SIGNALLING REPUTATION IN INTERNATIONAL ONLINE MARKETS

A. REBECCA REUBER* and EILEEN FISCHER
1 Rotman School of Management, University of Toronto, Toronto, Canada
2 Schulich School of Business, York University, Toronto, Canada

Although online technology enables young and small firms to gain access to buyers in foreign markets efficiently, it does not overcome the liability of being an unknown seller among a sea of largely unknown firms. In order to internationalize effectively through online markets, such firms need to establish an online reputation within a context where there are a large number of competitors, most of (or all of) are relatively unfamiliar to customers. The purpose of this article is to explore how they might do so. Drawing on economics-based signalling theory as well as past research in the areas of strategic management, marketing, and MIS, we hypothesize that firm-controlled reputation signals with credible commitments—price, advertising, and umbrella branding—will impact reputational performance and moderate the impact of user-generated reputation signals. We test the hypotheses using data collected about software products sold on the Web site Download.com. Our results show that signalling by advertising and umbrella branding affects reputational performance. The article provides insights about signalling in online markets for managers developing reputation-building strategies, as well as for international entrepreneurship researchers. Copyright © 2009 Strategic Management Society.

INTRODUCTION

Imagine someone looking for a software product to manage digital photographs. She knows she can download and try out different software products from the Web site Download.com, and visits it to see what is available. She goes to the product category Digital Photo Tools and sees that she can choose from among 562 products from companies based in countries all over the world. Now imagine that your young firm is one of those companies. How can you increase the chances she'll try your product?

Keywords: international online markets; signalling; reputation; customer; international entrepreneurship
*Correspondence to: A. Rebecca Reuber, Rotman School of Management, University of Toronto, 105 St. George Street, Toronto, Ontario, Canada M5S 3E6. Email: reuber@rotman.utoronto.ca

This scenario is played out repeatedly in sectors where there are many young and small firms entering a growing population of competitors. It is particularly common in international online environments offering products and services as diverse as adventure travel, software products, music, classified ads, and electronic gadgets. Such online technology plays a fundamental role in making international entrepreneurship feasible (Oviatt and McDougall, 2005). In theory, young and small firms can gain access to buyers in foreign markets without necessarily establishing a geographically-distant physical presence. However, while e-commerce provides an infrastructure to communicate efficiently with foreign buyers, it does not overcome the liability of being an unknown seller among a sea of largely unknown firms. A proliferation of other online sellers can render a market space so crowded and noisy that it is difficult to distinguish one particular firm from its rivals (cf. Loane, McNaughton, and Bell, 2004).
There may be so many firms that one firm’s credibility is difficult to ascertain (Petersen, Welch, and Liesch, 2002). In such a market, there is a scarcity of seller reputation and buyer attention (cf. Anderson, 2008). Thus, in order to internationalize effectively through online markets, young and small firms need to be able to establish an online reputation within a context where there are a large number of competitors most of or all of which are relatively unfamiliar to customers. The purpose of this article is to explore how they might do so. Specifically, our research question asks what reputational signals are effective with prospective buyers in international online markets.

We address this gap in our knowledge by integrating empirical findings from prior research on reputation from the fields of strategy, organizational studies, marketing, and MIS through the theoretical lens of economics-based signalling theory. We start from the premise that online user ratings are largely outside a firm’s control, but that the purpose of online reputational signalling is to provide complementary quality assessments, to magnify the impact of high ratings on reputation and to mitigate the impact of low ratings. In taking this perspective, we endorse the entrepreneurial view of firm-environment relations which posits that firms can influence the market niches in which they compete (e.g., Lukasah, 2008; Smith and Cao, 2007). We hypothesize that firm-controlled reputation signals with credible commitments—higher prices, advertising, and umbrella branding (i.e., giving products names with a common stem)—have such effects. We test our hypotheses using data collected about software products offered by sellers from more than 25 countries on the online market Web site Download.com.

This article contributes to the burgeoning literature on international entrepreneurship in two intertwined ways. First, it brings a new kind of customer base into the conversation about how young and small firms can or should enter foreign markets. In doing so, it addresses changes that there has been insufficient attention paid to customer perspectives in the strategy and management literatures (Brief and Bazarman, 2003; Priem, 2007), as well as in past entrepreneurship research (Shepherd and Zacharakis, 2003). Much of the prior research that has examined the customers of entrepreneurial firms has explored the learning opportunities and vulnerabilities that ensue from having dominant customers (e.g., Larson, 1992; Venkataraman et al., 1990; Yli-Renko, Autor, and Sapienza, 2001; Yli-Renko, Sapienza, and Hay, 2001; Yli-Renko and Janakiraman, 2008), and this same orientation has been reflected in international entrepreneurship research as well (e.g., Boer and Holmquist, 1996; Erramilli and Rao, 1990; Martin, Swaminathan, and Mitchell 1998; Presutti, Bouri, and Pratocchi, 2007). A salient characteristic of this prior research is that it is based on samples of firms in (often high-tech) industries where it is usual to have key dominant business customers, and where these key business customers themselves serve as powerful reputational signals to prospective business customers (cf. Fischer and Reuber, 2004; Stuart, Hoang, and Hybels, 1999). In contrast, entrepreneurial firms selling in international online markets typically do not have dominant customers. Instead, these firms need to use reputational signals that will attract large numbers of individual buyers (Fischer and Reuber, 2004; Reuber and Fischer, 2005). Thus, this research contributes to our field by providing an understanding of how firms signal reputation to a large international audience of potential customers.

The second, and related, contribution of this research is that it provides insights as to how firms gain an international reputation in a market context that has been understudied, but in which reputation is expected to play a prominent role in customer decisions. In doing so, this research supports recent arguments that contextual characteristics must be taken into account to refine theories so they are sensitive to variables that take on distinct values in different settings (Johns, 2006; Reuber and Fischer, 2005; Zahra 2007). In the emerging literature on reputation development, familiarity with organizations and/or the individuals associated with them tends to be an explicit or implicit assumption. One stream of research has studied well-established organizations in mature industries, where the relevant stakeholders are familiar with many of the players, and where there are widely published reputational rankings, such as Fortune magazine’s list of America’s Most Admired Companies (e.g., Pombro and Shanley, 1990) and published business school rankings (e.g., Labianca et al., 2001; Martins, 2005; Rindova et al., 2006), or favorable media coverage (e.g., Deephouse, 2000). Other research has examined new, unfamiliar organizations, but in industry contexts where competitors are relatively familiar to the stakeholders of interest. For example, studies of investors and alliance partners indicate that these stakeholders make reputational assessments of new
firms by leveraging their familiarity with industry
distributors. To evaluate a management team’s or a new
organization’s affiliations (e.g., Higgins and Gulati,
2003; Sacks, 2002; Shane and Cable, 2002; Shepherd, Zacharakis, and Baron, 2003; Stuart et al., 1999).

However, in international online markets, familiarity with particular players cannot be assumed.
What makes this international market unique from those usually studied in international entrepreneurship
research is the low level of customer familiarity with most competitors in a product category. This is
due to the very high number of competing sellers and the very low level of repeated exchanges. The
number of competitors tends to be large and growing, as happens when an organizational niche is attractive to many new players (cf. Baum and Singh, 1994). For example, a recent study of consumer packaged goods product categories found that the average number of brands in a category is eight, with a standard deviation of four (Steenkamp and Gielens,
2003), compared to the 100+ offerings in a product category studied here. There are few repeated exchanges because buyers typically interact with a seller in only one transaction (Resnick and Zeckhauser, 2002). The low potential for contractual arrangements, given the relative anonymity of buyers and sellers and the difficulty of enforcing contracts across the many national borders that are typically represented, also contributes to a lack of familiarity. Prior research has largely neglected consideration of reputational signals in such a context of unfamiliarity. The omission is significant because the functional role of reputation is to reduce uncertainty about firms (Roberts and Dowling, 2002; Shapiro, 1983; Weigelt and Camerer, 1988). Therefore, the uncertainties associated with a lack of familiarity increase the difficulty of making reputational assessments while, paradoxically, rendering them more valuable.

Our research question is also of practical importance to international entrepreneurs. Knight and Kim
(2009: 260) identify international marketing skills— ‘planning, controlling, and evaluating how marketing
tools are organized to differentiate offerings from those of competitors’— as a key international business competence. Previous research suggests that this competence is especially important for small and young firms. Finding and engaging international customers can be expensive for small firms (Mesquita and Lazzarini, 2008), and yet doing so has been found to be one of the key factors facilitating early internationalization (Rialp, Rialp, and Knight, 2005). Thus, insights as to how young entrepreneurial firms can effectively signal that they produce high-quality products have the potential to enable smaller and younger firms to compete online for foreign customers.

The remainder of the article is organized into four sections. In the next section, we integrate theoretical insights from signalling theory and from streams of past research, and develop the hypotheses to be tested. In the next two sections, we describe our research methods and report the results of the analyses. In the final section, we discuss the limitations and theoretical and managerial implications of the study.

THEORY AND HYPOTHESES

Defining reputation

A firm’s reputation is widely considered to be a valuable resource associated with sustained competitive advantage (Amit and Schoemaker, 1993; Barnett, 1997; Barney, 1991), if not the most valuable intangible resource a firm can possess (Hall, 1992). Research has shown that a good reputation provides a firm significant benefits (Fombrun and Shanley, 1990; Podolny, 1993; Rao, 1994; Weigelt and Camerer, 1988) that can persist over time (Roberts and Dowling, 2002). Firms with good reputations perform better because they are more attractive to a wide variety of audiences, including investors, customers, suppliers, and employees, and this attractiveness can yield price, cost, and selection advantages.

We define organizational reputation in the same way as Fombrun and Shanley (1990: 234), using a definition borrowed from Spence (1973): ‘the outcome of a competitive process in which firms signal their key characteristics to constituents.’ More specifically, reputation, or the outcome of this signalling process, is a perceptual representation of a firm’s overall appeal to external constituents (Fombrun, 1996). A firm’s reputation is, therefore, a social cognition developed through the cognitive processing of signals about the firm. It is a cognitive evaluation of the firm’s quality that is socially constructed, but objectively held, by current and prospective constituents.

Before proceeding, it is worthwhile to note that this definition of organizational reputation can be
contrasted with at least three other socially constructed intangible organizational resources: organizational identity, organizational image, and organizational status (Reuber and Fischer, 2007). Organizational identity has been defined as what insiders think about their organization (Gioia and Thomas, 1996) and organizational image as what insiders believe outsiders think about it (Dutton, Dukerich, and Harquail, 1994). So, it is the externality of reputational judgments that differentiates organizational reputation from these two constructs. However, in previous research, both identity and image have included outsiders' mental models of organizations (e.g., Gatewood, Gowan, and Lautenschlager 1993; Gioia, Schultz, and Corley 2000; Whetten, 1997). This overlap is true of reputation and status as well. While Washington and Zajac (2005) differentiate the economists' notion of reputation (the perception of quality achievements) and sociologists' notion of status (the unearned ascription of social rank), other theorists tend to use the two terms indistinguishably and, indeed, develop hypotheses about reputation from theory on status orderings (cf. Rao, 1994). Accordingly, the ways in which these other constructs have been used may partly overlap with the reputation construct used here.

Since reputation itself (the social cognition) is difficult to observe and measure, strategy and organizational scholars have proposed a number of different ways to operationalize its manifestation as a reputational performance construct—through surveys of stakeholders (e.g., Shane and Cable, 2002), media coverage (e.g., Deephouse, 2000), and market share (e.g., Shamsie, 2003). The firms we are investigating are mostly small, unfamiliar players in a crowded market, so it was not possible to use the first two types of measures. Stakeholders would not recognize the firms in surveys, and media coverage is scant and covers only a small percentage of firms in the sample at best. Accordingly, we measured a firm’s reputational performance with a market share approach, so the meaning of reputational performance is akin to market dominance (cf. Shamsie, 2003). It is a comparative measure consistent with the comparative nature of reputation, and reflects a firm’s relative standing among its peers (cf. Shenkar and Yuchtman-Yaar, 1997). Specifically, we operationalize a firm’s reputational performance as the number of product trials it attracts from prospective customers. Product trial is an important performance outcome for firms because it influences a customer’s consideration set, or the set of products among which the consumer ultimately chooses (Kardes et al., 2002).

The research setting

We collected data from the Download.com Web site. Download.com is a Web site owned by CNET Networks. It is an international market space that lists thousands of software products people can download for free, at least for a trial period. Products are categorized and subcategorized by their function; for example, the category Audio and Video has subcategories Jukeboxes, DVD Tools, and so on.

The Download.com Web site is an international market used by large numbers of online shoppers. At the time of data collection in August 2005, ranking.com (which ranks Web traffic) rated Download.com ninth among all sites in terms of unique visitors (in contrast, Google was ranked fifth). It was the highest ranked download site. It claimed an estimated 38 million users per month (based on Nielsen Netratings, November 2004). Sellers can list their products free of charge, in return for a percentage of their gross revenue from the site. If they pay a monthly fee for a listing, they owe the site a lower percentage of revenue and receive some additional services. Finally, Download.com makes product-level and seller-level information readily available to shoppers in easily accessible and standardized locations, as shown in Figures 1 and 2. Figure 1 shows a sample of product listings within a category, and Figure 2 shows an example of one product’s detailed listing, which provides a link to the seller’s Web site. As the figures show, products can be associated with two quality ratings—a CNET Editor rating and a user rating—which are indicated by colored stars.

Download.com is an ideal setting for investigating reputation in a typically crowded online market context where entrepreneurial firms seek to gain access to international customers. The various product categories on the Web site feature hosts of unfamiliar firms—bearing such names as Awinsoft, ConquerWare, FlarpDotNet, Kephyr, Pollen Software, and so on—that do not yet appear to have established themselves. In the product categories investigated here, sellers are from at least 25 countries, as shown in Table 1 (which lists the number of sellers in our sample which disclosed their country of origin on either Download.com or their firm’s Web site).
Of the disclosed countries of origin, the United States accounted for just under one-half (46.7%). We explored whether there might be a bias in favor of sellers from English-speaking countries, since the Web site is in English. Specifically, we investigated whether being from a country with English as an official language advantaged a firm in terms of the probability of being rated (number of user ratings) and the valence of ratings (both average user rating and CNET Editor rating), as well as our measure of reputational performance, product trial. T-tests comparing sellers from countries where English is versus is not an official language indicate that there are no differences in the means of these four variables: number of user ratings ($t = 0.80, p = 0.424$), valence of average user rating ($t = 0.155, p = 0.909$), valence of CNET Editor rating ($t = 0.317, p = 0.752$), and product trial ($t = -0.505, p = 0.615$).

Interestingly, a little more than half the firms (55.6%) disclosed their country of origin. We expect the actual countries of origin to represent greater diversity than the disclosed countries because online sellers are more likely to disclose information that favors them (Resnick et al., 2000) and some countries have negative stereotypes in the software products industry given their prominence as a source of spam (Einhorn, 2004) or software piracy (Business Software Alliance, 2004).

Download.com is also highly international with respect to its prospective buyers. It is not possible to determine how international the customer base of Download.com was at the time of data collection.

References:


but the data shown in Table 2 indicate that its user base was both international and diverse in May 2009. These data were compiled from Alexa Internet, a Web site that provides information about Web traffic to other Web sites. Together, Tables 1 and 2 show that Download.com is truly an international market from both sides of the transactions.

Firm-generated reputation signals

Firms competing in online international markets have little choice about whether to create signals about their products that their customers process—largely unreflectively—to form attitudes about them (Keller, 2002), but they can choose which signals to create. Signalling theory makes three important assumptions: (1) there exists different types of firms, such as higher and lower quality producers; (2) firms prefer to signal their type because full disclosure of their activities can provide too much information to competitors; and (3) different types of firms self-select different signals to send, so a signal itself can reveal the type of sender (Bernhardt and Leblanc, 1995; Spence, 1973). Condition 3 is called a separating, or revealing, equilibrium and exists when there is incentive compatibility among participants to signal truthfully. The most effective reputational signals are those that provide credible commitment. Credible commitment refers to the credibility of an organization’s commitment not to act in a certain way (Ingram 1996; Schelling 1960), such as not producing low-quality products. For example, money-back guarantees are credible commitments because the organization is likely to incur substantial losses if it sells low-quality products that are frequently returned. Thus, there is an incentive to offer money-back guarantees for firms offering high-quality products that are rarely returned, but not for
firms offering low quality products that are often returned. Credible commitment can substitute for contracts in contexts where contracts are infeasible (Ingram, 1996), such as international online markets like the one studied here. We now present hypotheses about the signals that are likely to provide credible commitment in a context of low familiarity. A diagram of the hypothesized relationships is shown in Figure 3.

Price

Price has been a much-studied signal of quality in offline environments. Higher pricing relative to competitors sends a signal to prospective buyers that a product is of higher quality. The argument is based on the possibility of repeat purchases. Although a buyer might purchase a low-quality product at a high price once, he/she is unlikely to do so again. Producers, therefore, have an incentive to set a price commensurate with their product’s quality level. Setting prices at a level higher than low-quality rivals are willing to copy reflects credible commitment, because such prices signal a commitment to keep quality high (Milgrom and Roberts, 1986). In contrast, if high-quality and low-quality competitors price at the same level, the signal would no longer be credible and would have little reputational impact with buyers. Studies have shown that even though higher pricing does not guarantee higher quality, the signal of higher price has consistently been shown to convey to buyers that a product is of higher quality (Erdem, Swait, and Valenzuela, 2006; Zeithaml, 1988).

We expect this incentive compatibility to hold in online environments as well. Price is a salient element of online markets: a common feature of Web sites offering products for sale, including the one studied here, is the ability to display search results in order of price. Although there may be a low likelihood of repeat purchase in online markets, the post-purchase behavior of customers is enormously consequential to firms. This is because of the ease of posting online ratings and reviews and the power of word of mouse in online environments (Dellarocas, Zhang, and Awad, 2007). Customers who are disappointed with the quality of purchase relative to its price can quickly and inexpensively express their disappointment in online forums. Because of the frequent introduction of new versions of products, we also expect buyers of software products to be particularly interested in credible commitment to quality. The investment inherent in learning how to use a particular software product will favor its selection over its rivals when it becomes necessary to upgrade (Klemperer, 1987). Accordingly, we expect credible commitment to be consequential in this context and price to be a reputational signal, leading to the following hypothesis:

Hypothesis 1 (H1): Price is positively related to reputational performance.

Advertising

Advertising is a reputational signal for experience goods (Milgrom and Roberts, 1986; Nelson, 1970, 1974), such as those offered in the market studied here. The difference between search goods and experience goods is that buyers can evaluate the quality of search goods before selection, but can evaluate the quality of experience goods only through using them. Advertising distinguishes a seller’s product from those of rival producers and makes a product more familiar to prospective buyers. Recent marketing research indicates that advertising is associated with positive reputational beliefs even for unfamiliar brands (Barone, Talor, and Urbany,
2005), so it is expected to be especially important in an international online environment where there are hundreds of rivals with which prospective buyers are likely to be unfamiliar. Like pricing, producers have an incentive to advertise commensurate with their quality level, so advertising provides credible commitment to quality in the same way as higher prices. As originally articulated by Nelson (1974), a firm's investment in advertising credibly signals its commitment to high quality. This is because high-quality products are more likely to be repurchased than low-quality products, making producers more willing to invest in advertising. Although repurchase in the context studied here is infrequent, producers will have an incentive to invest in advertising only when their quality is sufficient to avoid threat of negative user ratings and encourage the acquisition of future upgrades. This leads to the following hypothesis:

**Hypothesis 2 (H2):** Advertising is positively related to reputational performance.

**Umbrella branding**

Umbrella branding is a third reputation signal that provides credible commitment (Ingram, '96). Umbrella branding occurs when several discrete but related products share the same brand name or the same name stem (Montgomery and Wernerfelt, 1992)—for example, iPod and iTunes, or the iPod nano, iPod shuffle, and iPod touch. Umbrella branding constitutes a credible commitment: sellers have an incentive to maintain high quality standards because if consumers view one of the seller's products as low quality, they are likely to extend their negative judgments to the seller's other products. On the other hand, low-quality sellers do not have an incentive to invest in umbrella branding. For example, if you enjoyed a stay at a Holiday Inn hotel in one city, you are more likely to stay at a Holiday Inn elsewhere, whereas if you encountered quality problems, you are less likely to stay at other units of the chain. Ingram (1996) investigated naming strategies among hotel chains and found that failure was higher for chains that named hotel units individually compared to chains like Holiday Inn that used umbrella branding. We expect the credible commitment of umbrella branding to exist in the online world since sellers offer multiple products, and there is a range of quality levels among sellers. High-quality sellers have an incentive to umbrella brand, while low-quality sellers do not. This leads to the following hypothesis:

**Hypothesis 3 (H3):** Umbrella branding is positively related to reputational performance.

**Moderating the impact of user ratings**

So far in the discussion, we have focused on the signals created and controlled by firms offering their products in an international online market. In doing so, we have mentioned another reputational signal that is widely available to potential customers but not under the control of the seller: online user ratings. It is increasingly common to recognize that user signals provide important feedback to other users (e.g., Shah and Tripas, 2007). Previous studies of offline organizational reputation have found different types of endorsements to be influential in different types of market contexts. While high status endorsements are influential in high-tech sectors, when there is low product customization and low purchase complexity—as is the case in the context studied here—top managers believe that endorsements from customers who are representative of a large customer base are more persuasive (Reuber and Fischer, 2005).

Similar results have been found in online contexts. Admittedly, online user ratings can be distorted (Adami and Pflegher, 2001; Dellarocas, 2003, 2005; Lim et al., 2006). People motivated to post product ratings might have more extreme views—positive or negative—than most users. Alternatively, they might be dishonest, providing large amounts of positive feedback for a product a user has a stake in, or negative feedback for a product with which they compete. However, the valence of online user ratings have been found to influence consumer purchasing (Chevalier and Mayzlin, 2006; Dellarocas et al., 2007). Indeed, online buyers perceive anonymous users as being more trustworthy than experts in their online product assessments.

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1It should be noted that this discussion focuses on online user rating mechanisms that differ from those of online auction sites such as eBay. While research on rating mechanisms for online auctions indicates that online buyers do process signals of sellers' reputations (Ba and Pavlou, 2002; Bolton, Kanok, and Ockenfels, 2004; Dewally and Ederington, 2006; Sandiford, 2001), the specific feedback mechanisms available in online auctions are not widely generalizable to other online purchase contexts, such as the one studied here. In online auctions, buyers rate sellers, whereas in our context, buyers rate products. Furthermore, in online auctions, sellers also rate buyers. This sets up norms of reciprocity resulting in more biased reporting and a lower ability to make inferences than the case when sellers do not rate buyers (cf. Dellarocas and Wood, 2008).
(Senecal and Nantel, 2004) and better able to evaluate product quality in terms of everyday enjoyment or usage (Chen and Xie, 2008; Genser, Leenders, and Wijnberg, 2008). This discussion leads to the following hypothesis:

**Hypothesis 4 (H4):** The valence of online user ratings is positively related to reputational performance.

The valence of online user ratings is not only expected to have a direct relationship with reputational performance, but also to affect the impact of firm-generated signals. Most buyers process multiple reputation signals concurrently and in combination (Purolait and Srivastava, 2001), and we need to take this into account when developing a model of how firms signal firm-level reputation in contexts of unfamiliarity. Given the prominence of online user ratings, both visibly on the Download.com Web site and in terms of their influence expected from prior research, sellers in international online markets need to understand how they are likely to interact with signals that are more under the firm’s control, so they can magnify favorable ratings and mitigate unfavorable ratings. Since multiple signals are most influential when they are corroborating (Miyazaki, Grewal, and Goodstein, 2005), we expect that the credible commitment in the three types of signals discussed above—pricing, advertising, and umbrella branding—renders them effective in strengthening the impact of the online user ratings received. This logic leads to the following hypotheses:

**Hypothesis 5 (H5):** Price strengthens the relationship between the valence of online user ratings and reputational performance.

**Hypothesis 6 (H6):** Advertising strengthens the relationship between the valence of online user ratings and reputational performance.

**Hypothesis 7 (H7):** Umbrella branding strengthens the relationship between the valence of online user ratings and reputational performance.

**RESEARCH METHODS**

**Sample and data collection**

We collected data from three categories of products listed on the Download.com Web site: Adware and Spyware Removal (n = 165), Authoring Tools (n = 133), and Font Tools (n = 45), for a total of 343 products. In collecting data from the Download.com Web site, there were three main concerns. The first was that the set of listed products changes over time, and we needed to be able to calculate relative download demand for all products in a product category at one point in time. We handled this issue by collecting an inventory of the products in a category, as well as their demand and rating data, in a short period of time (one day). The second concern was that since the dependent variable reflecting reputational performance (product trial) was collected for all products at one time, it was necessary to collect the remainder of the data afterward. Thus, it is possible that the values for the independent and control variables changed during this period. Since it was impossible to collect all the data simultaneously, we handled this issue by minimizing the data collection period for each product category as much as possible (a month). We tested a subset of the sample to see the extent to which data fields changed throughout the month, and found little change overall (nine changes in seven data fields for 135 products). Third, in order to collect the data over as short a period as possible, we had two people doing the data collection, and it was important to make sure they were coding variables in the same way. In order to safeguard data integrity, we had both people collect data for 30 Adware and Spyware Removal products and discuss any differences in the values coded. After this training period, they both collected data on 133 products in the Authoring Tools category. We found 95.7 percent of the data elements had been coded identically, and the inconsistencies were resolved through discussion.

**Measures**

**Dependent variable (reputational performance)**

We measured reputational performance by product trial, the total number of downloads of the product in the past week (the week preceding data collection), which is information available on the Download.com Web site. This variable ranges from zero to 1,104,119, with a mean of 8,388. Because the variable is positively skewed, a logarithmic transformation was used in analyses. We used the number of downloads in the past week—rather than total downloads for the product—because products are listed for different lengths of time and we did not...
want a value to be high solely because the product had been listed on the Web site for a longer period of time.

**Variables reflecting reputation signalling**

**Price**

All of the products have a free trial period and 65.6 percent have a price for use beyond the trial period. We constructed two price variables. The first is a binary variable to measure whether the buyer has to pay to use the product after a trial period (yes = 1; no = 0). The second takes the value of the purchase price if the product must be purchased after a trial period, and is otherwise equal to zero. The binary variable was used to test the moderating effects of price, on the assumption that in the online context a limited free trial is a stronger reputational signal than the magnitude of the subsequent price if the free trial ends.

**Advertising**

We measured advertising by capturing whether or not there is an advertisement for the product on the Download.com Web site (yes = 1; no = 0). We included any blocks that were labeled either sponsored or advertisement, but did not include pop-up ads because they are unpredictable. There were advertisements for 5.2 percent of the products.

**Umbrella branding**

In order to capture data about umbrella branding, we examined the company’s Web sites for other products that shared part of the listed product’s name (cf. Ingram, 1996). We included new versions of a product that bore the same name as older versions as indicators of an umbrella branding strategy. This was based on the rationale that some entrepreneurial firms may have but a single product line and that strategic choices are reflected in whether new versions carry the same name as older ones. There was umbrella branding for 34.1 percent of the products. We constructed two variables to measure umbrella branding. The first is a binary variable that indicates whether the product was umbrella branded (yes = 1; no = 0). The second takes the value of the number of products if there is umbrella branding and otherwise equals zero. The binary variable was used to test the moderating effects of umbrella branding, on the assumption that carrying out some umbrella branding is a stronger reputational signal than is its extensiveness. It is also a less noisy reputational signal because it is not affected by the width of a firm’s product line to the same extent.

**Valence of online user ratings**

Average user product ratings were indicated on the Download.com Web site by purple scales, from one star to five stars. If the product had an average user rating, it was immediately obvious on the Web site beside the product name (see Figure 1). About 65 percent of the products in our sample were associated with average user ratings.

**Control variables**

**File size**

We used megabytes to measure the file size of the software to be downloaded. We expected people to be more reluctant to download larger software products, so file size should be negatively related to product trial. This is consistent with findings that a person’s computing capacity is related both to their intentions to adopt and to their adoptions of antispyware products (Lee and Kozar, 2005). The mean file size was 5.8 megabytes.

**Expert product rating**

We controlled for the influence on reputations generated by experts’ product quality rating because in other studies of online markets experts have been seen by online buyers as credible sources of product recommendations (Chen and Xie, 2008; Senecal and Nantel, 2004). Expert product quality rating was measured by the CNET Editor product rating, indicated on the Download.com Web site by a red scale, from one star to five stars. If a product had a CNET Editor rating, it was immediately obvious on the Download.com Web site beside the product’s name (see Figure 1). Having a CNET Editor rating was rarer than having an average user rating, as only 19.2 percent of products in our sample had one.

**Number of days listed**

We control for the number of days a product has been listed on Download.com to account for the possibility that interest in a particular software product might subside over time as newer products come on the market. Download.com indicates the date on which each product is listed on the Web site, and we counted the number of days from that
date until the day the dependent variable was collected.

Product category

To take into account any observed differences among the three product markets (for example, product characteristics or the number of competitors), we included dummy variables for two of the three product categories, Adware and Spyware Removal and Font Tools.

RESULTS

Descriptive statistics and zero-order correlations are shown in Table 3. As can be seen, there is some multicollinearity among the independent and control variables. We tested the seriousness of the multicollinearity by examining the Tolerance statistics of the regressions. Menard (1995) states that a Tolerance statistic of less than 0.20 is cause for concern. The lowest Tolerance statistic generated before the interaction terms are added is 0.527. Once they are added, they are associated with a Tolerance statistic under 0.20, but multicollinearity in the equation is not a concern at this stage. The objective is to compare the interaction model with the additive model, so the focus is on the change in R², rather than on interpreting the coefficients (Evans, 1991).

To test the hypotheses, we ran a series of ordinary least squares regressions to predict product trial, the variable operationalizing reputational performance. The results are shown in Table 4. The control variables are entered into the equation in Model 1. As expected, a product’s CNET Editor rating is significantly and positively related to product trial. The coefficients for file size and the length of time the product has been listed on Download.com are not significant. Both dummy variables representing product categories are significant and positive. The control variables alone account for slightly more than 30 percent of the variance of product trial (Adjusted R² = 0.306), and the equation has a significant F-value.

Model 2 shows the results of adding the firm-controlled signalling variables, to test H1, H2, H3, and H4 regarding the signalling effects of pricing, advertising, umbrella branding, and the valence of user ratings, respectively. The addition of these independent variables increases the adjusted R² to 0.494, the equation has a significant F-value, and the change in F from Model 1 is significant.
Table 4. Results of the OLS regressions to test the hypotheses

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>File size</td>
<td>0.064</td>
<td>0.062</td>
<td>0.061</td>
<td>0.061</td>
<td>0.070</td>
</tr>
<tr>
<td>CNET Editor product rating</td>
<td>0.475***</td>
<td>0.397***</td>
<td>0.384***</td>
<td>0.397***</td>
<td>0.400***</td>
</tr>
<tr>
<td>Number of days listed</td>
<td>-0.069</td>
<td>-0.146**</td>
<td>-0.167***</td>
<td>-0.146**</td>
<td>-0.157**</td>
</tr>
<tr>
<td>Authoring Tools product category</td>
<td>0.181**</td>
<td>-0.031</td>
<td>0.034</td>
<td>0.031</td>
<td>0.022</td>
</tr>
<tr>
<td>Font Tools product category</td>
<td>0.116*</td>
<td>0.026</td>
<td>0.066</td>
<td>0.056</td>
<td>0.055</td>
</tr>
<tr>
<td>Price (binary)</td>
<td>-0.264***</td>
<td>-0.028</td>
<td>-0.264***</td>
<td>-0.260***</td>
<td></td>
</tr>
<tr>
<td>Price (dollars)</td>
<td>-0.027</td>
<td>-0.029</td>
<td>-0.027</td>
<td>-0.028</td>
<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>0.198***</td>
<td>0.195**</td>
<td>0.182</td>
<td>0.187***</td>
<td></td>
</tr>
<tr>
<td>Umbrella branding (binary)</td>
<td>-0.005</td>
<td>-0.010</td>
<td>-0.005</td>
<td>-0.111</td>
<td></td>
</tr>
<tr>
<td>Umbrella branding (number of products)</td>
<td>0.174***</td>
<td>0.171***</td>
<td>0.174***</td>
<td>0.158**</td>
<td></td>
</tr>
<tr>
<td>Average user rating</td>
<td>0.197***</td>
<td>0.490***</td>
<td>0.197***</td>
<td>0.142**</td>
<td></td>
</tr>
<tr>
<td>Pricing x average user rating</td>
<td>-0.378***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertising x average user rating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Umbrella branding x average user rating</td>
<td></td>
<td></td>
<td></td>
<td>0.159*</td>
<td></td>
</tr>
</tbody>
</table>

Adjusted R²        | 0.306   | 0.494   | 0.515   | 0.492   | 0.499   |
R² change           | 0.195   | 0.022   | 0.000   | 0.007   |         |
F                   | 28.13*** | 28.32*** | 28.27*** | 25.88*** | 26.58*** |
F change            | 19.77*** | 14.0***  | 0.01    | 4.15*   |         |

Standardized coefficients are shown.
*p < 0.05.
**p < 0.01.
***p < 0.001.

H1 is not supported. The results show that having any price after the trial period is significantly and negatively related to product trial, although the price level itself is insignificant. However, as expected, H2, H3, and H4 are supported. There is a positive and significant coefficient for advertising (H2), indicating that product trial is higher when the product is advertised on the Web site. While the coefficient for the binary variable measuring umbrella branding is not significant, the coefficient for the variable measuring the extent of umbrella branding is significant and positive (H3), indicating the product trial is higher to the extent that the product is part of an umbrella brand. A separate analysis indicates that together these firm-controlled signals account for roughly 83 percent of the increase of the variance from Model 1 to Model 2 (16.1% out of 19.5%). Further, the valence of average user rating is a positive and significant predictor of product trial (H4). A separate analysis indicates that it accounts for roughly 17 percent of the increase of the variance explained in this step of the analysis (3.4% out of the 19.5% increase).

Models 3 through 5 show the results of testing for interaction effects. Regarding the pricing signalling strategy (H5), the results shown in Model 3 indicate that the hypothesis is not supported. The interaction effect is significant, but is negative instead of positive. The adjusted R² increases to 0.515 in Model 3 and the interaction effect is monotonic. The F-value of Model 3 is significant, as is the change in F from Model 2 to Model 3. Model 3, therefore, indicates that there is a penalty in terms of reputational performance to require users to pay a fee after a free trial period—not only is there a direct negative effect, but it also reduces the impact of the valence of average user rating on product trial.

The results shown in Model 4 indicate that H6, regarding the advertising signalling strategy, is not supported. We saw previously that advertising has a significant, positive direct relationship with product trial (H2), but Model 5 shows that it does not moderate the impact of average user rating on product trial.

Finally, the results shown in Model 5 indicate that H7, regarding the umbrella branding strategy, is supported. The adjusted R² increases to 0.499 in Model 5 and the interaction effect is monotonic. The F-value of Model 5 is significant, as is the change in F from Model 2 to Model 5. Model 5 shows that not only does umbrella branding have a significant direct effect on product trial (H3), but it also significantly
and positively moderates the impact of the valence of average user rating on product trial.

DISCUSSION AND CONCLUSIONS

In this article, we have addressed the challenges faced by young and small firms that attempt to increase their foreign sales by doing business via the Internet. Specifically, we investigated reputational signals in Download.com, an international online market where customers are unfamiliar with most of the many sellers in a product category because of the high volume of sellers from around the world and the low level of repeat purchase. Our results indicate that three reputation signalling mechanisms available to firms in such markets—pricing, advertising, and umbrella branding—all directly impact reputational perceptions of potential buyers enough to have a significant effect on product trial, although the impact of pricing was negative. Together they explain roughly 16 percent of the variance in product trial. Moreover, together they explain almost five times as much variance as does the valence of user ratings, even though they are generated by the firm and so are more self-interested.

Before discussing the implications and conclusions of this research, we note its key limitations. First, we cannot measure firms’ reputations (as social cognitions) directly. Instead, we measure reputational performance in a manner that reflects a firm’s standing among its peers. Second, our measure of reputational performance reflects product trial rather than purchases. We predict which products are downloaded, but not which products will ultimately be used or purchased. Third, we assume that the individuals using the Download.com Web site are indeed unfamiliar with most of the firms and products listed. This assumption seems valid given the millions of downloaders, thousands of products, and generally low level of familiarity with software such as this (cf. Lee and Koza 2005). Fourth, we need to be cautious about generalizing the results of this research to all online markets, because this particular market has a unique cost structure, as will be discussed next.

While keeping these limitations in mind, we turn to an interpretation of findings contrary to our hypotheses. First, we found that pricing—which has been found to be a quality signal of credible commitment in offline contexts (Milgrom and Roberts, 1986)—is not positively related to reputational performance in this context. Charging a price beyond an initial free trial period is negatively related to product trial and reduces the impact of user ratings on product trial, although the actual price charged is not consequential in either case. There are a number of potential explanations for this mixed pattern of results, and it is not possible with the current data to determine which are valid. In interpreting the results, it is important to note that the data capture demand at the time of a free trial period, rather than at the time when any payment is required. Further, the data are based on charging any price rather than on how high the price is. This is consistent with theories of switching costs (Klemperer, 1987): people do not want to invest in learning about a product they may need to upgrade if they know the price will go up. It is also consistent with the contemporary observation that people are generally reluctant to pay for things via the Internet (Anderson, 2009). Thus, in an international online market where some goods are free, our results suggest that price is a stumbling block, not a quality signal.

Since alternative explanations for our price-related findings exist, they should be investigated in future research to examine the extent to which our results hold true for other types of products sold in international online markets. Because the marginal cost of producing and distributing another unit of a digital product is close to zero, it is possible to have many sellers offering products free of charge. This possibility does not exist for other product categories where sellers need to cover the cost of production and distribution. Given that the binary price variable was significant while the price level variable was not, we know that having any price negatively impacted reputational performance, but cannot assess the reputational consequences of a price-related signal in international online markets offering different types of products.

Second, although we found advertising had a direct effect on reputational performance, advertising did not strengthen the relationship between the valence of user ratings and reputational performance. This suggests that prospective buyers separately process the reputational signals of online advertising and user ratings. Again, there could be a number of competing explanations for this result. It could be that the prominence of advertising on a Web page, or its proximity to the product description, affects the extent to which managers can strengthen the impact of positive user ratings through advertising, and this is a question for further research. The finding
could also be a result of the low level of advertising in this sample—only 5.2 percent of the products had an online advertisement on the Download.com Web site. When a reputational signal is rare, as in this case, its strength is likely to be heightened due to its higher diagnosticity (Fischer and Reuber, 2007; Skowronski, 2002). In other words, when a reputational signal is infrequently encountered, it provides more information than when it is a common occurrence. However, the low incidence of advertising in this context might also result in a low variance in the interaction terms, resulting in a low value for the change in variance explained by the addition of the interaction term. This explanation also suggests that the impact of advertising as a reputational signal should be investigated in international online markets where there are different norms of signalling through advertisements.

Overall, the results reported here suggest that the online signals sent by firms matter to their reputational performance. The results are important for policy makers who are often involved in developing or sponsoring training programs for entrepreneurs wishing to enter foreign markets. They suggest that Internet-based market entry strategies need to be tailored to individual firms. Not all producers will be high-quality producers. Given that a separating equilibrium exists, high-quality firms have an incentive to signal their quality through a credible commitment, while low-quality firms do not. Thus, different advertising and branding strategies are likely to be effective for different types of firms.

For entrepreneurs attempting to internationalize through online markets, this research suggests that the strategies for building credible reputations with prospective customers need to be customized to the new context. Strategic choices that might be sound in traditional markets—where sellers meet prospective buyers who form reputational assessments offline—cannot be assumed to be valid for online markets involving hundreds of vendors from around the world and unsolicited product ratings posted by users. This study shows that online sellers can strategically manage the impact of such externally-generated signals with advertising and umbrella branding signals of their own. There is value in advertising on sites where online buyers come across products and in umbrella branding so these products stand out as familiar among the hundreds of largely unfamiliar products. In addition, there might be advantages to a broad product line in an online market, to extend the benefits of umbrella branding (cf. Klemperer and Padilla, 1997). Overall, for entrepreneurs, our study shows that reputational signals are important in online contexts, as they are in offline contexts, but that the logic and consequences of particular signalling mechanisms can differ.

For international entrepreneurship as a field of research, this study highlights the Internet as an important marketplace for many young and small firms. While others have pointed out that the Internet plays a fundamental role in making international entrepreneurship feasible for many firms (Loane et al., 2004; Oviatt and McDougall, 2005; Petersen et al., 2002), there has been little exploration of how these firms can leverage the Internet effectively or how extensively it has been used. One contribution of this article is simply to document how international online markets can be on both the seller and buyer sides. Firms doing business in such markets do not have the dominant exchange partners and repeated transactions that are characteristic of the businesses studied in much international entrepreneurship research that is focused on technology-based firms. Our research indicates that managers in online contexts need to send different types of reputational signals to large numbers of internationally dispersed buyers, many of whom will make a single purchase from a seller.

More generally, both Johns (2006) and Zahra (2007) have recently drawn attention to the fact that theories and patterns of findings discovered in one context cannot necessarily be assumed to generalize to other contexts. Alertness to the unique challenges of selling in international online contexts is an underpinning of this study. In terms of results, we found that pricing in international online markets appears not to be a signal of quality to the same extent as in traditional offline markets, but that the theoretical construct of credible commitment—through advertising and umbrella branding—is important to online purchases even when there is little frequency of repurchase. We suggest that the impact of establishing a credible commitment in this context comes from the ease of posting negative user ratings, the expected need to repurchase upgrades in the future, and the lack of opportunity for contractual arrangements or legal recourse across national borders (cf. Ahuja, Gupta, and Raman, 2003).

Finally, this study indicates the need for future international entrepreneurship researchers to investigate different online markets systematically, by theoretically identifying how different features create opportunities and challenges for young and
small firms doing business in foreign markets. As Paul Deninger, CEO of the investment bank Broad- view, stated, 'it is true that the Internet will change everything. It is not true that everything will change' (Uzum, 2000). It is important for international entrepreneurship scholars to understand systematic sources of variation in online markets and their implications. Online markets differ considerably from one another and from offline markets—for example, in terms of competitive crowding and familiarity, availability of expert and nonexpert ratings, pricing norms, the degree of repurchase, and even the visual layout—and it is important for our field to develop a theoretically grounded understanding of the implications of these differences for how firms can effectively compete.

ACKNOWLEDGEMENTS

The authors are grateful for the research assistance of Anthony Lu and Nataliya Nebrat and financial support from the University of Toronto's Work-Study Program, the Entrepreneurship Research Alliance II and the Social Sciences & Humanities Research Council of Canada (grant number 720-142-07). We acknowledge with many thanks the comments of participants at the Queen's University Organization Behaviour Brown Bag Workshop, the Strategic Entrepreneurship Journal conference at York University and the Economics Department Seminar Series at the University of Winnipeg. In particular, we thank Douglas Cumming, Hugh Grant, Akie Iriyana, Manish Pandey, Harry Sapienza, Donald Siegel, James Townsend, Mike Wright and two anonymous reviewers for their contributions to this article.

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