



United Nations
University

WIDER

World Institute for Development Economics Research

Discussion Paper No. 2003/40

E-business Model Innovation and Capability Building

Stéphane Gagnon *

April 2003

Abstract

A firm's business model describes the way in which it creates, delivers, and appropriates value. In the debate about the ongoing demise of several e-commerce ventures, only a few analysts have looked at the relative sanity of innovative e-business Models, relying mostly on static environmental variables and the inherent economic logic of each industry. Our study sheds new light on this debate by concentrating on a set of more complex factors, namely the relative difficulty to build new capabilities, whether by creating or acquiring them. We interviewed 60 e-commerce ventures between 2 and 3 years old, both independent and corporate ones, in order to measure their performance, the innovativeness of their e-business model, their obstacles to capability building, and their exploitable resource base. By performing cluster, discriminant, and regression analyses, we demonstrate that a number of typical obstacles to capability building can significantly affect the relative success or failure of innovative e-business models, but that a richer resource base may alleviate this relationship. We end with a discussion of the implications for the e-business model literature, and point out to some new directions to explain how various e-commerce firms, whether 'pure-play' or 'click-and-mortar', can successfully innovate despite rampant capability building difficulties.

Keywords: e-commerce, business models, capability building

JEL classification: L29, M13, O32

Copyright © Author(s) 2003

* School of Management and College of Computing Sciences, New Jersey Institute of Technology, Newark; NJ 07102, USA; email: gagnon@njit.edu, web site <http://elab.njit.edu>

This is a revised version of the paper originally prepared for the UNU/WIDER Conference on the New Economy in Development, 10-11 May 2002, Helsinki.

Acknowledgements

Ann Langley (HEC-Montréal) and Jorge Niosi (UQAM) provided detailed comments on the first draft of this paper. My thanks also go to Henry Chesbrough (Harvard), Raghu Garud (NYU), Michal Rappa (NCSU), Christopher Tucci (NYU), and Christopher Zott (INSEAD), for kindly reading the first draft and providing encouragements and comments. We are also very grateful to our Executive MBA students who performed interviews with their own firms or others in Canada, the United States, and Latin America, as part of our e-commerce Strategy course at UQAM (Laval and Montreal), UQAC (Chicoutimi), USIL (Lima), and ESPOL (Guayaquil).

The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.

www.wider.unu.edu

publications@wider.unu.edu

UNU World Institute for Development Economics Research (UNU/WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Camera-ready typescript prepared by Liisa Roponen at UNU/WIDER
Printed at UNU/WIDER, Helsinki

The views expressed in this publication are those of the author(s). Publication does not imply endorsement by the Institute or the United Nations University, nor by the programme/project sponsors, of any of the views expressed.

ISSN 1609-5774

ISBN 92-9190-462-7 (printed publication)

ISBN 92-9190-463-5 (internet publication)

1 Introduction

A firm's business model describes the way in which it creates, delivers, and appropriates value. Since value resides in transactions, a business model represents an architectural configuration of the information, services, products, and parties in an exchange (Amit and Zott 2001).

For firms operating through e-commerce, it is generally assumed that implementing an innovative e-business model will lead to superior performance relative to its strategic group, where a variety of online and offline competitors cohabit. By astutely reconfiguring their relationships throughout the value chain, by offering new value propositions, and by creating innovative solutions and processes, e-businesses expect to change the rules of their industry and render competition obsolete. Unfortunately for them, after several years of experimentation, only a few players have succeeded to achieve such performance, and not necessarily the most innovative ones.

The debate continues as to what are the most important factors for the failure of e-commerce firms in various sectors. Most analysts have focused on relatively simple answers, pointing out to the enduring economic slowdown, financial market corrections, and especially massive brick-and-mortar counter-attacks. Only a few have looked at the relative sanity of e-business models, but they have relied mostly on 'static' environmental factors and on the basic economic logic of each industry (Rosen and Howard 2000; Carter, Geary, and Garcia 2001; DeYoung 2001; Ince 2001; PhoCusWright 2001; Schwartz 2001; Yang, Peterson, and Huang 2001).

Our study sheds new light on this debate by concentrating on a set of more complex factors, namely the relative difficulty to build new capabilities, whether by creating or acquiring them. We interviewed 60 e-business ventures between 2 and 3 years old, both independent and corporate ones, in order to measure their performance, the innovativeness of their e-business model, their obstacles to capability building, and the exploitable resource base. By performing cluster, discriminant, and regression analyses, we demonstrate that a number of typical obstacles to capability building can significantly affect the relative success or failure of innovative e-business models, but that a richer resource base may alleviate this relationship.

We begin this article with a review of the nascent literature on business models, in order to review all the dimensions necessary to develop a new measure for e-business model innovation. It then leads us to specify a number of hypotheses inspired by the dynamic capabilities and resource-based perspectives. After giving some details on our methodology, we analyse the data and test our hypotheses. We end with a discussion of the implications for the e-business model literature, and point out to some new directions to explain how e-commerce firms, whether pure-play or click-and-mortar, can successfully innovate despite rampant capability building difficulties.

2 Literature

The idea of representing the overall configuration of a firm's 'strategy system' within a single concept is not new. Indeed, holistic constructs have motivated several studies

over many decades, spanning several schools of thoughts (Penrose 1959; Ansoff 1965; Andrews 1971; Porter 1996; Mintzberg and Lampel 1999; Fuchs *et al.* 2000).

Therefore, a critical look at the concept of business model is necessary, as it serves to assess the fundamentals that drive innovation in what is now called the New Economy (Porter 2001; Useem 2001). We need to review its analytical relevance, internal coherence, and validity as a research construct, so as to clearly distinguish its potential contribution to the field of strategy, therefore avoiding any confusion with apparently similar concepts.

To address some of these issues, we first discuss the conceptual origins of business models. Second, we assess the usefulness of e-commerce business model classifications to inform and orient the strategic management literature. Third, we review and synthesize some key dimensions that should be included in a measure of e-business model innovation. Finally, we organize this literature into a complete and coherent innovativeness construct, indicating specific items and their importance for e-business strategy.

2.1 Conceptual origins of business models

Interestingly, references to business models in trade magazines and academic journals are relatively recent. The concept has been used first by software and systems designers concerned with ‘business process modelling’ and the proper integration of IT within strategy (Patterson and Altieri 1993; Vizard 1993; Kukalis and Senf 1994). Soon after, the business press has enlarged the concept to describe the strategic challenges posed by the Internet to specialized early-adopting industries, such as securities brokering, networking services, computer retailing, etc. (Schrage 1994; Kanellos 1995; Ginsburg 1996; Graves 1996; Lyons 1996; McQuillan 1996; O’Brien *et al.* 1996).

In the academic literature, the earliest references to ‘business models’ were made to encapsulate a mix of generic strategies and value chain configurations in various industries (Forge 1993; Potok and Vouk 1997). However, the first thorough applications of the concept in relation to the Internet can be found in studies of virtual organizations, knowledge management, business intelligence, and electronic markets (Sarkar, Butler, and Steinfield 1995; Bloch and Segev 1996; Hagel and Rayport 1997; Shaw, Gardner, and Thomas 1997; Bakos 1998; Campbell 1998; Ghosh 1998; Shapiro and Varian 1998b; Venkatraman and Henderson 1998). However, the concept was used mostly as a tool to analyse the economic logic behind a variety of models, while focusing strictly on one model at a time, analysing its strategic implications as compared to non-electronic business models.

Since then, the concept has been used to analyse the strategic configuration of e-commerce firms by going beyond the singular dimensions identified in the early literature. Three streams of research have emerged around e-business models. The first one attempts to classify the various models introduced by Internet ventures according to some underlying dimensions common to various firms (Bambury 1998; Timmers 1998; Rappa 1999; Kaplan and Sawhney 2000; Mahadevan 2000; Prabhu and Majmudar 2001). The second is concerned with developing a strategy process and design methodology in the formulation of e-business models, especially by grounding them in innovative information technology strategies (Venkatraman 2000; Gordijn and

Akkermans 2001; Martin and Kar 2001; Pant and Ravichandran 2001). Finally, the third research stream, and the most recent one, focuses on discovering and synthesizing the fundamental principles of value creation, delivery, and appropriation that should guide successful e-business operations and strategies (Afuah and Tucci 2000; Amit and Zott 2001; Han and Han 2001; O'Daniel 2001).

2.2 Importance of business models for strategy

The nascent literature on e-business models has clearly demonstrated the practical and analytical relevance of the concept for managers, especially in the case of Internet ventures where information economics meshes with old rules in a complex manner. Its cross-disciplinary origins and applications also provide us with a rich source of contributions, bridging such diverse perspectives as information technology, organization studies, strategic management, and industrial economics. Given the vitality of current research streams, we can expect a continuous effort to refine the concept, criticize its internal and external validity, and embed it within a variety of analytical tools.

As the concept formalizes, its importance for the field of strategy is becoming clearer too. By taking a holistic perspective of the literature, we recognize that a business model addresses a different level of analysis than other 'strategy system' concepts. By concentrating on a meso-level, the construct allows us to efficiently weave the industry and firm levels, in such a way as to integrate the right mix of both macro and micro dimensions to explain a firm's value creation, delivery, and appropriation mechanisms (Brandenburger and Stuart 1996).

It therefore offers an improved heuristic, since it relates technology, operation, strategy, and economics at all levels in a more systematic way, compared to concepts that focus strictly on internal or external firm analyses, or merely provide a list of both, relating them in search of an 'equilibrium' between forces or factors. The business model view of 'strategy systems' is also superior to concepts that attempt to relate both levels only by following contingency theory, a static perspective that finds relevance primarily in comparative studies, but remains clearly limited for the task of complex, iterative, emergent, and transformational strategy formulation (Chesbrough and Rosenbloom 2001).

As a dynamic representation of a firm's value strategy, a business model is grounded in a process and transactional view of the firm, which are key foundations of the dynamic capabilities and resource-based perspectives in strategy (Amit and Zott 2001; Makadok 2001). This makes business models the primary level where 'value innovation' occurs, and especially where new capability architectures are invented. Therefore, the concept can benefit from a number of existing analytical tools used to conceive innovative strategies, whether applied in designing offline and/or online firms (Kim and Mauborgne 1999; Choi and Valikangas 2001; Tucker 2001).

2.3 Fundamental dimensions of e-business models

Based on this definition of the construct, we must find the key dimensions of an e-business model that indicate its relative innovativeness, measuring to what extent the

‘strategy system’ of a firm is superior to that of its competitors, both online and offline. Since an assessment of construct validity requires a broad literature review, a thorough comparison, analysis, and synthesis of the recent contributions on e-business models is beyond the scope of this article. However, we will briefly discuss recent taxonomies of the various forms and distinctive thrusts of some pioneering e-commerce firms. Although many dimensions have been suggested from various research streams, taxonomies have the unique advantage of testing factors in a wider diversity of contexts. Consequently, these studies offer greater external validity, a key condition for comparing innovativeness among firms (Hollenstein 1996; Subramanian 1996).

We first look at an early taxonomy by Rappa (1999), which has been extensively cited and has become the reference in many textbooks. A total of 30 variants are synthesized into nine broadly defined e-commerce business models: brokerage, advertising, infomediary, merchant, manufacturer, affiliate, community, subscription, and utility. Clearly, two dimensions to classify models emerge from this study, which are the type of value chain activity and revenue mechanism. The variants of these nine classes are also divided along two other key dimensions: the product scope, and the reach and richness factor of each model (Evans and Wurster 1999). These concepts provide scales along which models are either narrowly focused, or cover broad categories, markets, activities, and players.

Another early study is that of Bambury (1998), showing how some e-business models are merely a reproduction from offline models, while others are unique to the Internet and exploit its most significant functionalities, implying a certain degree of online substitution, from physical to electronic environments. As well, references to a wide variety of models that emphasize the innovative ways to deliver personalized information and services, point to the importance of the relative facility to perform simple and complex functions within the same model, depending on the level of offering flexibility in each e-business models. These dimensions are important correlates of the successful application of information technology and its impact on the economics of flexible customization. Such variables have also been at the core of the argument that the massive adoption of the Internet gives birth to a ‘new economy’, with a distinct economics than one centred on physical and/or human-bound exchanges of proprietary goods, services, and information (Shapiro and Varian 1998a).

We also find classifications of e-business models by segments of the new economy. For example, in a detailed study of B2B market makers and e-hubs, Kaplan and Sawhney (2000) distinguish models primarily by the level of bias of each market, an outcome of the pricing power of some e-market players. Models are also differentiated according to their emphasis on either supply aggregation or on spot purchasing, which effectively depends on the underlying market fragmentation or concentration that leads firms to practice either one of these e-procurement approaches.

In a study by Mahadevan (2000), e-business models are also differentiated according to the dynamics of e-markets and industries. For example, the classification looks at the relative potential of certain models depending on whether they involve all the necessary factors to create a radical market expansion dynamics, or a declining one. As well, among the various factors used to compare models, many are effectively related to the various lock-in effects that allow firms to enhance transaction stability, such as customer loyalty, long-term contracts, etc.

In a similar way, Prabhu and Majmudar (2001) take a more holistic view of e-business model and argue in favour of a more complex combination of four basic models, differentiated by revenue, product, delivery, and pricing approaches. Among the many variables, which go along those identified so far, they introduce one that is more customer-centred, that is value proposition. They effectively emphasize the importance of fitting e-business models to the actual functionalities wanted by online customers, so as to maximize its innovative success. Competition between e-businesses is viewed as an issue of functional enhancement, which is the defining dimension of online value propositions, and is often the key factor driving the creative destruction dynamics brought by the Internet (Afuah and Tucci 2001).

Although strategic and economic concepts are most often used to classify e-business models, we also find interesting references to operational and technological factors. An early contribution by Timmers (1998) refers to the importance of the degree by which a firm efficiently integrates multiple value-adding activities, as well as innovates in the number of functions performed. These dimensions are well synthesized as a measure of process innovation, describing the relative degree of process improvement and reconfiguration along a value chain, and the variety of new functions performed, which can range from merely 'delivering' information to a highly complex 'matching' process.

Finally, Pant and Ravichandran (2001) have compared models primarily in the way they make use of information technologies. On one hand, e-businesses differ in the extent their systems can effectively perform various functions, allowing for greater application diversity. As well, models can be based either on simple or complex functionalities, implying a lesser or greater degree of Technology Integration. While technological change can be intense in some models, it may be relatively low in others, with complex feedback effects on performance, whether negative or positive.

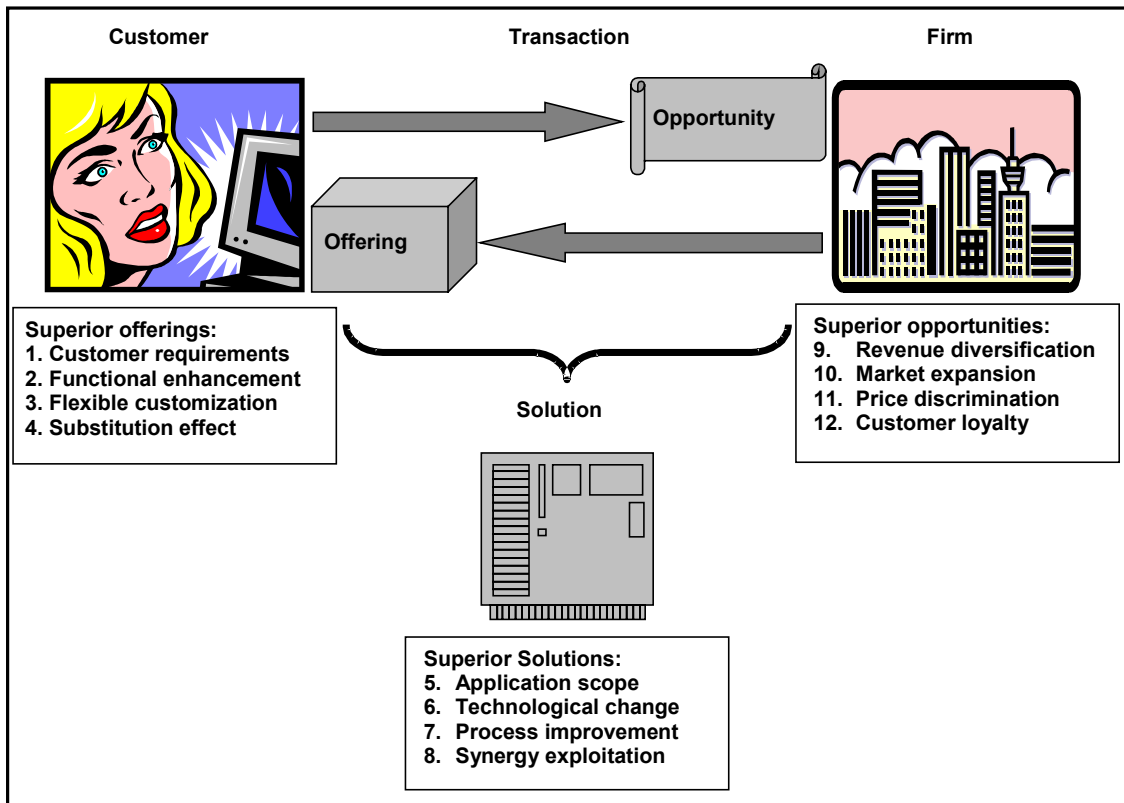
In summing up the fundamental dimensions of e-business models, we find that the recent taxonomies are highly convergent and complementary. As well, since they cover the whole range of existing and potential models, they are proven to be a sufficiently valid content for building a new measure of e-business model innovation. Consequently, we synthesize them as part of our model for this research.

2.4 Measuring e-business model innovation

In Figure 1, we present the commercial objects (offerings, solutions, opportunities), value flows (value creation, delivery, and appropriation), and active components (customers, firms, value chains) typical of most e-commerce transactions. Commercial infrastructures (network standards, legal institutions, and payment systems) are omitted in order to simplify our presentation. They are also assumed to be out-of-reach of any single firm, leaving us to concentrate on dimensions that can effectively be modelled by an e-business.

First, a customer (or a representative agent, automated or not) consults an electronic channel, such as the Internet, to purchase a product, service, or information. A number of competing 'offerings' must be assessed, in order to discover the real 'value creation' potential of various transactions. Once a transaction is initiated, and the buyer completes or guarantees a payment, the selling firm must rely on a well-configured 'solution', that

Figure 1
Measuring e-business model innovation



Source: Compiled by the author.

Table 1
Synthesis of e-business model taxonomies
into a new measure of innovation

Taxonomy using the dimension	Value flow	Commercial object / innovative dimensions
	Value creation	Superior offering
1 Rappa	Product scope	Integrating more customer requirements
2 Prabhu-Majmudar	Value proposition	Providing new functional enhancements
3 Bambury	Offering flexibility	Doing flexible customization more easily
4 Bambury	Online substitution	Provoking a radical substitution effect
	Value delivery	Superior solution
5 Pant-Ravichandran	Application scope	Widening the application scope of systems
6 Pant-Ravichandran	Technological change	Making technological change successfully
7 Timmers	Process innovation	Implementing key process improvements
8 Rappa	Reach and richness	Finding synergy exploitation in value chain
	Value appropriation	Superior opportunity
9 Rappa	Revenue mechanism	Creating revenue diversification schemes
10 Mahadevan	Market expansion	Unlocking a market expansion dynamics
11 Kaplan	Pricing bias	Using market power for price discrimination
12 Mahadevan	Transaction stability	Stimulating customer loyalty in new ways

is a set of optimized processes and technologies, to execute its ‘value delivery’ activities. To the extent the offering is significantly valuable to the customer, and the solution renders the firm capable to deliver the expected value level at a reasonable cost, the firm will effectively be able to exploit this ‘opportunity’ for a profit. The extraction of benefits from this transaction will depend on the various ‘value appropriation’ mechanisms the firm must devise and harmonize along with its unique solution, offering, and customer.

As stated earlier, an e-business model represents the configuration of interrelated sequences of such transactions, including their commercial objects, value flows, and active components (Amit and Zott 2001). Whether partly or wholly electronic, it constitutes a dynamic ‘strategy system’ that drives the value creation, delivery, and appropriation of a firm. Since transaction configurations, value flows, and particular model designs are difficult to conceptualize, measure, and compare, we must find an appropriate scale that allows us to capture the essence of a strategy system.

To overcome measurement difficulties, we can rely on easily measurable indicators that serve as reliable proxies of a ‘strategy system’. Therefore, if we want to assess the relative innovativeness of an e-business model, we can effectively measure the level of innovation in the commercial objects underlying the three value flows in a transaction. We propose the following definition for e-business model innovation:

E-business model innovation is the creation and implementation of a ‘strategy system’ that combines significantly new, differentiated, and superior offerings, solutions, and opportunities, relative to other business models in a strategic group.

We synthesize in Table 1 the fundamental dimensions of e-business models identified in recent taxonomies. Each one offers a specific item that indicates the innovativeness of ‘strategy systems’, and can be grouped along the three facets of value in transactions. Based on this scale, we can measure e-business model innovation by asking to what extent each item is superior to the same item of competing business models. Although absolute measures of these items are not available, we use a Likert scale to measure precisely what is relevant for strategic analysis, that is the relative innovativeness of a model compared to its competitors.

3 Hypotheses

The debate about declining e-commerce firms, whether pure-play or click-and-mortar, has frequently made reference to fundamental weaknesses of innovative e-business models. While some critical success factors have been successfully identified for specific models and industries, they remain extremely limited for strategy formulation since they are not properly integrated within a complete strategic analysis framework, or correlated to the dimensions underlying generic e-business models.

In order to overcome the deficiencies of single-factor studies, we perform a systematic measurement of e-business model innovation by capturing the most strategic dimensions identified in recent model taxonomies. As well, in order to clarify the debate about the fate of innovative models, we propose a number of hypotheses inspired from the dynamic capabilities and resource-based perspectives. Our intention is to test to

what extent highly innovative models that led to low performance have been affected by capability building obstacles. We will also test the relative importance of the resource base in alleviating the impact of these obstacles on innovative e-businesses. However, given the wide scope already covered by this article, we will not attempt to classify the models surveyed along any particular taxonomy.

3.1 Performance impact of e-business model innovation

In its most general statement, the main hypothesis that will allow us to demonstrate the validity of our new measure of e-business model innovation is the following:

H1: A firm with an innovative business model has a higher performance than the industry average and than its competitors.

Unfortunately, after seven years of experimentation, measuring the performance of e-commerce firms has proven an extremely difficult task, one that has misled several financial markets into the most dramatic speculative bubble of our time. As stock prices have become erratic indicators, and profits remain virtually absent, only a few more reliable metrics are left to measure e-commerce venture performance.

The first one is the relative growth rate of a firm's client and revenue base. This is often the only reliable metric to judge the success of any e-commerce venture. A new firm that fails to grow faster than its competitors, and especially that fails to grow as fast as the general trend of its industry, will probably hold a lower market position in the near future. Consequently, we can state the following hypothesis:

H1a: A firm with an innovative business model grows faster than the industry average and than its competitors.

The second performance measure we want to use is a proxy for profits. By looking at the relative profitability timeline of a firm, we can judge to what extent it has been successful in reaching its own commercialization calendar, and how far it is from reaching profitability. In the same time, as long as the sample contains only ventures of the same age (e.g., 2 years old), this measure allows us to compare the speed of a venture in attaining profits, relative to its industry average. However, since profitability timelines are extremely unique to each competitor, it is not a finely comparable measure among firms. Therefore, we test the following hypothesis stated as:

H1b: A firm with an innovative business model approaches profitability faster than the industry average and than its own commercialization calendar.

The third measure is the relative market share of a venture, which tells us whether a firm has attracted a larger or smaller volume of online customers than most of its competitors, and whether it holds a major share of the market. This measure is focused on customer visits instead of revenue figures, since the latter are difficult to account for in any privately held venture, while the former are easily logged and analysed throughout the Internet economy. However, to avoid any confusion, this metric is better left as a relative assessment instead of any specific ratio of customer volumes, since metrics have proven difficult to interpret between different e-business models. Indeed, B2B e-marketplaces for electric drive replacement parts have a totally different access

frequency and volume than a B2C e-retail storefront. Consequently, while measuring market share in a relative manner, we want to demonstrate the following hypothesis:

H1c: A firm with an innovative business model occupies a larger market share than the industry average and than its competitors.

3.2 Moderating effect of capability building obstacles

While a highly innovative e-business model should lead to higher performance, it has been demonstrated that it sometimes (many would say often) leads to a lower one. This debate about the relative usefulness, sanity, and sustainability of e-business model innovation has so far been limited to comparing firms within only one industry, and relying strictly on the analysis of the economic logic underlying competition among firms, whether pure-play, click-and-mortar, or brick-and-mortar.

For any meaningful progress in this debate, we must look at a more complex, dynamic, and comprehensive set of factors, which includes in the same time the internal, external, economic, and strategic dimensions explaining the relative success or failure of any innovative e-business model. Given the richness of the dynamic capabilities and resource-based perspectives, we propose to demonstrate the following hypothesis, which in its most general statement reads:

H2: A firm with an innovative business model has a low performance when it faces high obstacles in capability building.

As such, we want to demonstrate that the low performance of an innovative e-business model can be due to capability building obstacles inherent to particular sectors. We go beyond the simple argument that low performance of innovative firms is due merely to the irrelevance, insanity, or unsustainability of most models, claims that are in any case extremely difficult to measure and interpret. Capability building, and its underlying drivers and obstacles, represent a more significant, context-neutral, reliable, and proven construct to moderate the relationship between innovation and performance (McGrath *et al.* 1996).

The dynamic capabilities perspective offers an important advantage over most other moderating effects: it integrates all the key external and internal factors affecting capability building, especially those related to dynamic capabilities such as innovation (Teece, Pisano, and Shuen 1997). In addition, the resource-based perspective offers a clear set of principles to judge whether key resources, competencies, and capabilities can effectively give birth to new and more sustainable competitive advantages (Barney 1991). Both perspectives are complementary in explaining the performance impact of capability building, given the relative resource base of a firm (Makadok 2001).

Given the well-established literature on capability building obstacles, we can restate our second hypothesis depending on which type of obstacles the firm faces (Barney 1999). The statements relate to two fundamental issues in capability building: creating them internally and acquiring them externally. While testing the moderating effect of each obstacle on the overall performance of e-commerce ventures, we will also test the individual effect of each measure representing performance (i.e., H2 and each of its

following sub-statements should read as in H1, adding a, b, and c to link each hypothesis to our three dependent variables):

H2: A firm with an innovative business model has a low performance when it faces high obstacles in:

- H2-1:** *Historical context:* Creating capabilities at the right time and in the right areas;
- H2-2:** *Path dependence:* Creating capabilities with a steep learning curve without prior related ones;
- H2-3:** *Social complexity:* Creating capabilities that are hard to understand, codify, reproduce;
- H2-4:** *Causal ambiguity:* Creating capabilities with little understanding as to which ones are strategic and how to build them;
- H2-5:** *Legal constraints:* Acquiring capabilities that are hard to access due to legal issues and barriers;
- H2-6:** *Reduced value:* Acquiring capabilities and finding them later to be of lower value than expected;
- H2-7:** *Flexibility problems:* Acquiring capabilities that create a burden and reduce the ability to change and innovate quickly enough;
- H2-8:** *Mixed resources:* Acquiring capabilities that include a significant portion of unwanted and/or incomplete ones;
- H2-9:** *Integration difficulties:* Acquiring capabilities that are not fully exploited and leveraged along with existing ones.

3.3 Control effect of resource base

While the moderating effect of capability building obstacles is important, a richer resource base should alleviate or control this effect. To build this construct, we identify three important resource-based concepts that are particularly relevant in measuring relative resource richness in the context of new venture formation, whether independent or corporate. We also focus on control effects that have been frequently used in managing successful e-commerce ventures.

First, the concept of resources network has recently been extended to include more complex resource bases, such as human, intellectual, reputational, and social capital (Gulati 1998; Nahapiet and Ghoshal 1998; Gulati, Nohria, and Zaheer 2000). A venture's networks are often determinant in the successful introduction of innovations, depending to how they are deployed and leveraged (Jolly 2000). If well managed, strategic networks can have a compound effect in improving the position of resource-constrained firms, a factor that can radically change the fate of a new venture (Chandler and Hanks 1994). They also serve as a 'school' for managers to learn how to forge joint capabilities with other firms, exploit synergies, and align strategies (Combs and Ketchen 1999; Das and Teng 2000; Tyler 2001). This is why e-commerce ventures have frequently partnered with brick-and-mortar firms that can effectively challenge their

networking skills while sharing mutually useful resources, a behaviour that is similar to other industries where radical innovations are rapidly changing competition (Rothaermel 2001). However, networking initiatives that are mostly reputational in nature, such as announcing a '.com' venture or name change, which were very important tactics in the beginning of the Internet mania, are probably no longer as significant today given the end of the speculative bubble (Lee 2001).

Second, management experience is another traditional resource that has taken significant importance in the context of e-commerce ventures. Evidently, information technology (IT) is often mission-critical for success on the Internet. It is therefore natural to expect senior venture management to have spent some years working in the area, since IT management skills are the single most important factor for developing sustainable IT-related competitive advantages (Mata, Fuerst, and Barney 1995; Bharadwaj 2000). In addition to regular management and technology experience, venture championship skills have been emphasized as a key factor in resource and capability building (Greene, Brush, and Hart 1999). This is why both independent and corporate venture capitalists emphasize similar venture management practices, although corporate ones face rigidities that may impede learning (Chesbrough 2000). In the end, the relative richness of a champion's, owner's, and manager's experience is the driving factor for capability building (Hadjimanolis 2000), especially for overcoming causal ambiguity (King and Zeithaml 2001).

Third, governance mechanisms are a key dimension that determines the proper leveraging of a venture's resource base, especially of intangible ones (Fernandez, Montes, and Vazquez 2000). Since governance is primarily a task of interfacing the firm and its environment, the job of any board of directors is closely associated to that of resource network management. Indeed, the task of identifying new value chain synergies, learning from them, and redeploying the right visions, make governance the driving force at the core of capability building (Williamson 1999). The board must act as a supportive entity providing intelligence and guidance (Barney *et al.* 1996). This is especially true in moments when ventures need to synchronize their capability building initiatives with the adoption of new strategic orientations, such as a new market focus or a new differentiating factor, which succeed only if resources are properly built (Mosakowski 1993). Governance mechanisms should be viewed therefore as integral dimensions in value creation for new ventures, especially for those in incubation contexts where boards are crucial actors (Zott 2001). As such, they must be harmonized with fundamental principles of strategic leadership in new ventures, where a balanced approach is taken to enhance the independence of the management team in formulating and deploying visions, within a consistent range of strategic objectives set by the board (Rowe 2001).

Given these three concepts, we test the following hypotheses, first against overall performance, and then on each of our three performance measures (i.e., needs to be read adding a, b, and c):

H3: A firm with an innovative business model that faces high obstacles to capability building has a higher performance than firms facing similar levels of obstacles to capability building as long as it is endowed with a richer:

H3-1: *Resources network:* Network giving access to key pools of financial, human, intellectual, reputational, and social capital;

- H3-2:** *Management experience:* Management with several years of experience in relevant industries, and who have acquired a balanced vision integrating business, market, and technology perspectives;
- H3-3:** *Governance mechanism:* Governance systems that stimulate dynamism and minimize bureaucracy, with a board of directors acting as a supportive agent instead of a command-and-control authority.

4 Methodology

In order to test our hypotheses, 60 e-commerce ventures between 2 and 3 years old were interviewed, including a mix of independent (pure-play) and corporate (within a click-and-mortar but as an autonomous legal entity). We describe here the methodology followed and provide some important statistics about this sample.

4.1 Data gathering

A 30-item questionnaire was written based on the scales developed in the literature and hypotheses sections of this paper, and was translated from English to French and Spanish. The questionnaire was used in the author's course on e-commerce strategy, delivered to five groups of executive MBA students who are doing their last 3-credits course in a 45-credits programme in spring and summer 2001. Students attended had to perform an individual interview worth 30 per cent of their final mark. The evaluation required each student to perform the following research tasks:

- i) Search for a new venture between 2 and 3 years old, either independent or corporate,
- ii) Send a personal letter of invitation, the questionnaire, and the interviewer's credentials,
- iii) Arrange for a face-to-face or a telephone interview with a CEO or a key executive,
- iv) Prepare for the interview by reviewing written instructions and reading theoretical articles,
- v) Gather background public information about the company and its potential competitors,
- vi) Perform an interview lasting between 1 and 2 hours, depending on industry complexity,
- vii) Fill out the questionnaire using a Likert scale from 1 to 7, comparing venture to its industry,
- viii) Compare interview results with peers and use them as ideas in a team business plan,

- ix) Write a 10-page report justifying unusual answers and pointing out key relationships,
- x) Explain the usefulness of interview findings in a class presentation of the team business plan.

Students were directed primarily to publicly traded firms, searching first on stock exchanges in Canada and the United States, and then moving to online lists of e-commerce firms such as www.thestandard.com, www.gomez.com, www.wsrn.com, and www.hoovers.com. Many students also relied on industry contacts, while only 16 students chose to interview their own organization. These were mostly large firms providing a rich ground to study click-and-mortar corporate venturing, with four of them offering between two to three interviews each for a total of 12, but always with different ventures, attending separate missions and markets (e.g., the e-banking, e-insurance, and e-broker divisions of a major established bank).

The sampling of our 60 firms was very opportunistic, yet accurately represents the ‘new economy’ in the number of ventures in each sector and their underlying statistics, as shown in Table 2. As well, the wide dispersion of the search, the individuality of the research process, the relative newness of the topic to the interviewers, and the impossibility of measuring item values in advance, all prevented any bias in favour of a particular case and allowed for a fairly random sampling process. This resulted in a balanced coverage of Canada, the United States, and Latin America, leading 20 of our 60 students to interview with firms based outside their own country, in regions where they previously had experience and/or for which they mastered the language.

Table 2
Descriptive statistics by industry
(Number of cases and means by category)

	Manufactur- ing	Distribution	Retailing	Financial services	Publishing	Software	Pure play	Sample (Tot, Mn)
No of cases	12	2	4	19	4	5	14	60
Independent	2	1	2	1	3	3	13	25
Corporate	10	1	2	18	1	2	1	35
Canada	3	1	3	14	3	3	4	31
United States	7	1	0	3	0	2	7	20
Latin America	2	0	1	2	1	0	3	9
Performance	5.28	3.33	4.08	4.35	5.08	4.87	4.93	4.71
Innov.offering	4.98	3.88	4.69	5.03	5.19	6.25	5.66	5.22
Innov.solution	5.31	4.38	5.38	5.14	4.56	5.60	5.82	5.33
Innov.opport.	4.33	4.25	4.50	4.66	3.38	5.65	5.29	4.71
Cap.build.obs	2.83	2.38	3.19	3.25	2.63	3.55	2.88	3.03
Cap.acqu.obs	2.18	2.10	2.25	2.53	2.00	2.84	2.23	2.35
Resources	6.22	6.33	6.08	5.49	5.00	5.33	5.57	5.68

Note: All means are on a Likert scale of 7, from 1 = low, 4 = average, to 7 = high.

The questionnaire and ten-page report were emailed personally to the author, and were copied in MS Excel and SPSS tables by two research assistants, followed by systematic revisions by the author. Only 12 data points of the 1,800 were marked ‘not applicable’ by interviewers, which we substituted with a 1, representing the lowest value on our scale. For five missing data entries, the original questionnaire was reviewed for data entry errors, and compared again to the 10-page report justifications. The author gave appropriate values for each missing data, depending on the background data provided by interviewers and interviewees.

4.2 Sample statistics

The construct reliability of our 12-item e-business model innovation measure was fairly high, with a Chronbach alpha of 0.85. The same for our nine-item measuring capability building obstacles, which yielded 0.84. Both of the 3-item constructs, performance and resource base, had lower reliabilities in the range of 0.60, but since these scales did not share the same completeness objective as the two previous ones, we proceeded along with the study.

As provided in Table 2, summary statistics indicates our constructs behave differently among each industry. However, the MANOVA results of a discriminant analysis showed no significant differences among the means. An ANOVA test also demonstrated that our 25 independent ventures are not significantly different from our 35 corporate ventures, behaving similarly on most measured items. As expected, corporate ventures were mostly part of large multinationals in the manufacturing and financial services sectors with a strong click-and-mortar focus, while independent startups were mostly pure-plays. Only the financial sector was concentrated in Canada, while all other sectors were fairly distributed between Canada, the United States, and Latin America.

Interestingly, the worst performance was registered with ventures launched by distribution firms, which in fact enjoyed the richest resource base, while showing a low measure on all constructs. The retail sector came second with the same pattern, while both shared only average obstacles to capability building. On the other hand, ventures issued from manufacturing firms showed the best performance combined with the second richest resource base, while demonstrating lower innovation and lower capability obstacles than our sample’s average. As well, ventures in the software and pure-play sectors demonstrated the highest levels of innovation, but the software sector suffered from the highest levels of capability building obstacles, which probably explain its slightly average performance. Finally, the most balanced results were found in the financial services and publishing sectors, especially the later which enjoyed the second best performance level, and among the lowest capability building obstacles.

5 Analysis

The sample was analysed using three methods: cluster, discriminant, and regression analyses. We report on each one and on their respective contribution to demonstrating our hypotheses.

5.1 Cluster analyses

In order to explore the innovation levels of key venture categories, we first grouped our 60 cases into four clusters according to their underlying proximity in terms of performance and capability building obstacles. The number of cases in each cluster and means for e-business model innovation are presented in Table 3. The categories are significantly different, except for technological change, revenue diversification, and resources network items, which is consistent with the fact that technology is new for all firms, most innovative revenue sources have been uncovered so far, and that resources networks are equally open and manageable for all e-commerce ventures, showing the high tolerance of investors and partners to relatively low innovation and low performance firms. As corroborated in Figure 2, the overall innovativeness of firms with a high performance was very high, although those facing capability building obstacles innovated slightly less than those with lesser obstacles, indicating that H1 and H2 are generally consistent. As well, high performance ventures innovated consistently more than those with lower performance, except for the development of superior solutions in the case of high performance firms facing high obstacles, which would be explained primarily by the difficulty to exploit the synergies, technologies, and processes required to implement an innovative application scope. Finally, H3 was also found generally consistent, since firms that managed to achieve a high performance had a richer resource base, especially for management experience which had the strongest association with low capability building obstacles, indicative of its determinant control effect on the moderating variable.

A second cluster analysis was performed, this time classifying ventures along their relative innovativeness and performance levels. As Table 4 indicates, while capability creation obstacles were significantly different between groups, reflecting the unique internal situation of each venture, few of our capability acquisition obstacles were different, indicating that the external playing field was fairly levelled for all ventures, whatever their innovation and performance level. Interestingly, ventures with low innovation that achieved high performance were associated with the lowest capability acquisition obstacles, while low innovation ventures that yielded low performance were associated with the highest capability creation obstacles. This indicates H2-1 to H2-9 offer valid moderating effects, as low obstacles allow some ventures to reverse the general relationship specified in H1, and high obstacles strengthen H1 as predicted. The same can be said about high innovation firms, whereas those that ended with a low performance faced stronger obstacles on all counts, especially in capability creation, which is consistent again with H2-1 to H2-9. Finally, management experience was again strongly associated with high performance, high innovation, and low obstacles, indicating that H3-2 is generally the most significant resource base control factor in all contexts.

Since these clusters are not sufficiently different statistically for aggregate measures, we find it necessary to visualize them along our three performance measures. First, Figure 3 demonstrates that significant differences exist in terms of profitability timeline. Indeed, H1a is valid since more innovative firms can attain profits faster. Interestingly, H2a is also valid, as firms with high obstacles arrive at profitability at similar moments in their life cycle, whatever their innovativeness, demonstrating a strong moderation effect. Second, Figure 4 also demonstrates H1b for growth rate, but the moderating effects of

Table 3
e-business model innovation for each category of performance and capability building obstacles
(Means by category, with significance level of clusters' means difference)

	Low performance		High performance		Clusters signif.
	L obs	H obs	H obs	L obs	
	LL (12)	LH (5)	HH (14)	HL (29)	
	Laggard	Difficult	Fighter	Easy	
Customer requirements	3.20	4.50	5.29	5.76	0.001
Functional enhancement	3.40	4.25	5.50	6.21	0.000
Flexible customization	4.20	4.25	5.50	6.14	0.000
Substitution effect	3.20	3.58	5.14	5.45	0.001
Application scope	3.80	4.33	4.86	5.34	0.088
Technological change	4.80	5.58	5.29	5.83	0.424
Process improvement	4.80	5.42	4.93	5.93	0.014
Synergy exploitation	4.00	4.92	4.79	6.00	0.000
Revenue diversification	3.80	3.75	4.21	5.03	0.216
Market expansion	4.40	4.50	4.29	5.48	0.127
Price discrimination	2.40	3.33	4.14	5.03	0.018
Customer loyalty	3.20	4.58	5.43	5.66	0.010
Average innovation	3.48	4.08	4.57	5.22	
Resources network	5.20	5.75	5.43	6.10	0.411
Management experience	5.40	5.92	5.64	6.52	0.045
Governance mechanisms	4.20	4.50	5.36	5.45	0.127
Average resource base	4.93	5.39	5.48	6.02	

Note: All means are on a Likert scale of 7, from 1 = low, 4 = average, to 7 = high.

Table 4
Capability building obstacles for each category
Performance and e-business model innovation
(Means by category, with significance level of clusters' means difference)

	Low performance		High performance		Clusters Signif.
	L Innov.	H Innov.	L Innov.	H Innov.	
	LL (6)	LH (10)	HL (3)	HH (41)	
	Laggard	Average	Good	Leader	
Historical context	4.00	2.90	2.00	2.63	0.224
Path dependence	4.83	3.90	2.67	2.85	0.021
Social complexity	4.83	4.20	2.67	2.68	0.002
Causal ambiguity	4.33	3.70	3.67	2.54	0.035
Legal constraints	2.50	2.20	1.33	2.17	0.721
Reduced value	2.17	2.10	1.33	2.22	0.768
Flexibility problems	3.17	3.50	1.67	2.44	0.176
Mixed resources	2.83	2.30	1.33	2.17	0.411
Integration difficulties	3.17	2.90	1.67	2.44	0.399
Average cap. build. obs	3.18	2.77	1.83	2.21	
Resources network	5.17	5.20	5.67	6.05	0.275
Management experience	5.33	5.60	6.33	6.32	0.115
Governance mechanisms	4.00	5.10	4.67	5.34	0.214
Average resource base	4.83	5.3	5.56	5.9	

Note: All means are on a Likert scale of 7, from 1 = low, 4 = average, to 7 = high.

Figure 2
 E-business model innovation:
 overall innovativeness and performance depend on capability building obstacles

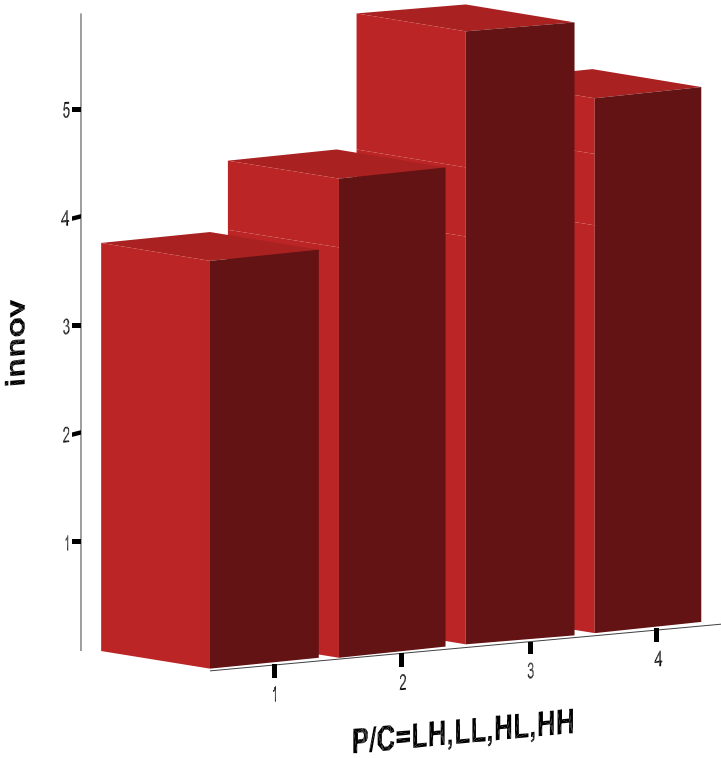


Figure 3
 Profitability timeline: fastest profitability for innovators who enjoy low capability building obstacles

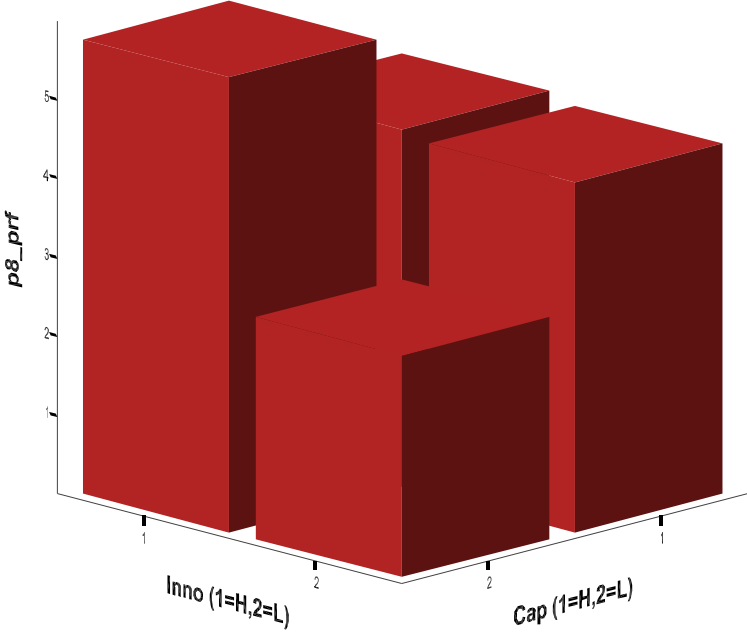


Figure 4
Growth rate: Firms fighting capability building obstacles can match growth of others

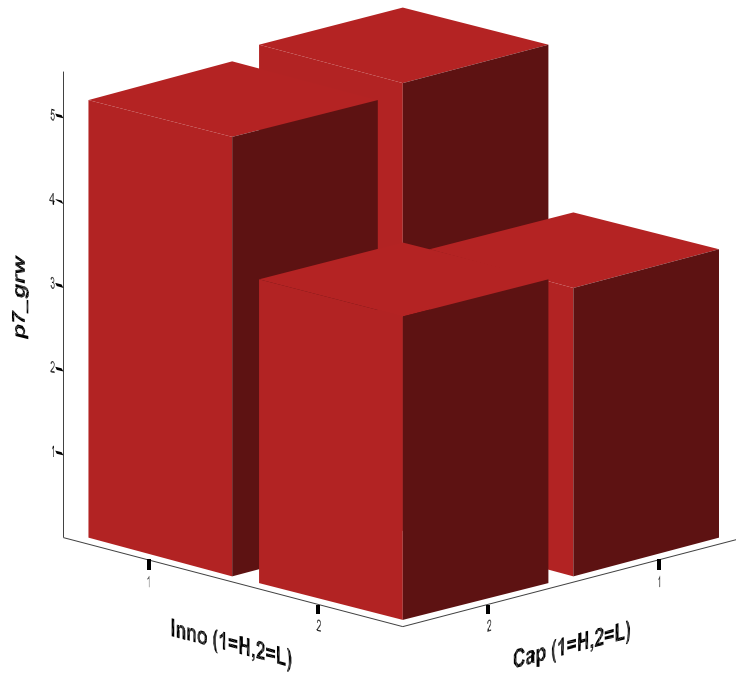
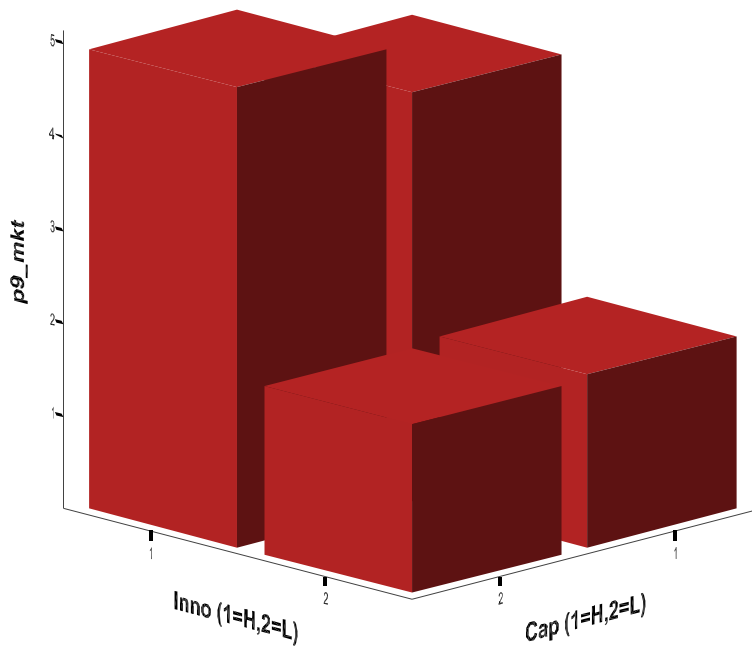


Figure 5
Market share: innovators dominate their market. capability building obstacles can weaken market position



H2b are really insignificant, indicating that firms can effectively fight capability building obstacles and match the growth of firms who face a more favourable situation. Finally, Figure 5 shows the strongest growth support for H1c, where high innovators effectively dominate their market, while low innovators register levels as low as 2 on our Likert-scaled market share measure, a strong proof they hold a much lower position relative to their industry. However, again the moderating effect stated in H2c is not as significant, although obstacles can perceptibly moderate the market dominance of some innovators.

5.2 Discriminant analyses

To better visualize moderating and control effects, we performed three discriminant analyses to predict whether the cases as classified in our previous cluster analysis are effectively valid, or if in fact they should belong to another category.

We present in Table 5 the prediction of where cases should belong when we control for three situations. First, while the high performance and high innovation group had 41 cases initially, this number rapidly decreases to 30 cases once we take into account the relative capability building obstacles of each case. It clearly demonstrates H2, where highly innovative ventures that are believed to possess relatively higher performance than others, should in fact be considered as low performance ones when we proportionate the H1 relationship to their capability building context. Second, the

Table 5
Prediction of innovation and performance by controlling for
capability building obstacles and resource endowment
(number of cases moved between each category after 3 discriminant analyses)

			HL	LL	HH	LH
			Predicted cluster membership by controlling for:			
			Initial cluster members			
			8	9	35	8
H Perf. L innovation	HL	3	2	0	1	0
L Perf. L Innovation	LL	6	1	4	0	1
H Perf. H Innovation	HH	41	4	4	30	3
L Perf. H Innovation	LH	10	1	1	4	4
			Resource base			
			10	8	26	11
H Perf. L Innovation	HL	3	3	0	0	0
L Perf. L Innovation	LL	6	4	1	0	1
H Perf. H Innovation	HH	41	7	5	22	7
L Perf. H Innovation	LH	10	1	2	4	3
			Capability building obstacles and resource base			
			9	7	37	7
H Perf. L Innovation	HL	3	3	0	0	0
L Perf. L Innovation	LL	6	1	4	1	0
H Perf. H Innovation	HH	41	4	2	33	2
L Perf. H Innovation	LH	10	1	1	3	5

control effect of the resource base is even stronger, as the same 41 cases are quickly redistributed in lower categories to leave only 22 truly high innovation and high performance cases. Finally, H3 is demonstrated as we take into account of moderating and control effects jointly, with the number of cases predicted at 33, slightly higher than the 30 cases predicted only with the moderating effect.

Interestingly, the same analysis can be made for high innovation ventures that were initially considered to have a low performance. When we proportionate this relationship to the moderating effect (H2), the number of cases is reduced from ten to four, whereas the control effect leads this number to go as low as three, indicating that when we believe high innovation firms are merely low performance ones, they are classified as such merely for the relative weakness of their resource base. Finally, when the moderating and control variables are taken in account, the number of cases predicted is increased from four to five, indicating H3 to be slightly significant.

5.3 Regression analyses

By performing regressions on each one of our three performance measures, we attempt to measure the exact content validity of each item in our constructs, and also demonstrate H2-1 to H2-9 (a, b, c) and H3-1 to H3-3 (a, b, c). We summarize key statistics in Table 6, indicating that all our regressions are highly significant, and have sufficiently high degrees of freedom. All models were verified for multicollinearity, which was absent in all cases since the tolerance level of each variable was very high (higher than 0.80 in most cases). As well, we visualized the distribution and P-P graph of each variable and confirmed their relative normality. It is interesting to notice that while adding the moderating and control variables increases our R squared, the adjusted R squared remains relatively stable. This indicates first that our constructs are rightfully chosen to describe our sample, but also are strongly representative of the situation in the population, since the inferred correlation remains strong despite lower degrees of freedom.

The results of each regression are presented in Table 7, with a star (*) indicating the most significant standardized regression coefficients (i.e., $p < 0.1$). The strongest model is the growth rate impact of e-business model innovation (first column), with 8 valid coefficients and constant among 13 items. The most interesting results relate to the strong impact that substitution effect and customer loyalty have on growth rate, with clear moderating effect from capability building obstacles, and clear control effect from resource base variables. Although these effects are small for synergy exploitation and price discrimination, these two other variables have an equally strong impact on growth rate.

The most surprising results relate to the negative impact that some innovative dimensions can have. For example, technological change has a strong negative coefficient with inverse moderating and control effects, indicating that innovative Internet technology can effectively reduce growth, but that this impact will be smaller for firms with high obstacles (i.e., busier building capabilities than technology), yet will be equally strong for firms with a richer resource base (i.e., technology is more difficult to manage in a more diffused resource base). Similarly strong negative growth impacts are registered with market expansion and flexible customization. The first one may be

Table 6
Summary statistics for regression analysis of performance
(3 performance measures with 3 models/combinations of predictors)

	Growth rate			Profitability timeline			Market share		
	I	I+C	I+C+R	I	I+C	I+C+R	I	I+C	I+C+R
R squared	0.50	0.59	0.60	0.41	0.52	0.60	0.56	0.60	0.63
Adjusted R squared	0.37	0.36	0.33	0.26	0.26	0.33	0.45	0.38	0.37
Degrees of freedom	47	38	35	47	38	35	47	38	35
F Test	3.87	2.60	2.21	2.70	1.99	2.20	5.03	2.76	2.47
Significance level	0.00	0.01	0.02	0.01	0.03	0.02	0.00	0.00	0.01

Note: Predictors are: I = 12 e-business model Innovation items, C = 9 capability building obstacles items, and R = 3 Resource base items.

Table 7
Moderating effect of capability building and control effect of resource endowment
(Standardized regression coefficients)

	Growth rate			Profitability timeline			Market share		
	I	I+C	I+C+R	I	I+C	I+C+R	I	I+C	I+C+R
Absolute intercept	3.16*	2.74*	3.58*	2.13	3.50*	-0.50	-1.61	-0.91	-0.24
Customer requirements	0.054	-0.030	-0.076	-0.195	-0.216	-0.153	0.196	0.158	0.207
Functional enhancement	-0.069	-0.051	-0.030	0.266	0.386	0.322	-0.268	-0.208	-0.256
Flexible customization	-0.245*	-0.255*	-0.244	-0.074	-0.110	-0.010	0.227	0.257	0.238
Substitution effect	0.383*	0.369*	0.410*	0.111	0.066	0.009	0.354*	0.357*	0.378*
Application scope	0.212	0.165	0.169	0.259*	0.154	0.277	0.097	0.094	0.025
Technological change	-0.333*	-0.222*	-0.241*	0.049	0.214	0.163	-0.097	-0.037	0.040
Process Improvement	-0.188	-0.079	-0.063	-0.381*	-0.369*	-0.484*	0.048	0.080	0.113
Synergy exploitation	0.389*	0.403*	0.403*	0.433*	0.296	0.291	-0.067	-0.175	-0.163
Revenue diversification	0.068	0.162	0.136	0.048	0.019	0.065	0.305	0.360*	0.348*
Market expansion	-0.292*	-0.350*	-0.343*	-0.173	-0.185	-0.101	-0.199	-0.221	-0.279*
Price discrimination	0.300*	0.162	0.229	0.171	0.155	-0.048	0.137	0.051	0.076
Customer loyalty	0.329*	0.324*	0.337*	0.155	0.125	0.086	0.355*	0.336*	0.337*
Historical context		0.060	0.031		-0.205	-0.054		-0.023	-0.093
Path dependence		-0.119	-0.102		-0.056	-0.028		-0.010	-0.035
Social complexity		-0.240	-0.246		-0.119	-0.076		-0.113	-0.152
Causal ambiguity		0.046	0.092		0.093	-0.063		0.027	0.074
Legal constraints		-0.125	-0.132		0.160	0.127		0.011	0.028
Reduced value		0.179	0.133		0.061	0.123		0.001	0.005
Flexibility problems		0.078	0.066		0.148	0.240		0.107	0.097
Mixed resources		-0.157	-0.170		-0.148	-0.150		-0.230	-0.241
Integration difficulties		0.277*	0.295*		-0.113	-0.108		0.057	0.074
Resources network			-0.096			0.177			0.127
Management experience			0.000			0.322*			-0.213
Governance mechanisms			-0.095			-0.044			0.072

Note 1: Standardized Betas with a * have the highest significance, i.e., $p < 0.1$

Note 2: I = 12 e-business model innovation items, C = 9 capability building obstacles items, and R = 3 resource base items.

explained by the fact that unlocking a fast growth market may not necessarily lead to growth of the venture itself, since it will have relatively more difficulty capturing that fast growth market, whatever the richness of its resource base. The second one may be a clear indication that offering too much customization impedes growth by overloading operations and requiring the buildup of too many new capabilities. In the same time, it clearly indicates that the economics governing customization is the same for both the physical and electronic world. The same arguments could apply to the negative impact of process improvement, functional enhancement, and customer requirements, but since these coefficients are very small and have no significance, it is probable that they in fact have a slightly positive impact.

While at least three of our 12 innovation dimensions go against the construct we have developed, their negative impacts are not as strong, or become positive, when we relate them to profitability timeline (3 columns in the middle of Table 7). The most significant result in this case is the negative impact that process improvement will have on attaining profits, which should be viewed as a logical consequence of increasing cost of capability building. On the other hand, synergy exploitation and application scope are important factors in attaining profitability, which indicates that tapping on the right partners along the value chain, and building highly innovative applications early in an e-commerce venture, will help it save undue costs later on as growth sets in, and will allow it to reach profitability faster.

As for market share, customer loyalty and substitution effect play the same role found in the case of growth rate. Surprisingly, revenue diversification opportunities have a strong significant impact on market share, indicating that ventures capable of devising new ways to earn revenues will most likely use them to stimulate the two previous variables, thereby seizing a larger share of their online markets. It is interesting to note that creating a superior solution for value delivery does not affect market share very strongly nor significantly. This may demonstrate the general belief that competition on the Internet is not about operational superiority, but primarily about creating more value to customers through superior offerings, and devising ways to appropriate more value with superior opportunities, while reinvesting this value in creating ever more innovative offerings.

Unfortunately, our standardized regression coefficients were not sufficiently significant to allow us to demonstrate H2 and H3 for each item. However, we can nevertheless look to these variables' coefficients so as to determine whether they move in the direction predicted by theory. Taking into account the fact that most coefficients are again not significant, and the fact that some small positive impact of capability building obstacles may in fact be a small negative one, we may conclude that this construct is generally valid to moderate the performance impact of innovation. However, reduced value, legal constraints, and integration difficulties in capability acquisition may possibly have a positive relationship with performance. Since they effectively prevent all firms from getting access to some critical e-commerce capabilities, this may allow highly innovative firms to perform better than others who could not innovate due to such obstacles, thereby representing a special case of self-reinforcement within the dynamic capabilities perspective. Finally, the strongest obstacles are most likely social complexity and mixed resources, which in fact represent well the context of many e-commerce ventures, where capability building is hampered by inherent complexities,

and capability acquisition remains hard to accomplish due to the difficulty in separating valuable capabilities from the less useful ones.

Finally, as we consider the relationship of the resource base with our three performance variables, we find again insufficiently valid coefficients to judge to what extent they have an impact. While growth rate is relatively independent of the resource base, profitability timeline appears to be directly related to it, especially to management experience, which is highly significant. This again depicts well the situation of successful and innovative ventures, where managerial prowess has been determinant in accomplishing breakthroughs.

6 Conclusion

This study sheds new light on the failure of innovative e-business models, since we first measure innovation in a more systematic manner, and then moderate and control its performance impact by measuring capability building obstacles and resource base, two of the most reliable, significant, and important constructs in the strategy literature.

Our results demonstrate that the debate on e-commerce failure has gravely exaggerated the importance of the fundamental economics of each sector, and has overlooked the complexity of capability building as a more important predictor of the relative success of e-business models. In addition, we find that managing a venture's resource base wisely, especially focusing on management experience, can effectively reverse the results predicted by such arguments. Finally, the significant differences we uncovered between more and less innovative ventures clearly demonstrate that e-business model innovation consistently yields higher performance, despite capability building obstacles and the fundamental economics of some sectors.

However, further research efforts are required to strengthen these conclusions, and to improve and validate our new measure of e-business model innovation. First, studies with a richer sample (i.e., size, better randomness, stratification by regions and sectors, etc.) will probably yield more significant regression coefficients, thereby allowing us to judge the exact contribution of each innovation dimension to performance. Second, the inclusion of new moderating variables will also serve to improve correlation coefficients and, possibly, reveal stronger moderating and control effects. For example, networking practices may in effect have a more dramatic moderating effect due to the importance of networks in e-commerce, and technology strategy may control this effect more significantly, since poor alliance performance should be alleviated by a stronger technological position. Third, future studies should try to compare these hypotheses for a variety of broad and narrow e-business models, so as to guide strategy making.

References

- Afuah, A., and C. Tucci (2000). *Internet Business Models and Strategies*. New York: McGraw-Hill.
- Afuah, A. N., and C. L. Tucci (2001). 'A Model of the Internet as Creative Destroyer'. Paper presented at the Annual Conference of the Academy of Management (AoM), TIM Division, Washington, DC.
- Amit, R., and C. Zott (2001). 'Value Creation in e-Business'. *Strategic Management Journal*, 22: 493-520.
- Ansoff, H. I. (1965). *Corporate Strategy*. New York: McGraw-Hill.
- Adreus, K. R. (1971). *The Concept of Corporate Strategy*. Homewood IL: Irwin.
- Bakos, Y. (1998). 'The Emerging Role of Electronic Marketplaces on the Internet'. *Communications of the ACM*, 41: 35-42.
- Bambury, P. (1998). 'A Taxonomy of Internet Commerce'. *First Monday*, 2.
- Barney, J. 1991. 'Firm resources and Sustained Competitive Advantage'. *Journal of Management*, 17 (1): 99-120.
- Barney, J. B. (1999). 'How a Firm's Capabilities Affect Boundary Decisions'. *Sloan Management Review*, 40: 137-45.
- Barney, J. B., J. O. Fiet, L. W. Busenitz, and D. D. Moesel (1996). 'The Substitution of Bonding for Monitoring in Venture Capitalist Relations with High Technology Enterprises'. *Journal of High Technology Management Research*, 7 (1): 91-105.
- Bharadwaj, A. S. (2000). 'A Resource-based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation'. *MIS Quarterly*, 24: 169-96.
- Bloch, M., and A. Segev (1996). 'The Impact of Electronic Commerce on the Travel Industry: An Analysis Methodology and Case Study: 1-12'. Berkeley: University of California.
- Brandenburger, A. M., and H. Stuart (1996). 'Value-based Business Strategy'. *Journal of Economics and Management Strategy*, 5: 5-25.
- Campbell, A. (1998). 'The Agile Enterprise: Assessing the Technology Management Issues'. *International Journal of Technology Management*, 15 (1,2): 82-95.
- Carter, A., L. H. Geary, and E. Garcia (2001). 'The Best Online Brokers of 2001'. *Money*, 30: 92-6.
- Chandler, G. N., and S. H. Hanks (1994). 'Market Attractiveness, Resource-based capabilities, Venture Strategies, and Venture Performance'. *Journal of Business Venturing*, 9 (4): 331.
- Chesbrough, H. (2000). 'Designing Corporate Ventures in the Shadow of Private Venture Capital'. *California Management Review*, 42: 31-49.

- Chesbrough, H., and R. S. Rosenbloom (2001). 'The Role of the Business Model in Capturing Value Innovation: Evidence from Xerox Corporation's Technology Spinoff Companies' Boston: Harvard University.
- Choi, D., and L. Valikangas (2001). 'Patterns of Strategy Innovation'. *European Management Journal*, 19: 424-29.
- Combs, J. G., and D. J. Ketchen, Jr. (1999). 'Explaining Interfirm Cooperation and Performance: Toward a Reconciliation of Predictions from the Resource-Based View and Organizational Economics'. *Strategic Management Journal*, 20: 867-88.
- Das, T. K., and B. S. Teng (2000). 'A Resource Based Theory of Strategic Alliances'. *Journal of Management*, 26: 31-61.
- DeYoung, R. (2001). 'The Financial Performance of Pure Play Internet Banks'. *Economic Perspectives*, 25: 60-75.
- Evans, P. B., and T. S. Wurster (1999). *Blown to Bits: How the New Economics of Information Transforms Strategy*. Boston: Harvard Business School Press.
- Fernandez, E., J. M. Montes, and C. J. Vazquez (2000). 'Typology and Strategic Analysis of Intangible Resources: A Resource-Based Approach'. *Technovation*, 20: 81-92.
- Forge, S. (1993). 'Business Models for the Computer Industry for the Next Decade: When will the Fastest Eat the Largest?'. *Futures*, 923-26.
- Fuchs, P. H., K. E. Mifflin, D. Miller, and J. O. Whitney (2000). 'Strategic Integration: Competing in the Age of Capabilities'. *California Management Review*, 42: 118-47.
- Ghosh, S. (1998). 'Making Business Sense of the Internet'. *Harvard Business Review*, March-April: 127-35.
- Ginsburg, L. (1996). 'e-Shop's Approach to Safe Net Shopping'. *CommunicationsWeek*, IA6.
- Gordijn, J., and H. Akkermans (2001). 'Designing and Evaluating e-Business Models'. *IEEE Intelligent Systems*, July-August: 11-18.
- Graves, L. (1996). 'Microsoft's Domino Theory'. *Marketing Computers*, 32-8.
- Greene, P. G., C. G. Brush, and M. M. Hart (1999). 'The Corporate Venture Champion: A Resource-based Approach to Role and Process'. *Entrepreneurship Theory and Practice*, 23: 103-22.
- Gulati, R. (1998). 'Alliances and Networks'. *Strategic Management Journal*, 293-317.
- Gulati, R., N. Nohria, and A. Zaheer (2000). 'Strategic Networks'. *Strategic Management Journal*, 21: 203-15.
- Hollenstein, H. (1996). 'A Composite Indicator of a Firm's Innovativeness. An Empirical Analysis based on Survey Data for Swiss Manufacturing'. *Research Policy*, 633.
- Hagel, John III, and J. F. Rayport (1997). 'The New Infomediaries'. *The McKinsey Quarterly*, 4: 54-71.

- Hadjimanolis, A. (2000). 'A Resource-based View of Innovativeness in Small Firms'. *Technology Analysis and Strategic Management*, 12: 263-81.
- Han, D., and J. Han (2001). 'Value-based Strategy for Internet Business'. *MIT E-Commerce Research Forum*.
- Ince, J. F. (2001). 'Business to Business: The Morning After'. *Upside*, 13: 68-70.
- Jolly, D. (2000). 'Three Generic Resource-based Strategies'. *International Journal of Technology Management*, 19: 773-87.
- Kanellos, M. (1995). 'Beyond Words and Pictures'. *Computer Reseller News*: SS19.
- Kaplan, S., and M. Sawhney (2000). 'E-hubs: The New B2B Marketplaces'. *Harvard Business Review*, 78: 97-100.
- Kim, W. C., and R. Mauborgne (1999). 'Strategy, Value Innovation, and the Knowledge Economy'. *Sloan Management Review*, 40 (3): 41-54.
- King, A. W., and C. P. Zeithaml (2001). 'Competencies and Firm Performance: Examining the Causal Ambiguity Paradox'. *Strategic Management Journal*, 22: 75-99.
- Kukalis, S., and G. A. Senf (1994). 'Object Oriented Concepts Applied to Strategic Planning'. *International Journal of Management*, 11 (2): 676.
- Lee, P. (2001). 'What's in a Name.com? The Effects of ".com" Name Changes on Stock Prices and Trading Activity'. *Strategic Management Journal*, 22: 793-804.
- Lyons, D. (1996). 'Internet Intrigue'. *InfoWorld*: 1.
- Mahadevan, B. (2000). 'Business Models for Internet-based E-commerce: An Anatomy'. *California Management Review*, 42: 55-69.
- Makadok, R. (2001). 'Toward a Synthesis of the Resource-based and Dynamic-capability Views of Rent Creation'. *Strategic Management Journal*, 22: 387-401.
- Martin, S. B., and A. K. Kar (2001). 'Developing E-Commerce Strategies Based on Axiomatic Design'. *MIT Ecommerce Research Forum*, 2 (7).
- Mata, F. J., W. L. Fuerst, and J. B. Barney (1995). 'Information Technology and Sustained Competitive Advantage: A Resource-based Analysis'. *MIS Quarterly*: 487
- McGrath, R. G., L. Tsai, S. Venkataraman, and I. C. Macmillan (1996). 'Innovation, Competitive Advantage, and Rent'. *Management Science*, 42 (3): 384-403.
- McQuillan, J. (1996). 'The Internet Gold Rush'. *Business Communications Review*, 10.
- Mintzberg, H., and J. Lampel (1999). 'Reflecting on the Strategy Process'. *Sloan Management Review*, 40 (3): 21-30.
- Mosakowski, E. (1993). 'A Resource-based Perspective on the Dynamic Strategy-performance Relationship: An Empirical Examination of the Focus and Differentiation Strategies in Entrepreneurial Firms'. *Journal of Management*, 19 (4): 819.
- Nahapiet, J., and S. Ghoshal (1998). 'Social Capital, Intellectual Capital, and the organizational Advantage'. *Academy of Management Review*: 242-66.

- O'Brien, J., R. Sales, I. Schmerken, and D. Tomasula (1996). 'Web Warriors Redefine the Street'. *Wall Street and Technology*: 60.
- O'Daniel, T. (2001). 'A Value-Added Model for Electronic Commerce'. *EM - Electronic Markets*, 11 (1, January): Online Article #1.
- Pant, S., and T. Ravichandran (2001). 'A Framework for Information Systems Planning for e-Business'. *Logistics Information Management*, 14 (1/2): 85-98.
- Patterson, S., and J. Altieri (1993). 'Business Modeling Provides Focus for Upstream Integration'. *Oil & Gas Journal*: 43.
- Penrose, E. T. (1959). *The Theory of the Growth of the Firm*. New York: Wiley.
- PhoCusWright (2001). 'The Online Travel Marketplace 2001-2003: Forecasts, Business Models, And Best Practices for Profitability'. Available at: PhoCusWright.com.
- Porter, M. (1996). 'What is Strategy?'. *Harvard Business Review*, November-December: 61-78.
- Porter, M. E. (2001). 'Strategy and the Internet'. *Harvard Business Review*, 79: 62-78.
- Potok, T. E., and M. A. Vouk (1997). 'The Effects of the Business Model on Object-oriented Software Development Productivity'. *IBM Systems Journal*: 140-61.
- Prabhu, G. N., and U. Majmudar (2001). 'A Conceptual Map of Business Models in Internet Commerce'. Paper presented at the Annual Conference of the Academy of Management (AoM), TIM Division, Washington, DC.
- Rappa, M. (1999). 'Managing the Digital Enterprise—Theme 5: Business Models on the Web', 1-7. Raleigh, NC: North Carolina State University (NCSU).
- Rosen, K. T., and A. L. Howard (2000). 'E-retail: Gold Rush or Fool's Gold?'. *California Management Review*, 42: 72-100.
- Rothaermel, F. T. (2001). 'Incumbent's Advantage through Exploiting Complementary Assets via Interfirm Cooperation'. *Strategic Management Journal*, 22: 687-99.
- Rowe, W. G. (2001). 'Creating Wealth in Organizations: The Role of Strategic Leadership'. *The Academy of Management Executive*, 15: 81-94.
- Sarkar, M. B., B. Butler, and C. Steinfield (1995). 'Intermediaries and Cybermediaries: A Continuing Role for Mediating Players in the Electronic Marketplace'. *Journal of Computer-Mediated Communication*, 1 (3): Special Issue on E-Commerce.
- Schrage, M. (1994). 'Watch Out, CompuServe'. *Across the Board*, 47.
- Schwartz, M. (2001). 'Fewer ASPs, More Services'. *Computerworld*, 35: 44-5.
- Shapiro, C., and H. R. Varian (1998a). *Information Rules: A Strategic Guide to the Network Economy*. Boston: Harvard Business School Press.
- Shapiro, C., and H. R. Varian (1998b). 'Versioning: The Smart Way to Sell Information'. *Harvard Business Review*, November-December: 106-14.
- Shaw, M. J., D. M. Gardner, and H. Thomas (1997). 'Research Opportunities in Electronic Commerce'. *Decision Support Systems*: 149-56.

- Subramanian, A. (1996). 'Innovativeness: Redefining the Concept'. *Journal of Engineering and Technology Management*, 13 (3,4): 223-43.
- Teece, D. J., G. Pisano, and A. Shuen (1997). 'Dynamic Capabilities and Strategic Management'. *Strategic Management Journal*, 18 (7): 509-33.
- Timmers, P. (1998). 'Business Models for Electronic Markets'. *Electronic Markets*, 8 (2): 3-8.
- Tucker, R. B. (2001). 'Strategy Innovation Takes Imagination'. *The Journal of Business Strategy*, 22 (3): 23-7.
- Tyler, B. B. (2001). 'The Complementarity of Cooperative and Technological Competencies: A Resource-based Perspective'. *Journal of Engineering and Technology Management*, 18: 1-27.
- Useem, J. (2001). 'And Then, Just When You Thought the "New Economy" Was Dead...'. *Business 2.0* (August).
- Venkatraman, N. (2000). 'Five Steps to a Dot.com Strategy'. *Sloan Management Review*, Spring: 15-28.
- Venkatraman, N., and J. C. Henderson (1998). 'Real Strategies for Virtual Organizing'. *Sloan Management Review*: 33-48.
- Vizard, M. (1993). 'IBM Strategy Looks to Custom Apps'. *Computerworld*: 7.
- Williamson, O. E. (1999). 'Strategy Research: Governance and Competence Perspectives'. *Strategic Management Journal*, 20: 1087-108.
- Yang, Z., R. T. Peterson, and L. Huang (2001). 'Taking the Pulse of Internet Pharmacies'. *Marketing Health Services*, 21: 4-10.
- Zott, C. (2001). 'Emerging Business Incubators in the Internet Era: (How) Do They Create Value for their Incubated Firms?'. Paper presented at the Annual Conference of the Academy of Management (AoM), TIM Division, Washington, DC.

APPENDIX A – Questionnaire

A Company

- 1 Business model
Choose 1 business model among the 30 defined by Michael Rappa:
http://ecommerce.ncsu.edu/business_models.html
- 2 Industry segment
Choose 1 industry segment among the 12 defined by Wall Street Research Net:
http://www.wsrn.com/help/igroups_def.xpl
- 3 Corporate vs. independent
Choose among these 2 alternatives:

Our firm / venture / project was created / operated within a larger company
Our firm / venture / project was created by independent entrepreneurs.
- 4 Resources network
Our firm / venture / project has access to a very rich pool of resources, in the form of financial capital, a well known brand and image we can leverage, and a wide experts network we can rely on and offers backing to our business.
- 5 Management experience
Our management team has several years of experience in the industries where we have gathered clients, and our leaders have a balanced vision integrating business, market, and technology perspectives.
- 6 Governance mechanisms
Our firm / venture / project is managed in a very dynamic way, with minimal bureaucracy, and operates independently from the board of directors, where the Board acts as a supportive agent instead of a command-and-control authority.

B Performance

- 7 Growth rate
Our firm / venture / project has grown much faster than our competitors, faster than our own growth forecasts, and following closely the Internet growth trends.
- 8 Profitability timeline
Our firm / venture / project has reached or will soon reach profitability, as expected by our initial calendar.
- 9 Market share
Our firm / venture / project has a larger volume of online customers than most of our immediate competitors, and captures the major share of our target market.

C Innovation

- (i) Offerings
 - 10 Customer requirements
Our firm / venture / project has developed offerings that integrate customer preferences and demands in a new way, and are the most complete on market.
 - 11 Functional enhancement
Our firm / venture / project has developed offerings that radically enhance the way our customers perform various functions, leading to great efficiency gains.
 - 12 Flexible customization
Our firm / venture / project has developed offerings that allow new ways to customize products and services, and does it in a more flexible way than the past.
 - 13 Substitution effect
Our firm / venture / project has developed offerings that give so much satisfaction that our customers now use them instead of offline or other online offerings.
-
- (ii) Solutions
 - 14 Application scope
Our firm / venture / project has developed solutions that perform a wide range of applications, more diversified than most legacy or Internet system available.
 - 15 Technological change
Our firm / venture / project has developed solutions that integrate the latest technologies, and attempts to propose or follow a new standard on the market. ./.
-

C Innovation (con't)

16 Process improvement

Our firm / venture / project has developed solutions that radically improve the value chain, improving or creating processes that perform better than the past.

17 Synergy exploitation

Our firm / venture / project has developed solutions that really exploit all the latent synergies throughout the value chain, opening new value creation options.

(iii) Opportunities

18 Revenue diversification

Our firm / venture / project has developed business opportunities that allowed us to diversify our revenue sources and volumes.

19 Market expansion

Our firm / venture / project has developed business opportunities that allowed us to enter online markets that had greater expansion potential than others.

20 Price discrimination

Our firm / venture / project has developed business opportunities that allowed us to price offerings differently for each customer and to capture better margins.

21 Customer loyalty

Our firm / venture / project has developed business opportunities that allowed us to build a loyal customer base and to recover the cost of acquiring customers.

D Capabilities

(i) Creating

22 Historical context

Our firm / venture / project has had difficulty creating new capabilities internally because we built our resources at the wrong time and in the wrong areas.

23 Path dependence

Our firm / venture / project has had difficulty creating new capabilities internally because we faced a steep learning curve and were not prepared for it.

24 Social complexity

Our firm / venture / project has had difficulty creating new capabilities internally because key processes were hard to understand, codify, and reproduce.

25 Causal ambiguity

Our firm / venture / project has had difficulty creating new capabilities internally because it was not clear what competencies to build, how to do it, where, etc.

(ii) Acquiring

26 Legal constraints

Our firm / venture / project has had difficulty acquiring new capabilities from the external groups / companies we partnered / acquired / merged with, because legal constraints prevented us from getting access to their resources / competencies.

27 Reduced value

Our firm / venture / project has had difficulty acquiring new capabilities from the external groups / companies we partnered / acquired / merged with, because after the deals their resources / competencies did not have the same value anymore.

28 Flexibility problems

Our firm / venture / project has had difficulty acquiring new capabilities from the external groups / companies we partnered / acquired / merged with, because the deals reduced our ability to change processes and innovate quickly enough.

29 Mixed resources

Our firm / venture / project has had difficulty acquiring new capabilities from the external groups / companies we partnered / acquired / merged with, because some of the deals included unwanted resources and/or incomplete competencies.

30 Integration difficulties

Our firm / venture / project has had difficulty acquiring new capabilities from the external groups / companies we partnered / acquired / merged with, because we were not able to fully exploit and leverage these resource / competence pools.

Questions 1 to 3 are answered by selecting the number related to the appropriate definition or option. Questions 4 to 30 are answered using a Likert scale that measure the ‘frequency’ by which a certain statement describes the firm of the respondent, reading as follows:

- i) This statement *does not at all describe* our firm / venture / project.
- ii) This statement *does not in most cases describe* our firm / venture / project.
- iii) This statement *probably does not describe* our firm / venture / project.
- iv) This statement *in average does and does not describe* our firm / venture / project.
- v) This statement *probably describes* our firm / venture / project.
- vi) This statement *in most cases describes* our firm / venture / project.
- vii) This statement *completely describes* our firm / venture / project.

