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LEVERAGING DIGITAL BUSINESS ECOSYSTEMS FOR ENTERPRISE AGILITY: THE TRI-LOGIC DEVELOPMENT STRATEGY OF ALIBABA.COM

Completed Research Paper

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Abstract

The existing discourse on IT-enabled enterprise agility views the internal organizational processes of IT capability development and organizational learning as the primary means of attaining agility, but has neglected the new dynamics of competition in the present networked economy. As Digital Business Ecosystems (DBEs) may be crucial to enterprise agility for organizations engaged in intense, inter-network competition, we apply the literature on business ecosystems to analyze the case of Alibaba.com, a B2B portal that organizes one of the largest DBEs worldwide. In doing so, a process model of how a DBE may be developed and leveraged for enterprise agility is inductively derived that sheds light on the antecedents, nature and implications of DBE development in three distinct phases. With its findings, this study contributes to a networked perspective of IT-enabled enterprise agility, and provides practitioners with a comprehensive and empirically-supported framework for the development and subsequent leverage of a DBE.

Keywords: Enterprise agility, Digital business ecosystems, Organizational strategies, Case study
Introduction

The modern competitive landscape is characterized by hyper-competition, turbulent strategic and operating conditions, increased time-to-market pressures, regulatory changes and rapidly evolving customer demands (McAfee and Brynjolfsson 2008; Overby et al. 2006). Consequently, enterprise agility, defined as the ability to consistently detect and seize market opportunities with speed and surprise (Sambamurthy et al. 2003), is increasingly viewed as an important determinant of business success for the contemporary firm (e.g. Sull 2009). With the step-shift advances in Information Technology (IT) over the last decade, the potential of IT in enabling enterprise agility has grown considerably (Sambamurthy et al. 2003); the real world examples of how organizations such as Yahoo and Cisco leveraged IT to pursue constantly evolving strategies to seize emergent business opportunities attest to this (See Eisenhardt and Sull 2001; Fryer and Stewart 2008). Accordingly, the concept of IT-enabled enterprise agility has received increasing attention from practitioners and the academia in recent years (van Oosterhout et al. 2006).

Yet, notwithstanding the academic and practical contributions of the growing body of research, a number of gaps can be identified in the literature. As will be elaborated in the following section, in a significant number of studies, the relationship between the adoption of IT and enterprise agility is treated as a “black box” and implicitly assumed to be automatic (e.g. Donnellan and Kelly 2005; Hovorka and Larsen 2006), when it is well-established that the organizational impact of the adoption of IT is limited unless it is aligned with the strategies of an organization (Porter 2001; Powell and Dent-Micallef 1997). In addition, much of the existing prescriptions for attaining enterprise agility through the use of IT have not been empirically validated (e.g. Overby et al. 2006; Seo and La Paz 2008), and tend to be overly abstract in that they do not provide sufficient indications for practical action (e.g. Holmqvist and Pessi 2006; Zain et al. 2005). While gaps in the literature are certainly to be expected given the relative immaturity of the research area, collectively, these gaps are symptomatic of a lack of knowledge of how IT gives rise to enterprise agility. Without grasping the nature of this underlying process, it may be difficult, if not impossible to consistently leverage IT for enterprise agility.

More importantly, the existing discourse on IT-enabled enterprise agility is centered on internal organizational processes such as IT capability development (Weill et al. 2002) and organizational learning (Sambamurthy et al. 2003) as the primary means for achieving enterprise agility. Yet, the reality is that significant changes in the managerial, legal and technological capabilities of organizations at the turn of the millennium have led to a new networked economy that is no longer driven by economies of scale, but the “economics of networks” (Shapiro and Varian 1999). As “distributed business networks became the established way of doing business” (Iansiti and Levien 2004a), the management of internal assets and competencies became less crucial to business success than managing the concurrent and paradoxical forces of stability and instability (Stacey 1995), cooperation and competition (Lengnick-Hall and Wolff 1999) that the focal organization is subjected to. As such, we contend that there is a pressing need for a different perspective of IT-enabled enterprise agility, one that accounts for the new dynamics of business competition in the present networked economy (Iansiti and Levien 2004a).

The literature on business ecosystems is well-suited for informing a networked perspective of IT-enabled enterprise agility as it replete with prescriptions for competing, strategizing and innovating in the networked economy (See Iansiti and Levien 2004a; Moore 1996). In particular, the development and leverage of a digital business ecosystem (DBE); a specific type of business ecosystem defined as an IT-enabled business network of entities with differing interests bound together in a collective whole (Iansiti and Levien 2004a), may hold the key to attaining enterprise agility in the context of organizations operating in complex business networks. This is because (1) the extent of integration and collaboration required in business ecosystems engaged in the form of intense inter-network competition that characterizes the networked economy can only be achieved using IT (Riggins and Rhee 1998), and (2) business ecosystems can enhance the organizational ability to sense and respond to emergent market opportunities (Teece 2007). Accordingly, we structure our inquiry around the process of developing and leveraging a DBE; as enacted within a “core firm” (Pierce 2009) that comprises the ecosystem, for the attainment of enterprise agility. A core firm is defined as an organization serving as a richly-connected hub wielding significant influence in a business network (Iansiti and Levien 2004a).

Using a case study of Alibaba.com, one of the world’s largest online Business-to-Business (B2B) e-commerce portals that supports a thriving business ecosystem of over 35 million members worldwide, the purpose of this study is to examine how enterprise agility can be attained by an organization operating as a core firm in a DBE. By constructing a process model of the development and leverage of a DBE, this paper will contribute to existing
knowledge by opening the black box of the relationship between the adoption and leverage of a specific IT artifact (i.e. a DBE) and enterprise agility, and provide actionable prescriptions for practitioners that are grounded in the empirical reality of the strategies and organizational actions of Alibaba. Moreover, by examining the phenomenon from the ecosystem perspective, our findings can shed light on the dynamics of attaining IT-enabled enterprise agility in the context of core firms operating in complex business networks, complementing existing internally-oriented prescriptions for attaining IT-enabled enterprise agility (e.g. Sambamurthy et al. 2003; Weill et al. 2002) so that by mutual reinforcement, theoretical advancement and a more holistic perspective of the phenomenon can be achieved. Specifically, the research questions that this study aims to answer are: (1) How are DBEs formed and developed? and (2) How can DBEs be leveraged for enterprise agility?

Theoretical Background

Existing Perspectives on Enterprise Agility

Enterprise agility is commonly conceived as an organizational capability consisting of two components: the ability to sense or anticipate changes in the internal and external organizational environment, and the ability to respond effectively and efficiently in a timely and cost-effective manner (Seo and La Paz 2008). Changes in the external environment that precipitate the need for enterprise agility may include regulatory or legal changes, economic fluctuations, changes in consumer demands, technological advancements and changes as a result of competitive actions from business rivals (Overby et al. 2006), while internal environmental changes may encompass the implementation of new information systems (IS), restructuring of the organizational IT function, and the enactment of mergers and acquisitions (van Oosterhout et al. 2006). When a change is detected, an agile organization would process the incoming signal and react accordingly. Depending on the scope and magnitude of change, the organizational response may entail the re-alignment of resources, processes, and/or organizational objectives (Seo and La Paz 2008).

The concept of enterprise agility builds on prior concepts in management that pertain to strategizing and competing in dynamic environments (Overby et al. 2006). Yet, what differentiates enterprise agility from concepts such as absorptive capacity (Zahra and George 2002), dynamic capabilities (Teece et al. 1997) and strategic flexibility (Grewal and Tansuhaj 2001) is that it augments speed and scalability with the classic formula of adaptability and flexibility (Baskerville et al. 2005), and it is this unique combination of traits; traits that are recognized to be salient to competing in turbulent conditions, that has captured the attention and imagination of managers and academics alike. As IT can be a potent enabler of enterprise agility (Mathiassen and Pries-Heje 2006; Sambamurthy et al. 2003), the concept of IT-enabled enterprise agility has similarly garnered considerable research attention since it was introduced to the IS community a number of years ago (Holmqvist and Pessi 2006). Yet, despite the growing body of research, a number of gaps can be identified in the literature.

First, a significant number of studies have focused on IT diffusion and agile adoption practices as the means to achieving enterprise agility (e.g. Donnellan and Kelly 2005; Hovorka and Larsen 2006). The underlying assumption of these studies is that the “ability to quickly change the type and flow of information within an organization must underlie a rapid and graceful reorganization” (Mathiassen and Pries-Heje 2006) and therefore, agility in IT adoption/diffusion must necessarily lead to enterprise agility. Yet, treating the relationship between the adoption/diffusion of IT and enterprise agility as a “black box” is problematic because even though IT has the immense potential for facilitating enterprise agility, the organizational impact of IT per se tends to be limited unless it is aligned with the broader strategic objectives of an organization (Porter 2001; Powell and Dent-Micaleff 1997).

Second, of the studies in the literature that offers prescriptions for attaining enterprise agility through the use of IT, most of them are conceptual in nature with no empirical evidence offered to substantiate their propositions (Overby et al. 2006; van Oosterhout et al. 2006). Consequently, while the discourse on the impediments of enterprise agility (Seo and La Paz 2008), agility-enabling IT capabilities (Weill et al. 2002), and the facilitating role of various forms of knowledge and process-oriented IT systems (Overby et al. 2006) certainly offers plenty of insights for IT researchers and managers, there is a pressing need for empirically validated theories if our knowledge of the IT-enabled enterprise agility is to be advanced. In addition, most of the existing prescriptions for attaining IT-enabled enterprise agility tend to be abstract and do not offer specific indications for practical action. To illustrate, some of the antecedents of enterprise agility identified in the literature include broad theoretical constructs; such as the use of IT (Zain et al. 2005), digital options (Sambamurthy et al. 2003), scenario development, and incremental systems
implementation (Holmqvist and Pessi 2006), that can take on a limitless array of possible configurations and values. The sheer variety of possibilities embedded in the definition of these constructs strips them of the ability to generate meaningful and actionable indications for practice, without which the utility and interpretability of these prescriptions are limited.

Third, the overarching conceptual frameworks guiding research on IT-enabled enterprise agility are based on the precepts of traditional strategic management, which views the organization as a focused, tightly-coupled system and emphasizes internal organizational strengths and weaknesses as the key to business competition (Iansiti and Levien 2004a). Thus, the two primary means advocated in the existing literature for the attainment of enterprise agility are the internal organizational processes of IT capability development (Weill et al. 2002) and organizational learning from prior competitive actions (Sambamurthy et al. 2003). However, with the advent of the networked economy, there is a growing sense of recognition that the traditional way of thinking about strategy is becoming limited in its ability to explain superior performance against the ubiquitous backdrop of amorphous, unbounded and fluid business networks (Iansiti and Levien 2004a; Teece 2007). Consequently, a networked perspective of IT-enabled enterprise agility that accounts for the dynamics of collective strategy and collaborative innovation may be more appropriate and relevant to the growing reality of networked competition.

Collectively, (1) the “black box” treatment of the relationship between the adoption/diffusion of IT and enterprise agility, (2) the lack of empirical validation and abstract nature of existing prescriptions, as well as (3) the emphasis on internal organizational processes as the means for achieving enterprise agility in the extant literature indicate an inadequate understanding of how IT can facilitate enterprise agility for contemporary organizations engaged in networked competition. To address this knowledge gap, we begin with a review of the literature on business ecosystems, which is an appropriate starting point for our inquiry since the research stream is primarily concerned with mechanisms that promote enterprise agility (See Adner 2006; Teece 2007) as the means to superior performance for organizations operating in complex business networks.

**Business Ecosystems**

Business ecosystems research emerged as a response to the growing need for a new paradigm for strategizing, competing and innovating in the networked economy (Iansiti and Levien 2004a) and has its intellectual roots in theories of complexity (Stacey 1995) and organizational ecology (e.g. Hannan and Freeman 1977). Business ecosystems are networks of organizations that are held together through formal contracting and mutual dependency (Pierce 2009). The entities of a business ecosystem are structured around core firms, whose centrality is established on the basis of control over the dominant technological architecture or brand that structures value in the ecosystem, or other factors such as product characteristics or geography (Teece 2007). These entities include suppliers, producers and retailers that work in tandem to create value, as well as customers (Moore 1996) and producers of complementary products and services termed “complementors” (Teece 2007). Collectively, these entities comprise niche markets within the ecosystem, which are specialized functions tied to the core firm (Pierce 2009).

The development and subsequent leverage of a business ecosystem by a core firm can bring about a number of important benefits for the focal organization. These benefits include enhanced procurement processes, an optimized product mix, operational efficiency and enhanced information sharing (Iansiti and Levien 2004b). More pertinently, business ecosystems may give rise to enterprise agility by enhancing the organizational ability to sense and respond to market and technological opportunities (Teece 2007), and facilitating the co-creation of effective and timely innovations (Adner 2006). The process of ecosystem development in turn, is determined by two primary factors: The discrete organizational strategies of the core firm and the role it plays within the ecosystem (Iansiti and Levien 2004a).

**Core Firm Strategies**

Although a core firm is faced with a vast array of strategies to choose from, and the intricacies of each possible strategy is certainly beyond the scope of a single paper, the essence of the most prominent streams of contemporary strategic management thought can be distilled into three distinct logics (Lengnick-Hall and Wolff 1999). The three core logics of contemporary strategic management are summarized in the Table 1.

A core firm may pursue strategies aligned with the capability logic by leveraging firm-specific strategic resources and capabilities to create a unique value proposition (Barney 1991). This influences ecosystem development as the
unique value proposition can serve to attract new entities; such as customers, suppliers and complementors, into the ecosystem, and the entities in the ecosystem in turn, can coordinate value creation around the seed proposition of the core firm (Moore 1993). In addition, by protecting the value proposition from imitation, the core firm delineates the boundary of the ecosystem by defining a distinct identity, which serves as an entry barrier that controls membership in the ecosystem.

Table 1: The Three Core Logics of Contemporary Strategic Management (Lengnick-Hall and Wolff 1999)

<table>
<thead>
<tr>
<th>Capability Logic</th>
<th>Guerilla Logic</th>
<th>Complexity Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Representative Research Streams</strong></td>
<td><strong>Theory of Hypercompetition</strong> (D’Aveni 1994)</td>
<td><strong>Chaos Theory</strong> (Stacey 1995)</td>
</tr>
<tr>
<td><strong>Core Principles</strong></td>
<td><strong>Dynamic Capabilities Approach</strong> (Teece et al. 1997)</td>
<td><strong>Business Ecosystems</strong> (Iansiti and Levien 2004a)</td>
</tr>
<tr>
<td><strong>Key Prescriptions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Identify and exploit firm-specific strategic resources that are valuable, rare, inimitable and non-substitutable</td>
<td>• Develop dynamic capabilities that allow an organization to rapidly recombine existing assets and competencies to form new value propositions.</td>
<td>• Understand and manipulate the underlying forces and attractors that create order in the business ecosystem</td>
</tr>
<tr>
<td>• Leverage complementary resources that enhance the value creating potential of strategic resources</td>
<td>• Adopt aggressive measures to cause fundamental instability and create a unique and unconventional basis for competing</td>
<td>• Develop ecosystem capabilities (as opposed to self-serving, internal organizational capabilities) through direct intervention or providing the means for capability development across the network</td>
</tr>
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Conversely, a core firm may pursue strategies aligned with the guerilla logic by developing the vision, capabilities and tactics for causing market disruptions that allow the firm to rapidly innovate (D’Aveni 1994) or recombine existing assets and competencies to create a series of temporary competitive advantages (Eisenhardt and Martin 2000). With the core firm acting as the lead innovator, its actions influence ecosystem development by introducing a continuous stream of fresh ideas that promotes self-renewal and staves off obsolescence (Moore 1996). Moreover, continuous innovation by the core firm coerces the other entities in the ecosystem to adapt to the changes or exit the ecosystem (Pierce 2009). With successive iterations, the surviving entities develop the capabilities to adapt efficiently and effectively, which results in the development of an agile business ecosystem.

Finally, a core firm may pursue strategies aligned with the complexity logic by attempting to manipulate the underlying forces and attractors that create order in the business ecosystem; such as shared values, the collective vision, mechanisms of control and platforms for interaction (Stacey 1995), maintaining the ecosystem at the “edge of chaos” (Brown and Eisenhardt 1997) so that the ecosystem is primed for innovation and continuous change (Stacey 1995). Alternatively, the core firm may focus on helping the other entities in the ecosystem develop their capabilities through direct intervention, or providing the tools and interfaces for capability development (Iansiti and Levien 2004a). The result of these community-oriented measures is the development of a healthy business ecosystem characterized by symbiotic relationships, collective strategies and orchestrated actions (Lengnick-Hall and Wolff 1999).

**Ecosystem Roles**

In addition to its organizational strategies, the role that the core firm plays within the ecosystem also has profound implications for ecosystem development. Specifically, the core firm can choose to play the role of a keystone by providing benefits to the rest of the ecosystem so as to improve its own chances of survival (Iansiti and Levien 2004a; Iansiti and Levien 2004b). By taking on the role of a keystone, the core firm influences ecosystem development through three distinct mechanisms. First, the keystone may enhance ecosystem productivity by maintaining the population of the ecosystem within an optimum range, or connecting different nodes within the network, thereby decreasing the complexity of coordination and integration in value co-creation (Iansiti and Levien 2004a). Second, the keystone may facilitate ecosystem robustness by introducing a continuous stream of innovations and providing a reliable point of reference for other entities in the ecosystem. This serves to buffer the ecosystem from environmental shocks and help ecosystem members adapt to new and uncertain conditions. Third, the keystone
may encourage diversity within the ecosystem by offering new capabilities to an array of third-party organizations that enable them to participate meaningfully in the ecosystem (Iansiti and Levien 2004b).

Alternatively, the core firm can choose to play the role of a dominator by exploiting their centrality in the network to take control or extract value from the ecosystem. This influences ecosystem development in two possible ways. First, by expanding horizontally and vertically to control a large proportion of the business network, the dominator may become primarily responsible for value creation within the ecosystem, which stifles ecosystem development by leaving little room for diversity. Second, by draining the value created by other entities within the ecosystem from the network, the dominator may leave behind “a starved and unstable ecosystem” (Iansiti and Levien 2004a) that is unable to sustain itself, which may ultimately collapse and lead to the demise of these entities (Iansiti and Levien 2004b).

It is important to note that the ecosystem role of the core firm is distinct from the organizational strategies that it chooses to employ, which are primarily influenced by its independent business objectives. For example, although the role of a keystone is more commonly associated with the complexity logic (e.g. Lengnick-Hall and Wolff 1999), a keystone may use (1) the capability logic to control the population of the ecosystem for optimum productivity, (2) the guerilla logic to introduce a continuous stream of innovations that promotes ecosystem robustness, and (3) the complexity logic to manipulate capability development across the network that promotes meaningful diversity in the ecosystem. Likewise, a dominator may use (1) the capability logic to establish ownership and control over the ecosystem, (2) the guerilla logic to expand horizontally and vertically in the network, and (3) the complexity logic to manipulate the underlying forces and attractors to facilitate domination and value extraction (Iansiti and Levien 2004b; Moore 1996). This conceptual distinction is important to studying ecosystem development as the precise nature of the process can only be understood by examining both factors in tandem.

Overall, the literature on business ecosystems suggests that the development of DBEs may be the key to attaining enterprise agility for organizations operating in the networked economy. This is because business ecosystems can be leveraged to enhance the ability to sense and respond to market and technological opportunities (Adner 2006; Teece 2007), and the extent of coordination and integration required for entities engaged in intense networked competition can only be achieved using IT (Riggins and Rhee 1998). The process of DBE development is in turn, determined by the strategies of the focal organization and the role it plays within the ecosystem. Applying this body of knowledge as a theoretical lens to analyze the case of Alibaba, a process model of the development and leverage of a DBE is inductively derived to address the research questions set forth at the beginning of the paper.

**Research Methodology**

The case research methodology is particularly appropriate for this study for a number of reasons. First, our research questions are “how” questions (Walsham 1995) that delve into the process of developing and leveraging DBEs. Second, as both DBEs and IT-enabled enterprise agility are complex, multi-faceted phenomena that are inextricable from their organizational context (Pentland 1999), an objective approach to research may be difficult, making it more appropriate to examine the phenomenon by interpreting the shared understanding of the relevant stakeholders (Klein and Myers 1999).

Based on our research questions, two conditions formed the basis for case selection. First, the case organization selected for this study must have, of course, formed and nurtured a DBE and subsequently, leveraged it for the attainment of enterprise agility. Second, the development and leverage of its DBE should ideally be enacted in a variety of ways as this allows us to identify a wider range of possibilities for managing and leveraging DBEs. The case of Alibaba.com, a B2B e-commerce portal that hosts one of the largest, most diverse and vibrant DBEs in the world is particularly appropriate for our purpose as a variety of different means were used to facilitate the growth of its ecosystem and consequently, the attainment of enterprise agility.

Research access was negotiated and granted in June 2008, and a total of 31 interviews were conducted with the middle and top management of Alibaba and its subsidiaries, as well as the suppliers, retailers, merchants and individual users that constitute its ecosystem. As the organization and the entities that comprise its ecosystem are geographically dispersed, 11 of the interviews were conducted by email or instant messaging. The face-to-face interviews, which took an average of 90 minutes, were digitally recorded and later transcribed for data analysis. To allay any fear of speaking, every interviewee was assured of the confidentiality and anonymity of the data provided, especially when potentially sensitive information is sought (Walsham 2006). The interview questions were exploratory in nature, open-ended and tailored to the role of the person interviewed. Data from the interviews was
supplemented by newspaper articles, books, internal publications, and information from the corporate website. Notes from direct observation were also used to corroborate the data obtained.

Data analysis was performed in tandem with data collection to take advantage of the flexibility that the case research methodology affords (Eisenhardt 1989). Based on our review of the literature on business ecosystems, we identified an initial set of themes that were pertinent to ecosystem development. This set of themes formed our theoretical lens, which served as a “sensitizing device” (Klein and Myers 1999) to guide data collection. The data obtained from each interview was then organized and coded according to the set of themes. Each new finding was verified to ensure that it was supported by at least two sources of data (Klein and Myers 1999), and our theoretical lens was modified incrementally whenever new findings that challenged the existing schema emerged (Walsham 2006). Data analysis was then carried out by moving back and forth between empirical data, the theoretical lens, relevant literature and the emerging process model (Eisenhardt 1989).

We first used a combination of a temporal bracketing strategy, a narrative strategy, and a visual mapping strategy to organize the empirical data (Langley 1999). Based on the emerging data, we divided the events, activities and decisions that transpired at Alibaba into three distinct phases to facilitate the examination of ecosystem development in different contextual conditions. A detailed narrative and several visual maps that summarized our interpretation of what happened were then created to condense the voluminous amount of data into a more manageable form. Next, the narrative and the visual maps were compared with the theoretical lens and the relevant literature to shape our emerging theoretical ideas. These theoretical ideas were then captured in various diagrammatic sketches and these sketches, together with the narrative and the visual maps, were verified with the relevant stakeholders at Alibaba to validate our interpretation of the data and the emerging process model. This process continued until the state of theoretical saturation is reached; where it was possible to comprehensively explain the findings of the case study and no additional data can be collected, developed or added to improve the developed model (Eisenhardt 1989).

Case Description

Organizational Background

According to the latest statistics from the web traffic tracking agency Compete, Alibaba is one of the world’s largest B2B e-commerce portals with over 2.6 million unique visitors per month. Alibaba’s business centers on providing a trading platform that connects international buyers to millions of small-medium enterprises (SMEs) in China that supply a kaleidoscopic array of products, ranging from agricultural products to aircraft parts. But since its inception, Alibaba has diversified into a wide range of businesses ranging from a consumer-to-consumer (C2C) online auction website (Taobao), an Internet portal (Yahoo China), an online review website for lifestyle products and services (Koubei), and an online advertising trading platform (Alimama). Incidentally, according to the web traffic tracking agency Alexa, these spin-offs, together with Alibaba, are all among the top 100 most popular websites in China, a considerable achievement that belies Alibaba’s humble origins.

The initial manifestation of Alibaba was ChinaPages.com. Launched in April 1995, ChinaPages was a small e-business that provided website development and indexing services to local enterprises. At the time, there were no commercial Internet service providers in China and the general population was unaware of the existence of the Internet. Yet, led by Jack Ma, the iconic founder of ChinaPages and later Alibaba, ChinaPages was able to convince many Chinese firms of the business potential of the Internet and subsequently, to engage its services. For approximately US$3,000, ChinaPages would translate the corporate and product information of their clients into English and send the translation to collaborators in the US who would develop and launch websites based on the information. And as commercial internet access became available over time, ChinaPages developed the technical capabilities required for website development and eventually, took over the role from their US collaborators as well.

In 1997, ChinaPages was merged with a local competitor but due to differences in strategic vision, Jack Ma and eight members of the core development team left the organization. Because of their experience in e-commerce, they were eventually roped in by the Chinese government to develop ChinaMarket, an e-government portal for global firms to locate products, services and business opportunities in China. It was the experience of managing both ChinaPages and ChinaMarket that led to the realization that China’s enormous SME market would benefit immensely from the global exposure afforded by the Internet and back then, there were no B2B platforms that catered exclusively to Chinese SMEs as the costs of joining a B2B platform were prohibitive. With this critical
insight, Jack Ma and his core team left ChinaMarket and returned to Hangzhou with the dream of establishing a B2B e-commerce portal that connected the hundreds of thousands of Chinese SMEs to the world. This led to the founding of Alibaba in March 1999 and at the time, Alibaba was operating out of Jack Ma’s apartment and the entire development team drew a salary of only US$73 a month. Yet, within a short span of 9 years, Alibaba has become a publicly listed multi-national corporation with over 10,000 employees worldwide and an annual revenue of US$207 million. Alibaba’s vibrant and populous DBE was cited by numerous informants as the primary driver of enterprise agility, which in turn, was crucial to its phenomenal success. To illustrate, a senior executive at Alibaba attested to the integral role of its DBE:

“Our ecosystem is the key to our success... We have a close relationship with our (ecosystem) members ... we know their needs and we are able to meet their needs quickly and effectively... this strengthens our members and enables them to contribute to the collective good... It is a virtuous cycle. When the ecosystem prospers, everyone (within the ecosystem) prospers...”

Informed by our review of the literature on business ecosystems, we narrowed the focus of our inquiry to three pertinent themes: (1) the antecedents of ecosystem development – manifested in the strategies and ecosystem role of Alibaba, (2) the nature of ecosystem development, and (3) the consequences of ecosystem development – centered on the facilitation of enterprise agility. From the emergent data, it became readily apparent that Alibaba underwent three distinct phases; adopting different strategies and ecosystem roles in each phase that resulted in different forms of ecosystem development, with correspondingly distinct implications for enterprise agility. Accordingly, we organize the presentation of our data according to the temporal sequence of the phases in the subsections that follow.

Leveraging Firm-Specific Resources and Capabilities (1999-2004)

In the first phase from 1999 to 2004, Alibaba’s business objectives were centered on establishing itself as the de facto platform for B2B e-commerce in China. Competitive imitation was rampant in the rapidly developing Chinese e-commerce industry then, and Alibaba had to act quickly to preempt potential competitors from imitating its business model. Accordingly, Alibaba enacted a number of strategies that were broadly aligned with three strategic thrusts. First, Alibaba took advantage of its unique insight of the unmet needs of Chinese SMEs and structured value creation towards meeting those needs. Second, Alibaba exploited its superior technical capabilities, developed from its experience in operating ChinaPages and ChinaMarket, to differentiate itself from the existing B2B portals in China (e.g. HC360, EasyTrade). Third, Alibaba leveraged its intimate knowledge of local SMEs and incorporated the nuances of Chinese business practices into its transactional processes to differentiate itself from the global B2B portals (e.g. allactiontrade, eceurope, MFGTrade). The collective consequence of these strategic thrusts is a unique value proposition targeted at fulfilling the needs of the immense SME market, which served to attract many Chinese SMEs to join Alibaba’s business ecosystem.

In addition, as many of the SMEs lacked the technical capabilities to go online, Alibaba took on the role of a service provider within the ecosystem, helping to collate, organize, publish and promote the corporate and product information of their members on their website. This enabled the SMEs to participate meaningfully in the ecosystem and consequently, benefit from the ubiquitous exposure afforded by the Internet. By providing a unique value proposition and lowering the barriers of participation, Alibaba was able to attract a myriad of SMEs to attain self-sustaining critical mass, and entrench itself at the center of value creation within the DBE. Its centrality in the network, in turn, enhanced Alibaba’s ability to sense its customers’ needs as Alibaba was able to collect feedback directly from the other entities within the ecosystem. Moreover, as Alibaba’s organizational actions were enacted at the center of the network, its actions impacted the entire business ecosystem concurrently, which enabled a quicker response to its customers’ needs. The key organizational strategies and ecosystem role adopted by Alibaba, the nature of ecosystem development, and the underlying mechanism though ecosystem development facilitated enterprise agility in Phase 1 are summarized in Table 2.

Acquiring New Organizational Capabilities (2005-2006)

Having established a firm dominance over the Chinese B2B e-commerce market, Alibaba began to realize that the biggest threat to its business came not from the existing B2B e-commerce portals, but rather from massive Internet portals such as Baidu and Google. This is because global firms looking for products, services and business opportunities from Chinese partners; and vice versa, can potentially find them by searching on these Internet portals, disintermediating Alibaba from the process of transaction. Consequently, Alibaba began to move in a new strategic
direction in 2005. The new strategic direction was characterized by the aggressive acquisition of new organizational capabilities in preparation for the inevitable conflict with the Internet portals in the near future.

<table>
<thead>
<tr>
<th>Table 2: How Alibaba’s Ecosystem was Developed and Leveraged in Phase 1 (1999-2004)</th>
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<tr>
<td><strong>Key Organizational Strategies</strong></td>
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<tr>
<td>Leverage unique insight of unmet needs in Chinese SME Market</td>
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<tr>
<td>Exploit superior technical capabilities developed from prior experience</td>
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<tr>
<td>Took advantage of its intimate knowledge of Chinese business practices</td>
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<tr>
<td><strong>Ecosystem Role</strong></td>
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<tr>
<td>Service Provider</td>
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<tr>
<td><strong>Nature of Ecosystem Development</strong></td>
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<tr>
<td>Development of a self-sustaining DBE with Alibaba at the core</td>
</tr>
<tr>
<td><strong>Consequences of Ecosystem Development</strong></td>
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<tr>
<td>Enhanced sense-and-response capabilities</td>
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First, Alibaba acquired search engine capabilities with the acquisition of Yahoo China in October 2005. The strategic intent behind the acquisition is to create a business-oriented search engine and isolate the members of its DBE from Internet portals such as Google or Baidu. To date, most of the information published on the Alibaba network can no longer be accessed by third-party search engines. Second, in October 2006, Alibaba acquired Koubei.com, one of the most popular online portals for the review of lifestyle products and services, such as restaurants, hair salons, and hotels. Alibaba’s management felt that the acquisition of Koubei would strengthen the sense of community within the ecosystem by enabling its members to “work, spend and play” on Alibaba, and facilitate greater interaction between ecosystem members by encouraging them to spend more time on the Alibaba network.

In addition, with exponential increases in the size of the ecosystem each year – Alibaba had over 10 million registered members by 2005, and as ecosystem members became more experienced and savvy in the use of Internet technologies, it became neither feasible nor necessary for Alibaba to continue providing “hands-on” services for its ecosystem members. Relinquishing its “hands-on” approach was potentially problematic as Alibaba could run the risk of disintermediation. But eventually, Alibaba’s role in the ecosystem evolved into that of a platform provider, creating value by supplying the mechanisms for ecosystem members to exchange information, interact and transact with each other, instead of involving itself directly in these activities.

By acquiring Yahoo China, Alibaba was able to demarcate the boundaries of the DBE and consolidate its position at the center of the ecosystem. In addition, by acquiring Koubei and taking on the backend role of a platform provider, thereby relinquishing direct control over its ecosystem members, Alibaba enabled richer and more frequent interactions between members, which facilitated the formation of informal, autonomous networks within the ecosystem. This in turn, enhanced enterprise agility as Alibaba was able to move beyond simply sensing and responding to expressed customer needs, to monitoring and analyzing the interactions between its members to anticipate and predict future and unexpressed needs. The key strategies and ecosystem role of Alibaba, the nature of
ecosystem development, and the underlying mechanism though ecosystem development enhanced enterprise agility in Phase 2 are summarized in Table 3.

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<tr>
<th>Table 3: How Alibaba’s Ecosystem was Developed and Leveraged in Phase 2 (2005-2006)</th>
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<tbody>
<tr>
<td><strong>Key Organizational Strategies</strong></td>
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<tr>
<td><strong>Acquisition of search engine capabilities (Yahoo China)</strong></td>
</tr>
<tr>
<td><strong>Acquisition of community building capabilities (Koubei)</strong></td>
</tr>
<tr>
<td><strong>Platform Provider</strong></td>
</tr>
</tbody>
</table>

**Nature of Ecosystem Development**

| **Formation of networks within the ecosystem as a result of enhanced interaction between ecosystem members** | “By integrating the largest and most vibrant lifestyle portal in China (Koubei) with the advanced Internet capabilities, large user base and global search capabilities of Yahoo (China), we are able to advance in terms of volume, convenience, trustworthiness and stickiness. In addition, both Yahoo (China) and Koubei encourage interactions and the formation of bonds between our members, helping the SMEs and individual users on our network to live, grow, develop and create leading-edge networks (between themselves)” – Communications Manager of Yahoo Koubei |

**Consequences of Ecosystem Development**

| **Ability to predict and anticipate customer needs** | “The development of Alibaba (acquisition of Yahoo China and Koubei) emerged spontaneously and was not the result of systematic planning... By allowing our members to interact with one another and form their own networks, we can collect data on their interactions and transactions, analyze the data to detect patterns or opportunities, and share our results with the entire organization.” – VP of Research and Training |

**Developing Ecosystem Capabilities (2007-Present)**

The capability acquisition/development strategies of Alibaba led to performance gains that outstripped all initial expectations. Between 2005 and 2006, Alibaba registered an 88.1% increase in revenue, an astounding 212% increase in net profits, and an 80.1% growth in terms of the number of registered members. The phenomenal success of the strategies of this phase made Alibaba’s management more keenly aware of the advantages of an organic, self-organizing ecosystem. Soon after, an ecosystem-oriented mentality took hold within the collective organizational consciousness and provided the foundation for a new strategic direction that began in 2007.

The new strategic direction is manifested in the enactment of two key organizational strategies. First, at the start of 2007, Alibaba launched Aliloan, an initiative in partnership with the Industrial and Commercial Bank of China and the China Construction Bank to help SMEs with limited assets or credit history secure financing for business expansion based on their transaction histories and credibility ratings at Alibaba. Second, in November 2007, Alibaba launched Alimama, a trading platform for online advertising space to enhance the ecosystem capability for online marketing and generating online advertising revenue. The overarching objective of these strategies is to foster a healthy DBE by enhancing the organizational capabilities of the other entities in its ecosystem. In doing so, ecosystem members are able to contribute more to networked value creation, which enhances the overall competitiveness of the ecosystem and benefits Alibaba in the long run.

Moreover, driven by the new ecosystem-oriented mentality, Alibaba’s role within the ecosystem evolved into that of a utility computing service provider (see Carr 2008; Ross and Westerman 2004) with the launch of Alisoft in January 2007. Alisoft is an online software portal based on a Software as a Service (SaaS) model. The purpose of Alisoft is to develop and provide its ecosystem members with a comprehensive suite of low cost, user-friendly web-based enterprise applications to meet their business IT needs. With its new strategies and ecosystem role, Alibaba was able to foster symbiotic relationships between entities; including itself, within the ecosystem, and channel the resources and actions of individual entities towards the shared objectives of the ecosystem. In this spirit of symbiosis, ecosystem members were engaged in the co-production of innovations, which gives rise to an advanced form of enterprise agility as the innovations are developed and tailor-made for the customers of Alibaba by the customers themselves. The key organizational strategies and ecosystem role adopted by Alibaba, the nature of
ecosystem development, and the underlying mechanism though ecosystem development facilitated enterprise agility in Phase 3 are summarized in Table 4.

<p>| Table 4: How Alibaba’s Ecosystem was Developed and Leveraged in Phase 3 (2007-Present) |</p>
<table>
<thead>
<tr>
<th>Key Organizational Strategies</th>
<th>Nature of Ecosystem Development</th>
<th>Consequences of Ecosystem Development</th>
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<tbody>
<tr>
<td>Enhance ecosystem business expansion capabilities (Aliloan)</td>
<td>“Alibaba has kept a comprehensive record of all our members’ transactions for many years. We can use this to track how the money is used before, during, and after the loan to minimize the costs of filtering the credit-worthy enterprises for the banks… Aliloan is especially important in helping SMEs grow their business as it is difficult for them to obtain loans through conventional channels, and they cannot provide mortgages or guarantees” – Alibaba Senior Executive</td>
<td>“By providing services and opportunities to the ‘bit players’ in our ecosystem, they attract more ‘bit players’ into the ecosystem… With a very large volume of these small players working synergistically for the collective good of the ecosystem, Alibaba’s profitability increases, and we have more resources to invest in enhancing our service platforms… This virtuous cycle results in a healthy ecosystem that is beneficial for all ecosystem members.” – VP of Operations</td>
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<tr>
<td>Enhance ecosystem capability for online marketing and generating online advertising revenue (Alimama)</td>
<td>“After opening a web store, many of Alibaba’s members, especially the larger establishments and the ‘power sellers’ on Taobao have two needs: To promote their store; which implies the need to buy advertisement space, and to sell advertisement space. (They will ask) ‘Can I convert my web traffic into revenue?’ Our existing services didn’t cater to their needs… This led to the launch of Alimama (an online advertising trading platform)... Alimama is different from Google’s or Baidu’s advertising programs. It is based on a whole new model” – Alimama Senior Manager</td>
<td>“Alimama is different from Google’s or Baidu’s advertising programs. It is based on a whole new model” – Alimama Senior Manager</td>
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<tr>
<td>Utility Computing Service Provider</td>
<td>“Alibaba provides everything an e-merchant needs to run a business. We provide the platform… (as well as) applications and online tools (on Alisoft), allowing them to start their business easily with minimal capital investment. It’s like in a village… we have dug the well for everyone… Our business users can use our various platforms to gain access to the SaaS services they need, and they are charged according to usage… We hope to provide for all their needs, such that all anyone needs is a computer to become an e-merchant – Alisoft Senior Manager</td>
<td>“After opening a web store, many of Alibaba’s members, especially the larger establishments and the ‘power sellers’ on Taobao have two needs: To promote their store; which implies the need to buy advertisement space, and to sell advertisement space. (They will ask) ‘Can I convert my web traffic into revenue?’ Our existing services didn’t cater to their needs… This led to the launch of Alimama (an online advertising trading platform)... Alimama is different from Google’s or Baidu’s advertising programs. It is based on a whole new model” – Alimama Senior Manager</td>
</tr>
<tr>
<td>Formation of symbiotic relationships between ecosystem members</td>
<td>“By providing services and opportunities to the ‘bit players’ in our ecosystem, they attract more ‘bit players’ into the ecosystem… With a very large volume of these small players working synergistically for the collective good of the ecosystem, Alibaba’s profitability increases, and we have more resources to invest in enhancing our service platforms… This virtuous cycle results in a healthy ecosystem that is beneficial for all ecosystem members.” – VP of Operations</td>
<td>“By providing services and opportunities to the ‘bit players’ in our ecosystem, they attract more ‘bit players’ into the ecosystem… With a very large volume of these small players working synergistically for the collective good of the ecosystem, Alibaba’s profitability increases, and we have more resources to invest in enhancing our service platforms… This virtuous cycle results in a healthy ecosystem that is beneficial for all ecosystem members.” – VP of Operations</td>
</tr>
<tr>
<td>Co-production of innovations</td>
<td>“Many third-party applications developers joined our ecosystem to develop software for Alisoft… Some of our B2B and C2C members used the open-source platform to develop their own applications. These applications include VOIP applications, video conferencing software, wireless telephony applications, website management systems, electronic ID services, and many others… The applications are all available on Alisoft. Alisoft is like a software supermarket, and our users can pick and choose the applications they need.” – Alibaba Senior Executive</td>
<td>“Many third-party applications developers joined our ecosystem to develop software for Alisoft… Some of our B2B and C2C members used the open-source platform to develop their own applications. These applications include VOIP applications, video conferencing software, wireless telephony applications, website management systems, electronic ID services, and many others… The applications are all available on Alisoft. Alisoft is like a software supermarket, and our users can pick and choose the applications they need.” – Alibaba Senior Executive</td>
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**Discussion**

By integrating the different patterns in which Alibaba’s DBE was developed and leveraged across the three distinct phases, a process model of how a DBE can be developed and leveraged for enterprise agility (refer to Figure 1) can be inductively derived. As our model suggests, the development and subsequent leverage of a DBE for enterprise agility is an evolutionary process that can be decomposed into three distinct phases. Given that our model is inductively derived from the Alibaba case study data, the following stream of reporting provides an explanation of how the existing literature corroborates our model and how the model enriches the existing perspectives of IT-enabled enterprise agility.

**Phase 1: Establishing Centrality and Attaining Critical Mass**

At the time of its inception, Alibaba’s strategies were aligned with the capability logic in that it leveraged firm-specific resources and capabilities such as (1) its unique insight of the unmet needs of Chinese SMEs, (2) its superior technical capabilities, and (3) its intimate knowledge of Chinese business practices to create a unique value proposition (Barney 1991). Specifically, by catering to the needs of the large SME market, and differentiating itself from local and global B2B portals, Alibaba was able to attract a large number of ecosystem members, establish its identity as the de facto B2B platform for business opportunities in China, and structure ecosystem value creation around its vision of connecting global buyers to a vast supplier network of Chinese SMEs. In addition, Alibaba was aware that many of the Chinese SMEs at the time lacked the technical capabilities to publish their trade-related information online. By taking on the ecosystem role of a keystone service provider and involving itself directly in collating the necessary information published on various electronic BBSs, publishing the relevant information on its website, facilitating access to the information by organizing the information and providing navigational tools, and promoting the information on other websites for international trade, Alibaba enabled many Chinese SMEs to
overcome their technical limitations, participate in the ecosystem, and subsequently, benefit from the global exposure afforded by the Internet.

<table>
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<tr>
<th>Phase 1: Establishing Centrality and Attaining Critical Mass</th>
<th>Phase 2: Nurturing Internal Networks and Fortifying Ecosystem Boundaries</th>
<th>Phase 3: Fostering Syntactics</th>
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<tr>
<td>Capability Logic: Leverage from specific strategic resources and capabilities to create a need value proposition</td>
<td>Guerilla Logic: Development of innovations and new capabilities that enhance internal interactions and minimize external interactions to disrupt the basis of competition for existing and potential competitors</td>
<td>Complexity Logic: Develop ecosystem capabilities to foster symbiotic relationships between entities in a healthy business ecosystem</td>
</tr>
<tr>
<td>Ecosystem Role: Keystone - Service Provider: Lower the barriers of membership by facilitating meaningful participation through direct services.</td>
<td>Keystone - Platform Provider: Create value for the badged by providing the platform for autonomous interactions and transactions.</td>
<td>Keystone - Utility Computing Service Provider: Expand badged role by providing a comprehensive suite of enterprise applications and online tools, and charging for them based on usage</td>
</tr>
<tr>
<td>Hub-and-Spoke Ecosystem</td>
<td>Networked Ecosystem</td>
<td>Symbiotic Ecosystem</td>
</tr>
<tr>
<td>By creating a unique value proposition with its strategies and lowering the barriers of participation with its role as a keystone service provider, an organization can attract and retain ecosystem members to attain critical mass and establish itself in the center of ecosystem value creation.</td>
<td>Enhanced capabilities for internal interactions and role as a keystone platform provider facilitates the formation of informal, loosely-coupled networks within the ecosystem. Minimizing external interactions fortifies the boundaries of the ecosystem.</td>
<td>By enhancing the capabilities of the ecosystem and functioning as a keystone utility computing service provider, the entire ecosystem functions as a single entity, utilizing communal resources and capabilities, working towards the shared objectives of the ecosystem.</td>
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<tr>
<th>Sense-and-Respond Agility</th>
<th>Predictive Agility</th>
<th>Collective Agility</th>
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<tr>
<td>By establishing itself at the center of the ecosystem, ecosystem members can provide direct feedback to the organization on their needs. Responses to feedback from ecosystem members occur at the center of the business ecosystem and benefit all members simultaneously.</td>
<td>The organization can not only react to direct, expressed feedback from its members, but can monitor and analyze the interactions between members to anticipate or predict future and unexpressed needs as well.</td>
<td>Ecosystem members may engage in the co-production of innovations, which ensures that organizations are able to innovate quickly and effectively, since innovations are tailored for ecosystem members by the members themselves.</td>
</tr>
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</table>

**Figure 1: Process Model of the Development and Leverage of a DBE**

Based on these findings, our model suggests that the focal organization, with the ability and motivation to be a core firm, should (1) pursue strategies aligned with a capability logic and (2) adopt the ecosystem role of a keystone service provider in the initial phase of DBE development. By enacting strategies aligned with a capability logic, the organization is able to structure ecosystem value creation around its unique value proposition, attract new ecosystem members, and define a distinct identity that delineates the boundary of the ecosystem (Moore 1996). Moreover, by adopting the ecosystem role of a keystone service provider, the focal organization “shares value” (Iansiti and Levien 2004a) with the entire ecosystem by providing direct services that lower the barriers of ecosystem membership, which in turn, enables a larger pool of entities to participate in the ecosystem.

Through these mechanisms, the focal organization can establish itself at the center of ecosystem value creation. Centrality enables the organization to effectively influence the development of the DBE and subsequently, leverage the DBE for the attainment of enterprise agility (Koka and Prescott 2008; Pierce 2009). Moreover, by lowering the barriers of participation, and supporting the attraction of new ecosystem members, these mechanisms enable the DBE to attain self-sustaining critical mass. Critical mass is particularly important in the initial phase of DBE development as it (1) is the key enabler of effective collective action (Hargrave and van de Ven 2006; Oliver et al. 1985), and (2) facilitates the attraction and retention of ecosystem members (Moore 1996), which is important because in networked competition, network entities tend to be highly mobile unless barriers to switching have been instituted (Pierce 2009).

The attainment of network centrality and critical mass gives rise to the formation of a hub-and-spoke ecosystem and positions the focal organization as a core firm at the center of the network. The hub-and-spoke ecosystem in turn, can be leveraged for a basic “sense-and-respond” type of enterprise agility (Overby et al. 2006) through two distinct mechanisms. First, the hub-and-spoke network configuration enhances the sensing capabilities of the core firm as its immediate ties with the other entities in the ecosystem enable the firm to solicit direct feedback, providing it with critical information on the needs of these members (Koka and Prescott 2008). Second, the centrality of the core firm in the ecosystem enhances its ability to respond to detected needs as similar entities within the ecosystem tend to
have similar needs, and organizational actions taken in response to the expressed needs of a small subset of members may effectively benefit all entities within the ecosystem concurrently (Blyler and Coff 2003).

Phase 2: Nurturing Internal Networks and Fortifying Ecosystem Boundaries

In the second phase of ecosystem development, Alibaba’s strategies were aligned with the guerilla logic in that they were centered on the acquisition/development of search engine (i.e. Yahoo China) and community building (i.e. Koubei) capabilities; self-serving, internal organizational capabilities meant to disrupt the basis of business competition for existing (i.e. B2B portals) and future (i.e. Internet portals/search engines) competitors (D’Aveni 1994; Teece et al. 1997). By augmenting search engine capabilities to their organizational repertoire, Alibaba was able to enhance interactivity within the ecosystem by allowing members to search for and form relationships with one another, and restrict external access to the information of its ecosystem members. Similarly, with the acquisition of community building capabilities, Alibaba was able to strengthen the sense of community among its ecosystem members, which served to enhance interactivity by encouraging them to “work, spend and play” on the Alibaba network. Moreover, as a result of the rapid growth of its business ecosystem, Alibaba was forced to relinquish its role as a “hands-on” service provider and take on the role of a keystone platform provider, sharing value with the ecosystem by providing the backend platform for information-sharing, interactions and transactions. By relinquishing direct control over its ecosystem members, interactivity within the ecosystem was further enhanced as frequent, rich and autonomous interactions between ecosystem entities were made possible.

Grounded in the empirical data, our model suggests that following the attainment of network centrality and critical mass, in the next phase of ecosystem development, the core firm should (1) pursue strategies aligned with a guerilla logic, with a particular emphasis on acquiring/developing capabilities that enhance internal interactions within the ecosystem and minimize external interactions with entities outside the ecosystem, and (2) adopt the ecosystem role of a keystone platform provider. By acquiring/developing capabilities that enhance internal interactions and adopting the ecosystem role of a keystone platform provider, the core firm can provide opportunities for ecosystem members to exchange diverse information and knowledge that enable the creation of unique value (Koka and Prescott 2008), enhance the coordination of their activities to strengthen ecosystem value creation, and increase the commitment of its members to the ecosystem (Holm et al. 1999). These mechanisms, in turn, facilitate the formation of informal, autonomous networks within the ecosystem, which can compete with one another for prominence in the ecosystem “in an escalating game of dueling paradigms” (Moore 1996), and result in continuous innovation and diversity in ecosystem value creation. In addition, with the acquisition/development of capabilities that minimizes external interactions with entities outside the ecosystem, the core firm is able fortify the boundaries of the ecosystem by establishing barriers that prevent its network resources from leaking into the external environment. This serves to protect the competitive advantage of the ecosystem from the competitive actions of rival business networks (Dyer and Harbir 1998).

The formation of informal, autonomous networks between ecosystem entities and the fortification of ecosystem boundaries leads to the development of a networked ecosystem. The networked ecosystem in turn, can be leveraged for an advanced, “predictive” form of enterprise agility. This is because the core firm, which manages the platform for internal interactions in its capacity as a keystone platform provider, is able to move beyond sensing and responding reactively to the existing and expressed needs of its members, to monitoring and analyzing the interactions between its members to anticipate future and unexpressed needs, and subsequently, respond proactively to those needs (Chandra and Kumar 2001).

Phase 3: Fostering Symbiosis

The phenomenal success that resulted from granting its members autonomy in forming informal networks provided Alibaba’s management with an indication of the potential benefits of an organic, self-organizing ecosystem. Consequently, influenced by a new ecosystem-oriented mentality that was rapidly taking hold across the organization, the strategies enacted by Alibaba in the third phase of ecosystem development were centered on the development of ecosystem capabilities meant for the benefit of its members that conferred little or no direct benefits on Alibaba itself. These strategies, aligned with the complexity logic (Iansiti and Levien 2004a; Lengnick-Hall and Wolff 1999), include the development of capabilities for business expansion (i.e. Aliloan), online marketing and online advertising revenue generation (i.e. Alimama) for its ecosystem members. In addition, in line with the new ecosystem-oriented mentality, Alibaba’s role within the ecosystem evolved from a backend platform provider into a
utility computing service provider (Carr 2008; Ross and Westerman 2004) as it expanded its backend role to provide a comprehensive suite of applications and online tools that catered to its members’ every need (i.e. Alisoft). The strategic intent underlying Alibaba’s strategies and its new ecosystem role was to strengthen their members and enable them to contribute more to networked value creation. In doing so, Alibaba was able to foster symbiotic relationships between its members and itself, and channel the resources and actions of disparate ecosystem entities towards the collective good that enhanced the health and overall competitiveness of the business ecosystem.

Based on the case data, our model suggests that when ecosystem development is at an advanced stage, the core firm should (1) pursue strategies aligned with a complexity logic and (2) adopt the ecosystem role of a keystone utility computing service provider. The enactment of strategies aligned with a complexity logic leads to a number of important consequences. First, by providing the means of capability development for the other entities in the ecosystem, there is increased mutual interdependence between the core firm and the other entities, which enhances ecosystem value creation (Holm et al. 1999) and serves as the foundation for stability, productivity and creativity in the ecosystem (Iansiti and Levien 2004a). Second, by strengthening the organizational capabilities of the other entities in the ecosystem, the core firm enhances its goodwill and social relations with the other entities in the ecosystem, which provide the opportunity, motivation and ability for solidarity and collective action (Adler and Kwon 2002). Third, by facilitating ecosystem capability development and becoming more valuable to the other entities, the core firm simultaneously gains power and control within the ecosystem, and enables greater diversity in ecosystem value creation. This results in conflicting forces that simultaneously pulls the ecosystem towards stability and instability, positioning the ecosystem at the “edge of chaos” (Brown and Eisenhardt 1997) that primes the ecosystem for innovation and continuous change (Stacey 1995). In addition, by adopting the role of a keystone utility computing service provider, the core firm lowers the costs of IT, provides on-demand IT capacity, and more importantly, enhance the strategic focus of their ecosystem members by enabling them to concentrate on their core competencies (Ross and Westerman 2004).

By increasing mutual interdependence, creating the conditions for solidarity and collective action, priming the ecosystem for innovation and continuous change, and enhancing the strategic focus of its ecosystem members, a “co-evolving, symbiotic, self-reinforcing system of strategic contributions” is formed (Moore 1996) that gives rise to a symbiotic ecosystem. As the entire ecosystem functions as a single entity, utilizing communal resources and capabilities towards the shared objectives of the ecosystem, individual ecosystem entities may be engaged in the co-production of innovations (Lengnick-Hall 1996), which precipitates a “collective” form of enterprise agility. Relative to the two previous forms of enterprise agility, collective agility facilitates an even faster and more effective response to the needs of ecosystem members. This is because collective agility (1) invalidates the need to sense or anticipate those needs, (2) enables the concurrent development of a near-infinite range of personalized innovations, and (3) provides the strongest assurances that the innovations pursued are in line with its members needs (Tan et al. 2009), since the innovations are tailor-made for ecosystem members by the members themselves.

**Conclusion**

**Limitations and Future Research**

This article is not without its limitations. Although studies based on the single case research methodology is a “typical and legitimate endeavor” in qualitative research (Lee and Baskerville 2003), a particular criticism that is commonly directed at these studies is the problem of generalizability or external validity (Walsham 2006). While it must be readily acknowledged that statistical generalization is impossible from a single case study, we nevertheless contend that our study is generalizable beyond its singular context as our process model is not only grounded in the empirical reality of our case study, but is corroborated by the theoretical propositions of some of the most established works in management and organizational literature. As such, this study invokes the principles of “analytic generalization” (Yin 2003) or what Lee and Baskerville (2003, p.235) refers to as “generalizing from description to theory”. Nevertheless, future research can be directed at statistically validating the propositions of this study, so that the boundary conditions of our process model can be better defined.

A second limitation of our study concerns the retrospective nature of the interviews conducted as the primary means of data collection. The disadvantage of retrospective responses is that they are susceptible to errors of recall (Glick et al. 1990). Yet, given that our account of the events, decisions and activities that unfolded at Alibaba spanned a period of nine years, it must be acknowledged that a synchronous approach to data collection is impossible. We have
however, tried to circumscribe this problem by only having informants who were personally involved in the process of DBE development during the relevant period of interest (Pan et al. 2007). Further, we adopted a systematic data verification procedure to ensure that all the information we used were triangulated by at least two sources of data (Klein and Myers 1999).

**Theoretical and Practical Implications**

By addressing the research questions set forth at the beginning of this paper, this study makes several important theoretical contributions. First, by examining how IT-enabled enterprise agility was attained through the development and leverage of a DBE at Alibaba, this study contributes to a networked perspective of IT-enabled enterprise agility and provides important indications for firms operating in the pervasive context of complex business networks. In doing so, this study complements the existing perspectives that emphasize internal organizational processes such as the development of IT capabilities (e.g. Weill et al. 2002) and organizational learning (e.g. Sambamurthy et al. 2003) as the means of achieving enterprise agility, and contributes to a more holistic perspective of IT-enabled enterprise agility.

Second, by examining how the strategies of an organization influences the development of a specific IT artifact (i.e. a DBE) and how the IT artifact is subsequently leveraged for enterprise agility, this study sheds light on how the use of IT can be aligned with the strategies of an organization and opens the “black box” of the relationship between the adoption of IT and enterprise agility (e.g. Donnellan and Kelly 2005; Hovorka and Larsen 2006). Moreover, in reiterating the importance of technology-strategy alignment (Porter 2001; Powell and Dent-Micalel 1997), this article urges for a thorough consideration of business objectives in future research on agile IT adoption/ diffusion practices, and suggests the need to look beyond a monolithic set of agile adoption practices to specific practices that are most appropriate for bringing the strategic objectives of an organization to fruition.

Third, of the prescriptions for attaining enterprise agility through the use of IT in the literature, most of them have either not been empirically validated (e.g. Overby et al. 2006; Seo and La Paz 2008) or are too abstract to offer specific indications for practical action (Holmqvist and Pessi 2006; Zain et al. 2005). By explaining how specific combinations of organizational strategies and ecosystem roles contribute to the development of various forms of DBEs, and how each form of DBE can be leveraged for enterprise agility, the process model developed in this article advances the state of existing knowledge by providing specific and testable propositions for attaining IT-enabled enterprise agility that are grounded in the empirical reality of a real world organization.

Finally, this study also makes two significant contributions to the literature on business ecosystems. First, although previous studies have identified a number of antecedents for ecosystem development (e.g. Iansiti and Levien 2004b; Moore 1993), our review of the literature has failed to identify a single process model that provides a description and explanation of the dynamics of ecosystem development. The process model developed in this article is thus an important contribution, as it not only describes the necessary conditions for successful ecosystem development, but structures them in a step-by-step “recipe that strings (the conditions) together in such a way as to tell the story of how (the outcome) occurs whenever it does occur” (Mohr 1982). Second, while prior research have suggested that business ecosystems can facilitate enterprise agility by enhancing the organizational ability to sense and respond to market and technological opportunities (Teece 2007), and facilitating the co-creation of effective and timely innovations (Adner 2006), this study advances the state of knowledge by making a conceptual distinction between the different forms of ecosystems and providing detailed explanations of the underlying mechanisms through which each form of ecosystem gives rise to enterprise agility.

In terms of implications for practice, this study is significant in that it provides a comprehensive and empirically supported framework for the development and subsequent leverage of a DBE. More specifically, the process model developed in this article has identified the crucial drivers of DBE development, and provided important indications on how different types of DBEs can be leveraged for different levels of enterprise agility. Moreover, in tracing the antecedents, nature and implications of DBE development from its initial formation to maturity, this study should be useful for practitioners managing DBEs in varying stages of development. In particular, it is hoped that practitioners who face difficulty in advancing the development of their ecosystems or leveraging their ecosystems for tangible gains can use the process model as a detailed roadmap to identify the appropriate remedial actions, so that they can make the most of the efforts and resources invested in managing their DBEs, and exploit their fullest potential.
References


