An Application of an Ecological Model to Explain the Growth of Strategies of Internet Firms: The Cases of eBay and Amazon

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Companies doing business on the Internet have experienced environmental turbulence from early growth and subsequent decline as businesses failed. The Internet provides a unique opportunity to examine the evolution of a business sector over a relatively short time period. Biological models to represent and predict the competitive dynamics within a business sector have been utilized. Using the analogy of strategies used in natural systems, this paper will demonstrate the applicability of using a model of population dynamics to companies that have survived the burst of the Internet bubble, specifically the cases of Amazon and eBay. © 2004 Elsevier Ltd. All rights reserved.

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Introduction

The Internet was promoted as a vehicle that would revolutionize the dynamics of international business, allowing small companies to compete in the global marketplace (Quelch and Klein, 1996). Unfortunately, over 130 Internet businesses declared bankruptcy or closed their doors in 2000 (Watson, 2001). Another 450 Internet firms fell from January to April, 2001. The growth of the Internet has often been referred to as a bubble and it seems that the bubble has burst (Cotman et al., 2001). Internet stocks have generally continued to lose value as the NASDAQ returns to levels seen prior to the Internet frenzy.

Several reasons have been given for the failure of dot.coms. Many authors have identified managerial and economic forces that contributed to the slow down of growth in populating the Internet. Some of the problems with doing business on the Internet include the use of poor business models, lack of strategy, security issues, and lack of infrastructure...
(Javalgi and Ramsey, 2001). Others included an unrealistic expectation on the part of venture capitalists, with Internet technology, nonexistent business models, and lack of management expertise (Mahajan et al., 2002). A complementary explanation presented by the authors is that the growth and decline being felt within the Internet environment is part of the natural selection process that is seen in an ecosystem as individuals struggle for survival.

The Internet provides a unique opportunity to examine the evolution and growth of a business sector because it has taken place over a relatively short time period. The initial Internet environment might be described as a virgin environment, in which rapid growth could be expected. Among emerging technologies, the Internet is a new channel for commerce applicable in a wide variety of industries around the world. As a new strategic tool, it is transforming businesses and creating new opportunities as well as challenges for international marketers as many nations are fast connecting to the global marketplace. E-commerce is about speed, connectivity, and sharing and exchanging goods, services, and information (Javalgi and Ramsey, 2001).

To understand the competitive forces within a market, marketing scholars have used an ecological paradigm for many years. Alderson (1965), in his development of the functionalist theory, built on the premise that marketing is a system, analogous to an ecological group and is referred to as the home ground. This marketing system also adapts to its environment. Alderson emphasized the system and system outputs, particularly the relationships between inputs and outputs and the structuring of processes to obtain maximum efficiencies (Green, 1999). This earlier theorizing by Alderson seems to be relevant to our situation with e-commerce today. Some of the economic concepts have been expressed in terms of self-organization dynamics that were originally derived from basic evolutionary concepts (Buenstorf, 2000). A study by Mascarenhas and Sambharya (1996) extended the population ecology framework to include international competition over time in the airline and oil drilling industries. At least one previous study has supported the idea that populations of industrial organizations sometimes follow a pattern similar to the one found occurring in natural environments (Carroll and Delacroix, 1982).

Biological systems evolve towards efficiency, with survival of the species dependent upon the organism’s ability to adapt to changing environments. For the species to continue to flourish, it must make the most efficient use of resources. It is in this manner that the analogy to the ecological aspect of the theory is made. Marketing systems can adapt by replacing company presidents, changing objectives, and modifying the technologies used to accomplish objectives. Competition, within behavior systems, consists of finding a differentiated position that gives an overall advantage to one rival over another resulting in a wider range of product/service variety or producing products based on exact customer specifications, and is the precursor of niche marketing (Green, 1999). The overall ecological system will survive as long as the constituent members are meeting their goals (Nicosia, 1962). The dynamics of interactions of species surviving within an ecosystem has been used to explain the success of Walmart and Microsoft (Levien and Iansiti, 2004).

Key to understanding population ecology is the premise that population growth and decline, and the evolution of species, are dynamic processes in which species adapt to better compete for scarce resources (Lambkin and Day, 1989). Previous research in this area as it pertains to traditional business and specifically to the Internet has been sparse. The purpose of this paper is to apply organizational ecology models, specifically r and K population growth strategies to growth in Internet businesses, specifically eBay and Amazon. These two companies were chosen to illustrate adaptation to the ecosystem in which they are doing business because both survived the Internet crash yet they have exhibited very different strategies to achieve their successful growth.

The Balance of Nature

The notion of a “balance of nature” has been a topic of discussion for ages. Biologists and ecologists have used the balance of nature supposition as the foundation for most of the theories that pertain to stability, competition and regulations within natural systems (Cooper, 2001). Key to the biological model of evolution is the premise that population growth and decline, and the evolution of species, are dynamic processes in which populations adapt to better compete for scarce resources (Lambkin and Day, 1989). Natural Selection provides an understanding of how the populations of an environment change over time. In biology, natural selection is described as the process where one organism leaves more successful offspring than another resulting in a gene pool where the successful organism becomes dominant while the less successful become extinct (Smith, 1974). Central to the development of natural selection is the idea of population pressure and the corresponding competition for the resources that are critical to survival (Mallet, 2001). Economists make the assumption that competition is an example of survival of the fittest (Freeman and Boeker, 1984). The most adaptable companies survive while those who are not, fail. Although this is an oversimplification of the concept in nature, it still has application as a possible model to describe growth in the Internet. A business can be structured to enhance flexibility, allowing it to adapt quickly to changes in market conditions. This may or may not be the most efficient mode of operation, but in a fast paced, technologically driven environment
such as the Internet, it may be the best operating strategy to ensure survival. In the long run, through a process of internal "natural selection," a business can change infrastructure and operations to become more efficient. Strategy can guide changes to meet the requirements of the environment. The surviving company changes as it evolves over time to make the best use of the resources available in the environment in which it is operating.

The primary concept crucial to understanding the dynamics of population growth in biology is the ecosystem. Ecosystems tend to evolve toward maturity, where complexity increases (Pianka, 1974). Changes occurring in the environment require the population to either adapt to survive or face extinction (Smith, 1974). In the business context, the ecosystem can be defined as the environment in which the exchange transaction takes place. The population is the primary functional unit of the ecosystem. The population is also an evolutionary unit that will adapt to changes in the environment. There is interdependence among the members of the population, with the role of one member determining the fitness of the other members of the population (Pianka, 1974). Each member of the population has its own place and function within the whole population. In business, the marketplace is analogous to the population. Each individual business operating with a market impacts the strategy of other businesses operating within the same market. Populations are characterized by a regulatory mechanism that limits their size within any given environment (Smith, 1974).

The ability of the environment to support the population becomes the limiting factor ultimately resulting in adaptation or death. Density refers to the size of a population in relation to its unit of space. In ecology, density refers to the number of organisms in relation to the amount of area available as living space (Smith, 1974). In business, density refers to the number of businesses operating within a given market. Carrying capacity, as defined in a biological context, is the limit imposed by the ability of the environment to provide food to support the population (Pianka, 1974). The long-term carrying capacity in business is governed by; the number of consumers, their wealth within the marketplace, the supporting economic and transportation infrastructure. The availability of start-up resources, and business’ ability to efficiently utilize these resources, are crucial to the determination of the carrying capacity.

As the population expands and resources become relatively limited, the carrying capacity becomes relevant and the growth of the population is inhibited. The terms used in this paper, r and K selection, are directly related to density dependent issues that affect the carrying capacity of the organism’s or, in the case of the Internet an organization’s environment. These terms describe a specific survival model which organisms adapt to as they attempt to grow within their ecosystem. In a competitive vacuum, the best reproductive strategy is to put maximal amount of matter and energy into reproduction and to produce as many total offspring as possible in the least amount of time (Pianka, 1974). Because there is little competition, these offspring can thrive even if they are quite small and therefore energetically inexpensive to produce. In a “saturated” environment, where density effects are pronounced and competition is keen, the best strategy is to put more energy into competition and maintenance, and to produce offspring with more substantial competitive abilities (Pianka, 1974). This usually requires larger offspring and, since they are energetically more expensive, it means fewer can be produced. No organism is completely r selected or K selected but rather all have reached a compromise between the two extremes. One can think of a given organism as an “r-strategist” or “K-strategist” only relative to some other organism. We think of an r — K continuum.

Lambkin and Day (1989) have further classified K-strategists as generalists and specialists. As the market matures, the r-strategists begin to evolve as the uncertainty is reduced within the business environment. They become larger scale generalist organizations that can survive by utilizing a wider range of environmental resources (Lambkin and Day, 1989). K-specialists have the resources to enter the market with an established brand name and high quality products. The K-specialists tend to be late entrants to the market. The types of competitive strategies typically used by K-specialists are those characterized by lowest cost production, vertical integration, and stand-alone divestment (Lambkin and Day, 1989).

Ecosystems in e-Business

It is clear that there are several parallels between newly formed ecosystems and the Internet business environment. Both are populated at a relatively fast rate with a variety of individuals, whether they are species in the ecosystem or businesses in the Internet. The environment within both is characterized by a significant amount of instability and movement, whether within a group of biological organisms or the interactions between fledgling businesses. There were a number of small entrepreneurial companies that rapidly reproduced in the Internet environment. The originator’s strengths were their ability to manipulate the technology involved in establishing their presence on the Internet and then carve out a niche. However most have been weak in terms of efficient utilization of business resources and entered the market with a poorly developed market strategy. Their long-term business plans were often weak or nonexistent. The goal was to get in quickly and take advantage of the short-term business opportunity.
Many of these fledgling companies were doomed to failure. Currently, larger corporations who have been successful in their brick and mortar operations are moving into the Internet market domain. Within this environment, they are the K generalists, relying on their established brand names and quality reputation to carry over into the Internet and lead them to success. Large conglomerates of companies are forming alliances to master the e-commerce terrain. They are experts in their business but not on the Internet. Whether they will meet the needs of the Internet consumer is not yet known.

**Applying the Model: Explaining the Growth Strategies of Amazon and eBay**

Although Amazon and eBay have been highly successful, despite the significant failure of many Internet firms within the ecosystem, both depend on complex interdependencies among business ecosystems where customers, technology providers and alike play a major role in influencing the success and the long term survival of the business. The differences in their growth strategies in terms of r and K are evident when we examine their individual pursuit of adapting in times of environmental turbulence. The following section compares and contrasts the growth and survival strategies, similar to those exhibited by individual species within a biological ecosystem.

**Amazon.com**

An example of an r-strategist turned K-strategist is Amazon, a company that has been successful in adapting to the Internet environment. Amazon.com began operations in 1995 and was quickly affected by a rush of dot.com enterprises trying to figure out how to survive and be profitable. By 2001–2002, dot.com companies faced severe financial and competitive pressures and many were forced out of business, while others scrambled to create profitable business models. For Amazon the sign of bright outlook and the first year of profitable operation was the year 2003, with sales of $5.3 billion (Ajello, 2004). They were one of the first entrants onto the Internet and were focused exclusively on becoming a book retailer. It created a community with its book buying customers, involving them in book reviews and recommendations. They established a business model, then grew and, as other companies exited, began expanding into other product areas (Chakrabarti and Scholnick, 2002). As their foundation became more stable, they expanded into a variety of other offerings, including partnering with retail outlets such as Target and Toys-R-Uss. Amazon grew by adding every imaginable product type (movies, health, tools, electronics, etc) to offer more choices to its customers, and it added more channel members and distribution centers (Mahajan et al., 2002). International business now makes up more than 30% of sales and is expected to grow (Stone, 2003). Using this strategy, they significantly broadened their product offering over time, growing and utilizing resources characteristic of a K strategist. Consistent with the dynamics of r and K selection, international Internet growth should consist of expansion and growth of existing web companies in terms of product offerings rather than an increase in smaller individual entities. In fact, one of Amazon’s strategies for growth was to actively court smaller, early entrants to the Internet and integrate the high margin, innovative products they offered into the Amazon family (Wolf, 2003). This is a tactic consistent with the evolution of a K strategist.

**eBay.com**

While Amazon can be described as a retailer, eBay is not technically considered a retailer because it owns no inventory and revenue consists of fees and commissions rather than traditional sales (Wolf, 2003). eBay went into online consumer to consumer (C2C) auction business in 1995; prior to eBay there was no online C2C business. It is also one of the very few online sites that has been profitable almost from its launch. The company has expanded internationally and is the world’s largest online auction. eBay provides a service where new, used, returned, renovated, overstocked and discontinued items can be liquidated through its online auction platform. eBay’s revenues, on an annualized basis, for 2003 were over $2 billion representing sales of over $23 billion in merchandise sales through its website.

Unlike, Amazon, whose growth strategy is one of expansion of product lines and offerings, eBay has focused on its current users, searching for opportunities to expand services based on the needs of its current customer base (Krause, 2003). eBay leverages its ability to create value for its customer base through the development of tools that increase the profitability of its network members and by soliciting the membership of new sellers. By sharing value, eBay continues to broaden its business relationships forming an ecosystem capable of sustaining long term survival. With this vision and drive to build and sustain long term viability, eBay continues to occupy a strategic position bringing and sharing profitability to members of its ecosystem. eBay’s strategy is characteristic of an r strategist as, unlike Amazon who grows through the evolution of its businesses, eBay expands by promoting its core service competencies, attracting new members to its existing environment. Amazon.com has altered its original strategic thrust by changing its core business through integration of other product lines, requiring greater collaboration.
Table 1 Comparing eBay and Amazon

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<tr>
<th>Business Environment</th>
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<th>Amazon</th>
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<td>Pure Play Internet</td>
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<td>Climate</td>
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Managerial Implications and Conclusions

The demise of several early entrants into the Internet environment represents an example of the inability to develop a strategy that makes the most efficient use of the resources available within the ecosystem. According to Levien and Iansiti, 2004), many business analysts expected the Internet bubble to burst, but the severe slope of the descent and failure of so many firms in such a short period of time was unexpected. The companies that survived were able to continue operating within the Internet ecosystem because of their ability to adapt to the changing environment. Amazon and eBay, although both impacted by severe environmental turbulence, demonstrate two manners in which companies can react to an external shock by matching strategy to the ecosystem in which they operate. Amazon and eBay represent two separate companies operating successfully using different growth strategies analogous to those found within biological systems. Amazon focuses on growth of the firm through the internal integration involving the expansion of product lines. In contrast eBay's strategies focus on growth through the integration and interactions between members of its customer community. Following the analogy of r and K selection, Amazon should continue to grow through international expansion and reach a point in which equilibrium around the availability of resources occurs. eBay, as an r strategist, will eventually need to focus on organic growth through an adaptation of its business model.

Conclusions and Future Research

Even though cyberspace seems like an environment with unlimited resources, there is a carrying capacity consisting of the availability of crucial resources. It has also been predicted that online businesses will be dominated by either large online superstores with a variety of product offerings, such as Amazon.com, or stores that have a large market share within a particular product niche, such as eBay (The Economist, 2000). A better understanding of the limiting factors that will impede uncontrolled growth on the Web will aid marketers in building a better business model.

There are many research challenges to this new area, but for those who find the population dynamic perspective to be intriguing; we suggest the following would be worthy. We made an educated guess regarding carrying capacity in the United States and Europe. In the real world, more accurate estimates are needed, with breakdown for industries and product lines. The current state of technology as relates to carrying capacity also needs more research. Many residential areas of the United States are inhibited by inadequate DSL lines or cable Internet connections. Satellite services and cell phones also could be a factor.

There are also a number of consumer behavior issues. A possible constraint, limiting growth, could be the inability of consumers to deal with the vast numbers of businesses operating on the Internet. Being
overwhelmed by the choices available, a consumer might choose to deal with a company based on size, experience and word-of-mouth testimonials. This could affect the population growth and carrying capacity.

The next evolution of firms, which may be the ultimate survivors, should follow the strategy of the K-specialists. These companies will be low cost producers with a focus on meeting the needs of the consumers on the Internet. The focus will be on efficiency and collaboration within the Internet ecosystem. Internet companies may merge together, broaden and deepen their product offering projecting an image of size and strength, creating credibility and reducing uncertainty in the mind of the consumer.

The Internet and the evolution of e-commerce are relatively recent, technologically-driven tools for doing business. The rate of change that occurs on the Internet is so fast that the evolution of the business environment occurs at a speed that can be mapped and a model designed to aid in the formation of competitive strategies as e-commerce spreads to the international marketplace. This is especially important for smaller companies who must choose a competitive strategy that involves specialization, partnering, or expansion over time. Learning from the dynamics of population growth, entrepreneurs can evaluate the market they are attempting to enter, determine which stage on the evolutionary model dominates the environment and then understand where the competitive pressures will lie.

References

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