

**THE ACCIDENTAL ENTREPRENEUR: THE EMERGENT AND COLLECTIVE PROCESS OF
USER ENTREPRENEURSHIP**

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ABSTRACT

We develop a process model of how users, an understudied source of entrepreneurship, create, evaluate, share, and commercialize their ideas. We compare and contrast our model to the classic model of the entrepreneurial process, highlighting the emergent and collective nature of the user's entrepreneurial process. Users are often "accidental" entrepreneurs who happen upon an idea through their own use and then share it with others; more specifically, the development of an idea and subsequent experimentation, adaptation, and preliminary adoption often occur *before* that idea is formally evaluated as the basis of a commercial venture. Users also tend to engage in collective creative activity prior to firm formation — often within the social context provided by user communities — that results in the improvement of ideas. Finally, we provide detailed data on the prevalence of user entrepreneurship in the juvenile products industry.

INTRODUCTION

In 1893, Josephine Cochrane unveiled an innovation at the Chicago World's Fair: the first truly functional dishwasher. A prominent socialite, she had grown tired of her servants' tendency to break her 17th century fine china and began to wash the dishes herself (Casey, 1997; Fenster, 1999). She reportedly said "If nobody else is going to invent a dishwashing machine, I'll do it myself" (Lemelson Center, 2004). She subsequently formed her own firm, Cochran's Crescent Washing Machine Company, to manufacture the machines, primarily for sale to hotels and restaurants. Cochrane's company eventually became KitchenAid, part of the Whirlpool Corporation.

In 1994, Ph.D. candidates in electrical engineering David Filo and Jerry Yang started a guide as a way to keep track of their personal interests on the Internet and called it "Jerry & David's Guide to the World Wide Web." What began as a student hobby evolved into a global brand — Yahoo! — that changed the way people communicate and exchange information.

On the surface, these examples are worlds apart, yet the process that these entrepreneurs underwent is strikingly similar. In both examples, individuals experienced a need in their day-to-day lives, created a solution to that need, had a passionate desire to share their solution with others, and eventually commercialized the solution. These examples are representative of the same phenomenon: user entrepreneurship.

While other sources of entrepreneurship, such as ventures based on the research of university scientists and ventures founded by employees of incumbent firms (i.e., spin-offs), have been studied extensively, user entrepreneurship remains relatively unexplored. The passage of the Bayh-Dole act, the increased activity levels of university licensing

offices, and the venture capital funding of university-based start-ups have all attracted the attention of academic researchers interested in better understanding university-based entrepreneurship (e.g., Audretsch and Feldman, 1996; Zucker, Darby, and Brewer, 1998; Shane, 2001; Feldman, Francis, and Bercovitz, 2005; Mowery, 2005; Stuart and Ding, 2006). Similarly, academics have been intrigued by the characteristics of firms that generate spin-offs, the influence of prior employment on the success of a new venture, and the motivations of individuals who leave a firm to found a new venture (e.g., Klepper, 2001; Burton, Sorensen, and Beckman, 2002; Phillips, 2002; Agarwal et al., 2004; Gompers, Lerner, and Scharfstein, 2005; Klepper and Sleeper, 2005). The assumption behind these lines of research has been that experience in established organizations is the primary source of entrepreneurial ideas; data, while limited, have supported this assumption. In a survey of the top 100 of the *Inc. 500* fastest-growing firms, Bhide (1994) found that 71% of entrepreneurs pursued ideas inspired by their previous employment, and Cooper (1985), in a cross-sectional survey of 119 firms, found similar results. These cross sectional data, however, have a bias towards high-growth, technology-based firms and may also mask significant differences in the sources of entrepreneurship across industries. As a result, the importance of users as a source of entrepreneurial activity remains under-recognized and understudied. In this paper, we fill this gap by empirically documenting the importance of the user entrepreneurship phenomenon, characterizing the user entrepreneurship process, and theorizing about the industry conditions under which user entrepreneurship is more likely to occur.

We define user entrepreneurship as the commercialization of a new product and/or service by an individual or group of individuals who are also users of that product

and/or service. We distinguish between two categories of user entrepreneurs: professional-users and end-users.¹ Professional-user entrepreneurs are embedded in an organization and employ a product in their professional life. They experience a need for improvement and leave their firm in order to develop and commercialize a solution.² End-user entrepreneurs, in contrast, are individuals who use a product in their day-to-day lives. User entrepreneurs are distinct from other types of entrepreneurs in that they have personal experience with a product or service and derive benefit through use in addition to financial benefit from commercialization. As a result, they often traverse a different path to entrepreneurship, choose different opportunities, and prioritize different goals from those typically described in the entrepreneurship literature.

The importance of users as a source of novel innovations has been well documented in the sociology of science, history, and innovation management literatures: examples span fields as diverse as automobiles, chemical and petroleum processing, electronic components, scientific instruments, semiconductors, and sports equipment (see for example Enos, 1962; Knight, 1963; Freeman, 1968; von Hippel, 1988; Kline and Pinch, 1996; Franz, 2005; Luthje, Herstatt, and von Hippel, 2005). A large percentage of users innovate (Table 1), and in some industries they innovate more frequently than do manufacturers (Table 2). User innovation, as opposed to manufacturer innovation in a corporate R&D setting, occurs under conditions of low appropriability: from the

¹ Although organizations can also be users, we do not include them in our conceptualization. While innovations by user organizations are an interesting phenomenon, we believe that the processes by which this type of activity takes place — e.g., skunkworks or the creation of a new division — is a fundamentally different dynamic from that in which individual end- or professional-users engage. For example, American Airlines developed the SABRE reservation system for its own use and eventually commercialized it, but we would not consider the airline a user entrepreneur.

² Professional-user entrepreneurs are different from employee entrepreneurs in that they generally develop products in a completely different industry from their prior employer. However, macro-level studies of employee spin-offs may include professional-user entrepreneurs in the sample.

manufacturer's perspective, the potential financial benefits are insufficient to merit corporate investment in the innovation, whereas from the user's perspective, benefits derived through use of the innovation are sufficient to merit investment (von Hippel, 1988).

INSERT TABLES 1 & 2 HERE

Research in this tradition posits that although users innovate, they rarely commercialize their innovations. In fact, the established wisdom has been that users allow and sometimes even encourage manufacturers to incorporate user innovations into their products for free, capturing limited economic benefit beyond that derived from their own use (von Hippel, 1988). Historical evidence, however, hints at a different story. Researchers have documented a range of examples where users commercialized their own innovations. For example, two of the three major technological advances in typesetters over a 100-year period were initially commercialized by professional-user entrepreneurs — in-house publishers who became frustrated with the workings of typesetters and were inspired to create and commercialize a better solution (Tripsas, 2008, forthcoming). Professional-user entrepreneurs were also instrumental historically in the ice harvesting industry (Utterback, 1994) and more recently in probe microscopy (Mody, 2006). Examples of end-user entrepreneurs also exist: Shah (2003) found that 43% of key innovations in windsurfing, skateboarding, and snowboarding were commercialized by end-users, and research has documented the role of end-user entrepreneurs in the rodeo kayaking (Baldwin, Hienerth, and von Hippel, 2006), mountain bicycle (Luthje et al., 2005), automobile (Franz, 2005), and stereo components

industries (Langlois and Robertson, 1992). These studies offer a compelling glimpse at what we argue is a significant, but understudied, phenomenon.

This paper contributes to both the entrepreneurship and innovation literatures by extending our knowledge of user entrepreneurship. First, through an empirical survey of start-ups from the juvenile products industry, we provide the first industry-wide statistics documenting the prevalence of user entrepreneurship. We show that users are an important source of entrepreneurial activity and that their actions — like those of university scientists and employees of industry incumbents — are worthy of further investigation.

Second, based on these rich empirical examples, we develop a model of the user entrepreneurship process and compare it to the classic model of entrepreneurship. The primary point of departure between these two models is that the user entrepreneurship process tends to be both emergent and collective. Users are often “accidental” entrepreneurs who happen upon an idea through their own use and then share it with others — the development of the idea, experimentation, adaptation, and preliminary adoption often occur *before* the formal evaluation of the idea as the basis of a commercial venture. In addition, the collective creation of a novel idea through community interactions can be a key part of innovative and entrepreneurial activity. Ironically, sharing an idea without receiving payment can lead to the generation of subsequent improvements and word of mouth diffusion to such an extent that the idea becomes commercially viable. Many user entrepreneurs benefit from the feedback and contributions of a community, and their firms have roots in these collective social processes.

Third, we theorize about the conditions that make user entrepreneurship more prevalent in some industries than others. Specifically, we argue that user entrepreneurship is more likely in industries where use provides enjoyment as opposed to purely economic benefits; where users have relatively low opportunity costs; where there is high variety in demand, and hence many small-scale niche market segments; and where markets are nascent, in the midst of high turbulence, and characterized by uncertain, ambiguous, and evolving demand conditions.

DATA AND METHODS

Our goal in gathering empirical data was twofold. First, we wanted to document the phenomenon and show that user entrepreneurs were common in at least one major industry. Second, we wanted to delve into the process by which users developed and eventually commercialized their innovations. As a result, we searched for an industry that *a priori* we believed would have a large representation of user entrepreneurs — an “extreme case” (Eisenhardt, 1989a). We chose to explore the juvenile products industry, an industry where anecdotal evidence suggested that many firm founders were parents, grandparents, and other caregivers — that is, users. The juvenile products industry is a \$7.3 billion industry and includes a number of categories: strollers, car seats, booster seats, bottles and accessories, baby cushions, blankets, baby carriers, diaper bags, high chairs, walkers, and a wide range of safety- and health-related products. These products are generally used by parents of infant through toddler-aged children.

Our initial sample was constructed based on membership in the primary industry trade organization — the Juvenile Products Manufacturers Association (JPMA). We

began with all JPMA members as well as additional firms that exhibited products in the 2007 JPMA trade show. We limited the sample to firms founded during the 27-year period of 1980 - 2007. We then excluded firms that were not manufacturers (e.g. magazine publishers). We also excluded firms that operated primarily in industries other than juvenile products — for instance, pure furniture, toy, and clothing manufacturers. This left us with a sample of 139 firms. We then searched through juvenile product e-commerce websites and mail-order catalogs to identify additional manufacturers until a complete list of currently operating manufacturers had been compiled. This process identified an additional 124 firms resulting in a total sample of 263 firms. This sample is biased in that it only includes firms in existence as of 2007, so if user-founded firms are more likely to survive, they may be over-represented in the sample, and if they are less likely to survive, under-represented. As we discuss in the conclusion of this paper, the survival rate of user-founded firms vs. other start-ups is an interesting question for future empirical research, but since there are forces both helping and hindering the user-founded firm, there is no strong reason to believe *ex ante* that overall user-founded firm survival rates are different from those of other start-ups.

For each firm, we attempted to determine whether the founder(s) were users. This information came primarily from the “About Us” section of the firm’s website or media coverage. In 58% of the cases we followed up with email and/or phone calls for additional information or to confirm data. We were unable to confirm the founder’s status for only 1% of the firms we identified. For firms that were founded by users, we also recorded the firm formation process, which was frequently included on the website as part of the story of the firm. This process included: whether the founder(s) first

innovated for their own use, when they first contemplated founding a firm, whether and when they shared their idea with others, and whether they participated in a parenting community. Finally, we conducted phone interviews lasting between one and two hours with the founders of 15 firms. The goal of these interviews was to further explicate the decision-making and founding process of these entrepreneurs as a basis for our model.

DESCRIPTIVE DATA ON USER ENTREPRENEURSHIP

Of the 263 firms in the sample, 84% were founded by user entrepreneurs. The vast majority of user-founders in the sample were end-user entrepreneurs, with 43% being mothers, 8% teams of mothers, 13% fathers, 1% teams of fathers, 14% mother/father teams, 15% one parent (unclear whether mother or father), 4% grandparents, and 2% professional-user entrepreneurs. The nonuser founders came from a variety of backgrounds with no clear pattern discernable.

Table 3 lists representative firms from the sample and the innovations commercialized. Some products were revolutionary and created entirely new categories. For instance, the jogging stroller category was created by Phil Baechler, a user entrepreneur and newspaper journalist by training, who founded Baby Jogger in 1984. He “began bringing his son along with him in his baby carriage while jogging. He quickly discovered that standard carriages were not made to endure the stress of long distance usage over various surfaces, so he designed a specialized stroller with features more conducive to running” (babyjogger.com, 2007). Similarly, the educational baby video category was created by the founder of Baby Einstein, a mom who incorporated classical music and artistic images into a video for her infant.

Other products were incremental innovations within existing categories. Some targeted underserved niches with specialized needs. For instance, the Angelguard car seat was designed to transport low birth weight babies (less than 5 pounds), who could not be accommodated safely in existing car seats, and the Baby K'Tan baby sling's unique design was optimized for special needs babies. Others introduced a fashion element into a staid category such as diaper bags. "There was nothing out there that fit my sense of style. It was time to throw caution to the wind and not give into animal prints, gingham or lace" (cadenlaneco.com, 2007) noted one founder. Finally, a number of products solved problems encountered in day-to-day life, such as babies dropping pacifiers or moms needing a place to store items on a stroller.

None of the ventures we examined created entirely new industries along the lines of the KitchenAid dishwasher and Yahoo examples described earlier. We do not believe that this result is representative of user entrepreneurship more generally, but is instead, an artifact of studying a relatively stable, mature industry. In fact, many of the documented examples of user entrepreneurship do involve the introduction of radically new technology and in some cases the creation of entirely new industries (Shah, 2003; Baldwin et al., 2006; Tripsas, 2008).

INSERT TABLE 3 HERE

Based on our sample of firms, we next develop a model of the user entrepreneurship process and contrast it with the classic model of the entrepreneurship process described in the literature.

A MODEL OF THE USER ENTREPRENEURSHIP PROCESS

The classic model of entrepreneurship

Classic management research in entrepreneurship, built on Austrian economics, argues that opportunities exist because of inefficiencies in the allocation of resources in the economy. By combining resources in a novel way, entrepreneurs can form new means-ends relationships (Kirzner, 1997), thereby introducing a previously unseen or unknown good, service, production process, or raw material to the commercial marketplace and creating the potential for economic profit (Casson, 1982; Shane and Venkataraman, 2000). The process of taking advantage of these opportunities is conceptualized as occurring in two stages: the discovery/recognition of the opportunity and the evaluation of whether or not to exploit the opportunity and form a firm (Venkataraman, 1997; Shane and Venkataraman, 2000).

Asymmetries in individuals' knowledge bases and unique approaches to framing problems make some more likely to discover an opportunity than others. Prior experience sends individuals down path-dependent "knowledge corridors" that create these asymmetries (Hayek, 1945; Venkataraman, 1997). For instance, prior employment or university ties can provide unique insights into the application of emerging technologies. Given these differences, some individuals are in a unique position to discover opportunities. Once an opportunity has been discovered, the potential entrepreneur assesses the commercial potential of the idea. Depending upon the magnitude of the opportunity and the potential entrepreneur's individual characteristics — such as his ability to attract resources (Aldrich and Zimmer, 1986; Burton et al., 2002),

opportunity costs (Amit, Eitan, and Iain, 1995), and prior entrepreneurial experience (Carroll and Mosakowski, 1987) — the entrepreneur decides whether or not to start a venture. Investment and actions such as generating prototype products and testing market reactions typically follow the firm formation decision. Next, a set of strategic choices is made covering the business model, partnerships, pricing, and product line, among others. After product launch, consumer demand either materializes or doesn't, providing the firm feedback on its idea and enabling adjustments. (See Figure 1.)

While this somewhat stylized depiction appears rational and calculated with roughly linear stages, a number of authors have pointed out the importance of feedback and adaptation. Baker, Miner, and Eesley (2003) note that the majority of firms in their sample were founded in quick response to opportunities that became apparent to nascent entrepreneurs. The founding process did not begin with a plan that was expected to guide future action. Even when planning does take place, informational feedback may lead an entrepreneur to reassess decisions made in a prior stage (Eckhardt and Shane, 2003). Similarly, Rindova and Kotha (2001) and Eisenhardt (1989b) point out that strategy making, for firms operating in rapidly evolving environments, is often a quick and highly flexible process, as opposed to a linear, highly structured one. As firms receive feedback from the market, they continuously morph and adapt products, organizational structure, and sources of competitive advantage. Bhidé (2000) labels this process “opportunistic adaptation.” Although these processes also occur in user-founded firms, the gathering of feedback occurs *earlier*, before the user even contemplates a commercial venture, as described below.

INSERT FIGURES 1 & 2 HERE

The user entrepreneurship process

Figure 2 illustrates our process model of user entrepreneurship. Actions taken by users are represented by rectangles, and input to those actions is represented by ovals. The user entrepreneurship process is distinct from the classic entrepreneurship process (Figure 1) in two primary ways. First, for a user the entrepreneurial process is typically emergent, meaning that the user entrepreneur takes a number of steps towards starting a firm, such as developing a product for personal use, without any formal acknowledgment or evaluation of a commercial opportunity. In contrast, only after a potential opportunity has been identified would a typical entrepreneur take action such as developing prototypes. Second, when users are embedded in user communities, the community can play a significant role in the development and diffusion of the innovation. While existing research emphasizes feedback and adaptation, it is focused on change that occurs *after* firm formation. User entrepreneurs obtain feedback and adapt prior to firm formation.

The user's emergent path to entrepreneurship

Many of the user entrepreneurs in our juvenile products sample followed a similar series of steps as outlined in Figure 2. First, before the concept of an entrepreneurial venture even existed, a user experienced a problem or need. After searching the market for available solutions, the user determined that the need could not be met by products or services available in the market. For instance, the founder of The Baby Bath Gate commented “When my daughter chipped her tooth on the tub faucet I felt terrible. I looked for a functional solution, but none was available. What I needed was a barrier.” Unable to find an acceptable solution, the user initially innovated to meet his or her own

need, developing a prototype product for personal use. The founder of a ToddlerCoddler (a pillow to support a child's head and neck while they are in a car seat) epitomized this process: "Finding no products on the market that could safely and adequately provide her children with the comfort and safety she thought they needed in the car, Susan experimented with various designs until she settled on the now-popular ToddlerCoddler pillows" (toddlercoddler.com, 2007). At this point in the process, no consideration had necessarily been given to forming an organization to profit from the innovation, yet a great deal of experimentation had occurred.

The next step in the process was exposing the innovation to others by using it. Once the innovator began to use the product/service in public, others observed it, often providing feedback and sometimes expressing interest in adoption. This expression of interest frequently sparked the idea of founding a firm. The story of the Cuddlebabe (a fleece baby wrap with flaps to prevent overheating) provides one example: A grandmother's "homemade gift for her newborn granddaughter was the hit of her baby shower, and drew so much attention from other mothers that she began making them as gifts for friends. When people in libraries, fitness centers and malls began asking where they could get one, she realized there was amazing demand for this unique baby blanket." Similarly, the founder of Baby A La Cart (which makes a cloth shopping cart cover) noted, "It was the overwhelming interest by moms and grandmothers that saw her [my daughter] riding in her plush cover that motivated me to produce the 'Baby A La Cart' " (babyalacart.com, 2007).

Thus signals gathered from other users, often unintentionally, led a user-innovator to see that "just" a useful idea could be a commercial opportunity. In fact, some user-

innovators received unsolicited requests from others wishing to purchase their innovations, enabling them to assess willingness to pay. Table 4 provides additional examples of users engaging in these steps.

INSERT TABLE 4 HERE

The user's collective processes

In some cases, input obtained from a user community was also important in the process. Individuals often associate with one another and share information, resources, and ideas as part of a community (Wenger, 1998; Brown and Duguid, 2001), and user communities are no different. Composed of loosely-affiliated members, they are characterized by voluntary participation, the relatively free flow of information, and far less hierarchical control and coordination than seen in firms (Shah, 2003). They provide social structures and, occasionally, tools that facilitate interactions among users. Forms of communication include informal one-to-one exchanges, semi-formal media such as newsletters, magazines, or websites, and in-person meetings such as monthly clubs or conferences.

Members of user communities engage in a variety of activities ranging from socializing with others who have common interests to teaching an activity to new members to sharing knowledge about how to use a product better to encouraging the creation and diffusion of useful innovations. For example, owners of the Apple Newton continue to exchange information on common user problems, solutions, and new applications despite the fact that the product was discontinued in 1998 (Muniz and Schau, 2005). A number of studies have documented frequent and/or important innovations stemming from user communities in industries such as computing, automobiles, home

crafts, astronomy, software, and sporting goods (Allen, 1983; Kline and Pinch, 1996; Freiburger and Swaine, 2000; Ferris, 2002; Franke and Shah, 2003; Shah, 2003; Franz, 2005; Luthje et al., 2005).

The term *community*, rather than network, is used to describe these groups, because they often possess a distinct social structure by which identification with the group, rather than ties to specific individuals, tends to motivate cooperation and sharing of ideas and resources (Ashforth and Mael, 1989; Hertel, Niedner, and Herrmann, 2003). As members interact and cooperate, their behavior can become self-reinforcing, leading to greater levels of identification over time (Dutton, Dukerich, and Harquail, 1994). To further reinforce and support cooperative behavior, many user communities will develop norms and rules, methods for attracting and socializing new members, and techniques for maintaining their structure and integrity over time.

User-innovators who participate in a user community benefit in two significant ways. First, the user-innovator obtains first-hand information regarding the needs and preferences of potential adopters. User communities create a forum for the open exchange of information about interesting applications, common problems, desired features, and unexpected experiences. Members share information and build upon one another's contributions. Sometimes users share their prototype innovations for free with others in the community, who serve as beta testers and provide iterative feedback that guides product refinements (Franke and Shah, 2003). Successful deployment of a product by members of a user's community can confirm the efficacy and relevance of the idea. The user's access to the community is unique in that a sense of trust permeates the group, increasing its willingness to try products and provide feedback to one of its own.

In fact, it might be difficult for an outsider to gather data of the same richness from the community. In some cases, a community-level collective innovation emerges from the sharing of ideas.

Second, higher levels of novelty can emerge due to collective creativity. Hargadon and Bechky (2006) identify four inter-related activities that trigger collective creativity, all of which are present to varying degrees in user innovation communities: help-seeking, help-giving, reflective reframing, and reinforcing. Community members often request assistance from others when engaged in problem-solving (*help-seeking*), and assistance (*help-giving*) is typically provided. *Reflective reframing* occurs as ongoing interaction among users with different backgrounds and with access to different resources causes them to question each other's approaches and redefine problems. These exchanges improve and refine an innovation, thereby enhancing the product's design and functionality. Finally, the *social norms* of innovation communities support open exchange and provide reinforcement for the other three activities. In addition, we posit that communities that have members with heterogeneous skills and resources will be able to nurture and create more novel and effective innovations, as a greater variety of problem-solving resources can be brought to bear.

In this study we found that user entrepreneurs starting juvenile products companies frequently belonged to some sort of community, generally a local parenting group and/or an online community. As one trade publication noted, "you probably found out as soon as you had children that a secret society of moms exists, eager to share insider tips on motherhood" (Torres, 2007). In-person communities were rooted in local organizations such as churches or preschools, but many users also belonged to a growing

number of online communities found on blogs and websites such as clubmom.com, hotmomsclub.com, workingmom.com, and momsrefuge.com. Regardless of being geographically collocated or dispersed, community members provided one another with support, advice, and feedback.

Members of these communities, whether local parenting groups or online, often embraced a beneficial innovation introduced by another member, thereby validating its commercial potential — often before the user innovator had even thought of commercializing the product. For instance, Julie “found that she had touched a nerve when moms from her child’s playgroup were clamoring for Taggies [a security blanket adorned with satin tags on all four sides]” (taggies.com, 2007). She subsequently founded a firm selling the specialized blankets. In online groups, parents often shared their innovations on websites, providing directions for how to make the product and/or posting pictures of it.

User’s information asymmetries

As in the classic model, asymmetric information possessed by users enables them to recognize opportunities. For user entrepreneurs, however, the source of this asymmetric knowledge differs. First, users possess unique need-related knowledge acquired through their own use. Sometimes these needs are idiosyncratic; at other times, they reflect the needs of a larger population (von Hippel, 1986). Because they have a privileged window into both needs and solutions, users can generate creative ideas.

Not only do users understand their own needs (*what* the product is used for), but they also have a distinctive perspective on *how* it is used. Users have unique knowledge

stemming from their system-of-use perspective. Particularly in industries characterized by interfirm modularity, where different components of a systemic product are made by different firms (Baldwin and Clark, 2003; Staudenmayer, Tripsas, and Tucci, 2005), the user may be the only one in a position to understand the entire usage system. Manufacturers' knowledge is restricted to their own module. Experienced users are therefore best positioned to understand and instigate new and modified uses for modular products.

Finally, users have a sense of demand from the market feedback they have received either from a community or through their own public use of the innovation. For example, when the innovation creates a new product category, estimates of market size and willingness to pay may be impossible to "collect," as the market has yet to be developed and cultivated. In this case, we would expect the user's background to provide a better estimate of the idea's value during the early stages of market and industry formation than could otherwise be determined.

All three types of asymmetric information generated by users are valuable because the knowledge is "sticky," meaning it is difficult, costly, or impossible for others to access, transfer, and use in a new situation (Arrow, 1974; von Hippel, 1994). This characteristic puts the user in a unique position to identify opportunities relative to other would-be entrepreneurs. Stickiness can stem from a number of factors. The inherent tacitness of some knowledge makes it difficult to communicate (Polanyi, 1958). Similarly, knowledge may be embedded in taken-for-granted routines and procedures, making its articulation difficult (Nelson and Winter, 1982). A lack of relevant prior knowledge can make it difficult for others to notice, assess, evaluate, and integrate new

knowledge, further increasing the uniqueness of the user's knowledge base (Cohen and Levinthal, 1990). Finally, the inability to identify which components of knowledge are important to replicate and transfer also results in stickiness (von Hippel, 1994; Szulanski, 1995; Winter and Szulanski, 2001). Armed with unique, inimitable knowledge, users are therefore in a strong position to identify opportunities. In addition to knowledge, however, users may also have a unique way of framing problems that helps them to identify opportunities.

Users' unique framing

Individuals from outside the core discipline of a given field generate original problem-solving approaches and are often in a better position to find innovative solutions because they frame the problem differently (Jeppesen and Lakhani, 2007). Since users frequently bring a new disciplinary perspective to problem-solving, they are well-positioned to identify opportunities. For instance, as Luthje et al. (2005, p. 963) note, "Mountain bikers might not want to *learn* orthopedic surgery to improve their biking equipment, but if they already *are* expert in that field they could easily draw on what they know for relevant solution information." This ability to bring a novel approach to the problem, without the constraints of existing logics, increases the likelihood of finding new opportunities.

Innovative ideas often emerge from the intersection of disciplines, and when users work collectively, a diverse variety of inputs are available. For example, motorcycle enthusiasts who cooperate within a community may have full-time jobs as doctors, lawyers, teachers, or mechanics. This diversity will promote a high level of variance in

the quality of user innovations. The average quality of user innovations may not exceed that of innovations developed by other sources, but users will likely initiate a greater number of breakthrough, radical innovations and a greater number of complete failures. Empirical support for this pattern exists in various industries: Fleming (2001) used patent data to show that greater diversity of knowledge inputs generated higher performance variation, and Taylor and Greve's (2006) study of the comic book industry found that greater diversity in the backgrounds of creative team members increased variation in the market performance of the comics. Finally, in the tennis racket industry, both technically and commercially important patents and *unimportant* patents were more likely to have been created by inventors from outside the industry than by existing industry manufacturers (Dahlin, Taylor, and Fichman, 2004). With this in mind, we expect that users will frequently develop novel solutions — identify opportunities — that industry participants might miss.

WHEN WILL USER ENTREPRENEURSHIP OCCUR?

We next develop four propositions regarding the conditions under which user entrepreneurship is likely to dominate over other sources of entrepreneurship. We begin by supporting a more nuanced view of entrepreneurial motives and goals, moving beyond the economically rational and structured perspective. Empirical research indicates that many entrepreneurs are motivated, at least in part, by nonpecuniary benefits, including satisfaction derived from self-employment, from autonomy and control over technical and strategic decisions, from engaging in work that they enjoy, from a desire to be part of a particular industry or process, or from a connection with a particular lifestyle that an

entrepreneurial activity might provide (Gimeno et al., 1997; Scott Morton and Podolny, 2002; Klepper, 2007). In fact, Scott Morton and Podolny (2002) empirically demonstrate that owners of private firms in the wine industry are likely to maximize utility rather than profits. If we view potential entrepreneurs as utility maximizing, then these nonpecuniary benefits partially substitute for pecuniary remuneration. A new venture's required profit threshold would thus be lower for individuals who enjoy non-pecuniary benefits, increasing the likelihood that these individuals found a firm.

Applying this logic to users leads us to propose that user entrepreneurship will be more likely in industries where use provides enjoyment, as opposed to providing pure economic benefit. Engaging in work related to an enjoyable and satisfying activity is particularly relevant in the case of hobbyist users, where lifestyle benefits can be significant. By founding a firm, the hobbyist users can spend a greater fraction of their time devoted to activities related to their interests. Put differently, activities related to the business that might typically be viewed as costs are, from the user's perspective, relatively low cost, as they are activities in which the user would have engaged — often for fun or driven by need — regardless of whether or not they planned to commercialize the idea. Moreover, because many user innovations are created out of need or as part of a hobby activity, initial production may be viewed as an exciting and engaging part-time extension of the hobby.

Proposition 1: User entrepreneurship is more likely to dominate classic sources of entrepreneurship when use provides enjoyment, as opposed to pure economic benefit.

Studies have found that, in general, individuals with lower opportunity costs are more likely to found firms (Amit et al., 1995). It therefore follows that in industries where users have lower opportunity costs, user entrepreneurship is more likely. For example, the users of many juvenile products are parents who have stopped working to stay at home after the birth of a child. Lacking alternative employment, their opportunity costs for starting a business, especially if it is launched in their home, are quite low. In contrast, many medical device innovations are made by practicing physicians who face high opportunity costs when they consider leaving a private practice or academic position to found a firm (Chatterji and Fabrizio, 2007). As a result, we would expect to see these innovations commercialized by established firms or potentially by start-up teams in which the physician-innovator plays a relatively small role.

Proposition 2: User entrepreneurship is more likely to dominate classic sources of entrepreneurship when users have relatively low opportunity costs.

Industries characterized by high variation in customer preferences and multiple peripheral segments are likely to have a high proportion of user entrepreneurs. Large established organizations are under significant pressure to grow, so specialized peripheral segments that are too small to accommodate their growth needs either go unnoticed or are ignored. Potential employee entrepreneurs, embedded in these established organizations, are therefore unlikely to have exposure to or recognize opportunities associated with these segments. In contrast, since users are interested in solving their own problems and benefit through use, they do not initially screen these ideas for growth or profit potential.

Instead, they create something personally useful and then commercialize the idea — often on a very small scale — if they sense interest from other users. As a result, we expect to see the commercialization of an array of user innovations that would have been screened out or not noticed by others.

Proposition 3: User entrepreneurship is more likely to dominate classic sources of entrepreneurship when the industry is characterized by small scale, peripheral, niche markets with high variety in demand.

User entrepreneurs also have multiple advantages in nascent industries that are characterized by turbulence, with uncertain, ambiguous, and evolving needs. As discussed earlier, use creates information asymmetries due to the user's possession of privileged information regarding both the user's own needs and the community's desires. This information is most valuable in nascent markets. In stable environments, where needs are well developed and relatively static, established market research methods can be used to assess customer preferences and develop and evaluate appropriate products. New markets however, show high levels of uncertainty and ambiguity about user needs, which are themselves changing (Clark, 1985; Tushman and Anderson, 1986). This means that likely targets for firm-sponsored research — consumers who have not yet used a product — have no clear sense of their preferences. There is, in essence, no market yet to research. Established firms, the source of potential employee spin-offs, therefore have difficulty developing appropriate products and gauging market potential. A user who has developed a product during this early stage therefore has unique knowledge, giving user entrepreneurs an advantageous position. In fact, product concepts developed by lead

users in a new market are often rated more highly than those developed by manufacturers alone (Urban and von Hippel, 1988; Lilien et al., 2002).

Users can not only better evaluate preferences; in turbulent markets they have the ability to shape preferences and nurture the market, thus establishing a strong competitive position. In the early stages of an industry, potential adopters need to be educated about the benefits of the new product category, convinced of the product dimensions and features that are important purchase criteria, and of the proper evaluation metrics to use (Tushman and Rosenkopf, 1992; Garud and Rappa, 1994). The connections users enjoy as part of a community can give them undue influence. Users are more likely to convince others to try their product; potential customers know the user entrepreneur as a trusted peer or as the colleague of a trusted peer, thereby mitigating fears of opportunism. A user entrepreneur's high status in the community, earned over time and based on his contributions, also increases the likelihood that others will want to try the product or service. Some user entrepreneurs may also be known as innovators and/or experts in the community, thereby creating name recognition and interest in the user's entrepreneurial activities. The user's unique position and experience therefore enable him to educate his colleagues and promote adoption in new, emerging markets.

Finally, during turbulent periods when the product design is changing frequently, user entrepreneurs have financial advantages over established manufacturers entering from other fields. In a formal model, Baldwin et al. (2006) identify three critical factors that facilitate users' entry into the market: 1) user entrepreneurs who are also user-innovators already possess product and process designs, whereas other potential entrants must invest in this initial design cost; 2) user entrepreneurs who are also members of a

community of users can use low-cost, word-of-mouth marketing techniques; and 3) user entrepreneurs who have made sunk cost investments in prototyping facilities can use these initial, low fixed cost, low volume facilities to build products. They can thus be profitable from the beginning of commercial production. In aggregate, these factors lead us to expect high levels of user entry.

Proposition 4: User entrepreneurship is more likely to dominate classic sources of entrepreneurship when the market for the product is turbulent, that is, when the product is new, when high levels of uncertainty and ambiguity about user needs exist, and when those needs are evolving.

DISCUSSION AND IMPLICATIONS

Users as a source of entrepreneurial activity are an understudied domain, but one that is likely to be both economically important and rich in theory-building insights. In this paper we provide the first empirical documentation of the prevalence of user entrepreneurship — the founding of a new venture by an individual or group of individuals who are also users of the product being commercialized. In our analysis of juvenile products firms founded over a 27-year period, the vast majority were founded by users. Based on this sample, we also develop a model of the founding process followed by users. Finally, we theorize about the industry conditions in which user entrepreneurship is likely to prevail.

Theoretical contributions

Our model characterizes user entrepreneurship as an emergent process in which users develop, test, share, and refine their ideas before they even contemplate founding a firm. In contrast, in classic depictions of the entrepreneurship process, experimentation and adaptation, while important, occur after the decision to start a firm. In addition, in our model participation in user communities can play a major role in developing a nascent idea. Many user entrepreneurs benefit from the contributions of others, and their firms are rooted in collective social processes, fed by trial-and-error problem solving, learning by doing, and the recombination of knowledge from multiple individuals with heterogeneous experiences. Our model thus emphasizes the collective nature of innovation and entrepreneurship, highlighting the fact that these processes can be open and shared, although they often are not, given the realities of commercial firms and academic science.³ In our model, ideas can be *created* and *vett*ed by both individual and collective actions, whereas dominant models of innovation and entrepreneurship focus on the *discovery* of entrepreneurial opportunities by those who possess the relevant prior knowledge (Venkataraman, 1997).

The extent to which innovation, in particular, is a collective process causes us to reexamine the way we think about intellectual property and its role in promoting and detracting from technological and economic progress. If individuals are innovating and sharing those ideas voluntarily, do patents help or hurt the collective innovation process? To what extent do patents increase the level of strategic gaming by incumbent firms to

³ That said, cooperation also occurs extensively among industrial firms and within academia, however that cooperation often takes place within a closed subgroup until a product is ready for commercialization or an academic paper is ready for circulation and publication. Sometimes wider cooperation and sharing does exist, see for example (Allen, 1983; Schrader, 1991).

the detriment of start-up firms? Do they restrict the volume and quality of information available for all to use as part of the “commons” (Heller and Eisenberg, 1998; Lerner, 2002; Ziedonis, 2004)?

Our model also adds insight into the processes that occur before firm formation, an area that currently lacks strong theoretical foundations (Ruef, 2005). In the case of users, the key processes are use and community interaction. Other types of entrepreneurs may enact different processes, although we suspect that many will benefit from interaction with their own communities. For example, immigrant entrepreneurs often find opportunities through association with members of their diaspora (Kalnins and Chung, 2006).

Not surprisingly, the desire for financial gain is only one motive for entrepreneurial activity. We join other authors in pointing out that a wide variety of motives may propel an individual to found a firm. These nonpecuniary motives are significant in that, while entrepreneurs are unlikely to resist more money all else equal, these motives may drive the individual and aggregate behavior of firms in unexpected directions. For example, an individual who wants to see her innovation broadly adopted (say, a safety innovation), may charge only enough to cover her costs and live a comfortable, but basic, lifestyle. An individual seeking autonomy or a peaceful lifestyle may choose to not take profitable clients that are likely to be highly demanding or unpleasant. Competitive dynamics under these conditions may differ significantly from those predicted by existing models.

The focus on user entrepreneurship provides theoretical rational for the empirical finding that entrepreneurship is a widespread and transitory phenomenon; that is to say,

significant percentages of the population are engaged in entrepreneurial activities at any given point in time, and many individuals attempt to start a business during their lifetimes (Reynolds and White, 1997). After all, every individual is a user of many products and services. A better understanding of user entrepreneurship may also elucidate the puzzling empirical finding that women entrepreneurs systematically engage in smaller, lower growth businesses than men. Our model suggests that this might occur, not because women suffer from an inherent lack of ambition or capability, but because women are self-selecting into businesses that leverage their experience as users.

Limitations and future research

We identify several limitations to our model, each of which opens up possibilities for future research. First, our model focuses on the time period prior to firm formation and does not extend beyond a user's decision to found a firm. The extent to which a user-founder's identity, knowledge base, and reputation as a user affects the firms' subsequent strategies, growth trajectory, financial performance, and survival rate is an exciting area for future research. In particular, these characteristics may lead user-founded firms to compete in different ways from firms founded by other types of entrepreneurs. For instance, user entrepreneurs typically lack the status and access to resources that can accompany individuals founding spin-offs from established firms. Thus one might expect lower performance and a lower survival rate for user-founded firms. On the other hand, the lifestyle benefits experienced by some users may lead them to stay in business, despite lower returns, thus increasing survival rates. Empirical work that teases out the effects of these opposing influences would be welcome.

Second, our model focuses on the *benefits* of working within communities. Working within communities may also create *costs* for users. These costs may relate to tensions that arise as users start charging for products that build upon ideas that had originally been freely shared. In addition, collective framing and taken-for-granted beliefs may constrain the user's interpretation such that the user entrepreneur sees only the opportunities that the community sees and foregoes other potential commercial opportunities. Empirical research is needed to identify the costs of working within communities as well as the strategies that entrepreneurs can use to either strengthen their ties to communities or strike a balance between being part of, yet distinct from, the community.

Third, while some users choose to diffuse their ideas through for-profit commercial ventures, others may choose to *not* commercialize the idea and instead to encourage the free and widespread diffusion of the idea. Diffusion may take the form of promotion through a variety of media channels (e.g., word-of-mouth, newsletters, Internet, radio, promotion at conferences or competitions, etc.), sharing within user communities, or the formation of a nonprofit organization. For instance, users have played a significant role in establishing and legitimizing social service organizations such as substance abuse programs (e.g. Alcoholics Anonymous) and battered women's shelters (Koss and Harvey, 1991). Investigating the role of user entrepreneurs in the formation of nonprofit ventures may thus allow us to better understand the foundation and emergence of nonprofit sectors.

Fourth, our model implicitly focuses on physical goods. Digital goods are a large and rapidly growing portion of the economy and are an area where the contributions of

users and their communities are strong and well known (e.g., open source software development projects, a host of communities and for-profit websites that share content such as music, video, or games). User entrepreneurs seeking to found firms in digital product domains are likely to face distinct opportunities and challenges, creating an opportunity for additional research.

Fifth and finally, our focus has been on end-users who become entrepreneurs — enthusiasts, tinkerers, or amateurs, who derive benefit from a product or service by using it. A better understanding of professional-user entrepreneurs would be welcome. While they were not a significant factor in the juvenile products industry, they may be an important source of entrepreneurial ventures in other settings. In addition, understanding the process by which user firms might commercialize innovations originally developed for their own use would be a welcome addition to research on corporate venturing. We hope that this paper inspires such additional research in these promising areas of user entrepreneurship.

Table 1: A Large Fraction of Users Innovate

Product Area	Innovating for Own Use	
	<i>Percent</i>	<i>n</i>
<i>Industrial Products</i>		
Printed circuit CAD software (Urban and von Hippel, 1988)	24%	136
Library information systems (Morrison, Roberts, and von Hippel, 2000)	26%	102
Apache OS server software security features (Franke and von Hippel, 2003)	19%	131
<i>Consumer Products</i>		
Snowboarding, sailplaning, canyoneering, and handicapped cycling equipment (Franke and Shah, 2003)	38%	197

Table 2: Many Important Industrial and Consumer Product Innovations Are Developed By Users

Product Area	Source of Innovation			
	<i>User</i>	<i>Mfr.</i>	<i>Other</i>	<i>n</i>
<i>Industrial Products</i>				
Petroleum processing (Enos, 1962)	43%	14%	43% ^a	7
Computer innovations 1944-1962 (Knight, 1963)	26%	74%		161
Chemical processes and process equipment (Freeman, 1968)	70%	30%		810
Scientific instruments (von Hippel, 1975)	76%	24%		111
Semiconductor and electronics subassembly manufacturing equipment (von Hippel, 1977)	67%	21%	12%	49
<i>Consumer Products</i>				
Windsurfing, Skateboarding, and Snowboarding Equipment (Shah, 2003)	60% ^b	25%	15%	48

^a Attributed to independent inventors/invention development companies.

^b Attributed to users and user-innovators who subsequently become entrepreneurs (e.g. user entrepreneurs).

Table 3 Examples of Juvenile Products User Entrepreneurs

Firm	Initial Product
	Strollers
9 Months Up, 9 Months Down Dreamer Design	Strollometer for tracking walks with baby joggers Jogging Stroller
	Baby Carriers
Cat Bird Baby Baby K'Tan	Mei tai style baby carrier Sling carrier for special needs babies
	Car Seats/Accessories
Sunshine Kids Angel Guard	Folding car seat Car seat for low birth weight babies
	Diaper Bags
Diaper Dude Amy Michelle	Hip male-oriented diaper bag Fashionable diaper bags
	Health/Safety Products
KidKusion Halo Innovations	Fireplace bumper pad Sleep sack that helps prevent SIDS
	Feeding/nursing
Loved Baby Podée	Nursing shawl Hands-free baby bottle
	Sleep aids
Arm's Reach Concepts Miracle Blanket	Bed-side bassinette Sleep-enhancing blanket
	Other
Baby Butler Clouds and Stars Walking Wings Zakeez	Electronic device to track baby care Crib sheet with zipper for easy changing Parent-held support vest for learning to walk Pillow for premature babies that imitates parental smell and feel

Table 4 Examples of the User Entrepreneurship Process

<p>User experiences a need, searches unsuccessfully for a solution, and innovates for personal benefit</p> <p>“ABC Fun Pads began when two parents searched all the baby stores, all the discount stores and all the furniture stores trying to find a product that met their needs. They wanted something that would fit and protect their coffee table but everything they found ... just didn't seem right. ... They started to think that the table cover should not only protect the table, but it would also be neat if it had some sort of activity on it. ...[the] founders of ABC Fun Pads, experimented ... they tried different patterns and eventually they made themselves the first ABC Fun Pad.” (abcfunpads.com, 2007)</p> <p>“My wife Meredith, came home with all of these diaper bags one day that were so feminine. I was like, ‘I am not going anywhere with this.’ So my wife wished me luck finding a bag... I researched at least 3-4 months looking for something that was hip, funky and functional.” (cbsnews.com, 2007)</p>
<p>Entrepreneurship is not necessarily in the original plans when the user innovates</p> <p>“I didn’t really expect that I was going to have a company — I just thought, ‘I’m going to make a video.’” - founder of Baby Einstein (ladieswholaunch.com, 2007)</p> <p>“After long and diligent study, research, and countless hours at the sewing machine, The AQUADUX® [swim aid] device was born, and immediately became very popular at the local swim parks, and beaches where the grandchildren played. ... The idea of creating [a commercial] entity came as a result of the growing popularity of the AQUADUX®.” (aquadux.net, 2007)</p>
<p>Public exposure creates interest in adoption, documenting demand, and sparking the idea of a commercial venture</p> <p>“After creating the first ABC Fun Pad, every other mom in the family wanted one, then all of their friends, then all of their friend’s friends and so on... And, that is how ABC Fun Pads was born.” (abcfunpads.com, 2007)</p> <p>“Inundated with requests from curious moms for Wiggle Wraps while on outings with infant Alex, Clyde recognized the potential value of their new invention. The Leaches decided to patent their idea and formed Leachco in May of 1988.” (leachco.com, 2007)</p> <p>“Before long, they [the founders] were being asked, ‘where did you get that great swaddling cloth’ by doctors, friends and mothers out and about who all wanted these muslin swaddling baby items for their own babies. Hence, the company ‘Aden + Anais’ was born.” (adenandanais.com, 2007)</p> <p>“Every time I used my Clean Shopper in the grocery store, I was approached by mothers wanting to know where they could buy one. I knew there was a demand for the product, so I started a company.” (cleanshopper.com, 2007)</p> <p>“Everywhere she and Zoe went, people asked where she found such a fashionable sling. Thus ZoloWear was born in August of 2001.” (zolowear.com, 2007)</p> <p>“When using my Take-Along Tether, I was often approached by parents who wanted to know where to get one. As a result, we decided to make this available to everyone, filed our patent application, and created Parent Partners, Inc., a family owned and operated business” (takealongtether.com, 2007)</p>

Figure 1: Classic Model of the Entrepreneurial Process

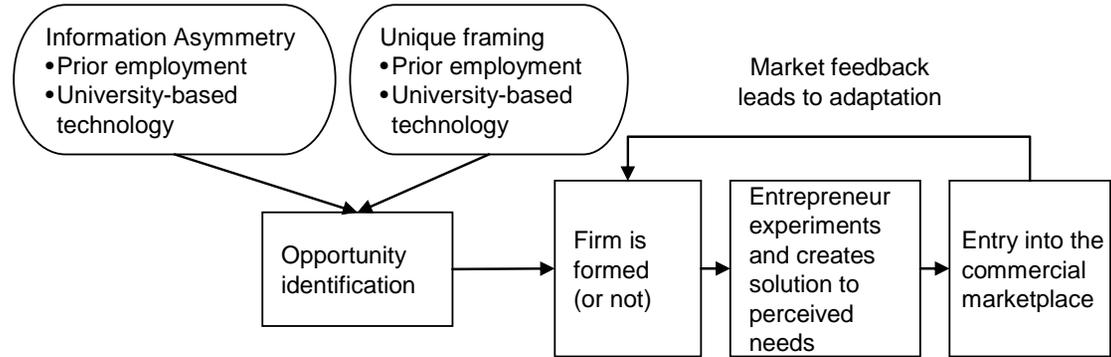
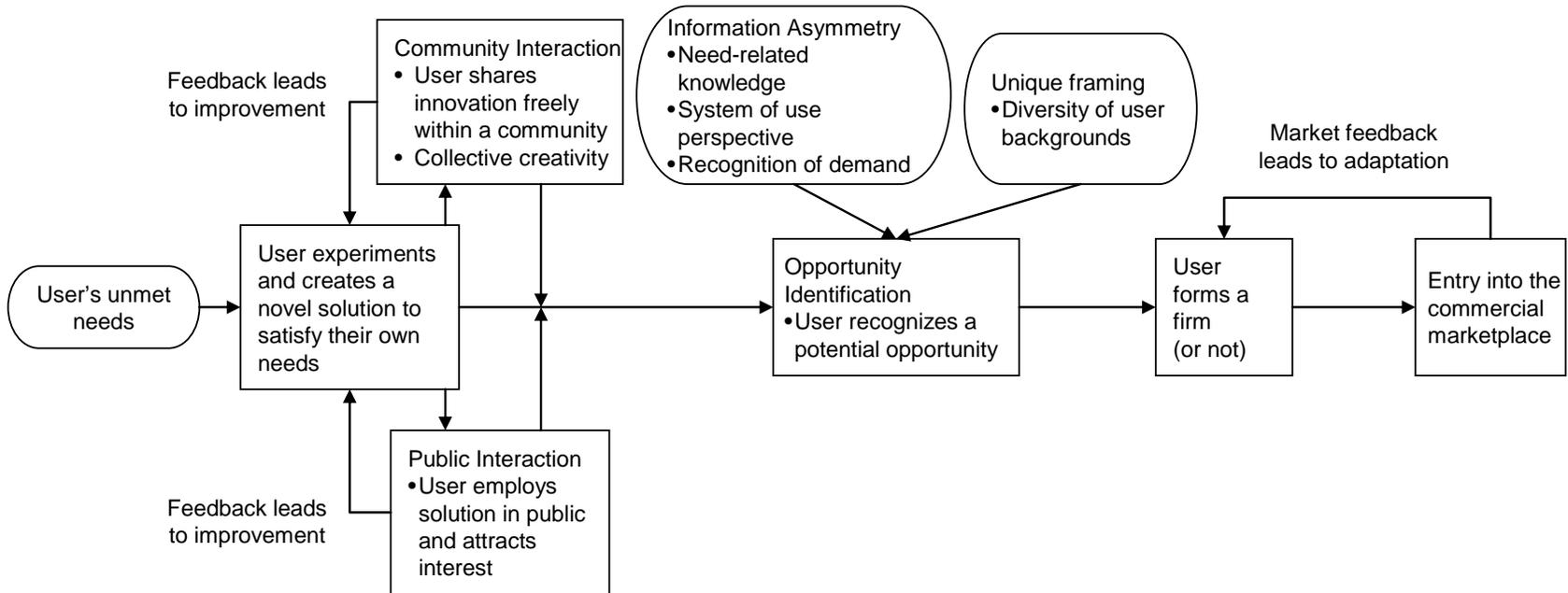


Figure 2: Model of the End-User Entrepreneurial Process



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