Value creation in web services: An integrative model

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Abstract

Web services are redefining the way organizations exchange business-critical information internally and externally with customers, suppliers, and other business associates. In this paper, we develop an integrative model for understanding value creation in web services from a provider’s perspective. The model integrates the static representation of conventional business values with the fluidity of the emergent IT services domain. It captures the complexity and contradictions facing Web services providers in their drive towards market leadership, strategic differentiation and revenue generation from web services. The model comprises twelve propositions to guide our understanding and future research and practice in this increasingly important segment in the IT field.

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1. Introduction

Gaining competitive advantage from IT is an ongoing challenge to firms (Luftman, 1996; Luftman and McLean, 2004). The recent rise and decline of the dot.com era reinforced this challenge, as the belief that e-business models would lead to competitive advantage (Amit and Zott, 2001), saw the creation of numerous start-up firms, with only a handful surviving the dot.com crash (Cassidy, 2002). Like many past ‘silver bullet’
technologies, web services is described by the IT industry as a new paradigm for business computing, as customers increasingly migrate towards a services oriented architecture (SOA). Yet for web services providers to create value for their customers in a sustainable manner, they must learn the lessons from past business failures and develop business models using conventional key performance indicators rather than only focusing upon advertising campaigns to develop a new brand (Cassidy, 2002).

Web services offer to transform traditional vertical firms into networked firms through the integration of disparate external and internal IT systems. A web services-based SOA allows organizations to exploit legacy and new technology in a loosely-coupled environment enabling agility and flexibility to adapt technologies to changing market and business dynamics (Hagel, 2002). Unlike the monolithic systems of forty years ago, which were inflexible and resistant to changing market and business dynamics, the SOA moves organizational IT from a tightly-coupled systems architecture to a loosely-coupled one, where integration of software applications plays a key role (Vidgen et al., 2004). This innovative architecture offers new opportunities for web services providers to offer customers business benefits through system integration and outsourcing.

As web services represent the next phase in software-as-a-service (Currie et al., 2004a), the focus on web services providers is critical to the development of the SOA. Prior to web services\(^2\), application service providers (ASPs) failed to deliver the seamless deployment of software applications over the Internet with numerous ASPs going out of business within only two years\(^3\). We contend that, contrary to the hype which surrounded the first phase of the dot.com and ASP market\(^4\) (Cassidy, 2002), web services providers will need to embrace the lessons from traditional businesses if they are to survive in this dynamic and fast-moving market.

In this paper, we develop an integrative model of value creation in web services\(^5\). We adopt a vendor perspective using the business model as the main unit of analysis (Amit and Zott, 2001). We suggest that web services providers need to develop their business models to achieve market leadership, strategic differentiation and revenue generation.

\(^2\) Definitions of web services vary. According to Gartner (Smith, 2001, p.1) ‘web services are software components that can interact with one another dynamically via standard Internet technologies, making it possible for enterprises to build bridges between IT systems that otherwise would require extensive development efforts’. The key difference between a traditional web application and a web service is that the information returned can be easily integrated into an internet/intranet server or desktop application. Unlike web services, which focus upon the infrastructure as well as the applications, ASPs are firms that, ‘manage and deliver application capabilities to multiple entities from data centers across a wide area network’ (Currie, 2004).

\(^3\) In this paper, we are concerned with service providers, which offer software-as-a-service. The distinction between ASP and web services therefore becomes blurred as both types of service provider engage in this activity. In the first phase of the ASP model, ASPs were generally described as firms, which offered software applications to customers priced on a subscription-based model. The majority of ASPs failed by 2001. More recently, web services providers also offer software-as-a-service, but this model also incorporates the broader aspects of IT infrastructure, and standards (i.e. UDDI, WSDL, etc.).

\(^4\) During this period (1999–2001) the focus of dot.coms was to achieve first mover advantage and brand development, often at the expense of customer satisfaction, revenue generation and profitability.

\(^5\) Research funding was obtained from the engineering and physical sciences research council (EPSRC) for a study on ‘assessing the benefits and risks of business critical information systems using application services providers; and from the economic and social research council (ESRC) for ‘a study on vertical and horizontal ASP business models’. Industrial collaborators included: cable and wireless a-services™; netstore (a leading European ASP); Ernst and Young; ICI chemicals; KW International; Keystone; Fullard Learning and DCS.com.
From an in-depth review of three inter-related literature sources, we identify several underlying factors affecting these three key success factors in the web services industry. We recognize there is considerable overlap between them, yet it is important to delineate them for critical inquiry.

The paper is structured as follows. First we explore the theoretical underpinnings of our proposed model for value creation from web services providers. Second, we develop our model integrating strategic choices, business leveraging and competitive advantage for web services providers. Third, we present and discuss several research propositions based on the model. Finally, we conclude with a call for longitudinal and process-oriented research based upon the theoretical and practical contributions of the paper.

2. Theoretical underpinnings

Value creation from emerging technology and services is a complex phenomenon. It involves simultaneous presence and inter-working of various endogenous and exogenous business factors. In this paper, we discuss theoretical contributions from three inter-related literature sources to frame our proposed conceptualization of value creation from web services providers. The contribution of this paper is to develop a richer, more holistic, and contextualized view, which synthesizes cross-disciplinary work from the fields of strategic management, e-business and IT management. We believe that much of the prior work on emerging technologies has focused upon either a market or firm level of analysis, often failing to recognize the symbiotic relationship, which exists between the two levels.

First, the strategic management literature offers a rich and diverse body of knowledge on how firms position themselves to enhance their competitive strategies for gaining market leadership (Porter, 1980; 1991). Complementing industry analysis, the resource-based view (RBV) offers insights on how a firm can achieve and sustain a competitive advantage by configuring its tangible and intangible assets to make it difficult or impossible to imitate perfectly, or by developing capabilities that are not easily transferred or replicated (Barney, 1986; 1991; Mata et al., 1995; Rumelt, 1984; Wernerfelt, 1984). Similarly, dynamic capabilities are a set of specific and identifiable processes, which distinguish a firm to become important to customers (Eisenhardt, 1989; Eisenhardt and Martin, 2000).

Second, the e-business literature provides a useful backdrop for analyzing the business model as the unit of analysis (Amit and Zott, 2001; Mahadevan, 2000). By deconstructing e-business models into their component parts, it is possible to identify their unique sources of value creation (Weill and Vitale, 2001). A precursor to web services was the ASP model which emerged during the late 1990s⁶, which focused upon delivering software applications as a hosted service, priced on a pay-as-you-go model (Kern et al., 2002). ASPs were largely firms, which deployed, hosted and managed software applications for their customers using the Internet or wide-area-network (WAN) (Wainewright, 2002). ASPs expanded rapidly during the dot.com boom, with many different, yet, mainly commodity-type application service offerings (Currie and Seltsikas, 2001). A comparative analysis of different IT vendor business models can help delineate their benefits, limitations, and implications (Rao and Parikh, 2003). The e-Business literature shows how e-business models change

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⁶ The first phase of the ASP market, was, in part, largely unsuccessful because the SOA was not developed to effectively host software applications (Hagel and Seely-Brown, 2001). Web services aim to resolve many of these problems with the support of large industry players like Microsoft, IBM and Sun Microsystems.
over time (Mahadevan, 2000; Weill and Vitale, 2001), with the ASP model gaining new significance with the emergence of web services in the space of just three years (Currie et al., 2004b).

Third, the IT management literature demonstrates how firms can leverage business value from IT (Clemons, 1986; Clemons and Row, 1991). A relevant source is the IT outsourcing literature, which draws distinctions between traditional forms depicting a one–one client/supplier relationship, and applications outsourcing, where suppliers utilize the Internet to deploy web-enabled software applications to firms using a one-to-many delivery model (Currie and Seltsikas, 2001; Kern et al., 2002). This literature stream further identifies and analyses how firms gain enhanced productivity and profitability from IT investments, with many studies focusing upon the perennial problem of the productivity-paradox (Hitt and Brynjolfsson, 1996; Weill, 1992).

Overall, the literature on strategic management (SM), e-business (e-Biz) and IT management (ITM), offers rich and insightful perspectives and observations for conceptualizing the sources of value creation from the business models of web services providers. Through a synthesis of the three literature sources (Fig. 1), we identify three important success factors of superior firm performance in the IT services sector. Market leadership, strategic differentiation, and revenue generation are among the three most important for firm competitiveness and survival. The key sources are given in Appendix A. We suggest that the interplay of these three constructs is critical for understanding value creation in web services.

Notwithstanding the optimism surrounding the dot.com era, few e-business firms achieved market leadership despite venture capital backing of $11.2 billion for 2123 start-ups in 1996 alone (Cassidy, 2002, p. 240). ASPs like Corio, US-Internetworking and Trizetto started with so much promise, yet experienced difficulties in the technology downturn. Whereas Corio and US-Internetworking focused largely on offering hosted-ERP solutions to customers from diverse industries, Trizetto saw itself as an industry-specific ASP offering. The logic of these two positions was either to offer commodity-based solutions to a wide range of customers or, offer customized solutions to fewer customers within a single industry.

These firms realized that achieving market leadership was inextricably linked to their effectiveness in strategically differentiating their products/services. Most ASPs offered commodity-type software applications (i.e. email, travel and expenses and office suites). Yet the one-to-many model of software delivery simply resulted in same-for-all (Currie et al., 2004b), as undifferentiated products and services proved unviable for building a sustainable e-business model (Weill and Vitale, 2001). To generate revenues to guarantee firm survival, customers had to be convinced that software-as-a-service as opposed to a product offering was an attractive value proposition with identifiable business benefits. This proved to be a major challenge for service providers (Carr, 2003).

So, against a background of numerous e-business failures, web services providers need to craft their strategies to achieve market leadership, strategic differentiation and revenue generation. They need to satisfy customer expectations recognizing the complex interplay between offering high cost, customized products and services against low cost,
undifferentiated alternatives. A deeper understanding of the determinants of these firm performance indicators, enable web services providers to prioritize the strategic choices available to them and take appropriate strategic decisions. We present our integrative model of value creation for web services in the next section.

3. Development of the theoretical model

3.1. Market leadership

Technical innovations, changes in cost structures and relationships, evolving consumer needs, and new products and services which lead to a viable business opportunity are continuously forming new industries and reforming the existing ones (Porter, 1980). The convergence of the software, computing and telecommunications industries is highly fragmented and piecemeal in nature (Coltman et al., 2001). Firms in these industries have
attempted to develop a unique strategic position in the emerging e-business market, but few firms have significant market share to enable them to influence industry outcomes. Many firms are small-and medium enterprises, each trying to differentiate their products and services to achieve leadership in a high velocity market (Eisenhardt and Martin, 2000). The overriding characteristic of this dynamic environment is the absence of market leaders with the ability to shape industry events. This is further complicated by the convergence between telecommunications and software, with market leaders like AT and T and BT entering the web services space from the former, and Microsoft and Sun Microsystems from the latter. Coupled with this, firms like Amazon (an on-line retailer) and eBay (an online auctioneer) are also using web services. Web services providers will therefore need to focus on how they can achieve market leadership in this nascent industry.

One strategy for achieving and sustaining market leadership is through partnerships and alliances, which enable firms to increase their market reach to co-opt customers or suppliers within their value stream activities (Henderson, 1990; Koza and Lewin, 2000; Sambamurthy et al., 2003). The formation of co-operative ventures is premised on expectations of gaining competitive advantage for all firms. Profitability is largely a function of positioning, and a strategy of cooperation may enable alliance partners to achieve a stronger positioning together than in isolation (Hamel, 1991). In fragmented industries like software, computing and telecommunications, firms are faced with many strategic choices and decisions in relation to market positioning and product/service portfolios (Armstrong and Hagel, 1996, p.139). Two challenging questions for web services providers are: How large is the potential customer market? How intense is the competition likely to be?

For web services providers, the trend for entering into partnerships and alliances is borne of necessity, as start-up firms offering a range of semi-customized and commodity products and services must align with infrastructure firms (telecoms and datacentres) to deliver an end-to-end solution (Currie and Seltsikas, 2001). Unless a web services firm creates pre-emptive capabilities and develops a defensible position through relationships and trust with partners, an early follower can build on its complementary assets and dislocate the firm from its early lead market position (Coltman et al., 2001). The success of these partnerships and alliances is variable, depending upon the perceived importance of, and commitment to, the relationship by each firm (Kern et al., 2002).

3.2. Strategic differentiation

Fragmented industries are characterized by a wide variety of products and services that reflect the diversity of firms (Porter, 1980). This contributes to a lack of consensus over customer requirements (Weill and Vitale, 2001). Standardization during growth and maturity phases increases product uniformity, with the result that a product may evolve toward commodity status unless firms develop new dimensions for differentiation (Grant, 1995; Carr, 2003). A feature of increasing commodity status is that buyers select primarily on price. Web services providers offering simple commodity software applications need to build a large customer base to generate enough revenues to survive (Patnayakuni and Seth, 2001). The failure of numerous dot.coms demonstrates that gaining a sufficient customer base with commodity products and services is difficult, suggesting that strategic differentiation is imperative (Seely-Brown et al., 2002).

A useful theoretical lens for analyzing strategic differentiation is the resource-based view (RBV) of the firm (Barney, 1986; Wernerfelt, 1984). Central to RBV is that firms
compete on the basis of unique corporate resources that are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1986; 1991; Schulze, 1992). RBV postulates that firm resources include all assets, capabilities, organizational processes, firm attributes, information, and knowledge, which contribute to improving firm performance (Barney, 1991; Rumelt, 1984). Key to a firm’s competitive position is the ‘bundle’ of diverse assets and resources, rather than the particular product market combination (Dierickx and Cool, 1989). The resources needed to develop, refine and implement strategies are heterogeneously distributed across firms and that these firm differences remain stable over time (Barney, 1991).

While it is possible to delineate between tangible, intangible and personnel-based resources as specific units of analyses, a firm may develop competitive advantage by mixing or bundling resources to create organizational capabilities (Grant, 1991). Capabilities are the ability of a firm to assemble, integrate, and deploy valued resources, usually, in combination or co-presence (Bharadwaj, 2000). They are a set of business processes, which are ‘strategically understood’ by a firm, yet they may also be mutually exclusive, where choosing between them is the essence of strategy (Stalk et al., 1992).

Although firms can accumulate a large stock of valuable physical, organizational and human assets and resources, they may fail to develop useful capabilities and integration (Teece et al., 1997). Extending the RBV, dynamic capabilities offers insights into how firms leverage valuable resources to develop organizational capabilities to achieve and sustain a competitive advantage (Grant, 1991). Dynamic capabilities are the firm’s ability to integrate, build, and reconfigure internal and external competences for organizational and strategic routines in high velocity markets. They reflect how firms acquire competitive advantage considering their path dependencies and market positions and influence how firms develop, acquire, integrate and eliminate resources to create strategic value (Teece et al., 1997; Eisenhardt and Martin, 2000).

Strategic differentiation between firms is achieved through developing, mobilizing and deploying a complex mix of firm assets, resources and capabilities (Montealegre, 2002). This is further complicated where firms competing in fragmented industries collaborate with partners to develop strategies, methods, tools and techniques for maximizing the value of combinations of physical, human and organizational resources. RBV and dynamic capabilities help to explain why some firms with similar assets and resources achieve a competitive advantage compared with others that do not (Clemons, 1986; Clemons and Row, 1991). For example, studies on the software industry have shown that competitors may imitate investments in IT, suggesting that investments in IT, per se, do not guarantee competitive advantage (Carr, 2003; Clemons and Row, 1991; Mata et al., 1995). An important question is: How do web services firms leverage their investments in IT to create valuable and rare resources, which cannot easily be imitated or substituted by other firms? This is particularly relevant where IT resources are heterogeneously distributed across firms, resulting in different outcomes and levels of performance (Barney, 1991).

Complementing the RBV and dynamic capabilities, the core competencies thesis conceptualizes the firm as a portfolio of core competencies and disciplines which suggests that inter-firm competition, as opposed to inter-product competition, is concerned with the acquisition of skills (Hamel, 1991).

Web services providers create strategic differentiation by developing valuable assets, resources, capabilities and competencies, which are not easily imitated by rival firms (Swinarski et al., 2002). But the antecedent paths and positions will both help and inhibit
their efforts (Sambamurthy et al., 2003). Product/services portfolios of firms arise from R&D activities or through partnerships and alliances (Grant, 1991). Differentiation is obtained through exploiting these relationships by expanding customer choices; or through developing unique, valued added features built into products/services. In the first phase of the ASP market, most firms failed to achieve strategic differentiation as commodity-type offerings ignored the integration requirements of potential customers (Susarla et al., 2003). Web services are designed to resolve this problem, since integration is perceived as the critical ‘missing link’ between product/service portfolios and the ability of firms to obtain strategic differentiation.

Previously, the cost of integration has precluded many firms from undertaking this activity. With web services, 20 trading partners may use XML based protocols (WSDL, SOAP, UDDI) to expose their internal systems to the exchange located on the extranet. This enables each trading partner to invoke, through the extranet, the unique software functionality offered to the exchange by each of the other trading partners. Each piece of software functionality resides within the extranet as a ‘web service’ available for utilization by all trading partners.

Using web services standards alleviates the need to write custom APIs to accommodate each of the 20 different computing platforms. Instead of accommodating 20 different systems, each party compiles with one set of web services standards, thus reducing the cost of integrating with the trading exchange. The success with which web services providers enable their customers to reduce integration costs will significantly enhance their own strategic differentiation among competitor firms.

3.3. Revenue generation

The ubiquitous infrastructure of the Internet has produced a dynamic environment where increased industry competition, unstable partnering/alliances, a proliferation of commodity-type products and services, and confusing pricing models has resulted in poor revenue generation for web services providers (Currie et al., 2004b).

Like most markets, the e-business sector falls between two extremes of a spectrum. One extreme is perfect price discrimination, where suppliers extract the entire consumer surplus and markets are least effective. The second is perfect competition, where markets are most effective because the surplus in its entirety accrues to consumers (Grover and Ramanlal, 1999). Opposing motives of suppliers and customers suggest that most markets fall between these two extremes. The conflicting forces at play will determine the eventual market structure.

For example, commoditization enhances product substitutability and lower search costs permit price comparisons, which enhance market effectiveness. Conversely, information asymmetries between suppliers and customers, and cost differentials between them for acquiring information about products and prices, results in less effective markets (Grover and Ramanlal, 1999). In the latter case, some of the consumer surplus will be expropriated from customers, as suppliers devise pricing models based on decisions made within the corporate hierarchy rather than as a consequence of market forces. This situation sustains itself when there are inhibitors to pure competition, which presupposes that buyers can easily search for alternative suppliers and compare product offerings (Grover and Ramanlal, 1999).

Electronic communities largely create value in four distinctive ways: usage fees; content fees; advertising; and synergies (Armstrong and Hagel, 1996). First, e-business firms can
charge pay-per-use fees. An example is America Online. Second, users pay content fees for downloading material. An example is Wall Street Journal Online. Third, advertising may generate significant resources, especially on popular web sites such as Yahoo!. Fourth, firms may be in a position to take advantage of synergies with other parts of the business. For example, independent software vendors (ISVs) may save the cost of physically distributing new software or software upgrades. Web services firms embrace all versions of this model, although their primary source of value creation is in the pay-as-you-go model, as other forms, such as advertising, have proven not to be as profitable (Cassidy, 2002). An important question is: How can web services firms generate revenues from these four models?

Despite the vast investment by venture capital (VC) firms in start-up e-businesses, very few survived the dot.com shakeout (Hagel, 2002). Faced with an accelerated cash-burn (largely consumed by the costs of marketing and advertising, in an attempt to win market share and achieve strategic differentiation), the inability to attract second-round VC funding forced many e-business firms to close. The failure to generate revenues was a combination of poor market positioning, unattractive products and services, lack of cost control, and confusing pricing models (Cassidy, 2002).

E-business firms failed to obtain perfect price discrimination or perfect competition. On one hand, the proliferation of e-business vendors prevented them from extracting a customer surplus, particularly as products and services were largely undifferentiated (Swinarski et al., 2002). Also, the readily available products and services offered on a pay-as-you-go pricing model failed to convince customers they would enhance business value (Currie and Seltsikas, 2001).

3.4. Integration of Performance Indicators

Our theoretical discussion above highlighted three success factors of superior firm performance: market leadership, strategic differentiation and revenue generation and their determinants, market positioning; partnerships/alliances; products and services; integration; cost structure; and pricing models. In Table 1, we define these constructs as they

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<th>Construct</th>
<th>Definition</th>
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<tr>
<td>Market leadership</td>
<td>The ability of a web services provider to achieve market share-based leadership in the IT services industry.</td>
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<tr>
<td>Strategic differentiation</td>
<td>The ability of a web services provider to differentiate its own products/services from those offered by competitors.</td>
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<tr>
<td>Revenue generation</td>
<td>The ability of a web services provider to generate revenue for its long-term survival.</td>
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<tr>
<td>Market positioning</td>
<td>A Web services provider’s fit in a previously unexploited niche in the IT services industry.</td>
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<tr>
<td>Partnerships/alliances</td>
<td>The extent to which a web services provider develops relationships with ISVs and infrastructure providers.</td>
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<tr>
<td>Products/services</td>
<td>A Web services provider’s product and service offerings.</td>
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<tr>
<td>Integration</td>
<td>The extent to which a Web services provider is able to integrate IT applications through its own products/services.</td>
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<td>cost structure</td>
<td>A Web services provider’s fixed and variable costs in providing its products/services.</td>
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<tr>
<td>Pricing model</td>
<td>A Web services provider’s inherent ability to optimally price its products/services.</td>
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relate to the web services industry. In Fig. 2, we integrate these success factors and determinants into a theoretical model and discuss the complex interplay between them in the following section.

4. Discussion and propositions

4.1. Building market leadership

The logic of positioning demonstrates how superior firm performance is determined by the strategic position of the firm, and the extent to which it executes those positions through an integrated system of activities (Sambamurthy et al., 2003). The basic premise is that the firm has multiple options in positioning itself in the marketplace. Notwithstanding the antecedent paths and positions of the firm, which may enhance or inhibit its efforts to achieve market leadership, firms can strengthen their position through partnerships and alliances (Eisenhardt and Martin, 2000; Henderson, 1990; Koza and Lewin, 2000; Porter, 1980). Strategic partnerships are likely to arise when performing an activity with a partner is superior to performing the activity internally (Porter and Fuller, 1986).
Strategic positioning is relevant to our understanding of the evolutionary paths and positions of e-business firms. From the late 1990s to the present, many ASPs evolved from hosted software delivery firms to labeling themselves web services providers or software-as-a-service providers (Currie, 2004). This re-positioning is largely a re-labelling exercise as the acronym ASP became associated with e-business failure during the dot.com crash (Hagel, 2002). For example, firms like Salesforce.com, Netledger and Employease were all referred to as ASPs prior to 2002. Following the demise of numerous ASPs, they are now labeled as software-as-a-service providers.

The dynamic, yet fragmented marketplace in which web services providers compete is characterized by intense partnering and alliance activity, where firms jockey for position by entering into strategic relationships with a range of industry players (i.e. telecoms and networking firms; data center providers; independent software vendors; management consultancies; managed service providers, ASPs). What type of partnership and with whom they form partnerships depends on the market position of the firm. For large infrastructure providers, partnerships and alliances are sought to create a channel to market for the provision of software-as-a-service for new customer markets like SMEs (Weill and Vitale, 2001). For start-up ASPs or web services providers, partnerships and alliances may be critical where these firms lack the necessary IT infrastructure assets, resources and capabilities to provision their products and services.

Within the strategic management literature, the link between strategic positioning and partnerships/alliances is critical. It is no less relevant for our analysis of web services providers, since this particular business model must be understood within the context of the inter-relationship between many different stakeholders. Web services vendors will therefore need to consider the scale and scope of their partnerships/alliances. Therefore,

**Proposition 1a.** Stronger market positioning will strengthen the partnerships/alliances sought by the web services provider.

In fragmented industries, few market leaders emerge and any competitive advantage developed by a firm is often temporary and unsustainable (Porter, 1980; Rumelt, 1984). The important criteria for developing market leadership in the web services industry seem to be the ability to provision network-based applications and services as core business activities; demonstrate a substantial and active end-user customer base; have proven revenue generation streams; demonstrate innovation in online delivery of software-as-a-service; and be recognized leaders within the industry (ASPnews.com 2003). To achieve this, web services providers will need to work closely with web services ‘enablers’ who are likely to be leading software or infrastructure providers, such as BEA systems, Cisco

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9 ASPs have adopted two types of approaches to partnerships with infrastructure providers. USInternetworking tended to purchase datacentre technology, whereas Corio opted to outsource this facility to external providers. In recent years, firms like Cable and Wireless have acquired large infrastructure firms, i.e. Digital Island, as a means of strengthening its infrastructure business. For smaller, start-up ASPs or web services providers, it is unlikely that they will have the resources to acquire infrastructure technology, making partnerships through outsourcing the only option.

10 The distinction between web services ‘providers’ and web services ‘enablers’ is important. The ‘providers’ tend to be the firms, which focus more on the software applications, whereas the ‘enablers’ tend to be large infrastructure firms with datacentres etc. In this paper, we are more concerned with web services providers, as these firms tend to ‘own’ the customer relationship in the deployment of software-as-a-service. An interesting website gives the top twenty ‘providers’ and ‘enablers’. http://www.aspnews.com.
Systems, and Hewlett Packard. The latter already have a substantial and active customer base. Web services providers will need to develop partnerships with the ‘enablers’ for provisioning network-based applications and/or services to customers. The relationship between the two groups is synergistic as enablers search for new channels in the form of providers to develop new business opportunity.

From the fall-out of the ASP market, described by some as a ‘flawed e-business model’ (Hagel, 2002), research suggests that an inability to develop strong partnerships and alliances was at the root of many ASP failures. For example, Cable and Wireless a-Services™ in partnership with Microsoft and Compaq proved unsustainable, as each firm pursued a different agenda regarding the ASP model. Partnerships were key to many ASPs, particularly start-ups, so their selection of partners, particularly large software firms and infrastructure providers (i.e. enablers) was critical. Similarly, for web services providers offering software applications as undifferentiated commodity products, achieving market leadership without strong partnerships and alliances with leading industry players will be difficult[11]. As markets mature, consolidation through mergers, acquisitions and takeovers increases (Koza and Lewin, 2000). The longevity of web services providers will therefore depend upon their ability to develop viable and sustainable partnerships and alliances with leading industry players. Therefore,

Proposition 1b. Stronger partnerships/alliances will enhance the market leadership of the web services provider.

4.2. Developing strategic differentiation

In high velocity markets, products and services face accelerated obsolescence, resulting in the erosion of a firm’s competitive position. This dynamic and unstable situation means that the only real source of competitive advantage is the ability to detect and seize market opportunities and respond consistently to changing markets by offering new products and services to create additional business value (Peteraf, 1993; Sambamurthy et al., 2003). Market positioning of the firm determines how the firm can leverage its existing product/service mix to effectively enhance its product/service offerings by developing new products and services and discontinuing or revitalizing the old ones. A firm with a strategic market position can leverage its position to manage such product/services evolution on a continuous basis.

Web services providers also operate in an unpredictable and unstable environment. They need to be prepared to recognize that product and service lifecycles have become increasing time-compressed (Grant, 1995). Many e-business firms have undergone product and service initiation to apparent maturity within only a few years. Time-compression requires a radical rethink of market positioning and product and service portfolios (Cusumano and Yoffie, 1998). A web services provider has to constantly evaluate its market

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[11] Examples of successful firms are rare, though two firms are noteworthy. Concur.com which offers automated expense management solutions claims to be ‘The undisputed world leader in the field of automated expense management’ (www.concur.com). Similarly, Salesforce.com claims to be ‘The worldwide leader in on-demand customer relationship management (CRM) solutions’ (www.salesforce.com). While these firms claim market leadership through the superiority of their products and services, the risk of competition from larger industry players is significant.
position and leverage it to develop products and services that help in developing strategic differentiation. Therefore,

**Proposition 2a.** Stronger market positioning will enhance the products/services offered by the web services provider.

Many web services providers have entered into partnerships and alliances with large independent software vendors (ISVs) to become, self-styled enterprise ASPs. Examples are Blue Star, Corio and US-Internetworking. These firms offer network-based enterprise applications and services as their core business and enhance and develop resources and capabilities by working with leading ISVs. ISVs benefit by developing a new channel to market by converting their best-in-class software products into a software delivery service aimed at the SME market (Currie and Seltikas, 2001; Patnayakuni and Seth, 2001). ISVs such as Peoplesoft all partner with web services providers to extend their product and services portfolios, either on a one–one model (where customer data is hosted on a single server) or one–many model (where economies of scale are achieved through hosting customer data on shared servers). As web services providers face intense rivalry and time–market pressures, their ability to seize market opportunities with speed and surprise will influence their choice of partnerships and alliances with other industry players (Combs and Ketchen Jr, 1999; Sambamurthy et al., 2003). This, in turn, will influence the types of products and services offered to customers. Therefore,

**Proposition 2b.** Stronger partnerships/alliances will enhance the products/services offered by the web services provider

Enterprise ASPs partnering with tier-one ISVs seek to enhance their integration\textsuperscript{12} capabilities through a strategy of full service provisioning combining mission critical pre-integrated enterprise software with additional vertical solutions offered on a modular basis. (Vidgen et al., 2004). Customers derive value from a hosting model by eliminating costly integration development and efforts. A modular approach to infrastructure and applications deployment creates business value from scalable, end–end solutions. Web services enable a firm to connect its applications to any number of trading partners (Hagel, 2002).

Stronger alliances and closeness in partnership increase trust among the partners and lead to high degree of cooperation (Ring and Van de Ven, 1992). Large-scale implementation of ERP systems imposes tightly coupled partnerships and alliances between customer and supplier (Sumner, 2003). This situation may result in lock-in for the customer, as the cost of moving to alternative technology partners is too complex and costly to undertake. A strategy of enterprise ASPs and ISVs is to integrate existing customer ERP systems with web-hosted ERP modules. Strong alliances or partnerships with other complementary web services providers and technology partners facilitate such enhanced integration. Therefore,

\textsuperscript{12} The term integration carried multiple definitions. In this paper, we do not intend to use a tight definition because the integration attributes of web services are varied. For example, integration can mean simply linking disparate software applications across multiple geographical sites and environments. It may also include integrating legacy applications with web-enabled software applications, built using web services platforms (i.e. .NET and J2EE). Integration may also involve tightly-coupling web services within the same industry setting (i.e. investment banking). Firms therefore need to decide on their integration needs and understand how resources to enhance integration may impact positively or negatively upon other business activities.
Proposition 2c. Stronger partnerships/alliances will enhance the level of integration offered to customers by the web services provider.

Coupled with the forces at play between product and services portfolios and cost structures, the level of integration of software applications offered by web services providers is integral to creating business value for the customer (Currie et al., 2004a). Yet the complexity of software applications integration is a major challenge for web services providers (Hagel, 2002). Recent research indicates a requirement for ASPs to facilitate integration with the customer’s existing IT facility to achieve ‘superior performance delivery, emphasize rigorous enforcement of SLAs, and ensure that their application meets standards of software capability’. (Susarla et al., 2003, p. 111). Yet this is complicated by the issue of asset specificity, which refers to the degree to which firm software applications are specialized to the specific business processes. The greater the degree of asset specificity, the less likely a firm will enter into an outsourcing contract with a third party supplier. The less asset specific the software application, the more likely it will be outsourced at reduced risk to the firm (Nam et al., 1996).

Customers selecting a web services solution will base their decision on how asset specific their software applications are in relation to their external and internal business processes. A highly complex trading system in a financial services setting will impose significant integration challenges for web services providers compared with a simple travel and expenses software package. Despite claims that web services offer the potential to integrate systems across suppliers and customers, which has hitherto been less feasible than integrating internal systems, significant challenges remain. Unlike a point solution involving the integration of two applications, the integration of six applications is not a linear increase but an exponential one. This has been called the n-squared problem: a term that represents the growing costs of the complexity associated with integration (Hagel, 2002). A client must therefore select the types of products and services according to the integration demands imposed by its business processes. Web services providers, in turn, will therefore have to develop and offer products/services that enable levels of integration to meet the specific integration needs of their clients. A web services provider with a wide variety of products/services will be better positioned to provide higher levels of integration for clients with different integration needs. Thus,

Proposition 2d. Better products/services will enhance the level of integration offered by the Web services provider.

The tendency for fragmented industries is to produce products or services that are commodities or otherwise difficult to differentiate (Porter, 1980). In the first phase of the ASP market, start-up firms labeling themselves as ‘pure-play ASPs’ designed their business models to include only Internet-enabled products and services, thus excluding legacy applications from their remit (Currie and Seltsikas, 2001; Hagel, 2002). This proved unsustainable as potential customers could not see any additional value from the remote delivery of commodity-based products, unless they could be customized or integrated with their existing applications (Susarla et al., 2003).

Responding to the pitfalls of the ASP market, Web services providers seek to differentiate themselves through developing integrated product and service portfolios. Vertically-focused Web services providers acquire industry-specific knowledge and expertise about their target market, with many examples emerging in healthcare (i.e. Trizetto.com).
Strategic differentiation may emerge and re-emerge as software applications are combined and recombined into new commercial offerings. Web services providers with low integration capabilities may end up offering commodity products/services that are unlikely to enhance their strategic differentiation, unless they develop a strong brand image and achieve scale economies from commodity offerings. Therefore,

**Proposition 2e.** High level of integration will increase the strategic differentiation of the Web services provider.

### 4.3. Building and sustaining revenue generation

The costs incurred by Web services providers are inextricably linked with the types and numbers of products and services offered to their target customer market. Provisioning vanilla-ERP software to midsize customers through partnering with leading ISVs is likely to be on a revenue sharing basis (Kern et al., 2002). In the first wave of the ASP market, many ISVs preferred to sell software licences to ASPs, who would then re-sell them to the customer (SCN-Education-BV, 2000). This scenario greatly increased the cost structure incurred by the ASP, with many firms becoming economically unviable. More recently, for a Web services provider, the greater the number of products and services, the higher the operational costs incurred by the firm. Web services providers need to calculate the extent to which an expansion in product and service portfolio enhances their strategic differentiation among rivals firms; or alternatively simply imposes additional constraints on their internal cost structures (Joyce et al., 2004). This dilemma remains unresolved in many firms, as the complex interplay between product and service expansion and cost structure is further complicated in a dynamic and turbulent market (Brown and Eisenhardt, 1998). Therefore,

**Proposition 3a.** Enhanced products/services will increase the cost of the Web services provider.

Complexities surrounding integration, cost structures and pricing models are intensified by the necessity for Web services providers to partner with other business and technology providers. Such a complex scenario invariably plays out with one partner deciding to withdraw from the relationship as expected revenues fail to accrue (Grant, 1995). This may produce devastating effects for the most vulnerable partner; likely to be a start-up web services provider. The higher the integration need of a customer, the more partners involved in the customer project, and the higher the vulnerability and risk for the service provider. The cost of the Web services provider will have to absorb such risk.

Additionally, the higher the integration needs of a customer, the greater the complexity involved in the customer project. Such complexity often requires development of specific tools and plug-ins. Web services providers will have to offer such tools and plug-ins, which will affect their overall cost. Further cost burdens can be imposed by customers demanding additional business and IT services, such as customization, consultancy, training and security. An example is in the provision of enterprise software, where traditionally, the cost of implementation has often exceeded initial estimates (Shanks et al., 2003). Therefore,

**Proposition 3b.** High level of integration will increase the cost of the web services provider.
The subscription or rental pricing model engendered by the emergence of software as a delivery service rather than a product was enabled by the falling costs of IT connectivity where the Internet was the main delivery channel. Technology sector firms perceived vast opportunities for business development, particularly through offering SMEs business critical software applications, which had previously only been available to large firms (Hagel, 2002). Adopting a one–many service delivery model, the cost of offering new products and services to SMEs would be low, with the financial benefits shared between the vendor and customer through revenue generation and IT cost savings, respectively (Patnayakuni and Seth, 2001).

Despite the perceived business advantages inherent in the software-as-a-service or ‘utility computing’ business model, setting pricing models has proved to be complex and unpredictable (Currie et al., 2004b). The provision of enterprise software on a hosted delivery model proved particularly problematic. Customer demands for integration and customization offered little scope for transferring to a subscription-based model, if existing ERP systems could not be integrated with hosted software. Equally, undifferentiated software applications priced on a $20 per person, per month basis failed to generate sufficient revenues to ensure the survival of the vendor. Since, the software-as-a-service industry is premised on a perceived customer desire to pay for software applications on a rental pricing model (SCN-Education-BV, 2000), web services vendors need to develop their pricing models according to scale (the number of potential users) and scope (the type of software applications offered). They will have to consider the influence of integration on appropriate pricing model. However, matching prices with different levels of integration needs would be difficult. Additionally, as a client’s integration needs change, the pricing model will have to be flexible enough to accommodate such changes without significant costs to or loss of revenue for the web services provider. Therefore,

**Proposition 3c.** High level of integration will reduce the flexibility in the pricing model of the web services provider.

Potential customer benefits from Web services are: lower total cost of ownership (TCO); increased revenue through enhanced customer service and satisfaction; access to improved technical capability (infrastructure, applications, IT staff); unparalleled high levels of performance; reliability, availability and scalability (RAS) from hosted software applications; fast time–market; and improved quality of service (SCN-Education-BV, 2000). Applications outsourcing shares many characteristics of traditional outsourcing and comparisons identify similarities between benefits and risks (Kern et al., 2002). As in the case with large-scale ERP outsourcing, some web services deals involving traditional and hosted models requiring large-scale integration, multiple partners, long-term contracts, and complex service level agreements (SLAs) will inflate costs, both for the supplier and customer. Web services providers, like Enterprise ASPs offering ERP software applications, may also find that the increased cost structure of providing integrated solutions prevents them from using TCO and other cost models as a significant customer benefit criteria. These higher and often hidden costs will have to be recuperated from customer projects for the long-term survival of the web services provider. Web services providers will have to develop pricing model with various ways in which such costs can be recovered without overburdening individual customers. However, higher cost structures impose constraints on the flexibility in dynamically and competitively pricing products and services (Bakos, 1991). Therefore,
Proposition 3d. Higher cost structure will reduce the flexibility in the pricing model of the Web services provider.

The fallout of dot coms revealed faulty e-business models with limited scope for generating medium or even short-term revenue streams (Weill and Vitale, 2001). The hype surrounding the benefits from Internet based software was not shared among potential customers, many of which distrusted a remote delivery model (Currie et al., 2004b; Susarla et al., 2003). A serious shortcoming of the first wave of the ASP market was the failure of vendors to recognize that provisioning customized products and services at prices close to the maximum customers were willing to pay was critical for revenue generation (Grover and Ramanlal, 1999). Their pricing models did not offer the flexibility to accommodate varying numbers of customers. The one–many model of remote software delivery was largely a same-for-all model, where commodity software products and services returned low economic rents and no surplus value for the vendor.

The complex interplay between buyer price sensitivity and buyer bargaining power are important considerations (Porter, 1980). The extent to which buyers are sensitive to pricing models depends on four main factors. First, the higher the cost of a product or service as a proportion of total cost, the more sensitive buyers will be about the pricing model. Second, the less differentiated the product or service of the supplier, the more willing the buyer is to switch suppliers on the basis of price. Third, the greater the competition among sellers, the more buyers will demand price reductions. Fourth, the relative importance of the industry’s product or service to the quality of the buyer’s product or service, the less sensitive buyers are to the pricing models.

The Internet enables agility and flexibility to adjust pricing models depending upon supply and demand (Bakos and Brynjolfsson, 1993). Within the Web services market, a dilemma was apparent. While the proliferation of undifferentiated, commodity products and services kept prices low, this resulted in poor revenue generation for Web services providers. Yet enhancing product and service offerings through higher levels of customization increased revenues but led to fewer customers. Web services providers therefore recognized the need for price flexibility since, this was critical in a highly dynamic and turbulence industry sector with low barriers to entry. Therefore, 

Proposition 3e. Higher flexibility in the pricing model will increase the revenue generation by the Web services provider.

4.4. Conflict in the value creation

In the model, we outline the interplay between the constructs based on theory and our observation of the web services industry. However, we do recognize that these relationships between constructs are not constant and may change under some conditions or in the presence of other overriding influential factors. We would like to point out some of the obvious conflicts as a limitation of the application of the model.

Partnerships and alliances are to enhance market leadership, products/services, and the level of integration offered by a web services provider. This should not be interpreted in terms of the numbers of partnerships/alliances. Attempts to engage with too many partners without strategic market positioning are fraught with risk, which may result in weak
and/or unviable partnerships, leading to business failure (Cassidy, 2002). A web services provider should identify key industry players that relate with the niche, whether it is a vertical market (e.g. health-care or financial services) or a functional application (e.g. customer relationship management or inventory management), in which the provider operates.

Second, products/services offered by a web services provider affect its ability to offer integration to its customers. Better products/services that fit with its niche are likely to enhance the level of integration. However, they would force the provider to incur additional expenses in development compared to generic, commoditized products/services. This increases the cost structure of the provider and reduces its ability to change prices and in turn profitability. A web service provider would have to carefully develop products/services portfolio to balance the integration needs of its customer with its own cost structure.

Another source of conflict is between market leadership and strategic differentiation, and revenue generation. The model indicates that factors that enhance market leadership and strategic differentiation may negatively influence revenue generation. For example, Integration would enhance strategic differentiation. However, it reduces flexibility in pricing model, which in turn may reduce the ability of the provider to generate revenue necessary for its long-term survival. Balancing these factors to achieve an optimal level of value creation would be a key challenge for web services providers.

5. Conclusion

Despite the optimism surrounding e-business, the failure of numerous start-up ventures and new business development initiatives in established firms, has led to attempts at delineating the critical success factors of different forms of e-business (Weill and Vitale, 2001). The purpose of this paper has been to revisit three influential and converging streams of literature to guide our theorizing on value creation from the web services model. The strategic management literature is a rich body of knowledge, which embraces the industrial organizational view, which argues that industry factors are the primary determinants of firm performance (Porter, 2001); while the RBV and dynamic capabilities perspectives argue that the firm’s internal environment drives competitive advantage (Grant, 1995). In the context of the web services business model, as the unit of analysis (Amit and Zott, 2001; Mahadevan, 2000), an industry analysis is critical for understanding the market positioning of firms in fragmented and high velocity environments. In parallel, how a web services firm acquires, develops and bundles assets and resources to create dynamic capabilities to compete with rivals is equally relevant to our analysis.

The e-business literature further offers insights into the scale and scope of different e-business models. The determinants of market leadership, strategic differentiation and revenue generation will vary across different e-business models. Firm strategies for outsourcing also frame our conceptualization, as the software-as-a-service delivery model potentially offers new application outsourcing challenges for managers. However, our analysis points up similarities in the risks and rewards between traditional and remote forms (Currie et al., 2004b).
We suggest that a generic model is a useful starting position for understanding the complex interplay between relevant constructs out of which more focused research studies may be designed. We recognize the inherent complexities and contradictions in the model, particularly as decision choices may result in both positive and negative impacts.

By focusing upon a critical vendor’s perspective, which has been under-researched in IS research (Levina and Ross, 2003), we suggest that achieving competitive advantage from the provision of emerging technologies is a complex and challenging activity, and not one which can be easily understood by focusing upon a narrow perspective of the technical attributes of web services. Future research may therefore involve longitudinal process-oriented studies of how web services providers develop and alter their business models to compete in dynamic and fast changing markets; the relationship between partnering and value creation; the role of strategic differentiation in developing web services offerings; and sustainable revenue generation through bundling web services, among others.

By drawing from multiple literature streams, we dispel popular arguments that the Internet or dot.com phenomenon represents the ‘new’ economy, where traditional (old economy) market and firm performance indicators can be revised or eliminated. As we have shown through our generic model, web services providers need to develop strategies for market leadership, strategic differentiation, and revenue generation. The pre-requisites for building brand identity and competitive position involve the complex interplay between six determinants of firm performance: market positioning; partnerships/alliances; products/services; integration; cost structure; and pricing models. The importance of these inter-relationships depends on the type of e-business model; with start-up web services providers needing to establish partnerships and alliances; and infrastructure or enabler firms seeking to maximize economic rents through extending their channels to market.

As web services providers evolve, the accent on customization and integration will be germane to their survival, as customers seek ways to integrate new software applications (whether remotely delivered or otherwise) with existing (legacy) ones. The proposed model for web services can be applied to other IT services and e-business models, and firm performance and capabilities more generally. By synthesizing theories and concepts from the three literature streams, we suggest that web services providers need to apply traditional performance criteria, such as market leadership, strategic differentiation and revenue generation rather than seek new criteria, which may be of little value to themselves and their customers (Cassidy, 2002).

By focusing upon the emerging IT artifact of web services, the paper presents deeper, theory-based insights into how vendors may offer software-as-a-service to potential customers. We suggest that our integrative model offers researchers a more complex and detailed framework from which to understand and analyze the value creating potential of web services. The 12 propositions articulated can, individually or in a cluster, be further investigated for additional insights and empirical support. Additionally, future studies can empirically evaluate the interplay of the constructs related to each of the three superior firm performance indicators. Finally, we suggest that a holistic approach offers a richer picture through the combination of an industry level analysis with an organizational level analysis.
Appendix A

The key sources in the development of the theoretical model.

<table>
<thead>
<tr>
<th>Key theories and concepts</th>
<th>Strategic Management literature</th>
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</thead>
<tbody>
<tr>
<td>Building competitive advantage in fragmented industries</td>
<td>(Porter, 1980, 2001)</td>
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<tr>
<td>High velocity markets</td>
<td>(Eisenhardt and Martin, 2000)</td>
</tr>
<tr>
<td>Managing partnerships/alliances</td>
<td>(Koza and Lewin, 2000)</td>
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<tr>
<td>Collaboration with competitors</td>
<td>(Hamel, 1991)</td>
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<td>Resource mix (bundling) to create value, rarity, imitability, non-substitutability</td>
<td>(Barney, 1986; Barney, 1991; Grant, 1995; Mata et al., 1995; Rumelt, 1984; Wernerfelt, 1984)</td>
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<tr>
<td>Creating and building dynamic capabilities</td>
<td>(Eisenhardt and Martin, 2000; Teece et al., 1997)</td>
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<tr>
<td>Focus on core competencies</td>
<td>(Hamel, 1991)</td>
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<tr>
<td>Coevolving to create synergies</td>
<td>(Eisenhardt, 1989)</td>
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<tr>
<td>Key theories and concepts</td>
<td>E-Business literature</td>
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<tr>
<td>Building blocks of e-business</td>
<td>(Afuah and Tucci, 2001; Weill and Vitale, 2001)</td>
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<tr>
<td>Value creation in e-business</td>
<td>(Amit and Zott, 2001; Rayport and Sviokla, 1996)</td>
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<td>Business model comparisons</td>
<td>(Rao and Parikh, 2003)</td>
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<tr>
<td>Business models for the Internet economy</td>
<td>(Mahadevan, 2000)</td>
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<tr>
<td>ASP business models</td>
<td>(Currie et al., 2004; Kern et al., 2002; Susarla et al., 2003)</td>
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<tr>
<td>Atomic e-business models</td>
<td>(Weill and Vitale, 2001)</td>
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<td>Evolutionary characteristics of e-business</td>
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<td>Key theories and concepts</td>
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<td>IS partnerships</td>
<td>(Henderson, 1990)</td>
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<td>Market reach</td>
<td>(Venkatraman and Henderson, 1998)</td>
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<tr>
<td>Integration of IT</td>
<td>(Susarla et al., 2003)</td>
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<tr>
<td>Leveraging IT infrastructure</td>
<td>(Weill and Broadbent, 1998)</td>
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<tr>
<td>Agility and flexibility</td>
<td>(Sambamurthy et al., 2003)</td>
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<tr>
<td>Measuring business value from IT</td>
<td>(Armstrong and Hagel, 1996)</td>
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<tr>
<td>IT productivity and profitability</td>
<td>(Hitt and Brynjolfsson, 1996; Weill, 1992)</td>
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<tr>
<td>Price discrimination and perfect competition</td>
<td>(Grover and Ramanlal, 1999)</td>
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<tr>
<td>Utility’ pricing models from applications outsourcing (ASP and web services)</td>
<td>(Currie and Seltsikas, 2001; Kern et al., 2002)</td>
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<tr>
<td>IT-enabled competitive advantage</td>
<td>(Clemons, 1986; Clemons and Row, 1991; Feeny and Ives, 1990)</td>
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References


