A Process Model of Capability Development: Lessons from the Electronic Commerce Strategy at Bolsa de Valores de Guayaquil

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Abstract

Past literature using the resource-based view of the firm has concentrated on attributes of firms' capabilities and on strategies for exploiting existing firm-specific assets. Comparatively little research has been conducted on how a firm develops, manages, and deploys capabilities to support its business strategy. This study seeks to understand the process of capability development and to establish a model that has both theoretical and practical significance. A longitudinal case study of the electronic commerce strategy formation and implementation at Bolsa de Valores de Guayaquil, an Ecuadorian stock exchange, yielded qualitative data that allowed inductive modeling of the capability development process. The model reveals that capability development in support of a new strategy is a gradual process that is cumulative, expansive, and very dependent on the way that difficult-to-imitate resources and actions are combined. At Bolsa de Valores de Guayaquil, actions that supported the development of the firm's capability to strategize seem to have contributed the most in the initial phase of the strategy formation and implementation; actions that helped the development of the firm's capability to be flexible appear to have contributed the most during the middle phase; and actions that supported the development of the firm's capabilities to integrate and engender trust seem to have contributed the most in the final phase. In addition, the key resources that supported the overall capabilities development process included leadership, organizational culture, information technology, long-term view, and social networks. Implications of this model for both research and practice are discussed.

(Resource-Based View of the Firm; Capabilities Development; Case Study; Electronic Commerce in Developing Countries; International Information Systems)

The worldwide trends of globalization, deregulation, technical evolution, and market liberalization are restructuring markets and challenging traditional approaches to gaining competitive advantage (Chakravarthy 1997, Hamel 2000). It is becoming harder for firms to retain a competitive advantage based on physical or financial assets, or even on a new technology, as competitors with access to the same open market conditions can easily acquire similar assets and technologies, and even leapfrog to newer technologies. Consequently, firms need to concentrate on developing distinctive capabilities that aremore difficult for competitors to imitate (Barney 1997, Wernerfelt 1984). Such development has become the focus of attention not only among academics, but also among business consultants, journalists, government officials, and business leaders (Miyazaki 1995).

A prevailing paradigm for understanding how and why firms gain and sustain competitive advantage is the resource-based view of the firm (Mahone and Pandian 1992, Schendel 1994). From this perspective, capabilities and resources enable firms to conceive and implement strategies to generate above-normal rates of return (Barney 1997, Dierickx and Cool 1989). Sustainable competitive advantage is viewed as the outcome of discretionary rational managerial choices, selective capability accumulation and deployment, strategic industry factors, and factor market imperfections. Notwithstanding its important insights, the existing literature has concentrated on explaining the exploitation of existing firm-specific capabilities and on the attributes of firm resources (e.g., their rarity, uniqueness, difficulty-to-copy, or nonsubstitutability). The research has assumed that economic motives drive capability procurement decisions, and economic factors in the firm's competitive and resource environments drive firm conduct and outcomes. But how do firms develop, manage, and deploy capabilities to influence the overall process of strategy formation and implementation? To answer this question, longitudinal studies are particularly appropriate.

The research presented here used as its basis an in-depth field study of the formation and implementation of the electronic commerce strategy[1] at a Latin American

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stock exchange, Bolsa de Valores de Guayaquil (Bolsa), in Ecuador. In 1996, Bolsa began providing static information about the stock exchange via the Internet. Then, in June 1997, it launched an organization-wide project dubbed "Mundo Virtual" (virtual world), aimed at exploring the interactive capability of the medium to attract foreign investors while capturing revenues from Ecuadorian institutional sponsors. During the same period, Ecuador suffered what have been described as the "most volatile years" of its history, with political instabilities, structural reforms, low savings and investment rates, lack of capital, high inflation, stagnant living standards, and deteriorating public services (*The Economist* 1997). Bolsa's managers knew that they had to develop their electronic commerce strategy fast, innovatively, and with world-class quality, but also with few people, modest information technology, and a small budget. The misfit between Bolsa's resources and its aspirations would have led most observers to challenge the feasibility of its goals. The company's ambitions belied its meager resource base. Yet Bolsa's electronic commerce strategy was a great success: (1) It was launched on time—a very unlikely achievement in such a challenging (some might even say "hostile") business environment; (2) it was paid for with the income generated in the first three months of operation; (3) one year after it was launched the Ecuadorian Congress and the Chamber of Production recognized it as the best national initiative in "promoting development of the national securities market and our country in the international market in order to foster foreign investment;" and (4) in January 2000 Bolsa signed an agreement with Brady Net—a pioneer and leader of online information on fixed-income securities in emerging markets—to provide ⟨bradynet.com⟩ with Ecuadorian stock market information.

There are at least three important reasons for studying the Bolsa case. First, given that the resource-based view of the firm proposes that capability selection and accumulation are a function of both within-firm decision making and external strategic factors (Oliver 1997), and given the market imperfections and resource scarcities faced by a developing country,[2] this case provides an opportunity to investigate how one local firm developed firm-specific capabilities within a volatile environment. Second, the period described in the case corresponds to the arrival of a new CEO who instituted organizational change, including the introduction of information technology, within an organization that had seen very little change. Thus, the Bolsa case provides an opportunity to trace the development of capabilities from the beginning because so little was there at the start of the investigated period. Third, since many firms in the world are building their plans of growth at least in part on electronic commerce, this case provides an opportunity to begin to identify the process that can be used to develop organizational capabilities to support such efforts.

This paper uses the Bolsa case as the basis for developing a process model of capability development. To motivate the need for such a model and to provide some additional context for this work, the following section reviews the existing resource-based view of the firm literature. The third section describes the research approach used to study the Bolsa case to develop inductively a process model of capability development. The fourth section is organized around the phases of the strategy formation and implementation that were observed and incorporated in the model. The fifth section draws upon the case analysis and interpretation, as well as prior literature, to identify key capabilities developed at each phase of the model. The sixth section discusses the implications of the model. The last section summarizes and concludes the article.

Theoretical Background

The resource-based view of the firm sees a firm as a bundle of resources and capabilities. Resources are firm-specific assets and competencies controlled and used by firms to develop and implement their strategies. They can be either tangible (e.g., financial assets, technology) or intangible (e.g., managerial skills, reputation) (Barney 1997). Resources are heterogeneous across firms, and some resources are valuable yet rare, difficult to imitate, or nonsubstitutable, giving the firms that have them distinctive core capabilities. Resources that provide sustainable advantage tend to be (1) causally ambiguous (e.g., transformational leadership), (2) socially complex (e.g., culture), (3) rare (firm-specific), or (4) imperfectly imitable (e.g., distinctive location) (Barney 1997). Capabilities are a firm's abilities to integrate, build, and reconfigure internal and external assets and competencies so that they enable it to perform distinctive activities (Teece et al. 1997). The resource-based approach focuses on the characteristics of resources and the strategic factor markets from which they are obtained.

Past research using the resource-based view associates rent potential, i.e., greater than normal returns (Alchian 1991), with two possible paths (McGrath et al. 1996). The first involves external factors, including buyer and supplier power, intensity of competition, and industry and product market structure, that influence what resources the firm selects, as well as how they are selected and deployed (Schoemaker and Amit 1994). The second path to the capture of rents involves creating idiosyncratically productive combinations of resources (Peteraf 1993).

Firms cannot expect to garner rents by merely owning and controlling resources. They should be able to acquire, develop, and deploy these resources in a manner that provides distinctive sources of advantage in the marketplace. The traditional conceptualization of the resource-based view has not looked beyond the properties of resources and resource markets to explain enduring firm heterogeneity. In particular, past research has not addressed or examined the process of resource development (Oliver 1997). Firms' decisions about selecting, accumulating, and deploying resources are characterized as economically rational within the constraints of limited information, cognitive biases, and causal ambiguity (Schoemaker and Amit 1994, Peteraf 1993). Additionally, the traditional resource-based view is limited to relatively stable environments (Leonard-Barton 1992). Barney (1997, p. 171) warns, "if a firm's threats and opportunities change in a rapid and unpredictable manner, the firm will often be unable to maintain a sustained competitive advantage."

Only recently have researchers begun to focus on the specifics of how some organizations first develop firm-specific capabilities and then how they renew competencies to respond to shifts in the business environment (see, for example, Iansiti and Clark 1995, Henderson 1995). The dynamic capabilities approach (Teece et al. 1997) is an extension of the resource-based view of the firm that was introduced to explain how firms can develop their capability to adapt and even capitalize on rapidly changing technological environments. Dynamic capabilities emphasize the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competencies within a changing environment. The development of such capabilities is limited by the firm's existing base of capabilities, and is shaped by its current market position and past history of developing capabilities (Grant 1996, Teece et al. 1997). The difference between the traditional conceptualization of the resource-based view of the firm (Barney 1997, Grant 1991, Wernerfelt 1984) and the dynamic capabilities view (Teece et al. 1997) is that under the traditional view, current firm resources and capabilities are exploited to the opportunities in the marketplace, whereas under the dynamic capabilities view, the firm needs to develop new capabilities to identify opportunities and respond quickly to them (Jarvenpaa and Leidner 1998).

Although Teece et al. (1997) outlined the dynamic capabilities approach, they did not provide empirical evidence to help understand how these capabilities are developed. Following this approach, a handful of models have been proposed to explain how resources and capabilities are built up over time (see, for example, McGrath et al. 1996, Miyazaki 1995, Oliver 1997). All these models are empirically grounded; however, they have all followed a factor-oriented, or variance theory, approach. Process theories are less common in the resource-based view of the firm literature, and have yet to be developed for explaining the resource and capability development process. Process theories focus on sequences of activities to explain how and why particular outcomes evolve over time (Mohr 1982, Shaw and Jarvenpaa 1997).

The literature review undertaken did not identify a single process model of capability development. The prevailing wisdom seems to be that capability development is a lengthy, complex process influenced by multiple organizational dimensions. Based on an analysis of the events that transpired at Bolsa, a grounded process model of the phenomenon is presented here that reveals it is a cumulative and expansive process where path dependency matters, but it also suggests the process can be strategically planned, one step at a time over time. The model clearly shows that the process of capability development is *not* simply a black box, and it is not random. Instead, the findings suggest that this process needs to be seen in the light of the firm's overall strategy formulation and implementation. This inductively derived model serves as the central contribution of this research.

Research Approach

Consistent with the focus of this research, an in-depth case research approach was followed (Yin 1994). This approach allowed the study to focus on the development of capabilities in a natural setting. Moreover, case research affords an opportunity to engage in theory building in an area where relatively little prior research has been conducted (Benbasat et al. 1987). The contemporary nature of this case also meant that extensive documentation was accessible and the key actors were available for interviewing.

Data Collection

This investigation began "as close as possible to the ideal of no theory under consideration and no hypotheses to test" (Eisenhardt 1989, p. 536). In accordance with the approach advocated by Eisenhardt (1989), the research problem was formulated and the existing RVB literature was reviewed in order to "specify some potentially important variables," but "thinking about specific relationships between variables and theories as much as possible, especially at the outset of the process" was avoided.

Research access was negotiated with Bolsa in July 1997; over the next six months the field research was

conducted (on-site observation, interviews, and documentation review). Thus, the research involved a longitudinal study of the process of capability development at Bolsa.[3] The longitudinal focus allowed enabled the activities and decisions that occurred during the course of the electronic commerce strategy formation and implementation to be studied, while the collection of multiple types of data from different sources provided triangulation and increased the reliability of the study.

Interviews were arranged with all middle and top managers (12 people), the leaders of technology implementation (6 people), Mundo Virtual users (27 people), and stock exchange experts and directors (15 people). All interviews were tailored to each person, focusing on the interviewee's perceptions of what happened and why, how decisions and actions were influenced and made, and how conflicts were resolved. Interviews also addressed the interviewee's role, attitude, and motivations. The interviews were tape recorded and transcribed, and additional observations were noted at the time of the interview. At the end of each interview, the subject was asked to suggest other individuals who would be important sources for understanding the implementation of the company's strategy. Written data included both primary sources (annual reports, company archival analyses, organizational charts, strategic planning documents, minutes of meetings, Mundo Virtual documents, and internal correspondence and memos) and secondary sources (investors' reports, industry and stock exchange documents, trade magazines, newspapers, and relevant Internet publications).

Data Analysis

Despite its significance, the resource-based view of the firm has not gone unchallenged. In particular, although resources and capabilities are at the heart of the resource-based view of the firm, they often are described in vague terms that have been criticized as being tautological, endlessly recursive, and nonoperational (e.g., Priem and Butler 2000, Williamson 1999). Precisely, the purpose of this paper is to extend our understanding of capabilities and how they develop in organizations. This understanding will, in turn, enhance the resource-based view of the firm. Thus, it is important to first note that in this paper resources are input factors (assets and competencies) controlled and used by Bolsa in the formation and implementation of its electronic commerce strategy. Capabilities consist of identifiable and specific organizational processes that were observed to create value for Bolsa by manipulating resources in the formation and implementation of the new value-creating electronic commerce strategy. Second, some of these resources and capabilities used have often been the subject of extensive empirical research in their own right.

The analysis of the data was conducted in several steps following the recommendations by Glaser and Strauss (1967) and Elsbach and Sutton (1992) to move back and forth between the empirical data and possible theoretical conceptualization. First, background documents, publicly available information, and transcripts of interviews and meetings were used to create a detailed narrative history of the electronic commerce strategy. This narrative was then written up more formally in the form of a Harvard Business School teaching case (Montealegre et al. 1998). Though the case is descriptive in nature, it provided a mechanism for condensing the large volume of data and moving toward a more in-depth, within-case analysis (Eisenhardt 1989).

In both the case study database and the case write-up, I endeavored to create what Yin (1994, p. 84) calls a "chain of evidence" that allows others to "follow the derivation of any evidence from initial research questions to ultimate case study conclusions." Together, both of these tools facilitated other researchers to examine the data for themselves and determine whether they would draw the same or different conclusions. Such an approach increased the reliability of the entire study (Yin 1994).

A key step in the analysis was to first create an event listing, a technique that can provide insight into "what led to what, and when" (Miles and Huberman 1994, p. 110), and then a critical incident chart (Miles and Huberman 1994) depicting the sequence in which capabilities were developed. The resources and capabilities themselves represent the researcher's interpretation based on evidence gathered from interviewees.

The final step in the analysis involved a variation on qualitative pattern matching between theory and data (see Campbell 1975 and Yin 1994). First, the resources and capabilities that appeared to have influenced formation and implementation of the electronic commerce strategy at Bolsa were compared and contrasted with the array of resources and capabilities that have been discussed in the resource-based view of the firm literature. Interview transcripts were cross-checked to verify that each resource or capability was supported by at least two sources of evidence. Then the sequence of resources and capability development was mapped, and the map was reviewed by several contacts at the case site.

The entire analysis was highly iterative and involved moving back and forth among the data, the existing literature, and the concepts that emerged as salient at the research site. This process continued until it was possible to explain the process that had been observed, and no additional data were being collected, developed, or added

to the set of resources and capabilities—a situation Glaser and Strauss (1967) refers to as "theoretical saturation."

The Electronic Commerce Strategy at Bolsa

This section presents background information about Bolsa, and describes the formation and implementation of its electronic commerce strategy. It highlights the process that was followed, and identifies the key capabilities developed. First, the antecedent condition is introduced. Then, the case facts are presented in three phases—establishing direction, focusing on strategy development, and institutionalizing the strategy. Finally, the consequence or initial outcome of the strategy formation and implementation is discussed.

Antecedent Condition

In Ecuador, the need of a capital market to finance the productive activities and allow for a more dynamic creation of enterprises by efficiently channeling capital from savers to companies originated the establishment of two stock exchanges in 1969, Bolsa in Guayaquil and another in Quito. These stock exchanges were established under the sponsorship of the World Bank, the Ecuadorian Securities Commission, and the National Finance Corporation—a private entity that finances private sector development projects in Ecuador.

In 1993, under the promulgation of the Capital Market Law, this picture changed. The law targeted development of an efficient, organized, integrated market that strongly emphasized full and fair disclosure and safeguarding investors' interests. The Capital Market Law provided the judicial framework for transforming the securities market and regulating the activities of the institutions involved with it—exchanges and brokerage houses, public offers, issuers, and intermediaries. The first step in the renovation process was to transform the Guayaquil and Quito exchanges into civil nonprofit organizations that were empowered to autoregulate themselves and to issue rules and regulations to control and monitor the operation of the securities market. After this transformation, Bolsa began its operations, which were conducted by distinguished personalities from the Ecuadorian business community on its board of directors. This board appointed one of its members, Enrique Arosemena, as Bolsa General Director. Since then, institutions wishing to negotiate in the stock market had to become members of Bolsa by paying membership fees. By mid-1990, 27 brokerage houses were members of Bolsa, and 96 issuers of security titles from the private-sector issuers and five from the government sector were listed with the Bolsa.

Upon the issuance of the Law of the Securities Market, Bolsa also began an accelerated transformation process in technology, operations, information dissemination, and administration, and pursued the creation of revenues for the institution, independent from operations. Arosemena believed that the survival of the institution could not depend exclusively on revenues derived from transaction commission.

In the mid-1990s, the most significant challenge Bolsa faced was the decline of investor confidence in response to Ecuador's slumping economic performance. The country's economy had suffered a series of adverse shocks, as shown in Table 1. Despite several attempts at stabilization and structural reform, inflation had risen, and savings and investment rates had declined. Failure to reestablish sustainable economic growth and the government's inability to meet the basic needs of the population were reflected in stagnant living standards and deteriorating public services.

Arosemena recalled his thoughts when, during the period of national turbulence, he accepted the challenge to modernize Bolsa.

> The way I saw it, we had two options. The first one was to sit in the shadow and wait until the investment environment became stable and the conditions were appropriate. The second option was to gain time, weather the storm, and get ready for times when the external factors would enable us to attract foreign investment. We followed the second option. We had only 18 people, no resources, and the money collected from transaction fees was insignificant. We had to develop the Ecuadorian stock market without an economic boom, and we had to self-support our operations and innovations.

The precarious economic situation in Ecuador required management to build an organization that could respond quickly to opportunities and threats. Arosemena explained:

> I always tell my management team, "we have to keep asking ourselves, what would happen if there was an economic boom in Ecuador? Are we going to be prepared to be there? But at the same time, we must think, what would happen if another crisis or period of instability took place? We always have to be ready. We must create new products and services, open new opportunities, execute them with high quality, and get ready to attract foreign investment."

To be prepared, according to Arosemena, meant understanding the market and providing innovative products and services with world-class quality to attract international investment and to earn national and international credibility. He was aware that learning occurs through observation as well as reflection and internal analysis. "Some of the most interesting ideas," he explained,

Table 1 Ecuador's National Context Factors (1995–1998)

Date	Context Factors
January 1995	An armed conflict with Peru over 49 miles of unmarked border broke. Although the conflict ended on February 17 of that year, uncertainty over future conflict caused interest rates to rise.
August 1995	An electric power rationing program left businesses without electricity as many as 16 hours per day, generating huge losses.
September 1995	Discussions among the country's business leaders and the Ecuadorian authorities about the fiscal gap generated during the conflict fueled further distrust and uncertainty when then Vice President Alberto Dahik fled to Costa Rica to avoid charges of misusing "discretionary funds" supposedly intended for national security purposes.
January 1996	Abdala Bucaram was elected president in 1996. His postelection economic recovery program, however, included hefty increases in the subsidized prices of cooking gas, electricity, and gasoline, which hit Ecuador's poor majority particularly hard.
February 1996	With Ecuador paralyzed by a general strike, backed by business as well as labor, Congress voted to depose Bucaram. Vice President Rosalia Arteaga briefly assumed power with the support of the army, but Congress exploited a loophole in the constitution to appoint its own speaker, Dr. Fabian Alarcón.
November 1997	El Niño began to damage the national infrastructure and intimidate investors. Extensive flooding in all the coastal provinces carried away houses, roads, and bridges, leaving banana and cocoa plantations under water and shrimp farms awash.
May 1998	Large bridges and over 2,500 km of roads had to be rebuilt at an estimated cost of $800 million. Farmers lost $1 billion in output. On top of that came the unquantifiable cost of disruption to transportation. Trucks stood in interminable queues where roads and bridges had been washed away.
June 1998	Inflation was 35.9%. The political system was in chaos: 14 parties held seats in the 82-member Congress; power struggles (notably between Guayaquil and Quito) separated the parties; and there were frequent clashes between the legislative and executive branches of the government. In addition, Alarcón's government had adopted a minimalist economic program, putting off major decisions until the next election in August 1998.

"have come from observing our surroundings." Recalled Bolsa's systems director:

> Bolsa never economized on field trips to understand particular issues and specific processes that we wanted to improve in Ecuador. For example, the operations director visited the stock exchanges in Mexico, Colombia, Peru, and New York. The projects director went to Peru and I visited exchanges in Colombia and Chile. In addition, Bolsa officers regularly attended international events such as the meetings and assemblies of the Ibero-American Stock Exchanges Federation. On our return, we would always discuss what we learned with the rest of the group.

By the end of 1996, Bolsa had 75 employees. Its products and services reflected four principal mandates: to provide information about the stock market, to develop a stock market culture in Ecuador, to ensure the security of the market participants, and to enhance the image of Ecuador's stock market and Bolsa in the global investment community.

In relation to information technology, before 1993, only isolated efforts had been made to maintain electronic records of the various transactions at Bolsa. The use of information technology to support Bolsa's modernization was part of Arosemena's initial vision for restructuring the organization. Recalled Bolsa's operations director:

> When I first arrived, Bolsa had one Unix-based computer with only four terminals. Two terminals were located in accounting and two on the trading floor. The only applications that existed supported back office operations such as accounting. The source code of these applications didn't exist, and only one person worked in the systems area. That person wrote programs and maintained the existing systems.

Fully aware of its lack of resources and technical knowledge, in mid-1994, Bolsa decided to establish a strategic alliance with DATATEC, a small software-development firm focused on supporting automation to financial service institutions. DATATEC brought to the partnership a fully functional electronic trading floor system and a communication network that linked to the major players in the Ecuadorian financial services community; Bolsa brought its stock exchange expertise. In addition, five systems analysts were hired to begin developing applications to support Bolsa's internal management and operations, and all the employees of the

various market institutions were assigned e-mail addresses and given access to the Internet. In early 1996, Bolsa contracted with a graphic design company to create its first home page, containing approximately 30 pages of information about Bolsa (in both Spanish and English). By mid-1997, Bolsa had 100 personal computers connected to an Ethernet network.

Phase 1: Establishing Direction

In June 1997, Arosemena participated in an executive seminar on electronic commerce conducted at an Ecuadorian business school. That seminar and a second meeting with the presenters convinced Arosemena that the Internet could be used for more than just presenting static information.

Bolsa's operations director commented, "Our interest in expanding our Internet presence and use was consistent with what we had seen during trips to other stock exchanges, particularly in New York, Chile, and Venezuela." Corroborated Bolsa's systems director, "Earlier that year I had attended an Iberoamerican Federation Stock Market meeting where the Chilean stock exchange presented a study that they had done on the potential use of the Internet in the stock market."

Once the decision was made to develop a more encompassing Internet initiative, a committee of Bolsa directors met to define the vision and the products and services that would be needed to accomplish that vision. The project was named "Mundo Virtual." A member of this committee recalled:

> We began by analyzing our existing website. It was not until then that I realized that our website was being visited on an average of 30 times per day. The most visited section of the site was the most dynamic part of our website—stock-market prices and transactions, which were updated at the end of each day. On the other hand, very few visits were made to the sections that provided static information—for example, investment banks and share issues—which had a simple list of telephone numbers and addresses of companies.

Adopting the notion that a firm should sell to the most profitable buyers, the committee focused on understanding how to use its website to attract them. Industry analysis was used to determine which types and forms of information products to provide. Explained a committee member:

> Given that potential domestic and foreign investors were our targeted group, we recognized that to invest in Ecuadorian companies detailed knowledge is required—not only about transactions and stock prices in the exchange market, but also about the particular company's financial conditions. Information on Ecuador in general, chiefly macroeconomic data and political news, is also needed. It also occurred to us that we should use the Internet to educate people and get them interested in the stock market. The Internet capabilities provided great opportunities for visitors to learn about the topic at their own pace.

After selecting the targeted stakeholder group, the committee identified primarily investment banks, bond brokers, and fund managers as key information providers for their website. It also developed a set of goals for Mundo Virtual: to promote a positive image of Ecuador, enhance the image and increase the visibility of Bolsa, improve Bolsa's customer service, distribute educational materials on stock market related topics, reduce the costs of matching buyers and sellers, and increase stakeholder communication.

Phase 2: Focusing on the Strategy Development

Mundo Virtual became Bolsa's primary business development project. Its steering committee reasoned that a visitor who had read information provided by Bolsa might want to know more about specific institutions negotiating in the Ecuadorian stock market, and that Bolsa's website could provide space for those institutions' information and advertisements. Thus, a visitor to Bolsa's website who clicked on an institution's logo was presented with three pages of targeted, specialized information about the institution. These pages were to include tools that would enable customers to interact with the institution (e.g., to place preliminary orders for buying/selling of fixed and variable notes). Sponsors would be able to lease space (monthly, biannually, or annually) and select the page and position of their advertisements on Bolsa's website.

Mundo Virtual's steering committee met daily to coordinate and monitor activities so that deadlines would not be missed. Bolsa's project director recalled:

> By the end of July 1997 the systems director and I developed a timetable for all the necessary activities to launch Mundo Virtual. There were three main check dates. On August 5, we were to begin visiting potential clients. To achieve this goal, we knew we had to have a prototype of the website, with appropriate public information from our potential clients. On September 5, we were to present the prototype of the new website to the participants of the XXIV Assembly of the Ibero-American Federation of Stock Exchanges [an event hosted by Bolsa that year]. On October 1, Mundo Virtual was to be online and ready for use.

In addition to computer and people costs, the Mundo Virtual project also required investment in two LANs and specialized software for the website development (MS Front Page) and database management (WebConnection and MS Visual Studio Enterprise 97). WebPromote, a United States firm, was contacted via the Internet to ensure that the address of Bolsa's website appeared in the listings of the Internet's 200 most searched directories

and search engines. A cooperative contract with Ecuanet[4] gave Bolsa a preferential tariff for a 64 Kbps Internet connection; in return, Bolsa offered to present Ecuanet as a strategic partner in Mundo Virtual. Ecuanet provided marketing and technical consulting for the implementation of Mundo Virtual and for website development for other stock market participants; it also offered project participants preferred prices for installing Internet connections.

Phase 3: Institutionalizing the Strategy

Arosemena placed great emphasis on selling Mundo Virtual as a way to build traffic to Bolsa's website. He explained:

> We were aware that our Virtual World clients had a very important role to play in the promotion of Mundo Virtual. If the investment banks, issuers, and fund managers communicated to their clients the benefits of using Mundo Virtual to monitor financial and institutional information and, later, to make safe paper orders, undoubtedly the volume of visits would increase.

The committee identified important websites that were related to Ecuador and international stock markets and, in accord with Bolsa's goal of promoting Ecuador's image, linked Mundo Virtual to these pages. Invitations to visit Bolsa's website and to link their websites to Bolsa's were sent to all these institutions. Bolsa used a list of individuals who had responded to *Financial Investor* magazine's special report on Ecuador as a basis for sending 1,300 letters announcing the launch of its website. A press conference was held to present the website to the media, and two of the main Ecuadorian newspapers, *Universo* and *Hoy*, a current events magazine, *Vistazo*, and a financial magazine, *America Economia*, published bulletins advertising the launch.

Arosemena and Bolsa's systems director managed and executed the sales campaign directly. "We roped in some heavyweight local bankers to push the sales campaign," explained a Bolsa officer. Bolsa's systems director added:

> We scheduled appointments with the general managers of the main issuers of financial papers that have a major presence in Bolsa, starting with the ones in the financial industry. . . . A typical sales meeting lasted around one hour, and we presented the objectives and characteristics of Mundo Virtual. One of every two people we visited contracted for space in Mundo Virtual, and specified the places where they wanted the link to appear on Bolsa's website. Mundo Virtual was perceived as an instrument for exposing Ecuador. We were becoming a window to the world.

Within Bolsa, "we soon realized that to maintain the website it was necessary to have a full support group to keep the data updated and follow up on the quality of products and services," acknowledged Bolsa's operations director. By the end of 1997, Arosemena thought it was time to formalize Mundo Virtual and involved more people at the staff level. Four subcommittees were formed: Innovation (to analyze ways to improve the website), Information Products (to automate the information acquisition process and the search for new information products), Commercialization (to develop a more aggressive sales campaign), and Quality Control (to improve product presentation and to ensure quality processes). The subcommittees were required to meet weekly with the Mundo Virtual steering committee. A computer engineer with 15-years' experience developing financial information systems was hired as the new systems director. He immediately began working on a data warehouse project with the objective of automating Bolsa's databases in order to make them available through the Internet in the near future.

Consequence: The Electronic Commerce Strategy's Results

All the planning deadlines were met on time; Mundo Virtual was launched October 1, 1997. By the end of 1997, income from paid-in-advance annual contracts was enough to pay for the development of Mundo Virtual, with a surplus of $72,600. In addition, on December 18, 1998, the Ecuadorian Congress and the Chamber of Production recognized the Guayaquil Stock Exchange in a public ceremony for its excellence in "promoting development of the national securities market and our country in the international market in order to foster foreign investment." According to Arosemena, "the development of Mundo Virtual was key for that accomplishment."

More importantly, however, as Arosemena explained, "we emerged from this process with a view of the industry and Bolsa's role that was substantially broader, more creative, and more prescient that it had been months earlier. This view was held not only by a few technical gurus or corporate visionaries but by every Bolsa officer." Another Bolsa director explained: "Through this exercise we improved our ability to see our everchanging environment and respond quickly to customer or market demands, and to incorporate new ideas and technologies into our products while preserving consistency with Bolsa's image and customers' expectations." Furthermore, as a member of Bolsa Board of Directors explained,

> The Internet represents a very important competitive opportunity for us. It provides a constant presence. It is providing us with an even greater advantage over the stock exchanges of other small countries. If there were 20 countries, all of which had instability in their national contexts, by providing information about our stock market, we should be able to reach foreign investors more easily.

A brief review of these results might suggest a limited success for an electronic commerce strategy. As research has shown, however, building a new value-creation strategy is a complex process that may take a long time to achieve competitive advantage (see, for instance, Oliver 1997). By the end of this research study, Bolsa had developed potentially valuable new capabilities supporting an electronic commerce strategy capable of meeting its new objective—And this is not a small achievement, especially in the field of information technology.[5] Additionally, even within a short time, the new offerings had created value to command gains exceeding costs.

It is important to emphasize here that a firm that has created capabilities supporting a new strategy has not necessarily created competitive advantage. The new strategy, then, may be conceived as a *potential* competitive advantage (Teece et al. 1997). It represents Bolsa's ability to do something it could not do before the innovation was attempted. It is also important to note that distinctiveness (vis-à-vis competitors) was at the heart of the strategy developed at Bolsa. Distinctive (firm-specific) resources and capabilities directly supported the process described above generated idiosyncratic insights, idiosyncratic resource combinations, and idiosyncratic routines at Bolsa that competitors could not easily match or imitate (Nelson and Winter 1982).

In the next section, the case is interpreted from the resource-based view of the firm, putting particular emphasis on the development of the capabilities that allowed Bolsa to achieve these results despite various obstacles in a highly volatile business environment.

Discussion: Revisiting the Findings in Light of the Resource-Based View

The case study shows that the formation and implementation of the electronic commerce strategy at Bolsa was an evolving process that was cumulative and expansive, but very dependent on the way capabilities and resources were marshaled, coordinated, and nurtured. Based on the case and the findings that emerged, a process model of capability development was produced, as depicted in Figure 1. Given that this model was inductively derived from the Bolsa case study data, it is appropriate to ask whether the existing literature on resource-based view of the firm corroborates the model and in what ways the model enriches our present understanding of capabilities development. To begin addressing these issues, the case data must be revisited in light of the existing resource-based view of the firm literature.

Capability Development as an Emergent Process

The case of Bolsa reveals that the capability development in support of a new strategy is a gradual process (rather than a sudden event) that is cumulative and expansive. While there may be a turning point at which capabilities can be retrospectively seen as having given a firm a strategic advantage, there is no single point in time at which they magically appear.

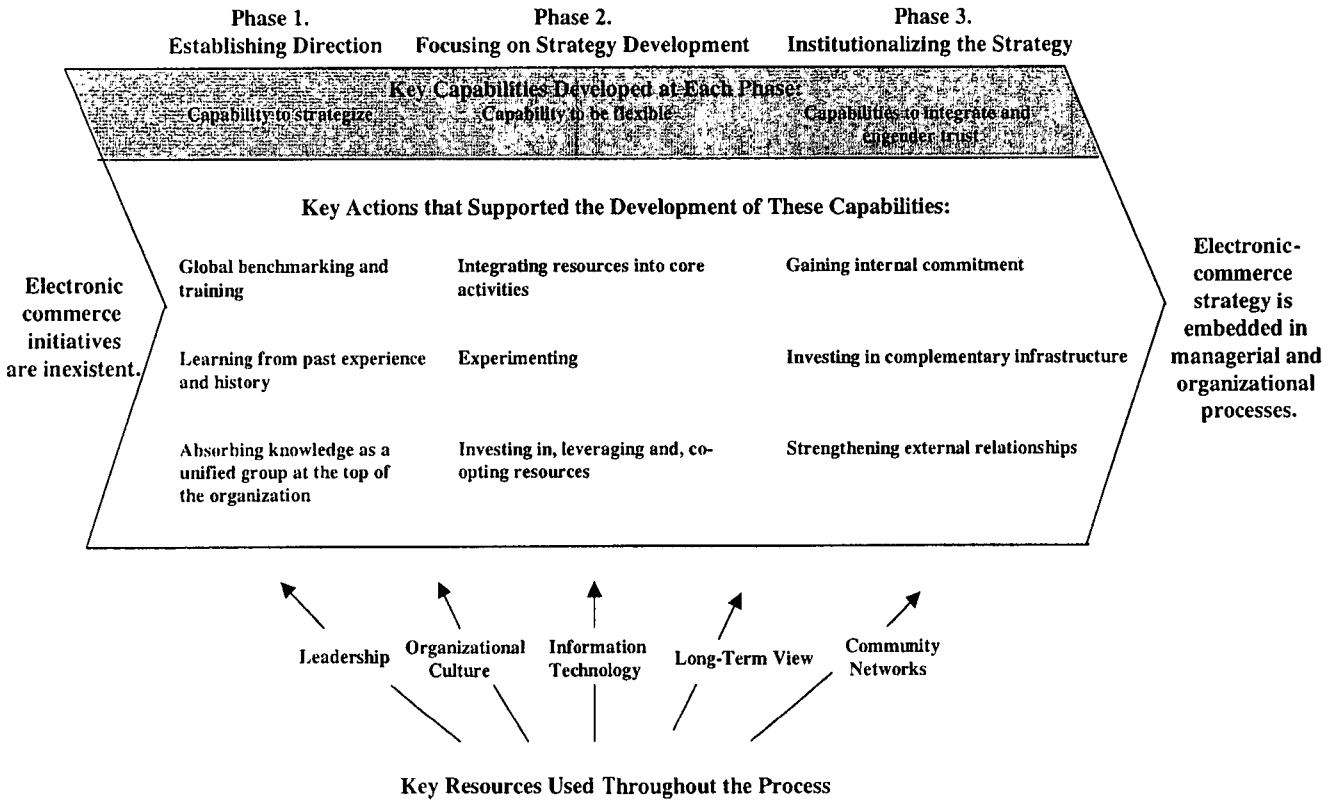
As the resource-based view of the firm theory suggests, many dimensions of a firm and its environment must be understood if one is to grasp the distinctive factors that enable it to create competitive value (Barney 1997, Oliver 1997, Teece et al. 1997). The general form of the model derived here represents three distinct developmental phases, each of which involves certain external, organizational, and technological resources (assets and competencies). These resources are associated with context-specific decisions that foster the emergence of specific capabilities. The antecedent for the process is the firm's existing resources (position) and the inherited path (Teece et al. 1997). The model depicts the process as dynamic: constrained by the firm's position in the antecedent episode, yet capable of constructing new routines. Firm-specific resources and the emerging capabilities are the basic theoretical constructs of the model and are measured by observations of the adopted path. Each phase involves one or more key resources that shapes the development of a firm capability and makes it stand apart from other capabilities. Like other process models, this one makes no attempt to provide precise predictions concerning the outcome or time scale during which capabilities will develop (Mohr 1982).

Key Resources Used Throughout the Process

The strategic posture of a firm is determined not only by its processes and by the coherence of its internal and external processes, but also by its specific resources (Teece et al. 1997). At Bolsa, the key existing resources that determined the way in which the electronic commerce strategy was formed and implemented included Arosemena's leadership, the organizational culture, information technology, a long-term view, and social networks.

Leadership. The leadership of Enrique Arosemena was crucial for the changes that took place at Bolsa throughout the electronic commerce strategy formation and implementation. Even during a period of national turbulence, he accepted the challenge to modernize Bolsa. In the first phase of this process, Arosemana did not begin with a grand plan of the process or a complete picture of where Bolsa's electronic commerce strategy was headed when he took the decision to innovate and move toward a new technological solution as "another way to reach Bolsa's customers." In the second phase, he articulated and described

Figure 1 **A Grounded Model of Capability Development in Support of the Electronic Commerce Strategy at Bolsa**



the immediate steps that were manageable, and this articulation set a force into action. In the third phase, his leadership was crucial in ensuring cooperation and support not only from Bolsa's multiple functional units, but also from company members of Bolsa. This finding is in line with Prahalad and Hamel (1990), who suggested that strategic renewal depends on the strategic intent of the CEO or corporate management based on industry foresight, and with Day (1994), who stated that the direct role of top management is often crucial, especially in strategic renewal projects that require substantial resources during development and cooperation across multiple business units.

Organizational Culture. Organizational culture has been identified as an important influence in the process of capability development (Oliver 1997). It becomes the context in which idiosyncratic routines become established—interactions among individuals become routinized, and this routinization contributes to the many subtle behaviors and beliefs that further contribute to inimitability (Hofstede 1991). At Bolsa, as the case data show, group work, experimentation, and innovation were firmly embedded practices, especially among senior managers. Although these embedded practices were used throughout the electronic commerce strategy formation and implementation, they existed prior to this process. Recall that Bolsa's system director praised the firm's willingness to fund field trips. Furthermore, Bolsa had created a profit-oriented, socially responsible, and caring company culture. Employees understood the need to create revenue in order to survive, but they were also passionate about Bolsa's mission to disseminate information about Ecuador to Ecuadorians and to those outside the country.

Information Technology. The management team at Bolsa—and Arosemena in particular—believed fundamentally in the leverage of technology with business to provide the flexibility to maneuver in an unstable economic climate. This is particularly challenging in developing countries, where the types of resources required to adopt information technology, including managerial, technical, and financial resources, are very scarce (Jarvenpaa and Leider 1998, Montealegre 1997, 1999). When Arosemena became Bolsa's general director in 1993, Bolsa had only one computer with only four terminals and one computer programmer. As the case data suggest, in the first phase of the electronic commerce strategy formation and implementation Arosemena

moved adroitly to secure and facilitate the development of these resources. In the second phase, he established an important strategic alliance with DATATEC to develop and operate an electronic trading floor system. In the last phase, specialized information technology infrastructure (including data warehouse hardware and software) was acquired. These accomplishments signal the strategic significance attributed to information technology at Bolsa. This is in alignment with the prior resource-based view of the firm research on information technology suggesting that since investments in information technology are easily duplicated by competitors, investments per se do not provide any sustained advantages. Rather, it is how firms leverage their investments to create unique information technology resources and skills that determine a firm's overall effectiveness (Clemons 1991).

Long-Term View. Strategic intent requires a long-term view and commitment to a long-term vision (Hamel and Prahalad 1991). Miyazaki (1995) found that long-term actions of Japanese and European optoelectronic firms influenced their development of assets and competencies. Similarly, because Bolsa took a long-term approach throughout its electronic commerce strategy formation and implementation, it was able to invest in innovations even at times of high national turbulence and persevere in developing an information technology infrastructure within the underdeveloped national infrastructure. A long-term view was also required to develop and nurture stock market awareness in a country with no stock exchange tradition and little stock market demand and supply.

Social Networks. Eisenhardt and Schoonhoven (1996) complemented the resource-based view by focusing on firm strengths that are embedded in social structures within the firm and across firms. Social networks have been found to be particularly important in societies that, like Ecuador, emphasize interpersonal relationships and strong group affiliations (Hofstede 1991, Jarvenpaa and Leidner 1998). An important aspect of Bolsa's institutional fabric was the cultivation of strong relationships with stakeholders inside and outside Ecuador. Since 1996, Bolsa has offered educational programs on stock market operations to officers of various institutions, high schools and colleges, and the general public. In addition, Bolsa regularly provided articles analyzing financial and stock market issues to newspapers and the general press, and conducted seminars to educate journalists on these matters.

Capabilities Developed in Support of Bolsa's Electronic Commerce Strategy

The path a firm has traveled often shapes its current position, which in turn molds its future path (Teece et al. 1997). At Bolsa, the management team did not begin with a grand plan or a complete picture of their final electronic commerce strategy, but merely with a general understanding of the Internet's potential. As Figure 1 shows, during the initial phase of strategy formation, management developed the capability to strategize, in which it was able to perceive broader opportunities and work toward using the Internet to attract external investors and educate local ones about the Ecuadorian stock market. The actions that contributed to the development of the firm's capability to strategize included global benchmarking and training, learning from past experiences and history, and absorbing knowledge as a unified group at the top of the organization. In the second phase, the management team identified and linked essential business processes to serve its main customers' needs. Bolsa achieved its strategy not by outspending other companies, but rather by integrating resources into core activities; by experimenting; and by investing in, leveraging, and co-opting resources from its external and internal contexts. These actions contributed to the development of the firm's capability to be flexible. Finally, in the third phase, the management team reshaped the organization—including external relationships and internal roles and responsibilities—to diffuse and mobilize support for the new initiative internally and externally as well as to gain a critical mass of users. The firm's capabilities to integrate and engage trust were critical in this final phase. These capabilities were developed by gaining internal commitment, investing in complementary infrastructure, and strengthening external relationships. This finding is in agreement with Jarvenpaa and Leidner's (1998) conclusion that capabilities to strategize, be flexible, and engage trust are key organizational competencies in developing countries. They provided empirical evidence that those dynamic capabilities enabled a Mexican information company to influence its environmental contingencies and constraints, although they did not analyze the process of developing these capabilities.

Key Capability Developed in Phase 1: Capability to Strategize

Phase 1 of the model involves establishing direction. For a firm to realize rents from an innovation, it must be able to reduce uncertainty in ways that are specific to it, while the uncertainty of its competitors remains (Amit and Schoemaker 1993, p. 40). In other words, by establishing direction for a strategic innovation a firm can develop unique insight into the future, which is opaque to competitors. So the first condition of the model is a perceived need or opportunity of sufficient proportion to capture the attention of a sponsor group. The capability to strategize,

which is based on deep insights into trends in industry, business, technology, demographics, and regulations as well as internal core capabilities and resources (Hamel and Prahalad 1994), is critical in rewriting the company's rules and creating new competitive space. Understanding the potential implications of such trends requires creativity and imagination, but also the encompassment of many people's visions. During this phase, a decision maker in a position of responsibility and authority becomes aware of a particular opportunity and decides to evaluate it further. Her/his primary role at this phase is to foster conditions that will let management capture and exploit the knowledge that already exists throughout the organization. The strategic significance of this role recalls Alchian and Demsetz's (1972, p. 793) point that "Efficient production with heterogeneous resources is a result not of having *better* resources but of *knowing more accurately* the relative productive performances of those resources." Unique insight is thus an important determinant of the firm's ability to garner rents.

At Bolsa, Arosemena had a general awareness about the Internet's potential. However, rather than just jumping onto the Internet wagon, he assigned a multifunctional committee of Bolsa directors, reporting directly to him, the task of investigating the competitive situation and designing an "Internet product." The committee enacted a shared view of the future of electronic commerce at Bolsa by pulling together the collective wisdom about existing processes and products, by focusing on the specific demands of their key investors, and by learning about the potentials of Internet technologies. As the members of the committee grasped the potential of the Internet as a communication medium, they realized that this was not just another new product initiative. Thus, they redefined Arosemena's first idea of a stand-alone "Internet product" into an initiative integrated with existing products and processes. They crystallized this new approach in a strategy aimed at exploring the interactive capability of the medium to attract foreign investors while securing revenues from Ecuadorian institutional sponsors.

Among the key resources that facilitated the development of the capability to strategize at Bolsa were Arosemena's leadership and Bolsa's organizational culture, information technology, and long-term view as well as specific actions including global benchmarking and training, learning from past experiences and history, and absorbing knowledge as a unified group and the top of the organization. As discussed below, each of these actions enhanced learning by top managers, who were wrestling with the new technology and considering its implications.

Global Benchmarking and Training. Oliver (1997) suggests that ongoing global benchmarking and training are critical to obtaining and enhancing resources. As the case emphasizes, management at Bolsa, including Arosemena, worked hard to ensure a steady flow of new ideas, even if they had to be imported from outside the organization. They attended educational and training programs, participated in and hosted conferences, were exposed to other leaders and educators, visited other stock exchanges, and developed an understanding of work practices and technologies. These managers then brought what they had learned back to the company and applied it to daily operations.

Learning from Past Experiences and History. Knowledge gained from past experiences is instrumental in achieving subsequent successes (Maidique and Zirger 1985). In addition, learning implies path dependency and specificity in the resulting capabilities, and consequently, it is one reason these capabilities are not inimitable. At Bolsa, to better understand the opportunities the Internet could bring while avoiding problems incurred in the past, senior managers devoted the initial part of their planning to evaluating their existing products, services, and processes. Furthermore, the statistics on their initial Web page provided valuable insight about the amount of traffic and type of customers that were being attracted. As Dosi and Marengo (1992) point out, "Assets and competencies represent the problem solving features of particular set of organizational interactions, norms and to some extent explicit strategies. Competencies are subject to learning and change through their very application to actual problem solving."

Absorbing Knowledge as a Unified Group at the Top of the Organization. Another key action in this phase was the creation of a high-level committee as a shadow organization paralleling the actual operation of Bolsa. A multifunctional group of directors, including the CEO, met every day for two hours to work specifically on this initiative—It became a small part of many people's jobs, instead of a large part of a few. The group became a forum that examined the characteristics of the Internet, reflected on the needs of Bolsa's stakeholders, assessed existing products and cross-functional processes and systems, and planned the new strategic initiative.

Key Capability Developed in Phase 2: Capability to Be Flexible

Any innovative idea must be translated into actions if it is ever to capture rent. In Phase 2, given an increased understanding of the strategic direction, leaders focus on the strategy and implement the initiative, typically a prototype or a limited solution, to exert an impact on a reduced domain. If the initiative yields benefits, there is

evidence that potentially valuable new resources and capabilities are being developed, and leaders are encouraged to expand their efforts (McGrath et al. 1996). Managers at Bolsa began to search for alternatives to put an electronic commerce strategy in place, as their understanding of the Internet potential increased and their awareness of the existing resource constraints became clearer. The management team soon realized that this would require far more resources than could be mustered by a small company like Bolsa. The stretch, as Hamel and Prahalad (1993) call the misfit between resources and aspirations, was the single most important problem faced by Bolsa's management team at the beginning of this phase.

Hamel and Prahalad (1993) propose that innovations are sparked by a stretching strategic intent. Chakravarthy (1997), on the other hand, claims that it is difficult to define an enduring strategic intent in a uncertain environment—an intent may lock the firm into an investment path unsuitable to its environment. He advises that a more flexible approach requires constant experimentation. A firm with flexibility can not only respond to environmental changes, but also influence or even control them (i.e., control capacity of the management) (Volberda 1996). Strategic flexibility is the capability of a firm to prepare for the execution of a strategy, while being highly responsive to surprises (Jarvenpaa and Leidner 1998). Thus, the capability to be flexible depends on the control capacity of management and the changeability of the organization (Eisenhardt and Martin 2000). At Bolsa, the capability to be flexible played a central role in this phase of the electronic commerce strategy formation and implementation. As described below, integrating resources into core activities was crucial in setting clear goals and detailing plans (control capacity of management). On the other hand, experimenting; and investing in, leveraging, and co-opting resources inside and outside the firm enabled Bolsa to develop its electronic commerce strategy without locking the firm into an investment path unsuitable to the unstable economic climate in which they were immersed (changeability of the organization).

Integrating Resources into Core Activities. After the decision had been made to proceed with the Mundo Virtual project, management's main concern was ensuring that the work itself was not neglected in the confusion of Bolsa's day-to-day operations. Thus, Arosemena assigned a high priority to Mundo Virtual—it became a strategic focal point of Bolsa. Well-defined goals and a detailed plan with clear deadlines were laid out. Resources were not to be squandered on competing projects, and the same high-level, cross-functional committee was assigned to keep the project moving. The essential part of the plan was to push the company to reach the goal. If people focus quickly on clear goals, they spend more time looking toward the future and less time stewing about the past—a critical fact in societies, like the Ecuadorian, that have strong traditions of honoring and celebrating the past (Hofstede 1991). This is in agreement with the findings by Miyazaki (1995), who found that successful Japanese and European optoelectronic firms tended to integrate initially into a few closely related distinctive activities.

Experimenting. Dosi and Marengo (1992) claim that asset and competencies building is affected by the firm's ability to improve task performance though trial-and-error experimentation. Rather than developing a detailed, full-fledged electronic commerce strategy, Bolsa managers began with a demonstration prototype. Although the new initiative was not a sharp break from the past, the product was different from what they had offered in the past and what the Ecuadorian market had seen. As a first product, the prototype embodied principles and approaches that Bolsa hoped to provide through the Internet on a larger scale. Furthermore, this test-drive approach enabled Bolsa to speed up analysis and lower the chances of major errors, just as it would in new product development.

Investing in, Leveraging, and Co-opting Resources. In seeking to get the most out of the existing resources, Bolsa developed a panoply of initiatives that included leveraging its own resources, investing in key technological resources, and co-opting resources available outside the organization. During this phase, for example, Bolsa made important investments in hardware and software, and arranged to include several of its own information-based products in the prototype. Furthermore, it partnered with WebPromote and Ecuanet to co-opt critical marketing and technical expertise as well as infrastructure elements. Even when Bolsa didn't own every link of the capability chain, it worked to tie these parts into its own Mundo Virtual initiative. This ability to share, combine, import, and exploit assets and competencies in the pursuit of new opportunities is in agreement with resource-based view of the firm approaches put forward by Chakravarthy (1997) and Hamel and Prahalad (1993).

Key Capabilities Developed in Phase 3: Capabilities to Integrate and Engender Trust

Phase 3 involves institutionalizing the strategy. The strong strategy-development capabilities developed during the previous phase required an equally strong capacity

to produce and deliver products and services with a sufficiently widespread distribution and with adequate support from the organization. At Bolsa, the capabilities to integrate and engender trust became critical in this phase. Strategic integration is a capability by which managers pool various business and personal skills and functional backgrounds to create revenue-producing products and services (e.g., Clark and Fujimoto 1991, Dougherty 1992). Knowledge had to be spread quickly and efficiently throughout the organization, and the new initiative had to be integrated with the rest of the organizational processes, but also exert influence over a broad spectrum of potential clients and partners. Until the beginning of this phase, however, knowledge about the electronic commerce strategy was held locally within the top management committee. The capability to integrate that enabled the committee to diffuse this knowledge through the existing organization was facilitated by Bolsa's long-term view, information technology, and organizational culture, as well as by specific actions directed toward gaining internal commitment and investing in complementary infrastructure.

On the other hand, the capability to engender trust is a capability where history, or path dependence, matters (Teece et al. 1997). Information coming from unknown sources (such as new websites) might be seen as having negligible value and lacking in trustworthiness (Jarvenpaa and Leidner 1998). At Bolsa, Arosemena's leadership; the firm's history of promoting a positive image of Ecuador and helping to nurture stock market awareness; the strong networks with large, powerful, and technologically savvy institutions in the banking industry; and Bolsa's track record as providers of trustworthy, reliable, and uncompromised information from the Ecuadorian stock market were critical in developing the capability to engender trust. The firm's specific action of strengthening external relationships to complement the new strategy was also critical in developing trust.

Gaining Internal Commitment. Newly formed capabilities have limited value as long as they reside only within the firm's top management team. As Nelson and Winter (1982) suggested, they become more valuable as they are vested in the collective skill sets of many employees or within special routines embedded more broadly in the firm's operations and knowledge base. Emphasizing the importance of integrating the new electronic commerce strategy throughout the rest of Bolsa, Arosemena appointed four firmwide working groups: one to analyze various ways to improve the Web site design, the second to automate information acquisition and search for new information products, the third to develop a more aggressive sales campaign, and the fourth to improve product presentation and ensure quality processes. Arosemena urged the various groups to meet once a week with top management to ensure coordination, which also enabled the now-experienced top managers to distill what they had learned and diffuse it across the company.

Investing in Complementary Infrastructure. To further integrate the electronic commerce strategy within Bolsa's operation, an experienced computer engineer was hired as the new systems director. In addition, new data warehouse technology was acquired in order to automate Bolsa's databases and make them available through the Internet. Research has suggested that apart from organizational routines, competencies may be embedded in instruments, testing equipment, and other hardware (Miyazaki 1995). It has also been suggested that the acquisition of complementary technological resources can help direct a firm's evolutionary path (Teece et al. 1997).

Strengthening External Relationships. The role that external elements of the environment, such as customers, competitors, and governments, play in affecting the rate and direction of asset and competency building has been examined by several authors (see, for example, King et al. 1984, Langrish et al. 1972). Bolsa's reputation for providing trustworthy information-based products and services and the existing relationships that Arosemena had with the top managers of major banking institutions were instrumental in commercializing this type of service, which was new in Ecuador. In addition, during this phase Bolsa also began developing important relationships with companies hosting Web sites and publications associated with Ecuador as well as with international stock markets. These relationships were useful in identifying potential clients and users, and in helping Bolsa to complement its Web site content.

Implications

The process model of capability development presented here has important implications for both research and practice. While some of the actions that were key in developing capabilities at Bolsa were deliberate and intended, others evolved as learning and capability accumulation took place. This does not mean, however, that actions that are useful in developing capabilities occur in a random fashion; there does appear to be a patterned sequence of phases that takes place along the road to capability development. Indeed, the contextualized actions and decisions made by Bolsa management proceeded

over time with no predetermined endpoint. What was observed in the Bolsa case is characteristic of an emergent process, the outcome of which is unpredictable.

For researchers, this study is significant in that it represents one of the first in-depth case studies of how capabilities are developed over time. Past research on the resource-based view has tended to focus on attributes of firm's capabilities and on strategies for exploiting of existing firm-specific capabilities. The dynamic capabilities approach extended the resource-based view of the firm to emphasize the exploitation existing internal and external firm-specific resources to address changing environments while also inviting consideration of managerial strategies for developing new capabilities (Wernerfelt 1984). Following this approach, a handful of studies have focused on explaining how capabilities are developed using a variance theory approach. The result has been that a number of capabilities are now believed to be related to how firms can create competitive value from strategic initiatives, but there is no overall model of how some of these capabilities are developed and managed.

This study complements the existing variance research stream by showing how a firm can develop, manage, and deploy capabilities to support the overall process of a strategy formation and implementation. As corroboration of the findings, it is noted that prior resource-based view of the firm literature is largely consistent with what was observed in the Bolsa case. The contribution of this research is in the development of a grounded model that adds a process perspective, allowing a disparate set of capabilities to be tied together into a more coherent model that can serve as the basis for further investigation.

While the process model presented here is grounded in the path that unfolded at one specific organization, Bolsa, aspects of this model should generalize to other cases of strategy formation and implementation. No claim is made that the capabilities and resources presented in this paper are exhaustive. Further research is clearly needed to test the applicability of the model in other contexts; obviously, not all strategies require the same capabilities, resources, and actions. However, as our understanding grows we may learn when (i.e., at what phases in the strategy development) specific capabilities will be most effective. Future studies can examine, for instance, what organizational capabilities enable firms to reduce time in establishing a strategic direction (using, for example, intensive training, global benchmarking, specialized team-based structures, and experience from the past), focus on strategy development (for example, through leveraging and co-opting resources, experimenting, and integrating firm-specific activities), or diffuse and grow a strategy rapidly through the firm (by gaining internal and external commitment through special communication processes, or by investing in complementary infrastructure).

In addition, this investigation focused on a developing country, where market imperfections and resource scarcities of the environment were particularly pressing. Today's business environments, however, are also pressuring firms in developed countries to be flexible, fast, and innovative. Thus, researchers might also conduct comparative studies across strategic groups, industries, or countries to uncover how capabilities development may be enabled or inhibited by different contextual factors. This suggests historical, cross-sectoral, or cross-cultural research designs.

For practitioners, this study provides useful insights into how capabilities were developed, managed, and deployed during the formation and implementation of an electronic commerce strategy. Of course, nearly every company these days claims to be "doing strategic business over the Internet." But there is a qualitative difference in the approaches that have been followed. The Bolsa case underscores the need for managers to integrate their electronic commerce strategy with the organizational processes while employing their resources and capabilities in the pursuit of the strategic objectives. Managers need some awareness of strategies and tactics that can be used to develop the required capabilities via firm-specific resources. The process model presented here provides the basis for a set of normative suggestions that managers could follow to develop organizational capabilities (these are summarized in Table 2).

Summary and Conclusions

Given the changing competitive structure of markets today, there can be no doubt about the value of understanding how managers can develop distinctive capabilities to support difficult-to-imitate strategic initiatives. Prior research in this area has tended to follow a variance theory approach. This study represents a contribution to research in that it articulates, for the first time, a process model that complements the existing variance research stream by showing how capabilities are developed in support of a firm's strategy.

In contrast to much of the existing literature, the formation and implementation of the electronic commerce strategy at Bolsa was neither sudden nor in direct response to existing capabilities. This study suggests that the strategy formation and implementation took place gradually but progressively, requiring over time different capabilities, which were in turn shaped by firm-specific resources. The Bolsa case clearly shows that this process is not a one-act play staged by efficient managers who

Table 2 Suggested Strategies and Tactics for Practitioners to Develop Organizational Capabilities

Capability to Develop	Normative Suggestions for Managers
Capability to strategize	• Ensure a steady flow of new ideas by engaging constantly and systematically in benchmarking and training activities. • Take time and effort to dissect and learn from your own past experience and history. • Develop a shadow organization paralleling the actual operation of the firm to reflect on and analyze the various components of a new strategic initiative.
Capability to be flexible	• Integrating the new strategy into the existing core activities and resources. • Rather than develop a detailed, full-fledged plan for the new strategic initiative, begin experimenting by creating a demonstration project to "test-drive" the initiative. • Move adroitly to develop, co-opt, and secure the resources required in the formation and implementation of the new strategic initiative.
Capability to integrate	• Gain internal commitment by spreading knowledge about the new strategic initiative quickly, and by integrating it into the existing organizational processes. • Invest in complementary infrastructure that would enable further integration of the new strategic initiative with the firm operations.
Capability to engender trust	• Appeal to existing relationships with internal and external constituencies, and strengthen them if needed in order to negotiate and improve the new strategy in ways that will be found acceptable by the various potential users.

rationally visualized early on the specific capabilities and resources required. Rather, it is a process in which managers struggle to understand. In this struggle, there are no predefined scripts or choreographed moves; instead, actions and decisions associated with the development of capabilities, and combinations of external, organizational, and technical resources, emerge as the situation unfolds.

The model derived from this case suggests that capability development in support of a new strategy is a gradual process that is cumulative, expansive, and very dependent on the way that difficult-to-imitate resources and actions are combined. Actions that support the development of the firm's capability to strategize (such as global benchmarking and training, learning from past experiences and history, and absorbing knowledge as a unified group at the top of the organization) seem to contribute the most in the initial phase of the strategy formation and implementation. Actions that help support the development of the firm's capability to be flexible (such as integrating resources into core activities, experimenting, and investing in, leveraging, and co-opting resources from external and internal contexts) seem to contribute the most during the middle phase. Actions that support the development of the firm's capabilities to integrate and engender trust (such as gaining internal commitment, investing in complementary infrastructure, and strengthening external relationships) seem to contribute the most in the final phase of strategy formation and implementation. In addition, the key resources that supported the overall capabilities development process include leadership, organizational culture, information technology, long-term view, and social networks.

The study also contributes to practice by providing suggestions to managers concerning tactics that may prove useful during the various phases of an electronic commerce strategy formation and implementation. The Bolsa case study presents a powerful example of how an electronic commerce strategy can be successfully formed and implemented even in a developing country with poor information technology infrastructure, lack of governmental support, scarce resources, and staff with insufficient technical and managerial skills. Further research into the model described here holds the promise of providing even more meaningful guidance to managers. However, as there are no universal sources of advantage (Barney 1997), additional study is required to understand more fully the dynamics of strategy formation and implementation and the extent to which the findings observed in the Bolsa case can be generalized.

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Endnotes

[1]Electronic commerce strategy is taken here as a technology-enabled business strategy for the economic exchange between parties (individuals, organizations, or both) as well as for the electronically based intra- or interorganizational activities that facilitate such exchanges (Rayport and Jaworski 2001).

[2]In comparison with developed nations, governments in developing countries often exert more influence over industries and companies. Scarcity of resources, inadequate physical infrastructure, and political barriers that modulate and distort market and competitive forces all limit the types of innovation a company can implement. Frequently, a handful of companies exercises a disproportionate amount of power, leading to implicit or explicit market-sharing arrangements and/or ruthless actions against competitors. In addition, the rules of the competitive game are often unclear and unstable, reflecting the underlying instability of the political and economic contexts (King et al. 1994).

[3]During the course of the research, a historical reconstruction of the antecedent phase of Bolsa development was also undertaken. This was useful because it provided a deeper understanding of context and existing resources and capabilities before the electronic commerce strategy initiative.

[4]Ecuanet was a nonprofit Internet service provider, sponsored originally by Banco del Pacifico, that led the adoption of the Internet in Ecuador.

[5]A recent survey of information systems auditors revealed that 30 to 40% of all information technology projects in the United States become entrapped in a failing course of action absorbing valuable resources without ever reaching their objective (Keil and Mann 1997). Although a similar study has not been conducted in developing countries, this percentage is suspected to be even higher there (Montealegre 1997).

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