes firms who were positioned differently on the basis of infrastructure and specializations among other things. Given this situation, we hypothesized that the drivers of imitation would vary from one type of online retailer to another. Our empirical analysis does indicate that this is often the case. Our findings have both theoretical and managerial implications. Theoretically it answers the call by other academic researchers to do a systematic investigation of how and where imitation is happening in industry. Managerially, our

research has several points of value. First it identifies determinants of imitation for one of the most important industries of our era – the online retail industry. Second, it is possible to predict the degree of imitation in new markets like in Mobile Commerce. For instance if the emerging M-Commerce retail industry in some market is made up mainly of company types who are more likely to imitate driven by efficiency motivations, then an inefficient innovation is less likely to be adopted by those types of companies. An analogous thing is also likely to happen in company-markets where legitimacy is the major determinant of imitative behavior and thus of diffusion of innovation in that market.

We develop an econometric model where the parameters of the density dependence term would indicate if imitation was occurring or not. Our model is able to distinguish differences in imitating behavior among potential adopters. This was possible by examining the magnitude of the estimated exponent term associated with the density term of our model.

We identified five different ways to classify firms based on existing theories in the management and organizations literatures and for each classification, developed hypotheses on how firms might behave. We then collected data about a broad spectrum of firms. The main data was whether a firm has an online store, and if yes then when was the online store set up. We also collected data about firm characteristics. We calibrated a non-linear probit model on the data to test the hypothesized relationships between firm characteristics and the probability of a firm entering online marketplace. The hypothesized relationships were for the most part empirically supported. We find that de novo online retailers were motivated by efficiency in their decision to follow in the steps

of earlier entrants. We also find that large retailers are motivated by legitimacy motivations, while smaller retailers are more likely to be driven by efficiency motivations. Specialist firms are motivated to imitate by efficiency motivations. We find that publicly traded companies are more susceptible to external legitimacy pressures and privately held companies are driven by efficiency considerations in imitation.

Naturally, an imitating firm would be pleased if their market performance is good following the implementation of the imitation strategy. If the performance is not good, firms driven by legitimacy or efficiency would both be unhappy but their reactions could be different. A firm driven by efficiency is likely to go back and examine where things may have gone wrong in their cost-benefit analysis calculations; their approach would be objective in nature. A firm driven by legitimacy is likely to feel immediate regret that they kind of blindly imitated since they were afraid because of legitimacy concerns; they may also want to think back about why they went wrong, but their approach is likely to be more subjective in nature since their reason to imitate was less rational to begin with than for firms who were driven by efficiency concerns.

Our theoretical development is compatible with our motivation in this research to show that whether legitimacy or efficiency was the primary motivator for imitation, varied from one category of online retailers to another. We would like to mention, though, that it is likely that for many retailers, both legitimacy and efficiency are drivers of online market entry; we have not explored this and therefore this is a limitation of our current research. Another limitation of our study is the operationalization of product fit. Researchers consider products to be a bundle of attributes (Lancaster, 1990). Some attributes of a particular product may make the product better suited for the Internet while

other attributes of the same product might make it less suitable. This is probably why some empirical papers have found contradictory results. For instance, Bhatnagar *et al.* (2000) said technologically complex products are a poor fit for the Internet while Lal *et al.* (1999) said that digital products are a good fit. Consider the fact that computers are both technologically complex and possess digital attributes. This means that computers could be either a good fit or a bad fit for the Internet. Similar potential problems can exist for other products, and this is probably why we could not find support for our Hypothesis 5.

This research can be extended along a number of different ways. We focused on only two overarching motivations, but researchers have identified several different types of motivations (Lieberman and Asba, 2006; Ordanini *et al.*, 2008). Future research studies can examine the role of these different motivations at a much finer level. We included only three determinant factors, Nasdaq, consumer price index and density. There are a number of other economic and firm variables that can be included in the study to identify different types of influencers of adoptions; at this point we are using the random error term to capture these influences in an overall sense. We combined the total number of firms that have entered online market space and then exited into one density term. It is possible that these two variables provide different types of information, and thus better kept separate in the data and analysis. Among the firm categories we empirically evaluated, we found that the efficiency motive was more common than the legitimacy motive. Future research could use our econometric model to identify other firm categories where imitation was caused by legitimacy pressures.

Despite its limitations, the current study contributes to the literature on imitation behavior and online market entry in a number of ways. First, it responds to Lieberman and Asaba's (2006) call for the challenging task of producing more empirical research on the identification of imitation processes "given the prevalence of business imitation and its potential consequences" (p. 381). It is essential for scholars and managers to understand how the type of imitation can ultimately affect market structure. If a population consists of a particular type of firms that are more likely to imitate driven by efficiency motivations, then an inefficient innovation is less likely to spread in such a population. On the other hand, if there are strong legitimacy pressures, it would be easier to predict which firms will follow next. Thus, understanding imitation motives can give us a better perspective on population dynamics both in terms of new market entry and adoption of innovations.

Second, our study directs the attention to a somewhat overlooked topic in the diverse streams of literatures on inter organizational imitation – the pool of potential imitators. While previous studies have explored extensively whom firms emulate, little such effort has been undertaken regarding the imitators. Yet it is exactly the structure of this pool of imitators that eventually determines the diffusion trajectory. Also, investigating who the imitators are could give answers as to why some innovations adopted by big and successful companies get copied and others adopted by the same companies do not.

Third, we demonstrate that imitation, as any other strategic decision and outcome is contingent on the particular circumstances of a firm. This is to say, that one-size-fits-all type of studies on imitative behavior may not reveal important information. For example,

both economic theory's information cascades and organization theory's neo-institutionalism/mimetic isomorphism fail to explain the very often observed gradual decrease in adoption rates after a period of growth (Strang and Macy, 2001). Accounting for differences in imitation motives can also improve the inferential value of prior adoptions for managers in the framework of Terlaak and Gong (2008). Observing prior adopters who are more likely to imitate for efficiency reasons would give more credible signals to potential adopters.

Finally we have looked at imitation and its drivers of legitimacy and efficiency in the context of one of the most monumental innovations in the late twentieth century – the advent of e-commerce.

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TABLE 1
Descriptive Statistics

	Number of Firms	Examples
Extant Firms	323	Costco, Kmart
De novo Firms	174	Carquest, Bluefly
Private Firms	243	Books on Tape, Big Y Foods
Public Firms	254	Circuit City, Carson Pirie Scott & Co
Large Firms	52	Neiman Marcus, Dillard's
Small Firms	445	99 cents only stores, Ann Taylor stores
Generalist Firms	151	Sears, Shopko
Specialist Firms	346	Academy Sports & Outdoors, Carquest
Firms with good channel fit	169	Factory Card & Party Outlet,
Firms with poor channel fit	328	Staples Burlington Coat Factory, Big Y Foods

TABLE 2A
Parameter Estimates for Extant Firms

Determinant Factors	β	Standard error	z value	p value
Constant	14.643	4.317	3.39	0.00
Nasdaq	.778	.673	1.15	0.25
Consumer price index	8.776	2.805	3.12	0.00
density	.826	.657	1.25	0.21
e	.312	.218	1.42	0.16

TABLE 2B
Parameter Estimates for De novo Firms

Determinant Factors	β	Standard error	z value	p value
Constant	5.637	3.219	1.75	0.08
Nasdaq	1.216	.823	1.47	0.14
Consumer price index	5.312	3.111	1.7	0.09
density	1.117	.512	2.18	0.03
e	.692	.299	2.31	0.02

TABLE 3A
Parameter Estimates for Large Firms

Determinant Factors	β	Standard error	z value	p value
Constant	10.251	7.65	1.34	0.18
Nasdaq	0.1532	0.09	1.76	0.08
Consumer price index	2.315	2.09	1.11	0.27
density	0.532	0.28	1.92	0.05
e	1.321	0.75	1.76	0.08

TABLE 3B
Parameter Estimates for Small Firms

Determinant Factors	β	Standard error	z value	p value
Constant	5.671	2.68	2.12	0.03
Nasdaq	1.342	1.00	1.34	0.18
Consumer price index	2.315	1.51	1.53	0.13
density	4.341	1.87	2.32	0.02
e	0.891	0.31	2.88	0.00

TABLE 4A
Parameter Estimates for Generalist Firms

Determinant Factors	β	Standard error	z value	p value
Constant	14.497	10.480	1.38	0.17
Nasdaq	-.789	.330	-2.39	0.02
Consumer price index density	-8.487	6.752	-1.25	0.21
e	1.523	1.290	1.18	0.24
	0.852	.624	1.36	0.17

TABLE 4B
Parameter Estimates for Specialist Firms

Determinant Factors	β	Standard error	z value	p value
Constant	25.785	3.556	7.25	0.01
Nasdaq	0.962	.107	8.96	0.01
Consumer price index density	4.216	2.326	1.81	0.07
e	2.196	.450	4.88	0.01
	.734	.138	5.3	0.01

TABLE 5A
Parameter Estimates for Private Firms

Determinant Factors	β	Standard error	z value	p value
Constant	12.566	3.376	3.72	0.00
Nasdaq	0.859	0.103	8.33	0.00
Consumer price index density	8.142	2.221	3.66	0.00
e	2.559	0.596	4.29	0.00
	0.941	0.147	6.40	0.00

TABLE 5B
Parameter Estimates for Public Firms

Determinant Factors	β	Standard error	z value	p value
Constant	15.275	4.823	3.16	0.00
Nasdaq	0.785	0.140	5.60	0.00
Consumer price index density	9.854	3.099	3.17	0.00
e	3.137	1.094	2.86	0.00
	1.362	0.603	2.25	0.02

TABLE 6A

Parameter Estimates For Firms with good channel fit

Determinant Factors	β	Standard error	z value	p value
Constant	11.324	6.294	1.79	0.07
Nasdaq	.456	.385	1.18	0.24
Consumer price index	7.018	4.131	1.69	0.09
density	4.105	3.852	1.07	0.28
e	1.813	1.726	1.05	0.29

TABLE 6B

Parameter Estimates For Firms with poor channel fit

Determinant Factors	β	Standard error	z value	p value
Constant	12.091	3.982	3.03	0.00
Nasdaq	.817	.622	1.31	0.19
Consumer price index	2.997	2.610	1.14	0.25
density	1.893	.631	3.00	0.00
e	1.164	0.827	1.41	0.16

FIGURE 1

Histogram of e-commerce adoptions by year

