SMALL e-FIRMS: eNLIGHTENED BUTTERFLIES OR eNDANGERED CATAPLILLARS

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Colin Jones
Lecuturer in Entrepreneurship
University of Tasmania
PO Box 152 – 16
Sandy Bay TAS 7005
Ph: 61 0 3 6226 2826
Fax: 61 0 3 6226 2808
Colin.Jones@utas.edu.au

Dr Rob Hecker
University of Tasmania
PO Box 152 – 16
Sandy Bay TAS 7005
Ph: 61 0 3 6226 1774
Fax: 61 0 3 6226 2808
Rob.Hecker@utas.edu.au

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INTRODUCTION

The "e" prefix has seemingly come to symbolise the information revolution. But, does it change all manner of thinking, or, is it simply just the fifth letter of the alphabet? Despite claims to the contrary that e-business is nothing more than just business (Porter, 2001), the "e" has been widely associated with anything and everything related to the ubiquitous Internet ("the web"). There appears widespread consensus that the web has forever changed the business environment (Sawhney and Zabin, 2001). Such environmental change has impacted certain industries (e.g. banking, stockbroking, bookselling and auctioneering) at a greater rate than others, but increasingly permeates all industries to some degree. The unprecedented scale and speed of the web's growth has caught many firms off guard. An inability to adapt to the changing business environment may, in many cases, lead to a break in the fit between the environment and the firm's routines and competencies, a maladjustment (Santos, 2002). Such maladjustment may act to ignite attempts to adjust this fit internally, or, result in the demise of the firm due to an inability or unwillingness to adjust routines and competencies. This paper considers the plight of the place-based small firm (i.e. a small firm whose operations have historically been determined by geographical location) in such web-impacted environments, environments characterized by new innovative entrants who use the web's technologies to provide unprecedented and unique consumer value.

CLASSIFYING THE e

With the "e" not yet returned to its rightful place as the alphabet's fifth letter, lessons are beginning to emerge as to the significance of its recent use as a descriptor of all things related to the information revolution. Firstly, e-commerce and e-business do not mean the same thing. E-commerce can be defined as "technology-mediated exchanges between parties (individuals, organizations, or both) as well as the electronically based intra- or interorganizational activities that facilitate such exchanges" (Rayport and Jaworski, 2001:3). In contrast, e-business can be thought of as "the use of electronic networks and associated technologies to enable, improve, enhance, transform, or invent a business process or business system to create superior value for current or potential customers" (Sawhney and Zabin, 2001:15). The distinction between the two is emphasised when consideration is given to the disparity between small firms connected to the web and those actually using it to take orders and receive payments (Yellow Pages Business Index, 2002), small firms defined by McLennan (1999) as having 19 or less employees.

We suggest that in web-impacted environments, e-business represents a major change. Within such environments the routines and competencies of existing firms through must adapt to meet the needs and wants of current and potential customers to ensure a fit between the firm and its operating environment. Therefore, we use the term 'small e-firm' to refer to those small firms whose e-activities are transformational and go beyond mere generic technology-mediated exchange of an informational nature. We also use the term 'quasi small e-firm' to mean those small firms connected to the web but who have not transformed existing activities to create new web-based value for both firm and customers. They are therefore in limbo between a state of e-commerce and e-business. These

distinctions are critical to furthering our understanding of why some small firms succeed where other fail in their efforts to change with the times. This paper proposes that a small firm's journey from adopting e-commerce to conducting e-business appears to have some similarity with the story of the "Caterpillar and the Butterfly"(Köhe't, 2003).

ON A WING, OR… ON A PRAYER

Can small firms successfully transform their operations in web-impacted environments, or will the environment's exogenously generated change result in their demise? The story of the caterpillar and the butterfly provides a vivid analogy of the obstacles small firms are confronted with, and also emphasises a new paradigm of thought required by both small firm owners and academics alike. Just as a caterpillar must endure a painful metamorphous to become a butterfly, small firms must radically transform their goals, boundaries and activities (Aldrich, 1999) to be transformed into an e-firm. The story offers a syllogism for thinking about the challenges confronting the small firm attempting to adapt within a hostile business environment through the development of e-business activities.

> *The caterpillar spent most of his existence struggling to survive, and only thinking of his immediate needs. The caterpillar struggled for existence against many predators, and the caterpillar was unable to see past the few leaves in front of him. The caterpillar could not imagine what it would be like to be a butterfly soaring in the wind, and see the beauty of everything around him.*

Small firms typically exhibit a short-term focus, with cash flow a strong determinant of their immediate focus (Carson, 1998). Given the difficulties of quantifying probable future cash flows from e-business, it is perhaps understandable why such short-term thinking may apply to the web. Not surprisingly it has been the easy to reach 'leaves' (e.g. email and information searching capabilities) that predictably have been most attractive to small firms adopting the web. However, such change does not constitute a transformation. A transformation is determined by the scope and depth of the change across the firm's goals, boundaries and activities (Aldrich, 1999). A failure to look beyond the short-term could condemn the quasi e-firm to ignorance of what the web could contribute to the firm. The assumption is that the quasi e-firm has yet to develop a vision of what may occur. This is understandable given the propensity of established firms to develop deeply entrenched mental models that cloud their view of what the future could be (Sawhney and Zabin, 2001).

> *Could the caterpillar really imagine what his new existence would be like? If the caterpillar told the other caterpillars what was going to happen, most of the other caterpillars would think the caterpillar was going insane. Most of the other caterpillars could not even begin to conceive that what they were told was possible. Would any of this mean that what was going to happen to each caterpillar was not real? Would it simply mean that the other caterpillars were not ready to know the truth?*

Small firms are less likely to have the degree of resources and individual power in comparison to the larger firms within their industry. Carson and Gilmore (2000) note that in addition to these limitations, small firms also typically rely upon experiential learning to develop their knowledge base. The founding and development of small firm operations are typically derived from reproducing existing and observable operational forms, rather than creating new ones (Aldrich and Kenworthy, 1999). A potential down side for many small firms is an inability to truly sense the degree and nature of change that surrounds their enterprise. Unlike the innovator, who is prone to experimentation and challenging existing best (or

normal) practice, the reproducer is largely reliant upon other firms to develop new knowledge. It is proposed that in the absence of firm capabilities that support the acquisition, assimilation, transformation and exploitation of external knowledge, defined as absorptive capacity by Zahra and George (2002), small firms will be at the mercy of the gales of creative destruction (Schumpeter, 1934) that threaten to selectively remove ignorant quasi e-firms from web-impacted environments.

This assertion assumes that the knowledge base of the quasi e-firm is insufficient for enabling exploitation of the web's technologies. Rogers (1995) states that complex innovations (e.g. the web) must depend upon know-how knowledge (e.g. information necessary to fully exploit the web) and principle knowledge (e.g. information relating to the web's theoretical underpinnings) to fully exploit the innovations potential. In the absence of such vital knowledge, firms would be expected to conform to industry norms. Under such circumstances, the firm would be expected to continue the role of reproducer (rather than innovator) of current business practices. Unfortunately, the web is a real phenomenon; it is changing the very way business is conducted with firms unable to adapt to its new rules inevitably naturally selected from their operating environments.

> *When the caterpillar first created his cocoon, the caterpillar did not know what was happening. The caterpillar was still attached the caterpillar's old world, but the caterpillar was no longer a part of the caterpillar's old world. The caterpillar was closed off from the caterpillar's old world, but the caterpillar was not ready to enter the caterpillar's new world. The caterpillar constructed his cocoon from all of the accumulated rubbish from the caterpillar's existence. This is what the caterpillar must discard before the caterpillar can become the butterfly.*

A basic question exists; does the web represent evolution or a revolution to the typical small firm? This question is perhaps best answered with reference to Bach's (1994) notion that, *what the caterpillar calls the end of the world, the world calls a butterfly*. Thus, viewed from the quasi small e-firm's perspective, it would seem revolutionary. However, when viewed retrospectively by the e-firm it may seem an evolutionary process dependent upon self-discovery. Perhaps, a key determinate enabling the quasi e-firm to avoid the unrelenting forces of natural selection is that of vision. Unlike the biological process that the caterpillar will endure, the small quasi e-firm (in web-impacted environments) must overcome obstacles to exploiting the web or be subject to the vagaries of maladjustment with their operating environment.

An example of such an obstacle is the changing and unpredictable nature of consumer behaviour associated with the web. In comparing consumers to the mythological Greek centaur, Wind, Mahajan and Gunther (2002) suggest that consumer behaviour has forever been altered by the emergence of the web. Consumers it seems, will choose from the web what improves their lives, and leave behind what does not. The consequences of such change in consumer behaviour are the difficulties that occur in segmenting markets based on observable and stable preferences. The small firm's advantage of closeness to its customers is lost, as the unstable metamorphous consumers undergo between traditional consumer and cyberconsumer occurs largely via the privacy of the consumer's interface to web.

> *The metamorphous which the caterpillar must undergo to transform from caterpillar to butterfly is very painful, but unless the caterpillar endures the metamorphous, the caterpillar cannot become the butterfly. The caterpillar has no idea what to expect…. As the metamorphous progresses, the caterpillar slowly*

starts to understand what is happening. However, the caterpillar has difficulty believing what is occurring, despite the wings which are forming.

For the quasi e-firm, this process requires a vision of what path the firm should pursue and what existing routines and competencies will not support this journey. Such evaluation is dependent upon the direction, speed and intensity of the firm's efforts to acquire external knowledge (Zahra and George, 2002). The web can be viewed as an activation trigger that compels small firms to seek information from which to determine the most appropriate response to the changing environment. Firms that possess potential absorptive capacity (i.e. the acquisition and assimilation of external knowledge) would seem to have an increased ability to make sense of complex environmental change (Kim, 1997). Such a high-level routines would be practised at identifying which external knowledge is critical to improving firm performance. Such routines would enable external knowledge to be analysed, interpreted and its contextual value determined. The successful reconstruction of the firm's knowledge base (i.e. the transformation of knowledge) through combining new and existing knowledge provides the basis for realizing the firm's absorptive capacity through the development of new competencies (i.e. the exploitation of knowledge). Clearly, such a capability presumes a degree a curiosity by the firm to explore its operating environment.

Therefore, we propose small firm exploitation of the web is dependent upon the development of different knowledge bases, typically from new knowledge sources. In the likely absence of new knowledge, exploitation of the web is limited by the technological paradigm within the firm (Dosi, 1984) that governs the normal patterns of problem solving or opportunity exploitation. Such paradigms may cause exclusion effects that prevent exploitation of the web through ignorance of the extent of technological possibilities. Given that small firms typically have less internal resources at their disposable to evaluate environmental threats and opportunities (Lang, Calantone & Gudmundson, 1997), reliance upon external sources may be intensified.

However, at present little evidence exists to suggest that small firms are actively pursuing knowledge with regards exploiting the web (Chau and Lawrence, 1998). This is perhaps due to the resource constraints of knowledge, time and capital (e.g. Vescovi, 2000; Chaston, Badger, Mangles & Sadler-Smith, 2001; Plume, 2001; Jones, Hecker & Holland, 2002; Van Beveren & Thomson, 2002). Further compounding this issue is the difficulties small firms may face difficulties in locating technology linkers who can understand how their core activities relate to web-based opportunities and guide their exploitation (Plume, 2001; Jones et al., 2002). Under such circumstances the web, despite being a source of new variation and a catalyst to altering the existing selection criteria (Aldrich, 1999), may also pose a threat. That is, existing internal selection processes may promote persistence rather than change. In such situations small firms could become stymied, unable to adequately understand variations and ignorant of external environmental selection forces.

Regardless of how hard the butterfly tries, the butterfly cannot possibly fly until the butterfly first discards the cocoon. Before the butterfly can fly, the butterfly must force it's way out of the cocoon, which takes some effort.

It is the quasi e-firm's lack of vision and understanding of what the web could be that must be overcome to enable transformation. Penrose (1959) suggests that an imbalance between embodied technology (e.g. the web's hardware) and disembodied technology (e.g. know-how of the web) would prove detrimental to optimally developing new technologies. The suggestion is that while the web is available to all firms in the market, it is only those firms

with the knowledge-based resources to exploit its potential that will profit from its acquisition. Again it is the dependence upon knowledge that governs the evolution of the quasi e-firm. However, the ability to develop potential absorptive capacity may be limited by a lack of prior knowledge (Cohen & Levinthal, 1990) related to the web. Consequently, increased complexity of learning may result in firms struggling to acquire, comprehend and implement knowledge associated with new routines and competencies (McKelvey, 1982).

When the routines and competencies of other web-based entrants remain imperceptible through geographical, technical and legal barriers, decreased exposure to variations may restrict the firm's ability to change. This is because the firm must bridge the knowledge gap between what is known and what is not, through difficult to acquire and assimilate (and therefore difficult to transform and exploit) foreign knowledge bases. It is also possible that routines imprinted into firms (Tucker, Singh & Meinhard, 1990) prior to the emergence of the web may not support the learning behaviors required to adapt to the web. Many existing small firms are experimenting with varieties of web applications. Four basic business models options are possible; stay place-based without connecting, stay place-based and use a shopping mall (portal) to exploit the web, integrate the web within existing place-based assets, or reject place-based operations in favour of a pure web model (e.g. Amazon.com). As yet however, a dominant design for place-based firms successfully conducting exchange on the web, regardless of the business model chosen, seems elusive.

Tushman and Murmann (1998) note new dominant designs (i.e. business models) are dependent upon patterns of variation, selection and retention at the subsystem level that ultimately effect firm and industry change. Given the resource poorness of many small firms, identification of a particular business model that will be both efficient and effective is a major challenge. Also, the volume of web-based exchange in many industries is still relatively low restricting the observability of variations upon which new dominant designs are conditional. Again, the absorptive capacity capability is deemed of importance given that dominant designs are only known in retrospect and then only after only they account for over 50% of exchange against competing designs (Anderson & Tushman, 1990). Despite optimism to the contrary that firm learning under such conditions will be sufficient (Ruef, 1997) our thesis is that many firms, especially small firms, will experience difficulty learning in rapidly changing web-impacted environments. Clearly, the emergence of active small e-firms represents a triumph of knowledge development capabilities.

> *One day, the butterfly breaks out of it's cocoon and soars off into it's new world, leaving an empty shell behind. The butterfly recalled that he had worried about which caterpillar had the juiciest leaf, and whether the leaves would always be there. The butterfly now saw trees and knew that there were other trees. The butterfly could not understand why he had believed that the insignificant leaves on a single tree had been so important. However, without those insignificant leaves, the caterpillar could not have sustained itself, and grown to become the butterfly.*

The e-firm is identified by the transformation that has occurred across its goals, boundaries and activities. The extent and nature of the change should be reflected in the firm's value proposition, with both existing and future customers' needs addressed. In essence, the value proposition is anchored by the firm's past and determined by the firm's vision. The value proposition represents the total value appropriated by the firm, its customers and any other participants involved during transactions (Brandenburger and Stuart, 1996; Amit and Zott, 2001). A critical distinction between the quasi e-firm and the e-firm is that while e-commerce delivers immediate value to the quasi e-firm (e.g. reduced communication costs and

efficiency in acquiring vast amounts of information), it does not provide the foundational value required to support the e-firm. The e-firm harnesses the web's interactivity to go beyond simple internal efficiencies and exploit "trapped" value (i.e. value gained from market and value system efficiencies) and/or "new-to-the-world" value (i.e. new value through customisation and personalisation) (Rayport and Jaworski, 2001).

The customer relationships that have sustained the quasi e-firm during its pre-web history perhaps hold the key to the development of a sustainable value proposition. Until the technologies associated with the web are employed to meet the discovered needs and wants of a target segment/s, the quasi e-firm's transformation will remain incomplete. Despite the pervasive claims by many marketing theorists that such discovery is reliant upon traditional market-oriented behaviours (e.g. Hoffman & Novak, 1997; Lodish, Morgan & Kallianpur, 2001), little evidence exists to support the continuation of such a prescriptive approach. In fact, Connor (1999) and Wrenn (1997) note that where radical technologies significantly alter market conditions, the ability of consumers to articulate their latent needs is very questionable.

Wrenn (1997) proposes a new way of thinking about the traditional market orientation (see Kotler, 1997). Wrenn suggests that typically, assumptions are made that customers can always express their needs. The role of marketing is seen to be one of interpretation and the provision of a product or process driven solution. He proposes that under conditions of technological uncertainty, the role of marketing must also be that of mediator between the customer and the available technology. This suggests that the firm must have or develop a vision of what could be in order to translate potential technological attributes in possible customer benefits. Wrenn's "reality based market orientation" thesis is challenging to mainstream marketing due to its suggestion that firms may experience difficulty relying upon generic linear frameworks to strategise. It requires firms to revisit their past in order to discovery their future trajectory.

> *The butterfly lands on the flower of a tree. The same tree the butterfly had lived on as the caterpillar. The butterfly carries pollen to another flower, to fertilise the seed, which will fall to the ground and grow into a tree for caterpillars to live on.*

The transformation of quasi e-firms provides tangible evidence to other quasi e-firms seeking to adapt to web-impacted environments. At present, the cognitive legitimacy (Aldrich, 1999) that surrounds optimal small e-firm business models is limited. The emergence of observable and perhaps imitable organizational forms provides a vital source of variations for populations and broader communities of firms to consider. Given that the transformation of a firm "involves a major change in an organization over time and represents a substantial variation, planned or unplanned, that has been selected and retained" (Aldrich, 1999:194), the presence of successful e-firms is crucial to both reproducers and innovators. The premise is that the e-firms "that survive are replicated, diffuse through the population and become the predominant type" (Ziman, 2000:4).

This paper has adopted a Lamarckian evolutionary view that "organizations exist in environments and are responsive to environmental forces" (McKelvey, 1982:242). From this perspective small e-firms have been capable of identifying specific niches that promote the value of their physical assets, using the web's reach to enter new markets, or a combination of both. It has also been noted that despite a small quasi e-firm's deliberate intention to consider new variations, external selection pressures may in the event of maladjustment, prevent transformation occurring (Grant, 1985; Amburgey, Dacin and Kelly, 1994; Santos,

2002). At present, the mediating issues (e.g. vision, knowledge development, and creativity) that significantly enlighten or endanger the quasi e-firm are not addressed adequately within mainstream marketing literature.

> *How many centuries did it take for us to discover that the caterpillar and the butterfly were the same entity? We spend most of our lifetimes like a caterpillar struggling to survive, and only thinking of our immediate needs. The metamorphous which we must undergo is extremely painful, but unless we endure the metamorphous, we will remain as caterpillars.*

THE eVOLUTION MINDSET

In conclusion, if e-business will eventually be just business, why should academics seriously consider new ways of thinking about the changing nature of the small firm? The answer is straightforward. The imminent return of the "e" to the alphabet signifies the cognitive and sociopolitical legitimacy (Aldrich, 1999) that increasingly surround e-business. It signifies the legitimacy of the organizational structures and practices that support the exchange of value between consumers and e-firms. It is through the evolutionary processes of variation, selection, and retention that new routines and structures emerge victorious. Observation and knowledge of these prosperous behaviours provides a specific pathway for many quasi e-firms and new entrants to follow. The challenge for academia is to aid the diffusion process of how such transformation occurs, rather than why firms should engage the web.
The use of evolutionary theory throughout this paper serves to illustrate how such diffusion might occur. "Evolutionary theory unites in a single coherent framework a concern for the entrepreneurial outcomes and the processes and contexts making them possible." (Aldrich and Martinez, 2001). This approach provides a critical view of the variations that support new enterprise and adaptation within web-impacted environments, and the circumstances (both external and internal to the firm) that lead to the selection and retention of new business practices. This process of viewing the changing nature of small firms requires the researcher to appreciate the organizational hierarchies (Baum and Singh, 1994) that support and influence evolutionary change. Attention to the nested nature of multiple levels of analysis (e.g. individual, firm, population of firms, community of populations, and the ecosystem that surround them) enables high-level routines associated with the acquisition, assimilation, transformation and exploitation of external knowledge to be traced and analysed.

If, as it appears, small firms are experiencing difficulty developing awareness of and gaining appreciation of variations in new business models, the development of potential absorptive capacity represents a significant starting point. Comprised of knowledge acquisition and assimilation capabilities, potential absorptive capacity provides the gateway to internalising and comprehending external knowledge for complex innovations such as the web. A clear challenge remains for those firms whose histories are without experience with web-like technologies. To move beyond a potentially inadequate technological paradigm, boundary-spanning behaviours of inquiry must be present. However, in the absence of persons whom adequately perform the role of technology linker to small firms, the owner/manager must act in this capacity by default. In the absence of such reflection, existing firm knowledge may ensure the replication of current practice, and therefore block out consideration of new variations from which possible adaptation is possible.

At present, it would seem that many small firms are trapped in a cocoon of their own making, unable to visualise what heights they could soar to. During this elongated period as a quasi

e-firm, the small firm is increasingly susceptible to external forces of selection that are beyond their control. The development of a value proposition that satisfies both current and future customers is conditional upon the selection of new routines. Therefore the quasi e-firm must be exposed to external knowledge to ensure awareness of and enlightenment from the variations that may provide an increased fit with the changing environment. The alternative, the continuation of ignorant practices that endanger the future prosperity of the firm.

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Colin Jones is a lecturer in Entrepreneurship in the School of Management at the University of Tasmania. He currently is a doctoral candidate researching the growth of knowledge within small firms confronted by technological change. He has previously been a small business owner and consultant to small business. He currently is publishing in the fields of Entrepreneurship and Marketing.

Dr Rob Hecker is a lecturer in Marketing and Human Resource Management at the School of Management at the University of Tasmania. His PhD is in cognitive psychology and his current research interests lay in the services sector and the human interaction between delivery and consumption. Prior to his current academic appointment he was a private consultant in the government services sector. His research has appeared in a variety of

academic journals, including the *Journal of European Industrial Training*, the *Journal of Service Industry Management*, and the *Australian Journal of Information Systems.*