Achieving competitive capabilities in e-services

Pedro Oliveira*, Aleda V. Roth1, Wendell Gilland2

Operations, Technology, and Innovation Management Area, Kenan–Flagler Business School, The University of North Carolina at Chapel Hill, McColl Building, CB#3490, Chapel Hill, NC 27599-3490, USA

Received 23 June 2001; received in revised form 14 October 2001; accepted 5 November 2001

Abstract

What implications does the Internet have for service operations strategy? How can business performance of e-service companies be improved in today’s knowledge-based economy? These research questions are the subject of this paper. We propose a model that links the e-service company’s knowledge-based competencies with their competitive capabilities. Drawing from the current literature, our analysis suggests that services that strategically build a portfolio of knowledge-based competencies, namely human capital, structural capital, and absorptive capacity have more operations-based options, than their counterparts who are less apt to invest. We assume that the combinative capabilities of service quality, delivery, flexibility, and cost are determined by the investment in intellectual capital. Arguably, with the advent of the Internet, different operating models (e.g., bricks-and-mortar, clicks-and-mortar, or pure dot-com) have different strategic imperatives in terms of knowledge-based competencies. Thus, the new e-operations paradigm can be viewed as a configuration of knowledge-based competencies and capabilities. © 2002 Elsevier Science Inc. All rights reserved.

Keywords: e-services; Service operations strategy; Competitive capabilities

1. Introduction

The Internet is fast becoming an important new channel for businesses in many sectors, raising e-services as the emergent business paradigm in the industrialized world. E-services,
according to Roth [1,2], “are comprised of all interactive services that are delivered on the Internet using advanced telecommunications, information, and multimedia technologies.” In this paper, we discuss the challenges and opportunities for providing e-services (e.g., those delivered over the Internet) and attempt to answer the following research questions: What implications does the Internet have for service operations strategy? How can business performance of e-service companies be improved in today’s knowledge-based economy?

In the past decade, services have faced intensified competition that can be characterized by substantial deregulation, technological progress, continuous fragmentation of markets, evolving customer expectations, shorter product life cycles, and the enormous growth in telecommunications and inexpensive computing power [3–5]. High quality and competitive prices are necessary, but they are no longer sufficient requirements for commercial success in the “hypercompetitive” market place of e-services [3,6]. Speed, whether defined as time to new products, real time information, or quick and flexible customer response, is increasingly becoming a standard, and hence, it is a pivotal capability in such a dynamic environment. Determining how best to take strategic advantage of Internet economics is an increasing concern for modern business.

In this paper, we make the case for incorporating the Internet technology strategy within the context of a knowledge-based, service operations strategy. While the Internet has rewritten many of the rules of customer engagement, it has not fundamentally changed the fact that business performance results from a portfolio of strategic operations choices that service providers make to deliver their offering [7,8]. Thus, strategic operations choices not only foster the firm’s current competitive capabilities, they also impact their future capabilities because of the dynamic and long-term effects [9]. Moreover, the Internet has not changed the company’s need to tailor the development of offerings and support the requirements of individual customers. Nor has it eliminated the need altogether for human contact in pre- and postsales in order to build and sustain relationships of key customers. What the Internet has changed, however, is the balance of power between companies and their customers. The Internet has dramatically altered the front-end, channel options for customer accessibility to the service delivery process and changed the scope of the customer encounter. First, on the most simplistic basis, customers have virtually unlimited access to the company, 24 hours per day, 365 days per year. Second, customers now have a more expanded scope in that the breadth of information available for purchasing decisions, distribution, and advice is altered and the possible nature of the encounter is more varied. Increasing the complexity of the service design, the encounters even extend beyond traditional communications, such as online chats (e.g., customer-to-customer communications). Consequently, Porter [4] argues, “The winners will be those that view the Internet as a complement to, not a cannibal of, traditional ways of competing.”

Clearly, the tumultuous business environment and its increasing complexity [10] have created many new challenges and opportunities for the e-service component of a service operations strategy. In framing our discussion of e-services, Fig. 1 illustrates the strategic decision processes that managers face for investing resources that develop knowledge-based competencies. Whether the business model is a traditional “bricks-and-mortar” (e.g., services with a presence only in the physical space), “clicks-and-mortar” (e.g., services with a
presence both in the physical and virtual space), or “pure dot-com” (e.g., services with a presence only in the virtual space), our model posits that the level of its inherent knowledge-based competencies will determine the firm’s competitive capabilities that ultimately lead to business performance. Note also that pure dot-coms can be classified as either digital or physical, considering their operational differences. “Digital dot-coms” are defined as Internet-based companies, such as information providers, whose product and service offerings are purely digital in nature, and therefore, they can be delivered directly over the Internet. The “physical dot-coms” are also based entirely on the Internet, but they can sell physical products that are shipped to consumers [11].

Notice that the relationships hypothesized in Fig. 1 are nonlinear and are affected by exogenous factors, which increase the complexity of a service operation design. In the context of our model, the traditional service operations strategy paradigm [7] is recast into the set of knowledge-based competencies that define the firm’s intellectual capital. Accordingly, human capital, structural capital, and absorptive capacity take a broader focus than their counterparts of infrastructure, and integration choices typical of service operations strategy contents. The operations-based competitive capabilities include service quality, delivery, flexibility, and cost [8,12,13].

In the context of our model, we hypothesize that different business models require different service operations strategies. Porter [4] contends that “dot-coms and established companies face different strategic imperatives.” Expanding on this notion, we believe that the distinctions must take a deeper cut. Namely, that the strategic operations choices must be aligned with the structure as pure dot-coms (either digital or physical), or a hybrid clicks-
and-mortar or a bricks-and-mortar. We argue that each has substantially different needs in terms of knowledge-based competencies and competitive capabilities in order to achieve business performance.

The rest of this paper is organized as follows. In Section 2, we present the motivation and context of this research. First, we discuss in 2.1 the impact of the Internet on the business environment followed, in 2.2, by an overview of the business models that have emerged as a result of the Internet penetration into mass market. Then, in 2.3 we discuss the characteristics of today’s economy highlighting the fact that it is increasingly complex and knowledge-based. In Section 3, we present a case for a new operations service strategy paradigm. Section 3.1 discusses the required competitive capabilities, Section 3.2 discusses the knowledge-based competencies, and Section 3.3 provides some examples. Finally, Section 4 summarizes the main results.

2. Motivation and research context

2.1. Impact of the Internet on the business environment

Since they were introduced in organizations nearly 50 years ago, information and communication technologies (ICT) have undergone rapid and fundamental advances. The recent economic impact of the Internet illustrates how deep the ICT has contributed to change today’s business environment. Barua et al. [11] argue that the “Internet economy” exceeded US$500 billion in revenues in 1999, which represents a 68% growth from 1998. Forecasts by the consulting firm Forrester Research [14] indicate that worldwide net commerce will amount to US$6.8 trillion in transactions in 2004 (both B2B and B2C), as illustrated in Fig. 2. North America represents the majority of this trade, but its dominance will fade, as some Asian-Pacific and Western European countries hit hypergrowth over the next years.

![Fig. 2. Worldwide e-commerce growth (in US$ billion).](image-url)
How do these trends map historically? Reviewing the information technology (IT) use in organizations, DeSanctis et al. [15] characterized five distinctive eras that can be classified as follows: first era (1954–1963): isolated machines; second era (1964–1976): distributed access to mainframes, compatible product lines (IBM 360 architecture); third era (1977–1984): midrange computers, easy-to-use interfaces; fourth era (1985–1996): personal computers, local area networks, Internets, and Extranets; and the fifth era (1997 onward): personal digital assistants, mobile technology with next-generation Internet as primary platform. In this fifth era, the increasing integration of ICT has facilitated the emergence of virtual organizations, defined by DeSanctis and Monge [16] as “a collection of geographically distributed, functionally and/or culturally diverse entities that are linked by electronic forms of communication and rely on lateral, dynamic relationships for coordination.”

ICT development has not only impacted the organizational forms and hierarchical structure, but it has also reshaped nearly every supply chain relationship in the way businesses partners perform transactions and deliver value. Moreover, the Internet has created some entirely new business areas and market places (e.g., online exchanges and auctions). Perhaps one of the greatest impacts of the Internet has been to enable the reconfiguration of existing business models [4] or provide an alternative view of service operations strategy, as illustrated in Fig. 1. Clearly, it has affected the firm boundaries and supply chains by changing the costs of coordinating economic activity within and between firms; and therefore, impacted their strategies and market positions [17]. Hitt [18], for example, found that increased use of IT is associated with substantial decreases in vertical integration and weak increases in diversification.

There are other reasons to evoke deliberate e-services strategies. Watson et al. [19], for example, identified five strategic and tactical reasons for firms to invest in e-commerce. First, the costs of matching buyers and sellers are potentially reduced. This not only enables buyers and sellers to obtain a greater depth and breadth of information for less cost, it also allows them to compare product prices on a real-time basis. Second, the image of a leading-edge corporation can be promoted and visibly increased globally. Third, new services can be introduced, either as stand-alone or added features to existing products and pre- and postsales customer service improvement. Fourth, market expansion and reach is increased. Finally, stakeholder communication costs through online transactions and global information distribution are lowered.

Along these lines, there is a growing consensus that the Internet can be characterized as a “disruptive technology,” since it enables innovative companies to create new business models that alter the economics of their industry [20–22]. According to Forrester Research [14], e-commerce is ubiquitous, infiltrating entire industry supply chains, from raw materials like timber all the way to purchases of household items like books and magazines. For retail services, Christensen and Tedlow [20] argue that the first disruptive technology arrived in the form of department stores. The second was the mail-order catalog. The third was the rise of discount department stores. Internet retailing or “e-tailing” marks the fourth disruption. Notably, in 1999, 170 million packages were shipped by Internet retailers, and forecasts by Forrester Research signal that by 2004, this figure will increase to 1.1 billion packages shipped annually.
Clearly, services must develop operations strategies that build the requisite competencies in order to leverage the new technologies. Kevin Kennedy, Senior Vice President of Cisco Systems [21], states that “organizations need to embrace disruption, and have a strategic plan to prepare their companies to maximize the opportunities that disruptions create.” Thus, Fig. 2 serves to highlight the overall economic importance of the Internet as a new disruptive technology in that the forecasts depict exponential growth worldwide.

2.2. Emerging business models

The impact of advanced ICT on organizations, and more specifically the impact of the Internet on business models, has been discussed by authors from different disciplines and using different approaches and theoretical frameworks. A business model depicts the design of transaction content, structure, and governance so as to create value through the exploitation of business opportunities. Amit and Zott [23] argue that a firm’s business model is an important locus of innovation and crucial sources of value creation for the firm and its suppliers, partners, and customers. Most authors agree that the integrative and synergistic effects of ICT improve business processes and provide significant value-added. Hammer and Champy [22, p. 493], for example, argue that “the real power of technology is not that it can make the old processes work better, but that it enables organizations to break old rules and create new ways of working—that is to reengineer.”

As a consequence of the advances in ICT and the Internet, traditional operations management models and competitive capabilities that are based upon industrial age logic [24] are being challenged. In particular are those associated with intangible aspects of services. The established “stores” of a traditional bricks-and-mortar firm has a market presence within a limited geographic area and supplies the consumers in that area. In order to increase the market reach, the service either has to relocate, build physically dispersed facilities, and/or set up a catalogue operation. In contrast, a pure dot-com exists only in the “virtual space,” while clicks-and-mortar are hybrid, with both store and Internet channels. In this sense, the clicks-and-mortar is a convergence between the virtual and the physical presence.

As mentioned earlier, it is important from a service delivery system design perspective to distinguish between two types of pure dot-com companies: digital and physical. Arguably, each requires different service operations strategies. Digital dot-coms are Internet-based companies, such as Priceline, Yahoo!, Wingspan and Bank Egg, whose offerings are digital in nature, such as information-based contents. These can be delivered directly over the Internet. The physical dot-coms “store fronts” are also based entirely on the Internet, but they sell and distribute physical products (e.g., books, CDs, jewelry, toys) that are shipped to consumers, usually by third parties. The physical dot-coms are often referred to as electronic retailers (e-tailers) [11].

Clicks-and-mortar businesses, evolving from existing bricks-and-mortar platforms, generally have the advantage of an established brand name, customer base, and distribution system. On the other side, clicks-and-mortar companies have the disadvantage of entrenched cultures that may be resistant to change and/or infrastructures that are not aligned with the hybrid business model. More recently, pure dot-coms are converging to clicks-and-mortar as
well [1]. Pure dot-coms also face some problems. Among the most critical issues is their ability to acquire resources and sufficient time to build a brand name and develop customer base from ground zero, before the competition. Importantly, click-and-mortar businesses are able to serve their existing customers online and, at the same time, focus on acquiring new customers often at lower total operating costs. As bricks-and-mortar services take the initial steps to go “online” and converge to clicks-and-mortar, they face a host of new challenges and risks associated with balancing their scarce resources between the traditional and online channels.

Fig. 3 provides an illustrative example of service operations strategy perspective on channels and product type. In particular, our research focuses on the match between business model and information content of the product, from physical to a more information-intensive, as portrayed in Fig. 3. Boyer et al. [17] found the continuum from physical to pure information to be an important dimension of service design for the Internet. We hypothesize that companies operating in the “gray” area of Fig. 3 are more likely to be successful because their operational channel and product offerings are “aligned.” We further hypothesize that firms outside the “gray” area on Fig. 3 will have substantial difficulties surviving. There are some exceptions, however. For example, there may be opportunities for successful business in niche markets, such as gourmet food, or highly innovative companies like Amazon.com that was among the first to introduce a radical transformations in the supply chain of books. However, a compelling case can be made for having a good fit between channel characteristics and product characteristics.

We analyzed a few companies by the relative information intensity of their product bundle (e.g., the relative mix of tangible and information attributes of the offering). Toys, pet goods, and food, for example, are generally considered as products with relatively low information content. Pharmacies and computers retailers provide offerings with middle-level information content, whereas travel agents and financial services provide offerings with relatively high information content. Notice also that in Fig. 3, Pets.com, Etoys.com, and Webvan.com are portrayed as out of alignment. These companies provide offerings with relatively low information content, and deploy, albeit physical, pure dot-coms channels. Pets.com, Etoys.com, and Webvan.com have filed bankruptcy. Although Amazon.com has had a rocky road, it appears to be in reasonably good shape for now. This is because Amazon.com has augmented its offerings with more information content and has taken control of its distribution system like a physical dot-com.

There is some support for our channel–product design matrix highlighting the advantage of clicks-and-mortar services, especially where channel leverage is possible. Gulati and Garino [25] argue that success in the new economy will go to those who can execute clicks-and-mortar strategies that bridge the physical and virtual worlds. Lee and Whang [26] indicate that “the basic idea of clicks-and-mortar is to elicit consumer cooperation for the final mile of the delivery journey.” CVS, the US pharmaceutical chain, has adopted an interesting clicks-and-mortar strategy for online sales. Today, with more than 5000 CVS items available for purchase online, 65% of online purchase are picked up by the customers at CVS stores, solving the last-miles problem [26].

According to our service operations strategy model (Fig. 3), clicks-and-mortar services can span the information-intensity successfully if they develop the appropriate competencies.
What are these competencies? What is the best way for executives to forge strategies to bridge the physical and virtual spaces? While the answer to this question is still under considerable debate by researchers and managers (e.g., Refs. [25,27]), we propose that the level of infrastructural and supply chain integration must be examined along the following business dimensions: brand, management, and operations. Clearly, clicks-and-mortar com-
panies have developed different service operations strategies by varying the level of integration of marketing, human resources, and operations.

As illustrated in Fig. 3, the pet goods market provides an interesting example of the competition between pure dot-com companies (Pets.com) and clicks-and-mortar companies that have evolved from bricks-and-mortar businesses (PetSmart, including its online subsidiary, PetSmart.com). Pets.com was one of the first pure dot-com businesses to appear. Pets.com put together an expensive marketing scheme and had virtually every product known for pets. As a pure dot-com, they had to devote resources and time to building a brand name and customer base, as well as a distribution and supplier network from ground zero. A large portion of their capital was invested in marketing and the customer acquisition processes. Once all the money was gone, Pets.com did not have a sufficiently large customer base to produce enough revenue to sustain the business, so they declared bankruptcy. With limited funding and time (often 18 or 24 months), many pure dot-com players have declared bankruptcy without ever turning a profit.

PetSmart, on the other hand, has been a successful bricks-and-mortar store since 1987 with physical stores in 525 locations across the US and Canada. PetSmart took advantage of strong customer bases in key market areas and had established a brand loyalty and trust unlike any other pet store chain. With distribution, supplier, and inventory programs in place, PetSmart has been able to run a profitable business. By combining the online store with the physical store, they have had many synergistic benefits. However, this did not come without risk. Clicks-and-mortar companies face the challenge of integration and balancing resources between the traditional and successful “bricks” business and the new and uncharted channel of the “clicks.”

The banking sector, considered an information-intensive sector, also provides interesting examples of disruption caused by the Internet. The Economist [28] suggests an alternative classification of Internet banking strategies and business models, which, however, fits well the classification we proposed. According to The Economist [28], the strategies followed by banks to invest in the Internet tend to follow four main categories, namely “pure Internet banking,” “online hybrids,” “online alliances,” and “white labeling” or “private labeling.” The most famous example of “pure Internet banking” or digital dot-coms is Bank Egg, from the UK, which acquired about 1 million customers in 18 months. In the US, the most well-known example is probably Wingspan with about 100,000 customers.

The Economist [28] also suggests alternative clicks-and-mortar strategies followed by the banking industry: “Online hybrids” refers to those banks that extend their existing brand to the web with the expectation that brand loyalty is transferred to the Internet. It is normally easy to find the bank’s websites since their web addresses reflect the name of the bank (e.g., bankofamerica.com). “Online alliances” refers to those banks that team up with a telecom or Internet provider company. Finally, “white labeling” or “private labeling” refers to those firms that provide unbranded back-office services to enable another firm to run a bank.

Yet, the level of service integration is a major execution challenge that clicks-and-mortar service providers face. As presented in Table 1 under the headings of brand, management and operations, we examine the integration chains between Office Depot and OfficeDepot.com, KB Toys and KBkids.com, and Rite Aid and Drugstore.com.
Using the arguments of Gulati and Garino [25], we demonstrate that each paired set of clicks-and-mortar displays an appropriate degree of integration that is consistent with organizational behavior theories.

Thus, integrating Internet initiatives into an existing business makes sense only if the brand extends naturally to the Internet. Moreover, the management structure must fit the operations channels strategies. Executives must have the requisite skills and experience needed to pursue a fully integrated channel strategy. They must also be willing to judge and manage by different performance and reward criteria, and the firm must be able to attract and retain the right people. Operational competence with distribution and information systems translate well to the Internet and can provide a competitive superiority if aligned with the management structure. In general, the integrated service providers remain attractive to potential alliance

<table>
<thead>
<tr>
<th>Degree of Integration</th>
<th>Brand</th>
<th>Management</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Depot and Office Depot.com</td>
<td>Fully integrated</td>
<td>Fully integrated</td>
<td>Fully integrated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OfficeDepot.com is technically part of the business services division, although its reach extends to the stores and international divisions.</td>
<td>Internet systems are simply a layer on top of existing information systems.</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KB Toys and KBkids.com</td>
<td>Mostly integrated</td>
<td>Slightly integrated</td>
<td>Moderately Integrated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Independent management teams.</td>
<td>Separate distribution systems.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequent interaction between counterparts.</td>
<td>Customers can return toys bought online to bricks-and-mortar stores.</td>
</tr>
<tr>
<td>Rite Aid and Drugstore.com</td>
<td>Slightly integrated</td>
<td>Slightly Integrated</td>
<td>Moderately Integrated</td>
</tr>
<tr>
<td></td>
<td>co-branded Rite Aid and Drugstore.com pharmacies</td>
<td>Independent Management Teams.</td>
<td>New, integrated distribution center.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequent Interaction between counterparts.</td>
<td>Customers can pick up prescriptions ordered online at bricks-and-mortar stores.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rite Aid's president sits on Drugstore.com's board</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Gulati and Garino [25].
partners, on such dimensions as brand strength and speed of action, as long as the cultures of the e-service and of the existing brick-and-mortar business gel in a mutually supportive way.

On the other end of the integrative continuum, Gulati and Garino [25] contend that forming a separate business unit can be a more viable alternative when (1) a different customer segment or product mix is being offered; (2) pricing tactics are different and stay competitive; (3) channel conflict and threats to the current business model exist; (4) outside capital is needed and is best raised by a stand-alone operation; (5) there are problems retaining or attracting the right talent; (6) a key partner is reluctant to connect with the parent company; or (7) the parent company’s culture would undermine the effectiveness of the e-service.

2.3. Managing complexity in click-and-mortar services

We now turn our focus to click-and-mortar services, as the trend towards convergence highlights their importance. Accelerating economic, technological, social, and environmental changes are especially challenging to these managers. Employees must learn at increasing rates, creating the need to design and manage complex systems with multiple feedback effects, long time delays, and nonlinear responses to decisions. Paradoxically, however, clicks-and-mortar will have more opportunities and external stimuli to foster accumulated learning. Complex business environments can be characterized by factors, such as dispersed interaction where economic activity is determined by the continual need to adapt because of perpetual novelty and out of equilibrium dynamics [10]. Yet, learning in complex environments is hard since it is difficult to confront directly many of the consequences of the most complex decisions.

By analogy in both nature and society, there are many systems with the properties of complex systems. For example, nervous systems, immune systems, ecologies, and economies are called adaptive nonlinear networks [10]. An essential element of successful systems is that they do not act simply in terms of stimulus and response. Instead, they “anticipate.” Accordingly, economic agents form expectations, develop models of the economy, and act on the basis of predictions generated by these models. Consistent with the complexity approach, one of the emerging research topics in management has been the understanding of how firms in such volatile environments create and sustain competitive advantage.

In response to complexity arguments, research streams over the past decades in the areas of economics and management have increasingly emphasized the role of knowledge for the development of economic activities. This line of reasoning contested the orthodox understanding of the firm and the economy (e.g., Refs. [3,24,29–32]). Beginning in the 1950s, Penrose [34] proposed a theory of the growth of the firm that gave birth to what was later called the resource-based view (RBV) of the firm and shaped contemporary views on the importance of organizational knowledge. Penrose described the firm as a collection of productive resources (material and human) that accumulated over time. Thus, each firm is unique and its historical development is important to understanding its competitive position and future opportunities.

The RBV, in contrast to the traditional industrial economics paradigm, suggests that competitive advantage originates at the firm (rather than industry) level. It specifically links a firm’s resource competencies and competitive capabilities [35]. Both from a theoretical and an empirical perspective, the RBV of the firm contends that creating and sustaining a firm’s
competitive advantage must be heavily based on the dynamics of how the firm’s resources are acquired and managed. Thus, the RBV perspective focuses on the analysis of resources, as well as organizational forms that permit their acquisition and exploitation, which led directly to a knowledge-based view (KBV) of the firm, which is the basis for our new perspective of service operations strategy, as one of developing intellectual capital.

2.3.1. Knowledge-based view

The RBV naturally evolved into studying how intangible resources, such as intellectual assets, could be leveraged in order to accelerate organizational learning and competitive advantage. The recent explosion of interest in knowledge and intellectual capital reflects the current emphasis on the KBV of the firm, and recognition of knowledge as the principal source of economic rent [6,24,30,31]. The KBV requires greater integration of “intangibles of production” (e.g., organizational strategies and structure), in contrast to management of physical assets. Thus, the KBV provides an analytical framework that permits the reanalysis of the firm resources in terms of intellectual resources.

Drucker [31] observed that if the command of resources is an important source of power, then, as specific knowledge becomes an increasingly important resource, whoever controls and is able to secure that knowledge would gain more power. According to Drucker: “In this society, knowledge is the primary resource for individuals and for the economy overall. Land, labor, capital—the economists’ traditional factors of production—do not disappear, but they become secondary. They can be obtained, and obtained easily, provided there is specialized knowledge. At the same time, however, specialized knowledge by itself produces nothing. It can be productive only when it is integrated into a task. And that is why the knowledge society is also a society of organizations: the purpose and function of every organization, business, and nonbusiness alike, is the integration of specialized knowledge into a common task.”

Grant [36] further developed the KBV drawing upon competitive dynamics, the RBV of the firm, organizational capabilities, and organizational learning. He proposes a theory that explains how knowledge plays an integral role in competing. According to Grant’s knowledge-based theory [36], the processes that integrate a firm’s specialized knowledge are fundamental to creating and sustaining competitive advantage.

2.3.2. Knowledge-based services

Clearly ICT have accelerated the pace of change, catapulting services into the emergent knowledge economy, where “economies of knowledge” are the key enablers of global competitiveness. “Economies of knowledge” are defined by Roth [24, p. 30] as the firm’s ability “to use its business acumen, combined with skilled people and experience with advanced technologies, to create an organization that consistently identifies, assimilates, and exploits new knowledge more efficiently and effectively than the competition.” Thus, knowledge-based services are revolutionizing the economy and every corporate strategy.

Quinn [30] analyzed the technological and economic forces that make such knowledge-based strategies essential. He argued that intelligent companies of the 90s will derive their competitive edge not from ephemerally superior products but from a deep understanding of a few highly developed knowledge-based “core competencies.” Rarely will owning the largest
raw materials resources, equipment and technology bases, or integrated facilities provide a maintainable competitive edge for major service providers. Such physical properties are too easily cloned, imitated, or outsourced. Successful service enterprises will derive sustainable advantage from knowledge-based activities that leverage intellectual assets.

Intellectual assets increase value through increased technological sophistication, better knowledge bases, more creative customer responsiveness, and the unsurpassed management of intellectual capital that competitors cannot reproduce. How then can service providers create and leverage knowledge-based core competencies for maximum focus and effectiveness? First, they can redefine their strategies noting each value-creating activity as a knowledge-based service. Second, they can determine whether or not they can deliver their service offerings better than anyone else in the world.

Clearly, then, the KBV has important implications for service operations strategy, as discussed in the next section. Higher level of intangibility that characterizes service dictate that knowledge assets will play a particularly relevant role in competitiveness. Ironically, the dominant service paradigm still focuses on traditional tangible attributes and measures that do not capture the knowledge-based contents of service operations. Nor do they define how intellectual capital is best leveraged due to the adoption and use of advanced ICT for delivering e-services.

3. Towards an e-services operations strategy paradigm

In this section, we explore the role of knowledge-based competencies in the form of organizational intellectual capital for improving the business performance of e-services. As the KBV takes hold, the fundamental paradigms of service operations strategies must also evolve. Our model, depicted in Fig. 1, broadly frames this new paradigm in the context of e-services. As e-services business models converge towards hybrid clicks-and-mortar, our fundamental tenet is this: the multichannel environment is increasingly complex to manage, especially as the offerings become more information intensive. Consequently, according to KBV theory, e-services, like their traditional service counterparts, will need to be increasingly agile in order to compete in an increasingly volatile and global marketplace. Traditional operations criteria of quality, delivery, flexibility, and cost are fast becoming ante for the competitive game under a KBV of the firm. Conventional wisdom of trade-offs is being challenged [12,24,29], as combinative operations capabilities will be required. Therefore, following the strategic management logic proposed by Grant [36] and Kogut and Zander [33] and the theoretical developments in services strategy put forth by Roth and Jackson [8] and Menor et al. [12], our general proposition of an e-services strategy under a KBV is this:

**Proposition 1**: Acquiring and maintaining requisite intellectual capital is a necessary antecedent for acquiring strategic agility (or combinative competitive capabilities) that impact business performance.

Our proposition is guided by the notion that intellectual capital is comprised of three key elements, namely, human capital, structural capital [42], and absorptive capacity [37]. Thus,
the emergence of a new e-services paradigm can best be viewed as a configuration of knowledge-based resources that impacts the acquisition of strategic agility.

3.1. Competitive capabilities and agility

The theoretical foundations for strategic operations agility are based upon notions of capabilities-based competition. Both Roth and Jackson [8] and Menor et al. [12] develop a strategic operations perspective of the RBV under exogenous conditions of increasing environmental dynamism that has been exacerbated through technological progress and globalization. For semantic clarity, capabilities-based competition through operations refers to the ability of the total service delivery system extended through the service supply chain to meet external customer requirements through operations criteria, such as quality, delivery, flexibility, and/or cost [7]. According to this view, competitive capabilities are one core element of a service operations strategy [38,39]. Strategic choices of structure, infrastructure, and integration are the second [8,38,40].

Based upon a study of retail banks, carried out under the aegis of the Bank Administration Institute, Roth and Jackson [8] empirically linked key components of intellectual capital to objective measures of business performance. Menor et al. [12] extended this research on service operations strategy by coining the term strategic operations agility to reflect the formation of combinative operations capabilities. They defined strategic agility as “the ability to excel simultaneously on operations capabilities of quality, delivery, flexibility, and cost in a coordinated fashion.” Notably, the concept of agility had emerged in the manufacturing literature as the capability to thrive in a competitive environment of continuous and unanticipated change [5,41].

3.2. Knowledge-based competencies

As discussed previously, we argued that an adequate set of knowledge-based competencies is necessary for competing in complex business environments. In the context of our research, intellectual capital is described in terms of the stock and the flows of knowledge. The stock of knowledge is comprised of what Stewart [42] describes as human capital and structural capital. Human capital refers to the stock of skills and expertise of the people in an organization that are required to provide solutions to customers. Human capital is, therefore, composed of overall people attributes, competencies, and mindsets [43]. Structural capital is an organizational support element that enables the people to meet market requirements. The stock of structural capital includes organizational technologies and know-how including the strategies, structures, processes and culture of the organization, and how these in turn translate into the specific core competencies of the organization [43].

Moreover, Stewart [42] argues that “sharing and transporting knowledge—leveraging it—requires structural intellectual assets, such as information systems, laboratories, competitive and market intelligence, knowledge of market channels, and management focus, which turn individual know-how into the property of a group. Like human capital,
structural capital exists only in the context of a point of view, a strategy, a destination, and a purpose. Thus, it is the organizational capabilities of the organization to meet market requirements.”

In addition, our research suggests that the flow of knowledge is a third element of intellectual capital, which is captured by Cohen and Levinthal’s [37] notion of absorptive capacity. Absorptive capacity [37] is defined as the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends. Thus, absorptive capacity is a proxy for the rate of knowledge flows (e.g., the organizational learning and its abilities to assimilate and use new knowledge).

3.3. Illustrative evidence

Our e-services research suggests this: clicks-and-mortar services will require an inherent learning capacity and a greater stock of human and structural capital and the ability to learn faster, especially as the offerings become more information intensive beyond the processing of transactions. In other words, they will be more agile. As illustrative evidence, the strategic groups of retail banks (based upon Roth’s indices [13] of service quality, delivery, flexibility, and cost) were used to identify similar and dissimilar operations strategies among banks competing on different criteria. Menor et al. [12] identified four main clusters: agile, traditionalists, niche, and straddlers.

Fig. 4 illustrates empirical differences between agile and nonagile strategic groups in terms of resource competencies and competitive capabilities. Agile banks have significantly higher levels of both knowledge-based competencies and competitive capabilities than nonagile banks (traditionalists, niche, and straddlers). In this research, we argue that adequate levels of human capital, structural capital, and absorptive capacity are necessary to achieve competitive capabilities. While the empirical results provided here are supportive of our proposition, clearly future research along these lines is warranted.

Previous analysis [44] shows that banks that invest in activities aimed to promote knowledge tend to be more efficient than banks that do not emphasize such activities. Also, agile banks have higher levels of knowledge-based competencies and competitive capabilities than nonagile banks. On the other hand, banks that have only invested in physical infrastructures and more employees do not demonstrate an increased efficiency. This is in line with Shapiro and Varian’s [6] observation: “infrastructure is to information as a bottle is to wine.” Infrastructure makes it possible to store, search, retrieve, copy, filter, manipulate, view, transmit, and receive information, but it does not work alone. It needs an adequate level of human capital. Also, such physical properties are too easily cloned or bypassed. In order to understand how to develop strategies to deliver outstanding service using the new ICT, Voss [45] conducted a survey of service levels in 70 UK companies and found that most organizations are not yet prepared for delivering service on the web and are being outperformed by web-based companies. This author argues that an e-service strategy will become an essential part of companies’ overall e-commerce strategy. The key issue for organizations is not “should we invest
in e-service?”, but “what is our strategy for e-commerce and e-service and how should it be implemented”.

4. Conclusion

Our general proposition is that acquiring and maintaining requisite intellectual capital is a necessary antecedent for acquiring strategic agility (or combinatorial competitive capabilities) that impact business performance, and is especially important for managing complexity in the emerging click-and-brick service environment. We aim to increase our understanding of how e-services create and sustain competitive advantage in an increasingly complex environment that is created in part, by the advent of the Internet—a disruptive technology. We examine the KBV of the firm, which is emerging in the areas of economics, management, and organizations to provide the theoretical underpinnings for e-service delivery system design.

The KBV emphasizes the role of intellectual capital for the development of economic activities, thereby contesting the orthodox understanding of the firm and the economy. It appears that the increased complexity and volatility of operating a “click-and-brick” service calls for higher levels of knowledge stocks and accelerated flows. This is especially the case,
where tighter integration of operations, marketing, and human resources are required in order to achieve the requisite strategic agility to compete effectively [10]. We build upon previous work (e.g., Refs. [12,44]) that studies the importance of knowledge-based investments on company success.

These factors, taken together, set the stage for a new paradigm for service operations strategy that links the company’s intellectual capital (human capital, structural capital, and absorptive capacity) with combinative competitive capabilities of service quality, delivery, flexibility, and cost (or strategic agility). E-services strategy is thus portrayed as configuration of knowledge-based resources and capabilities. We provide tentative anecdotal and empirical evidence of the increasing importance of intangible assets. From emerging KBV theory, we posit that successful service companies will derive their competitive edge from a deep understanding of a few highly developed knowledge- and service-based “core competencies,” and not only from owning the best physical infrastructure. The models and frameworks presented in this study lend themselves to a future research stream for e-services strategy.

References


Pedro Oliveira is a PhD candidate in Operations, Technology, and Innovation Management at Kenan–Flagler Business School, The University of North Carolina-Chapel Hill. He is also a researcher of the Center for Innovation, Technology, and Policy Research at IST, Lisbon, Portugal. He received his MSc and BSc from IST.

Aleda V. Roth is a professor of Operations, Technology, and Innovation Management at Kenan–Flagler Business School, The University of North Carolina-Chapel Hill. Professor Roth serves as associate editor for Management Science, POM, and Decision Sciences, as senior associate editor of MSMO, as area editor for POM, and on the Advisory Boards of the Journal of Service Research, International Journal of Service Industry Management, and Benchmarking for Quality and Technology Management. Professor Roth is the president of POMS.

Wendell Gilland is an assistant professor of Operations, Technology, and Innovation Management at Kenan–Flagler Business School, The University of North Carolina-Chapel Hill. His research interests include the role of technology on supply chain management and the impact of flexibility on the performance of processing systems. Professor Gilland received his PhD and MBA from Stanford University.