The internet competitive landscape: insights from organisational ecology

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Abstract: This study analyses the competitive landscape of the internet from the perspective of organisational ecology theory, an approach that fits well the evolutionary nature of the growth and development of the internet, and the nature of the business competition it engenders. It explores how the 'electronic commerce firm', as an individual organisation, should best be conceptualised, and then examines the three levels of organisational ecology analysis in detail: the demography of internet organisations, population ecology and community ecology. This study relates various aspects of the internet competitive landscape to organisational ecology theory, borrowing from the resource-based view of the firm.

Keywords: organisational ecology; internet; electronic commerce; resource-based view; competition.

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1 Introduction

In 1995, Bettis and Hitt (1995) described a 'new technological landscape' driven by "technology [that] is rapidly altering the nature of competition and strategy in the late twentieth century" (p.7). The phenomena that are drawing this new landscape include the rapid rate of technological innovation; the dawning of the information age; the increasing emphasis on and necessity for knowledge; and increasing returns to scale for various production activities (Bettis and Hitt, 1995). The internet – particularly the World Wide Web – is an integral part of this new competitive playing field. In the 1990s, the internet emerged as a revolutionary communications technology, with far-reaching effects in all

spheres of society. By allowing widespread and efficient information transfer, it has enabled businesses to improve their operational efficiency, reach wider markets and implement many new information-focused strategies that were previously impossible (Porter, 2001; Sampler, 1998).

It has proven challenging to adequately conceptualise the nature of this new competitive landscape that the internet is creating. On one end of a spectrum of conceptualisations, the internet is perceived as little more than a new marketing channel to make customers aware of a company's products and services (Ranchhod and Gurãu, 1999; Subramaniam *et al*., 2000; Wootten, 2003; Rowley, 2004). On the other end, it has been touted as the fundamental platform of a new wave of creative destruction that is ushering in a new industrial revolution, perhaps even distinct from and beyond the information revolution (Afuah and Tucci, 2003; Zittrain, 2005). One reason for this disparity of perspectives on the internet could be the lack of a unifying theoretical framework that can adequately situate, not so much the internet itself as a technology or set of technologies, but the competitive environment that is reshaped by this technology. It is important to carefully assess the features of this new internet-based landscape of competition to discern the appropriate applications of strategy (Porter, 2001).

In recent years, there have been many approaches taken to conceptualising and analysing the competitive landscape of the internet. Poon (2000) studied small firms to assess the conditions necessary in their business environment for them to adopt and use e-commerce. He found that the nature of the business environment, customer participation in e-commerce, competitive advantage and information support were all positively related to the benefit firms get from e-commerce. However, his study did not provide a comprehensive framework for how firms might fit within the general environment of e-commerce competition. A number of studies, though, have made attempts at providing such overarching frameworks. Lan (2006) modelled how internal and external forces for innovation drive "changes of innovation environment, innovation practices and innovation paradigm" in the internet age. Azumah *et al*. (2005) presented a three-stage model of how small businesses migrate towards electronic integration in the internet age, passing through the "½-fusion, fusion and the ultimate e-organisation" stages. Woodside (2004) focused on business-to-business e-markets in presenting a framework of how new businesses are formed on the internet, highlighting the role of 'network champions', and the strategic significance of the internet in its process of creative destruction.

Does this correspond to Woodside *et al*., 2004 listed in the reference section? If not, please provide reference.

Please clarify if this should be "and also focused on the strategic significance" or "and in presenting the strategic significance".

These prior approaches all have their respective value, but none of them provides an overarching framework that comprehensively models the business competition environment in which firms compete using the internet. One framework popular in sociology and organisational theory that helps to explain the nature of competitive landscapes is the organisational ecology perspective (Hannan and Freeman, 1989; Carroll, 1984; Amburgey and Rao, 1996; Boeker, 1991). This approach reveals a very good fit for the evolutionary nature of the growth and development of the internet, and the nature of the business competition it engenders. Modelled on biological ecology, this theory considers organisations as open subsystems that dynamically operate within larger systems, interacting and competing with each other for scarce environmental resources. Competition occurs through the forces of internal development and adaptation within the organisations, and the external selection of viable organisations by the environment. These organisations might be business firms (Boeker, 1991; Amburgey and Rao, 1996) or non-profit organisations of all kinds (Carroll, 1984; Hannan and Freeman, 1989).

Organisational ecology is an intriguing lens for viewing electronic commerce for a number of reasons. First, the internet has permitted an unprecedented number of new firms to pop up by lowering barriers to entry to a significant new domain of business competition. However, for similar reasons, the internet is also the context of an unprecedented number of business failures, with the great dot-com crash of 2000. Organisational ecology as a theoretical perspective is helpful for analysing industries where firm entry and exit due to competitive pressures are important factors. Second, electronic commerce has given rise to a new kind of organisation, a firm with both an online and offline manifestation, which interacts with other firms – traditional and e-commerce – in new ways. This hybrid nature of electronic commerce firms matches organisational ecology's perspective of organisations as open subsystems dynamically operating within larger systems – in this case, the traditional business environment. A third appeal of an ecological study of the internet is given in the question "What is an electronic commerce firm?" Is cyberspace simply a new channel for competition, like television or the telephone, or is it such a completely new domain of competition that the internet presence of a firm is virtually a distinct entity from its bricks-and-mortar presence? While we cannot claim to answer this question definitively, we begin this paper by discussing how best to understand an 'electronic commerce firm' from an ecological perspective.

There are three levels of analysis in the ecological perspective: organisational demography considers the adaptive evolution of individual organisations within a single population; population ecology analyses interactions within populations of organisations; and community ecology takes a 'macroevolutionary approach' to the formation, growth, decline and death of multiple disparate populations (Carroll, 1984; Hannan and Freeman, 1989). The goal of this present study is to use these levels as a framework to study competition using the internet. Specifically, we will compare how each of these levels is conceptualised in their traditional competitive context with the new conceptualisations that are necessitated by the nature of internet competition. Our analysis is summarised in Table 1. We will begin by exploring how the electronic commerce firm as an individual organisation should best be conceptualised, and then we discuss each of the three levels of organisational ecology, examining what light they shed on internet competition.

Before we proceed, we will first clarify the scope of this analysis. First, it must be clear that 'internet business' means far more than just the Business-to-Consumer (B2C) perspective of setting up a website for customer purchases and information exchange. It involves all the various uses of the internet to promote business processes, including electronic data interchange, electronic marketplaces, internet-connected enterprise systems, software agents and so on (Turban *et al*., 2000). Second, our discussion primarily assumes single lines of business rather than diversified corporations. The implications of our discussion can be readily extrapolated to multi-business organisations. Finally, to focus the analysis, we limit our discussion to principles that can be generalised to most industries, or that apply to wide blocks of industries, rather than considering in detail the interactions between specific industries.

Table 1 Levels of organisational ecology analysis

Organisational level	*Definition*	*Conceptualisation in traditional context*	*Conceptualisation in internet context*
Individual organisation	A business firm; the unit of an organisational population for ecological analysis	A single-business corporation, or as a business unit for a diversified corporation	Three representations: traditional bricks-and-mortar establishments; 'pure-play' e-commerce companies ('dot-coms'); and e-commerce 'hybrids' with varying degrees of integration between internet and physical presences
Demography of organisations (Level 1)	Studies interactions between firms of the same kind; that is, organisational forms	Industries (Carroll, 1984; Carroll, 1985; Hannan and Freeman, 1989) or strategic groups (Boeker, 1991)	New industry boundaries based on Hannan and Freeman's (1989) five ecological bounding effects: technological factors, minimising transaction costs, social networks, successful collective action and institutional processes (Porter, 2001; Sampler, 1998)
Population ecology (Level 2)	Studies organisational populations and assesses how they interact and compete with each other	Regards organisations within populations as being basically identical, or identifies differences on only one dimension, such as market share (Baum and Mezias, 1992)	Focuses on organisational information resources as the ultimate source of firm value, and defines an industry as a group of "firms possessing sufficient amounts of critical information for the same market" (Sampler, 1998)
Community ecology (Level 3)	Focuses on the interactions between different kinds of organisational populations that operate in the same organisational ecosystem	Studies populations that interact in many complex ways to directly and indirectly affect each other's survival and prosperity; traditionally focuses on the business environment	Many various dimensions are pertinent, but this study focuses on the internet consumer culture, internet personnel, the effect of geographical boundaries on e-commerce, and various effects of the government and regulatory agencies

Source: Hannan and Freeman (1989)

2 The individual organisation: the electronic commerce firm

Before we begin examining the three levels of organisational ecology, it is necessary to have a proper understanding of the nature of the individual organisation that we will classify into organisational populations. In ecological studies of business organisations, the firm has typically been identified as a single-business corporation, or as a business unit for a diversified corporation (Boeker, 1991; Carroll, 1984; Hannan and Freeman, 1989). For example, Baum and Mezias (1992) studied individual hotels in Manhattan.

However, when considering doing business using the internet, there are three representations of a firm that must be recognised to understand the competition that is carried out. First, there are the traditional bricks-and-mortar establishments, businesses without any significant internet presence beyond perhaps general product and contact information. Next, there are the 'pure-play' e-commerce companies (often called 'dot-coms'). Finally, there are the e-commerce 'hybrids', which vary widely in the extent of integration between internet and physical presences. In all cases, 'electronic commerce' refers not only to B2C sales and services, but very much also to business-to-business transactions and exchange systems, as well as intranets that support various internal company processes.

2.1 Traditional offline-only companies

In this paper, companies that operate without any meaningful web presence (a mere 'here we are' information page does not count as 'meaningful') are considered traditional. In developed countries, almost every company today has adopted the internet beyond merely putting up a token website, except smaller businesses with limited skills and other limited resources.

2.2 Internet-only companies

Internet-only companies deal with their customers almost entirely over the internet, using their website and e-mail as the primary means of interaction. While they continue to communicate via telephones, faxes and regular mail, and they typically ship physical products by common carriers, these businesses have no physical location where consumers can go to do business with them. Internet-only companies avoid operating out of any physical buildings other than the bare minimum administrative office space.

2.3 Online-offline hybrids

Businesses use the internet to communicate with customers, suppliers and partners, to share product information, to buy and sell, and for many other daily business functions. As a result, 'traditional' offline-only businesses are becoming increasingly nonviable, and hybrid companies will soon become the most standard configuration of internet business. These companies use the internet as an extension of their existing business, and to varying degrees try to leverage it for competitive advantage. However, as more and more businesses use the internet to improve their efficiency, its use is increasingly becoming a competitive imperative, just to stay competitive (Porter, 2001).

3 Interfirm competition using the internet

To better understand the dynamics of competition using internet business, it is helpful to look at multiple scenarios of how this competition plays out. Various approaches can be taken for this analysis (see, for example, Chen, 1996); here we will consider how integrated the competitors' internet and offline business activities are. The matrix laid out

in Table 2 describes the dimensions of competition that a firm faces when employing the internet. While this matrix displays only the competitive interactions between two firms at a time, the principles highlighted also apply to multi-firm competition.

Table 2 Dimensions of internet competition

		Firm B		
		Internet-only	*Traditional offline-only*	*Integrated internet and offline*
Firm A	Internet-only	1. Pure-play internet competition		
	Traditional offline-only	2. Mixed advantages and disadvantages to both Firms A and B	3. Traditional competition in physical space	
	Integrated internet and offline	4. Firm A leverages offline presence to its advantage	5. Firm A benefits from extended internet market and increased efficiencies, and draws away Firm B customers who prefer internet advantages	6. Holistic competition online and offline

Scenario 1, competition between two pure-play e-commerce firms, is rather rare. One example is the competition between online auction firms such as eBay, uBid and Yahoo! Auctions. Since auctions merely facilitate the transfer of physical goods between individuals without having to physically store these goods, the efficiency of the internet is ideal for this business model. *Scenario 2* is the case of an internet-only firm competing with a traditional offline-only firm. This form of competition is even rarer today than the first; it was mostly evident as a transitional situation before physical companies started doing serious business on the internet. The offline-only company benefits from its physical roots, while the internet-only company takes advantage of internet-enabled efficiencies. *Scenario 3* is the traditional case of competition in physical space, without any significant internet competition. Again, this is primarily a transitional stage, as more and more companies gear up for using the internet to do business. By the end of this decade, probably the only companies that will compete on this level will be a few local small businesses and some businesses in developing countries.

The remaining three scenarios represent the competitive dimensions that a firm faces when it has substantially integrated its offline and internet business activities. In *Scenario 4*, the integrated firm has significant advantages over the internet-only one: it continues to serve customers who are not yet willing to do business online; it can use its offline brand name on the internet without having to create a name for itself from scratch (in the case of an existing company establishing internet operations); and by integrating its online ordering system with its offline delivery, it gives customers more flexible options. For example, Amazon invested many millions of dollars to build its internet brand, advertising both online and offline to tout itself as ‘the largest bookstore on Earth’. But Barnes and Noble, although a relatively late comer to B2C e-commerce, eventually set up comparable internet infrastructure and quickly caught up with Amazon, primarily

by virtue of the reputation it had established offline (Fombrun, 1996; Porter, 2001). In fact, Amazon has had to build its own physical warehouses to keep up with Barnes and Noble's distribution network.

Scenario 5 is another transitional stage, where companies who have integrated their on- and offline presences enjoy competitive advantages over those who still operate primarily offline (see Lieberman and Montgomery, 1988). The integrated firm competes traditionally with its offline competitors, but with the added channel of the internet, it can reach a much wider market; it receives cost benefits from the efficiencies of the electronic technologies; and it draws away both customers and suppliers from the offline-only company who prefer the advantages of internet business. The pizza delivery industry illustrates this transition, where a few companies like PapaJohns.com and Dominos.com feature online ordering for delivery. This option gives customers an extra convenient channel for placing orders, as well as significantly saving costs in order taking; this integration gives these companies advantages over their competitors.

The final and ultimate case is *Scenario 6*, where both competitors have successfully integrated their internet activities with their established offline businesses. Because of the dynamics that we have described in the other scenarios, competitive pressures will increasingly drive businesses in this direction as the internet continues to mature. In support of this argument, Powell and Dent-Micallef (1997) cited extensive research that has culminated in the 'strategic necessity hypothesis', which says that more and more, firms must implement Information Technology (IT) just to survive.

From an organisational ecology perspective, we would expect that firms that achieve a smoother integration between their online and offline dimensions would have a greater chance of survival and prosperity in their industry, compared to their competitors that use the internet either almost exclusively, or very little. With this holistic conceptualisation of an e-commerce firm – the organisational unit for our organisational ecology analysis – in the following sections we will discuss how populations of e-commerce firms can be understood when considering internet business from an ecological perspective. We will examine the three levels of organisational demography, population ecology and community ecology (Hannan and Freeman, 1989).

4 Demography of organisations (Level 1): internet industries

Once the basic unit of the e-commerce firm has been clarified, the first real level for analysing organisational ecology involves studying the interactions between firms of the same kind, which organisational ecology calls organisational forms. Hannan and Freeman (1989) call this level the "demography of organizations" (p.14); it is the most basic level of organisational ecology study. For business applications, these organisational forms have often been represented as industries (Carroll, 1984; 1985; Hannan and Freeman, 1989), typically defined as similar firms producing similar products for similar customers. Alternatively, though, organisational forms could be conceptualised as strategic groups, which are groups of competing firms classified among firms that employ a similar strategy. For example, in Boeker's (1991) study of US breweries, the organisational forms were the strategic groups of national, regional and local breweries. Each group pursued significantly different strategies in pursuing their markets, and thus competed directly primarily with firms within the same strategic groups.

From a strategy perspective, this perspective of organisational study is essential for understanding the competitive pressures that an individual firm faces, but the overemphasis on rates of entry into and exit from an industry gives only part of the picture. It is necessary to closely study the intensity of competition that existing companies face in an industry. While organisational ecology studies have represented competitive intensity with measures like concentration of market share, this is only a proxy for the more relevant bottomline of the performance of individual firms. Future studies should observe the changes in performance (perhaps measured by returns on assets and on investments) resulting from entries into and exits out of the industry; these changes for individual firms should be compared with average industry performance. This approach would more precisely pinpoint the effects of changes in industry constitution, and elucidate which kinds of firms within an industry (perhaps classified as strategic groups, as in Boeker (1991)) are affected in what specific ways by the same changes.

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The primary focus of organisational ecology has been to consider the founding, merger and disbanding rates of organisational populations, and to try to "relate variations in the rates to patterns of change in environments" (Hannan and Freeman, 1989, p.14). In this section, we discuss various aspects of how organisational forms of e-commerce firms can be understood from an organisational ecology perspective. Here, we particularly use Hannan and Freeman's (1989, pp.54–57) ecological perspective on industry (or organisational forms, to be more precise). This approach sheds further light on the environment within which businesses compete using the internet. Because this study focuses on more generalisable principles, we will take the industry rather than the strategic group perspective.

Hannan and Freeman noted five effects that set boundaries on industries:

1 *Technological factors* that define the methods of production (also look at Astley, 1985). With the trend of an exponential rate of innovation, internet technology will continue to redefine industry boundaries as it creates opportunities for new business models.

2 *Minimising transaction costs* also has a bounding effect. Hannan and Freeman (1989, p.55) argue, "When transaction-cost considerations lead to distinctive and persistent bundling of sets or transactions, organizational forms will tend to diverge" (also look at D'Aveni and Ravenscraft, 1994; Williamson, 1979). With the drastic lowering of entry barriers and switching costs in many industries, the internet is significantly changing the boundaries of a number of industries (Porter, 2001; Sampler, 1998).

3 *Tightly knit social networks* also define the scope of an industry, when similar firms use the same human resource skills and knowledge base. A trace of this effect could be seen in the dot-com craze, when many internet start-ups moved to Silicon Valley, trying to take advantage of its high concentration of technologically minded people.

4 *Successful collective action* helps firms to forge a common identity and understand better the relationships and interactions between firms in the industry. This includes the development of industry standards, pervasive in industries that apply high technology.

5 *Institutional processes* work to solidify organisational forms or industries. Some of these are structural, as in when the government makes laws that affect the existence of industries such as online gambling and e-mail marketing, while others have to do with cognitive legitimisation, where industries are recognised simply when people conceptually associate certain kinds of firms with each other.

One commonality of all the bounding effects that Hannan and Freeman described is that attributes of the external environment in which businesses operate help to shape the formation of industries. In the next section, we will explore in more detail how various organisational forces of the wider community set the atmosphere for internet business.

5 Population ecology (Level 2): the internet environment

The second level of organisational ecology analysis is "the population ecology of organizations" (Hannan and Freeman, 1989, p.14). This level studies various organisational populations and assesses how they interact and compete with each other. Baum and Mezias (1992) criticised past population ecology research for treating organisations within populations as if they were all the same, or differed in only one dimension, such as market share (Boeker, 1991; Carroll, 1984; Hannan and Freeman, 1989; Hannan *et al*., 1991). With the elimination of channel intermediaries in various industries and the resultant change in industrial structure, a multifaceted population ecology analysis is a very important perspective on internet competition, with significant implications for strategy. However, when applying population ecology to the internet, it becomes evident that the changing competitive landscape and the arrival of the information age – for which the internet is a major enabler – are changing the boundaries of our traditional conceptions of industry (Bettis and Hitt, 1995; Bettis, 1998; Sampler, 1998). These changes correspond to the internet-based demography of organisations we described in the previous section.

Porter (2001) pointed out many ways in which changes induced by the internet erode the profitability of firms within most industries. He acknowledged a few important benefits that the internet has given to industry, primarily by increasing efficiency, providing access to larger markets, and eliminating powerful intermediary distribution channels. However, his outlook on the effects of the internet on competition within industries is mostly negative. Using his Five Forces model (Porter, 1980) as a framework, he detailed several ways in which the internet decreases average industry profits by giving consumers more bargaining power, thus lowering their switching costs; reducing any individual company's bargaining power over suppliers; reducing barriers to entry; increasing the development of substitute products; and intensifying rivalry among industrial competitors by minimising product differences and encouraging competition on price.

However, Porter's analysis is based on the classical industrial organisation economics perspective of an industry: a group of firms that create similar products using similar methods of production for similar customers (Deephouse, 2001). Sampler (1998) argued that the 'Information Age' in which we now live calls for a fundamental redefinition of industry that recognises information as one of the most important competitive resources. He proposed, "Firms possessing sufficient amounts of critical information for the same market (*e.g.*, customers) define the industry boundary". He further argued that industry

concentration should be reconceptualised in terms of the breadth and depth of critical information, and that, "for certain types of industries", corporate diversification should be determined by the variety in types of information needed. His argument is that, when a firm has the right information about its market, it can easily leverage this knowledge to deliver any product needed by its information base (that is, by the customers about whom it has information). The key feature of the reconceptualisation of industries from the perspective of information resources is that it focuses on organisational information resources as the ultimate source of firm value, and thus defines industries around this concept. The firm strives to maximise its performance by effectively leveraging its information to create valuable products. An industry in this perspective comprises a group of "firms possessing sufficient amounts of critical information for the same market" (Sampler, 1998).

From the traditional industry perspective of similar firms serving similar products to similar customers, the most relevant organisational populations in an ecological analysis are the industry being examined, and the populations of the industry's customers and its suppliers. Based on this focus on information resources, however, these organisational populations cannot be defined based simply on the products or services being produced. To adequately understand the competitive environment, it is important that customers, suppliers, partners and competitors all be classified largely – if not primarily – based on the information resources that such organisational populations have at their disposal and that they leverage strategically for competition. Okoli (2002) discusses in detail the new organisational networks that derive from information-based competition on the internet.

6 Community ecology (Level 3): the internet environment

After discussing the demography of organisations and then population ecology, we now come to community ecology, the highest level of analysis in organisational ecology. Community ecology focuses on the interactions between different kinds of organisational populations that operate in the same organisational ecosystem. In contrast to population ecology, where the organisations in the populations studied are similar enough that they often compete with each other, community ecology studies populations that interact in many complex ways to directly and indirectly affect each other's survival and prosperity. Traditionally, strategic management researchers do not typically address community ecology with the approaches explicitly specified by Hannan and Freeman (1989) and Astley (1985), which focus specifically on groups of organisational populations, such as "populations of firms, populations of labour unions, and populations of regulatory agencies" (Hannan and Freeman, 1989, pp.14–15). Rather, because the elements that community ecology focuses on are typically covered in non-ecological studies that cover 'the business environment', management studies of the community interactions between different kinds of organisations tend to focus on the atmosphere within which businesses and industries operate (Carroll, 1993; Gimeno and Woo, 1996; Venkatraman and Prescott, 1990).

In our discussion of the internet from an organisational ecology perspective, we will follow the precedent set in strategic management research and adopt a more general environmental approach. Venkatraman and Prescott (1990) found that a company's alignment of its strategy with its operating environment significantly improves its performance (also look at Porter, 1996). Moreover, Powell (1996) argues that an

important dimension of strategy involves carefully understanding the social institutions in which a business is embedded. Thus, understanding the environment in which an internet business operates is vital to developing a successful strategy. Although there are many dimensions of the internet environment, here we will discuss only four important aspects that set the ecological setting for firms to compete on the internet: the internet consumers that support B2C e-commerce; some issues about personnel who support e-commerce; the effect of geographical boundaries on e-commerce; and various effects of the government and regulatory agencies. While not entirely comprehensive, these aspects of the internet ecosystem frame the setting in which e-commerce firms operate.

6.1 Internet consumers

The internet has brought consumers online both by helping them meet their physical needs and by enhancing their social lives. One of the most influential factors that have gotten non-tech-savvy consumers to use the internet has undoubtedly been the internet portals such as America Online, MSN and Yahoo!. By heavily pushing e-mail, chat rooms and other online community features as fun and easy ways to stay in touch with friends and to meet new ones, they have helped to get people past the intimidating technology barriers into the virtual world of the internet. Other vital internet features that have been crucial to drawing users include simple services for building personal websites, such as those offered by Geocities, and free (albeit sometimes illegal) music transfer, popularised by Napster and other file-sharing networks.

Realising these strong social effects, many successful B2C internet companies have tried to build communities that give users a sense that they are meeting real people when they shop online, rather than merely interacting with faceless technology. Notable efforts include Amazon's book review service, The Motley Fool's extensive discussion groups, where users help each other with personal investing, eBay's buyers' and sellers' forums, and many others. The significant benefit of these community-building features is that when users invest time and energy in building relationships with other users at one website, they are more reluctant to forsake their virtual friends by going to competitors' sites. Thus, while the basic technology is easily imitated and has low switching costs for the users, users become very loyal to an internet business that offers them a community they can interact with (Davis and Meyer, 1999).

6.2 Human resources for internet business

The rise of the internet as a new force in business is associated with the economic boom in the USA and many other countries from 1990 to 2000. There was an abundance of venture capital ready to fund any internet business model that promised to attract large numbers of online visitors, with the specious hope that profits would eventually follow. Because of the extremely low unemployment, many people were willing to take on risky jobs in these dot-coms, whether as entrepreneur-managers or as employees seduced by stock options. The increasing rate of technological innovations, as well as the artificially high performance of the dot-coms in the stock market, fuelled a sharp increase in demand for education in IT. Programme enrolments grew tenfold, and the innovations that this workforce helped to generate fuelled even more demand for labour skilled in IT. The high level of productivity further improved the economy, and the virtual cycle of

economic progress continued, amidst repeated analyst warnings that the upward trend could not go on forever. And in 2000, investors in dot-coms finally grew weary of waiting for profits that were not forthcoming, and at pretty much the same time the US economy took a dip from which it has not yet turned around. Because of the simultaneous occurrence of the two trends – the dot-com frenzy and the booming economy – it is difficult to say which caused which; it is most likely that the two had strong effects on each other, with interaction and feedback.

6.3 Geographical boundaries in cyberspace

One of the most touted benefits of the internet is that it spans national borders to present one unified virtual field to anyone in the world. However, although globalisation is bringing this idea closer to fruition, international boundaries are still quite palpable on the internet. The most obvious barrier is the language in which web pages are written. The USA is still by far the greatest source of websites, and along with Canada, the UK and other English-speaking countries, it has defined English as the primary language of internet communication, with well over 50% of the total content. Community-oriented internet sites such as Yahoo! and MSN have multinational versions of their websites, divided more according to language than to national boundaries.

International B2C commerce is restricted by many of the same limits that are in place with offline commerce: multiple currencies, extra shipping costs and increased insurance liability, import duties and various legal restrictions placed on specific forms of trade, such as on financial products. Globalisation is increasingly lowering these barriers, but their persistence demonstrates the importance of government policies and regulations in setting the pace for internet business activity, which we will now briefly discuss.

6.4 Government influences on internet business

In Hannan and Freeman's (1989) outline of the boundaries of organisational forms, they identified structural institutional effects as a major demarcator, referring primarily to how government agencies set boundaries by regulation. Powell (1996) argued that businesses should take a more interactive approach to responding to the legal and regulatory environment. Because it plays such a vital role in their performance, strategists should seriously consider how they could legally interpret and implement laws to their advantage.

National governments have acted as major pioneers and sponsors in promoting the internet by using it extensively on all levels to become more efficient and to serve citizens better. In the first place, the internet was established primarily by the sponsorship of the US military, and now all departments and levels of most national governments use it extensively to operate internally and communicate with citizens. Moreover, many governments, such as that of the USA, do not exact sales taxes on internet purchases.

Government influence has also been felt in its regulation of certain industries. Typically affected industries have traditionally been regulated for various reasons, but the new channel of the internet makes it necessary to reassess the regulatory principles, especially as businesses take the opportunistic interpretation that the internet lowers all restrictions. Examples include online pharmacies that sell regulated medications, pornography and gambling industries. An area where the government has clashed with businesses of all industries has been in attempts to restrict spam, unsolicited bulk e-mail.

Please verify if "pornographers" is more appropriate.

Consumer privacy advocates lobby for laws that require e-mail marketers to obtain consumers' explicit permission before e-mailing them. Online marketers in general want laws that permit them to liberally accumulate and use customer information, while respecting customers' explicit instructions about the use of their private information.

7 Research implications

The fundamental purpose of the organisational ecology perspective is to characterise the landscape or domain in which organisations operate at various definite levels of analysis, so as to better conceptualise the nature of competitive pressures that influence the organisations' behaviours, especially those behaviours that directly affect their growth and survival. We can discuss the implications of this study for researchers in terms of the organisational levels of analysis described in Table 1.

7.1 The individual organisation

Traditionally, the 'organisation' has been conceptualised in business research as a single-business corporation; that is, a business unit that provides one consistent line of products or services. With the advent of the internet, a distinction has arisen between the traditional 'bricks-and-mortar' manifestation of these business units and the 'online' manifestation. However, as we have indicated, there is an increasing and rapid movement towards integrating the two as tightly as possible, with competitive benefits strongly accruing to businesses that can forge as strong as possible an integration (Powell and Dent-Micallef, 1997; Okoli, 2002). It is important in any organisational research involving internet-based competition that researchers measure the degree of integration between the offline and online components of a business, as this could likely significantly affect the results found. The six-scenario classification presented in Table 2 is a valuable tool in categorising different degrees of integration.

7.2 Demography of organisations (Level 1)

The first level of actual ecological study involves interactions within organisational forms, that is, between organisations that essentially engage in the same kind of business. Organisations have been traditionally grouped into industries (Carroll, 1984; 1985; Hannan and Freeman, 1989) or strategic groups (Boeker, 1991) based on an economy that is based on physical products and tangible services. However, the intangible nature of much internet-based information goods, as well as the amorphous nature of relationships between disparate organisations enabled by the information revolution, blurs these traditional boundaries of 'organisations of the same kind'.

Rather than the traditional industry boundaries that largely derive from industrial organisation economics (Porter, 1980), it is necessary to reassess the criteria that bound organisational groups. Fortunately, organisation ecology theory provides a robust and scalable framework to tackle this constantly morphing challenge, through Hannan and Freeman's (1989) five ecological bounding effects discussed earlier: technological factors, minimising transaction costs, social networks, successful collective action and institutional processes. More recent research focused on the internet as a competitive

landscape has identified links between traditional criteria for industry boundaries and the present realities of internet-based competition, with views varying from modest updating (Porter, 2001) to radical revision (Sampler, 1998). It is important that researchers reconceptualise industry boundaries in light of the nature of internet-based competition, and organisational ecology theory provides frameworks that continue to be relevant.

7.3 Population ecology (Level 2)

Please verify if this should be "organisational ecology".

The next level of ecology studies organisational populations and assesses how they interact and compete with each other. In traditional organisational ecology theory, organisations within populations are regarded as being basically identical, or as differing on only one dimension, such as market share (Baum and Mezias, 1992). This limited perspective needs to be realigned with the information age by focusing on organisational information resources as the ultimate source of firm value (Okoli, 2002), and by defining an industry as a group of "firms possessing sufficient amounts of critical information for the same market" (Sampler, 1998). This might be the level at which organisational ecology theory requires the most revision to match the information age, but it is nonetheless valuable in presenting a focused level of analysis that is extremely relevant for internet-based competition. In particular, Stampler (1998), Porter (2001) and Okoli (2002) have developed frameworks and propositions for competition at this level. Such studies, with organisational ecology theory as a backdrop, could prove valuable in conceptualising industrial competition in the internet age.

or Sampler?

7.4 Community ecology (Level 3)

The highest level that organisational ecology treats focuses on the interactions between different kinds of organisational populations that operate in the same organisational ecosystem. It studies populations that interact in many complex ways to directly and indirectly affect each other's survival and prosperity, and has traditionally focused on the business environment.

Many various dimensions are pertinent, but this study focused on the internet consumer culture, internet personnel, the effect of geographical boundaries on e-commerce, and various effects of the government and regulatory agencies. Business operations on the internet operate within definite legal, political, social, cultural and economic contexts, which have profound effects on the results of business competition for individual firms, industries and entire economies. Organisational ecology theory provides a framework for conceptualising the classes of societal institutions that influence the outcomes of internet-based competition. This study has discussed only a few of these classes, but it provides a foundation and stimulus for the generation of definite propositions and investigations on these important influences.

8 Conclusion

In this study we analysed the competitive landscape of the internet from the perspective of organisational ecology theory. The goal was to use these levels as a framework to study competition using the internet. Specifically, we compared how each of these levels is conceptualised in their traditional competitive context with the new conceptualisations

that are necessitated by the nature of internet competition. We began by exploring how the 'electronic commerce firm' as an individual organisation should best be conceptualised, and then examined the three levels of organisational ecology analysis in detail. The demography of internet organisations involves classifying electronic commerce firms into populations based on various bounding factors relevant to the digital economy. The population ecology of the internet examines the interactions between organisational populations, a scenario in which internet 'industries' are increasingly being defined based on competition in information resources rather than in traditional products and services (Okoli, 2002). The highest level is community ecology, which examines various institutional and environmental factors that set the background for the competition of organisations using the internet.

The frameworks presented in this study will need to be validated by conducting internet-based research using organisational ecology as a theoretical basis. Because of the broad nature of this theory, it is not feasible to validate the entire study by one or even a few studies. Rather, continued incremental work is needed, using organisational ecology as a theory base applied to internet-based competition. Some beginnings in this direction have been made by Javalgi *et al*. (2005) and Constantinides (2004). Hopefully, the present study will aid other efforts.

Competition on the internet is an extremely broad topic, as it spans all industries and affects the entire business environment. While our analysis has been general and high level, we have discussed the implications of the information-oriented competition that the internet enables and requires. Further studies are needed to develop specific propositions and test them empirically; then specific recommendations can be made to managers on how to compete effectively using the internet. There are various possibilities for further research based on the groundwork we have laid here. It would be valuable to investigate how the internet impacts interactions between specific industries and strategic groups on the population ecology level. In this study we have been very generic in discussing the ecological phenomena of industries using the internet; it would be helpful to examine specific industries from an ecological perspective. Another interesting area involves a closer examination of the nature of an e-commerce firm. It is necessary to better understand the characteristic features of a business that would make it easier for the business to adopt a hybrid internet-offline format, and to explore what the equilibrium points are along the internet-offline spectrum. Other interesting topics for further study would be to investigate how geographical boundaries are still felt in cyberspace, and the impact of technologically oriented human resources in building social and intellectual capital for the internet.

As one of the most important technological developments of our time, the internet holds much promise for business. An organisational ecology perspective of the internet is a helpful approach to understanding the complex features of internet competition, giving multiple levels of analysis. Such multidimensional approaches to understanding this new competitive landscape are critical for managers to harness the internet for competitive advantage.

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