

Association for Information Systems AIS Electronic Library (AISeL)

ICIS 2004 Proceedings

International Conference on Information Systems
(ICIS)

December 2004

Strategic Action Repertoires and Performance of Firms in the Internet Industry

Samer Faraj
University of Maryland

Sanjay Gosain
University of Maryland

Mani Subramani
University of Minnesota

Follow this and additional works at: <http://aisel.aisnet.org/icis2004>

Recommended Citation

Faraj, Samer; Gosain, Sanjay; and Subramani, Mani, "Strategic Action Repertoires and Performance of Firms in the Internet Industry" (2004). *ICIS 2004 Proceedings*. 28.
<http://aisel.aisnet.org/icis2004/28>

This material is brought to you by the International Conference on Information Systems (ICIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICIS 2004 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

STRATEGIC ACTION REPERTOIRES AND PERFORMANCE OF FIRMS IN THE INTERNET INDUSTRY

Samer Faraj

R. H. Smith School of Business
University of Maryland
College Park, MD U.S.A.
sfaraj@rhsmith.umd.edu

Sanjay Gosain

R. H. Smith School of Business
University of Maryland
College Park, MD U.S.A.
sgosain@rhsmith.umd.edu

Mani Subramani

Carlson School of Management
University of Minnesota
Minneapolis, MN U.S.A.
msubramani@csom.umn.edu

Abstract

Researchers have called for new theoretical frameworks and empirical analyses to understand variations in organizational strategies and management practices in the Internet industry, where existing paradigms may have limited applicability. Studies to date have neither articulated the repertoire of key firm actions in this context nor developed theory to relate firm actions to performance. This paper seeks to identify a key set of firm moves in the Internet industry and develop a theoretical model to relate firm actions to two important firm outcomes: sales performance and firm survival. We draw on the construct of dynamic resourcefulness to the firm level and develop a research model linking the actions of firms in the Internet industry underlying dynamic resourcefulness to firm-level outcomes. We test our hypotheses using the action repertoire-year mode of analysis on the actions of 106 leading firms in the Internet industry over a period of 6 years from 1994 to 1999. Our results suggest that firm actions to manage and direct their intellectual, relational, and financial capital resources are associated with higher levels of performance and survival.

Keywords: Internet industry, dynamic resourcefulness, action repertoires, time series regression

Introduction

The Internet industry is an organizational sector that has emerged in the recent past from the confluence of innovations in technological developments in computing hardware, telecommunications, and software. It is characterized by a high level of innovation and knowledge intensity and has low barriers to entry and is an exemplar of hypercompetitive contexts described in the literature. Firms in this industry, largely entrepreneurial startups in the mid-1990s, faced the challenges of coping with ongoing changes to information technologies, blurred industry boundaries, frequent emergence of new players, and the constant need to seek out opportunities for value creation (Sambamurthy et al. 2003). Straub and Watson (2001) suggest that these firms are net-enabled organizations. Confronting a complex, uncertain, and fast-paced context, firms in the Internet industry made ongoing changes to their strategies and organizational routines, engaging in alliances and acquisitions to build or acquire resources and capabilities required to remain competitive (Rindova and Kotha 2001).

Recent accounts propose that the Internet industry is a context where radical shifts in configurations of firm strategy and structure combine to form a novel domain where conventional paradigms are inadequate to explain the links between firm actions and

outcomes (Rindova and Kotha 2001). In the rapidly changing environment of the Internet industry, firms are suggested as experimenting with a range of strategies and organizational forms with limited *a priori* clarity regarding their outcomes and interrelationships (Rindov and Kotha 2001). The challenge posed by these changes has led to calls for theoretical frameworks to systematically understand the organizational designs, strategies, and management practices of firms in the industry (Straub and Watson 2001).

These issues are central to the concerns of the IS community since the availability of information technologies is an important determinant of the transformation of competition, development of firm capabilities, and shaping strategy in the Internet industry. Despite the significance of these issues for both IS academics and managers, it is surprising that work focusing on the Internet industry is currently sparse and fragmented. Studies to date have neither articulated the repertoire of key firm actions in the context nor developed theory to relate firm actions to performance in the Internet industry. This paper seeks to fill this gap to identify a key set of firm *moves* in the Internet industry and develop a theoretical model to relate firm actions to two important outcomes for firm in this industry: sales performance and firm survival. To this end, we extend the construct of *dynamic resourcefulness* (Thomas 1996) to the firm level and develop a research model and hypotheses linking the actions of Internet firms underlying dynamic resourcefulness to firm level outcomes. We use longitudinal data on the actions of 106 leading firms in the Internet industry from January 1, 1994, to December 31, 1999, to empirically test the hypotheses. This study makes two key contributions to the IS literature. First, it extends the theoretical construct of dynamic resourcefulness to the firm level and operationalizes the role of this construct in the context of the Internet industry. It also provides an empirical test of the theory based on longitudinal data over a period of 6 years on the actions of firms in the Internet industry. Overall, the paper takes a step toward the development of a theory relating managerial actions in the Internet industry to firm performance and survival.

Theoretical Background

Rindova and Kotha (2001) provide one of the earliest accounts in the academic literature of the actions of Internet firms. Using the inductive case study method, they describe the complex series of managerial actions of Yahoo and Excite, two competing firms in the Internet industry in their evolution from search engines to destination sites offering a variety of content and then to portals—sites offering a range of content, community, and commerce functionality. Their descriptions of the two firms reveals a sequence of profound changes made by the firms to their products and services, the reconfiguration of firm resources, capabilities, and organizational structures to be competitive in the marketplace being transformed by the ongoing and rapid innovations in different Internet technologies. In their analysis, Rindova and Kotha indicate that the established paradigms of sustainability, competitive advantage, and stability of organizational forms may have limited applications to the context of firms in the Internet industry. Instead, they argue that *continuous morphing*—the ongoing process of firms acquiring new resources and applying current resources to address needs emerging in dynamic markets—is a central determinant of competitive advantage at different points in time. The implication of strategic processes being key determinants of competitive advantage is that variances in firm outcomes in the Internet industry are likely to be strongly linked to differences in the series of organizational actions by firms across time rather than to differences in their resource endowments in a particular period.

From the dynamic capabilities perspective (Teece et al. 1997), advantages enjoyed by firms in the Internet industry are viewed as being transient and firm performance as deriving from the continuous recreation of the sources of competitive advantage. Firm strategies are reflected in competitive actions (e.g., Grimm and Smith 1997) and the action repertoire-year level of analysis can relate organizational actions over a period of time to performance outcomes (e.g. Ferrier et al. 1999). Prior work highlights firm *moves*—purposeful actions by firms—as the means to recognize the choices made by firms to acquire resources and apply them to create value. Ferrier et al. (1999) found that market share erosion and market leadership in a variety of industries are related to patterns of competitive actions and the timing of actions by firms. Smith et al. (1991) suggest that patterns in the competitive responses of firms are linked to performance. In an examination of the software industry, Young et al. (1996) found firm-level competitive activity to be significantly related to firm performance. The results of the study suggest that firm moves pertaining to technology licensing, mergers, and acquisitions are significant determinants of moves related to product introductions which in turn influence firm performance.

While the literature offers useful insights applicable to the context of the Internet industry, there are several issues that remain unresolved. Prior work treats a variety of firm actions—moves to license patents and technologies, moves related to acquisition and those related to mergers—as comprising a homogeneous category of *cooperative actions*. Similarly, the range of firm actions related to product announcements and development of new products are seen as part of a broad class of *competitive actions* (Young et al. 1996). With respect to firms in the Internet industry, a finer-grained understanding of the influence of the individual

constituents of cooperative and competitive actions can provide greater clarity on the performance implications of individual classes of firm moves.

To this end, the notion of *dynamic resourcefulness* suggested by Thomas (1996) represents a promising lens to relate firm actions and performance. Dynamic resourcefulness refers to the ease with which firms can create new strategic assets and also reflects the rapidity of the depreciation in the values of firms' strategic assets. Industries with high levels of dynamic resourcefulness are contexts where the competitive advantage in hypercompetitive industries shifts over time as new resources linked to advantage are created on an ongoing basis and old sources of advantage decline in value. Firms in such industries are, therefore, seen as engaged in ongoing change, an *endless race* (Aoki 1991) to sustain performance.

While the construct of dynamic resourcefulness has been proposed at the level of an industry, it has not been studied at the firm level. Although different classes of resource-related firm actions such as *choosing* and *matching* have been suggested in the literature (e.g., Wheeler 2002), an overarching construct capturing the ability of a firm to continuously engage in creating and regenerating strategic resources still remains to be articulated. Examining the *dynamic resourcefulness* at the level of a firm reflected through the nature of *moves* by firms can, therefore, provide a theoretical mechanism to capture differences across firms that drive performance in the Internet industry.¹

The work of Straub and Watson (2001) and of Wheeler (2002) highlights that firms in the early phase of the Internet industry faced a complex context where hardware and software technologies, the telecommunications infrastructure, and applications were coevolving. Firms in the Internet industry needed to assemble a range of resources and relationships to survive and perform (Wheeler 2002). Studies of the biotechnology sector, which is similarly characterized by high levels of uncertainty and growth, suggest that the focus of firm efforts is on accumulating human, intellectual, alliance, and social capital (Baum et al. 2000) to build and sustain competitive advantages.

Drawing on recent research in the Information Systems and the Strategy literature (Amit and Zott 2001; Sambamurthy et al. 2003), we conceive of the construct of dynamic resourcefulness at the firm level in the Internet industry as being based on firms' ability to dynamically create and deploy resource configurations that are advantageous to the firm. These are achieved through actions that allow a firm to gain or release resources (e.g., acquisition of other firms, license their technologies to others), reconfigure resources (e.g., develop alliances with other firms), and deploy resources (e.g., create new products). Drawing from the context of the biotechnology industry, we suggest that the dynamic resourcefulness of Internet firms comprises their assembly and management of resources and relationships: intellectual resources, and relational resources, financial capital. Dynamic resourcefulness is also influenced by firms' actions in the product-market space and in process and infrastructure creation. Consistent with the dynamic view of strategy as a stream of action, firm moves related to these components of dynamic resourcefulness, in particular the timing and pacing of these moves, is associated with firm performance. The research framework is depicted in Figure 1.

Intellectual Resources

Recent evidence suggests that intellectual capital is increasingly replacing physical capital as the key source of value creation in the economy (Subramani and Venkatraman 2003) and the Internet industry represents almost an ideal case of this transition. Firms in the Internet industry generally based their future prospects on advantages derived from innovative proprietary techniques, often encoded in hardware, software, and business processes (Amit and Zott 2001). Prior research suggests that the licensing of patents from other firms as well as the signing up of licensees to a firm's patents are proxies that reflect managerial actions with respect to the creation and the assembling of intellectual assets (Baum et al. 2000). Consistent with arguments suggesting the importance of intellectual assets to performance for firms in the Internet industry, we hypothesize that:

H1: The performance and survival of Internet firms is positively related to the level of their patent activity.²

¹We view dynamic resourcefulness as being a more focused construct underlying the broader notions of *capability building* and *entrepreneurial action* discussed in recent IS research (Sambamurthy et al. 2003).

²Patent creation, licensing patents from other firms (licensing in), and licensing patents to other firms (licensing out) create differential benefits for firms. These activities are highly correlated in Internet firms—the more active firms tend to do more of each concurrently. We, therefore, focus on firms' overall level of patent-related activity.

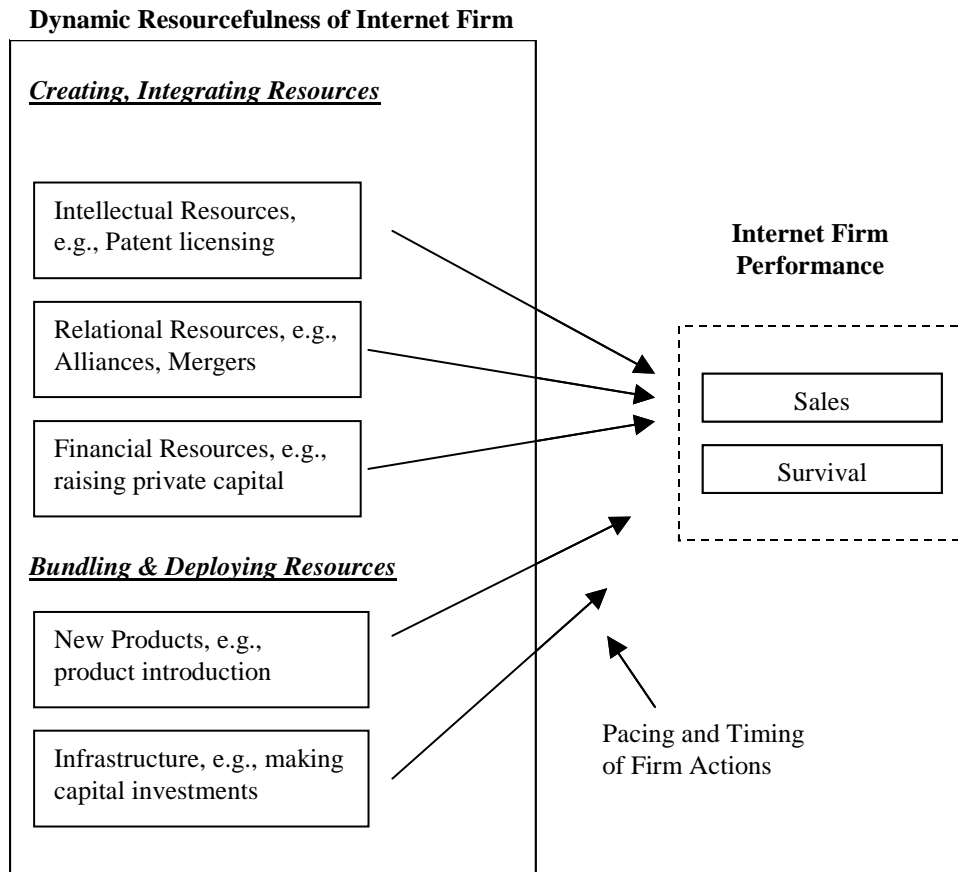


Figure 1. Theoretical Framework: Dynamic Resourcefulness and Firm Performance

Relational Resources

Alliances

Alliances have been suggested as providing firms a variety of advantages (Dyer and Singh 1998), particularly in markets with many competitors and markets that are in an evolving stage (Eisenhardt and Schoonhoven 1996). In particular, firms can overcome resource shortages by engaging in alliances (Lavie 2002). Through alliances, Internet firms can gain access to intangible resources such as complementary software technologies and the services of skilled programmers from the partner firm and alliances are viewed as important enablers of firm performance. We, therefore, propose that

H2: The performance and survival of Internet firms is positively related to the level of their alliance activity.

Mergers and Acquisitions

Mergers and acquisitions increase the knowledge base of the firm and firms can derive significant advantages from these managerial moves. Mergers and acquisitions can be very useful in time-sensitive contexts by helping firms avoid the delays involved in developing capabilities internally. Mergers and acquisitions are also viewed as being useful in gaining access to the knowledge and skills of talented individuals (Wysocki 1997) and can enhance the level of innovation and have other positive benefits for acquiring firms. We, therefore, hypothesize that

H3: The performance and survival of Internet firms is positively related to the level of their mergers and acquisitions activity.

Managing Financial Capital

Although firms in the Internet industry operate in a wide variety of markets with different characteristics, a common feature of their operation is the significant level of ongoing expenses they incur—a feature referred to as the *burn rate*. The ability of these firms to raise capital to finance operations is, therefore, recognized as one of the most significant issues facing managers of Internet firms (Baum and Silverman 2002). We, therefore, hypothesize

H4: The performance and survival of Internet firms is positively related to the level of their financing activity.

Deploying Resources: New Products

The creation and introduction of new products and services on an ongoing basis is an important means for firms to incorporate new developments in technologies and to adapt to customer needs. New product introduction is a key managerial action strongly related to firm benefits in the Internet industry (Rajgopal et al. 2002). New product introduction and releases of new versions of existing products and new products involve significant development effort and reflect the ability of the firm to seek and leverage profitable opportunities. New products also signal the firm's directed activities toward a new or enhanced intellectual domain or market. New product introductions are important signals regarding the intent to match firm resources to address specific markets needs. We, therefore, hypothesize that

H5: The performance and survival of Internet firms is positively related to the level of their new product activity.

Deploying Resources: Infrastructure

The emergence of technological infrastructure in an industry sector provides an “institutionalized framework in which technological change can occur as routine, cooperative process among many organizations, defines the boundaries of technological problems, provides an accepted technological approach, and establishes the criteria for evaluating projects and results” (Weiss and Birnbaum 1989, p. 1020). For firms in evolving industries infrastructure, therefore, creation is critical as it provides the basis for effective formulation and implementation of technology-based strategies. We, therefore, hypothesize that

H6: The performance and survival of Internet firms is positively related to the level of their infrastructure activity.

Pacing and Timing of Strategic Actions

The speed and timing of organizational processes has been suggested as conferring significant benefits to organizations. These factors are linked to the agility of firms and have been suggested as an important determinant of firm success (Brown and Eisenhardt 1997; Sambamurthy et al. 2003). Prior evidence indicates that successful firms, in continuously changing and creating innovative products, develop a sense of where to go next while still focused on current actions, and act in a “time-paced” manner rather than reacting to their environments (Brown and Eisenhardt 1997). We, therefore, propose that

H7: The performance and survival of Internet firms will be related to the pacing and timing of their strategic actions.

Data and Methodology

Sample

The Internet industry during the period of its rapid growth comprised a very large number of players. In view of the novelty of Internet technologies and the Internet industry, key positions in most of these firms were held by relative novices to management, mainly technologists with little prior management experience or industry background. Observers suggest that the managerial

Table 1. Sample Characteristics (1997)

Percentile	Weighted Average		
	Employees (1997)	1997 Sales (\$M)	1997 Income (\$M)
5	18.1	0.3	-58.63
10	25	1.29	-45.75
25	75	5.85	-23.05
50	188	16.95	-7
75	394	49.525	-2.875
90	814.8	129.67	2.35
95	1718.2	421.28	17.12

actions of many of these firms were ill advised and reflected a lack of consideration of important principles of management strategy (Porter 2001; Shapiro and Varian 1999). To enable valid conclusions from examining firm actions, we focused on a subset of Internet firms that could be considered to be well managed—the set of 106 public companies identified by *InformationWeek*, a leading industry publication, as being the leading firms in the Internet industry and most likely to succeed. This set of firms can be expected to have been central in shaping the Internet industry with their products and services. This choice makes analytical tests more conservative by reducing the variance in performance outcomes. Demographic characteristics of firms in the sample are shown in Table 1.

Data on firm actions were derived from LEXIS/NEXIS and FirstSearch, two commercially available news and information databases providing reports of firm activities (see the appendix for examples of typical reports). For each firm, the research team comprising the authors and MBA students searched these databases to locate news items containing the name of the firm along with occurrences of search terms such as agreement, patent, partnership, alliance, financing, acquire, relationship and partners, team, merge, and marketing linked to specific firm moves of interest. The time period of each search spanned 6 years from January 1, 1994, to December 31, 1999. These searches retrieved over 15,000 news items comprising a mix of press announcements and news reports.

Independent Variables

Eliminating duplicate news items and irrelevant news items that happened to contain the search terms reduced the dataset to 13,786 announcements. Firm moves were identified through a structured content analysis, a procedure employed in prior studies of dynamic strategy (e.g., Young et. al. 1986). The coders—MBA and doctoral students supervised by a faculty member—were trained on sample announcements to recognize firm actions of interest.

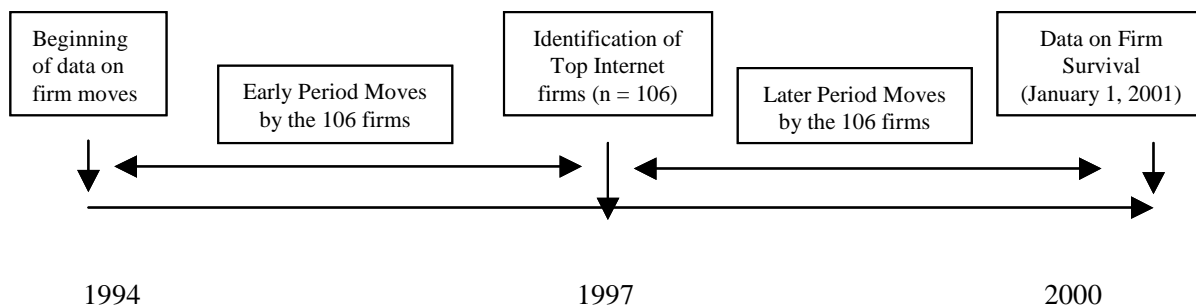


Figure 1. Temporal Sequence of Data (January 1, 1994, to December 31, 2000)

Since a very large number of news items had to be examined, each item was coded only once by the trained coders. The reliability of coding was computed by comparing randomly selected sets of 100 items that were independently coded by the authors to that assigned by coders. Samples of 100 items randomly selected from the sample that were recoded and compared to coders' assignments reflected adequate levels of reliability.

Dependent Variables

The study focused on two aspects of firm performance: sales revenue and firm survival. Sales revenue has traditionally been an important metric of firm success in management research (Brush and Bromiley 2000). We also incorporated firm survival in the year 2000 as another dependent variable, reflecting the ability of the firm to continue operating through the turbulent periods when a large number of Internet companies went out of business.

Sales Revenue: Data on the sales revenues were obtained from Compustat for firms as all the years when they were publicly listed in the seven-year period from January 1, 1994, to December 31, 2000.

Survival: In instances when a firm failed, the date when the firm announced bankruptcy was obtained from news archives by searching on the firm name through Web search engines. Consistent with the prior literature (Baum and Silverman 2002), changes in firm name or firm ownership through acquisition or mergers during the study period were coded as survivors and the newer entity was tracked for the remainder of the period. The dependent variable of firm demise (DEATH) was coded as a 1 if the firm terminated its operations. This conservative measure does not include cases where a firm was acquired by another firm (ACQDEATH) and still continued operating because it is difficult to distinguish between an acquisition where the firm ceases to sustain a viable business model versus others where a successful firm is targeted for acquisition by another. The model for the more conservative measure is presented in the paper. The results remain substantially similar for the broader measure.

The correlations among action totals across the 1994–1999 time-frame are presented in Tables 2 and 3. The tables indicate that, at an aggregate level, there is a high level of correlation between some of the action categories. This is reduced significantly for the non-aggregated data used for the first model and for action proportions in the second model.

Table 2. Correlations among Actions (Aggregate)

	(1)	(2)	(3)	(4)	(5)	(6)
1. Infrastructure Actions	1.000					
2. New Product Actions	.819	1.000				
3. Patent Actions	.436	.777	1.000			
4. Alliance Actions	.832	.933	.657	1.000		
5. Financing Actions	-.107	-.151	-.165	-.128	1.000	
6. M & A Actions	-.088	-.159	-.178	-.118	-.122	1.000

Table 3. Correlations among Actions (Proportions Early)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Infrastructure Actions _{early}	1.000						
2. New Product Actions _{early}	.105	1.000					
3. Patent Actions _{early}	.002	.412	1.000				
4. Alliance Actions _{early}	.285	.493	.362	1.000			
5. Financing Actions _{early}	.057	.020	.024	-.060	1.000		
6. M & A Actions _{early}	.007	.167	.191	.160	.245	1.000	
7. Total Actions _{early}	.270	.229	.155	.396	-.015	.101	1.000

Controls: To discount rival hypotheses, we incorporated product type (digital or physical) and firm experience (time online) as control variables in the model.

Model Specification

Model 1: Predicting Sales Performance

For the first model, the number of actions in each category was computed for every firm in the sample for each of the 5 years. These numbers were then used in a log-linear growth model to predict sales revenue. For the analysis, we pooled the yearly data and estimated models on the pooled cross section using time series regression techniques. For each firm in our sample, we had one set of observations for each of the years between 1994 and 1999 that the firm was in operation. In the dataset, a firm founded in 1994 and continuing in business on December 31, 1999, would be represented by six observations. Firms founded later or those that went out of business before the end of the observation period are represented by fewer observations. The length of the time series related to each firm thus varies from three to six based on the period it began operation and when it ceased operation. The average number of periods of firms in the sample is 4.7. Pooling data in this manner improves estimation efficiency and allows us to explain both the cross-sectional pattern of relationships between key variables influencing outcomes as well as the influence of time related variables such as incumbency on outcomes. We specified the following time series regression model:

$$\ln (S_{it}) = \alpha \ln (S_{it-1}) + \beta x_{it} + \gamma x_{it-1} + \epsilon_{it}$$

This is a log-linear growth model, where S_{it} is the sales revenue in year t for the i^{th} firm, S_{it-1} is the sales revenue in the prior year, α is an adjustment parameter that captures the effect of past performance on current performance, β is a vector of parameters for the effects of independent and control variables, and γ is a vector of parameters for the lagged independent variables. The inclusion of the lagged dependent variable S_{it-1} as a predictor helps account for the possibility that the model of Internet firm performance suffers from a specification bias due to unobserved heterogeneity (Jacobson 1990). This lets us infer hypothesized relationships with greater confidence because if the Internet firms' alliances, new product introductions, and alliance activity are themselves the result of unobserved factors related to performance, including the lagged performance term eliminates the possibility of spurious effects arising from such endogeneity. Pooling repeated observations on the same organization is likely to violate the assumption of independence from observation to observation and result in the model's residuals being correlated which makes OLS models inefficient (Judge et al. 1993). We, therefore, estimated random-effects GLS models, which corrects for autocorrelation of disturbances (Greene 1993). The model was estimated using the SAS TSCSREG procedure.

Model 2: Predicting Survival

The second model was modeled as a binary logistic regression model with firm demise as the dependent variable. For this model, an action portfolio was constructed for each company by computing the total number of all actions of that company, and then computing proportions for each type of action. Further, the proportions were constructed to separate out the early moves. For instance, if Company X had 100 actions over the 1994 to 1999 time frame, of which 5 related to alliances and occurred before January 1, 1997, then Alliance Actions_{early} = 0.05. January 1, 1997, is used as the cut-off date demarcating the early and late periods, consistent with prior suggestions (e.g., Roberts 2000) of a structural break in growth of the Internet in this period.

We specified the following logistic regression equation to predict the category of each company (survival or death) as a function of independent variables for each company denoting the proportion of early actions for each category.

$$\log(p(x)/1-p(x)) = \alpha + \beta x$$

where p denotes the probability of death and x is the matrix of predictors.

Thus, a greater proportion of specific types of actions before 1997, controlling for the total number of actions, are expected to confer significant early-mover benefits for firms, resulting in a greater probability of survival.

Results

The cross sectional time series regression for Model 1 included 106 firms over five periods³ and we employed the random effects GLS to estimate the parameters. The results of the analysis are in Table 4. The results of the binary logistic regression model are shown in Table 5.

Table 4. Results of Cross-Section Time Series Regression Model (n = 106)

	b (s.e.)
Intercept	0.744 (0.098)***
Ln (Sales _{t-1})	0.698 (0.0316)***
Patent Actions _{t-1}	-0.024 (0.0238)
Alliance Actions _t	-0.009 (0.005) *
M&A Actions _t	0.016 (0.008) **
Financing Actions _t	0.054 (0.021) ***
New Product Actions _t	0.009 (0.003) ***
Infrastructure Actions _{t-1}	0.009 (0.021)
Cumulative Months Online _t	0.010 (0.002)***
Industry Sector	0.180 (0.167)
R ² 0.734***	

*p < 0.10; **p < 0.05, ***p < 0.01

Table 5. Results of Binary Logistic Regression Model (n = 103)

	Dependent Variable: Firm Death	
	b (s.e.)	Wald Test
Constant	42.587 (25.561)	2.776
Patent Actions _{early}	-52.612 (71.231)	0.546
Alliance Actions _{early}	54.907 (30.597) *	3.220
M&A Actions _{early}	-15.164 (30.966)	0.240
Financing Actions _{early}	11.599 (28.594)	0.165
New Product Actions _{early}	-21.023 (13.029) *	2.604
Infrastructure Actions _{early}	-41.505 (75.706)	0.301
Online	-0.001 (0.001) *	3.142
Industry Sector	1.028 (1.034)	0.988
Nagelkerke R ² .245***		

*p < 0.10; **p < 0.05, ***p < 0.01

Note: Negative coefficients indicate a positive relationship with firm survival.

³Since the model includes a lagged dependent variable, we perform the estimation over five periods.

Table 6. Summary of Hypothesis Tests

H1-H6			H7	
Firm Moves		Conclusion from Model 1 (DV=Sales)	Firm Moves	Conclusion from Model 2 (Survival)
Patent Related Actions†	H1	Not Supported	Patent Related Actions†	Not Supported
Alliance Actions	H2	Not Supported	Alliance Actions	Supported
Mergers& Acquisitions	H3	Supported	Mergers& Acquisitions	Not Supported
Financing Actions	H4	Supported	Financing Actions	Not Supported
New Product Actions	H5	Supported	New Product Actions	Supported
Infrastructure Actions†	H6	Not Supported	Infrastructure Actions*	Not Supported
			Months Online	Supported

† Consistent with prior literature, assessed at period (t-1) as lagged effect expected on Sales

We examine support for H1 through H6 based on the significance of coefficient in the log-linear growth model predicting sales performance for each year. For H7, we examine the significance of the relevant coefficient in the binary logistic regression predicting survival based on the extent to which the firm action portfolio was composed of (relatively) more early actions of a specific type. The summary of hypothesis tests are in Table 6.

We find no support for H1, suggesting little evidence that prior period patenting actions were associated with higher incremental sales. The insignificant coefficient for the coefficient of patenting in Model 2 indicates that the data does not support a link between a greater proportion of early patenting actions and did not improve firm survival. H2, predicting that alliances would be associated with firm performance, was not supported but the direction of the effect was the reverse of what was hypothesized: a higher number of alliance actions reduced firm sales. However, increased early alliance actions were significantly related to firm survival. H3 is supported, suggesting that mergers and acquisitions activity is positively associated with firm performance. However, firm survival is not related to increased proportions of early M&A activity. H4 is supported: financing actions are significantly associated with increased sales performance. However, there is no evidence that an increased proportion of early financing actions is associated with statistically significant higher chances of survival. H5 is supported. New product actions are associated with increased sales performance. Further, a higher proportion of early product actions significantly improves chances of firm survival. H6 is not supported. Infrastructure actions are not associated with statistically significant increased sales in the next time period. There is also no evidence that the proportion of early infrastructure actions significantly affects firm survival.

Cumulative experience online is significantly associated with both higher sales and reduced chances of firm demise. This variable, reflecting a variety of firm-specific factors, related to the advantage of incumbency controls for the influence of these extraneous factors on firm performance and survival.

Discussion and Conclusions

Past research on strategic moves has been generally based on a study of relatively mature industry contexts, and trying to understand competitive activity among leading firms (e.g., Ferrier et al. 1999). We draw upon this methodology and its focus on purposeful actions in the context of Internet firms, a context where the complexity of a firm’s repertoire is indicated by conceptual analyses as being determinants of firm performance (Sambamurthy et al. 2003). This research represents, to our knowledge, the first empirical test of the dynamic perspective of strategy in the context of the Internet. The results of this study point to important insights for understanding the implications of different types of strategic actions in the context of an embryonic industry. This study also demonstrates the utility of conceptualizing dynamic resourcefulness at the level of a firm to begin to articulate the firm actions that underlie this important firm attribute linked to managerial action within the firm.

The results demonstrate the utility of a finer-grained approach to conceptualizing firm actions- going beyond the broad categories of *cooperative*, *competitive actions* commonly used in prior literature—to highlight the individual effects of firms’ actions with respect to issues such as patents, alliances, raising capital, and new product introductions. Since each of these has a differing

influence on firm performance and survival, our results contribute to a more nuanced understanding of the relationships between managerial actions and firm outcomes.

The lack of a significant impact of intellectual capital patents may be ascribed to the specific characteristics of Internet software and services patents. It is proposed that rather than representing real innovation, these patents are being filed for techniques already in wide use, but not patented or published in the kinds of journals the patent office searches when looking for “prior art” (O’Reilly 2000). Further, it is believed that a number of companies are filing defensive patents to protect their turf in the light of the patent “land grab.” It has been proposed that transitory alliances may be an instrument for firms in turbulent environments to acquire knowledge swiftly and deal with change (Duysters and de Man 2003). However, the results of this study suggest that increased alliance activity may be disruptive for organizations. This may be due to difficulties in appropriating the benefits from knowledge available from numerous alliance partners without significant investment in enhanced absorptive capacity to overcome the stickiness of this knowledge. Past research suggests that alliances tend to be unstable, and a large number of them fail. Some estimates put the failure rate of alliances as high as 70 percent (Parkhe 1993). Alliances inherently pose the potential for conflict and a clash of interest between alliance partners, while they may also create a culture that tends to focus on the “logics of alliances” that clash with the “logics of innovation” (Bidault and Cummings, 1994).

The study finds that mergers and acquisition actions are associated with higher sales performance and chances of survival. In conjunction with the results on alliance actions, this suggests that firms need to carefully assess company-specific competencies, market position with respect to other firms, and the state of the product market as they assess whether to ally or acquire. The combination of H5 and H6 suggest that directing resources toward new product development actions was associated with improved organizational outcomes while directing resources toward infrastructure creation actions was not. It is likely that product and service versioning may be more easily accomplished for the kind of products and services offered over the Internet and offer benefits in turbulent environments, as firms can learn more about markets and customers through experimental forays. In contrast, infrastructural moves may be significantly more expensive and be more demanding on firm resources.

Limitations and Future Research

This study has several limitations. The cross-sectional analysis undertaken here needs to be complemented by studies that analyze each action in greater depth to evaluate characteristics of each type of action that may moderate its effectiveness. For instance, past research on alliances using an event-study methodology has found that while markets may be (overall) indifferent to the announcements of strategic alliances, there are differences in the valuations based on alliance type and resource position (Das et al. 1998). Our findings, that alliance related actions that aid survival appear to undermine sales performance, suggest that there are the tradeoffs involved in seeking and structuring alliances. This is an area for further research.

This study has focused on explicit announcements that suggest a firm’s strategic management of key resources. These announcements focus on external stakeholders so they do not provide much insight into internal firm processes that may also be key to how these resources are integrated and reconfigured. Socially complex tacit knowledge that is diffused throughout a firm (Barney 1991) may be an important aspect of intellectual capital, for example, that needs to be considered to supplement our examination of codified intellectual capital in the form of patents.

References

- Amit, R., and Zott, C. “Value Creation in E-Business,” *Strategic Management Journal* (22), 2001, pp. 493-520.
- Aoki, R. “R&D Competition for Product Innovation: An Endless Race,” *American Economic Review* (81:2), 1991, pp. 252-256.
- Barney, J. “Firm Resources and Sustained Competitive Advantage,” *Journal of Management* (17), 1991, pp. 99-120.
- Baum J. A. C., Calabrese, T., and Silverman, B. S. “Don’t Go it Alone: Alliance Network Composition and Startups’ Performance in Canadian Biotechnology,” *Strategic Management Journal* (21:3), 2000, pp. 267-294
- Baum, J. A. C., and Silverman, B. S. “Picking Winners or Building Them? Alliance, Intellectual, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups,” University of Toronto Working Paper, 2002.
- Bidault, F., and Cummings, T. “Innovating Through Alliances: Expectations and Limitations,” *R&D Management* (24:1), 1994, pp. 33-45.
- Brown, S. L., and Eisenhardt, K. M. “The Art of Continuous Change: Linking Complexity Theory and Time-Paced Evolution in Relentlessly Shifting Organizations,” *Administrative Science Quarterly* (42), 1997, pp. 1-34.

- Brush, T. H., and Bromiley, P. "The Free Cash Flow Hypothesis for Sales Growth and Firm Performance," *Strategic Management Journal* (21:4), 2000, pp.455-472.
- Das, S., Sen, P. K., and Sengupta, S. "Impact of Strategic Alliances on Firm Valuation," *Academy of Management Journal* (41:1), 1998, pp. 27-41.
- Duysters, G., and de Man, A. "Transitory Alliances: An Instrument for Surviving Turbulent Industries?," *R & D Management* (33:1), 2003, pp. 49-58.
- Dyer, J. H., and Singh, H. "The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage," *Academy of Management Review* (23:4), 1998, pp. 660-679
- Eisenhardt, K. M., and Schoonhoven, C. B. "Resource-Based View of Strategic Alliance Formation: Strategic and Social Effects in Entrepreneurial Firms," *Organization Science* (7), 1996, pp. 136-150.
- Ferrier, W., Smith, K., and Grimm, C. "The Role of Competitive Action in Market Share Erosion and Industry Dethronement: A Study of Industry Leaders and Challengers," *Academy of Management Journal* (42), 1999, pp. 372-388.
- Greene, W. H. *Econometric Analysis*, Macmillan Publishing Company, London, 1993.
- Grimm, C., and Smith, K. G. *Strategy as Action: Industry Rivalry and Coordination*. South-Western College Publishing, Cincinnati, OH, 1997.
- Jacobson R. "Unobservable Effects and Business Performance," *Marketing Science* (9), 1990, pp. 74-85.
- Judge, G. G., Griffiths, W. E., Hill, R. C., Lütkepohl, H., and Lee, T. *The Theory and Practice of Econometrics*, John Wiley & Sons, New York, 1993.
- Lavie, D. "The Competitive Advantage of Interconnected Firms: An Extension of the Resource-Based View," *Academy of Management Proceedings*, 2002, pp. c1-c7.
- O'Reilly, T. "The Internet Patent Land Grab," *Communications of the ACM* (43: 6), 2000, pp. 29-31.
- Parkhe, A. "Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation," *Academy of Management Journal* (36:4), 1993, pp. 794-829.
- Porter, M. E. "Strategy and the Internet," *Harvard Business Review*, March 2001, 63-78.
- Rajgopal, S., Venkatachalam, M., Kotha, S., and Erickson, M. "Managerial Actions, Stock Returns, and Earnings: The Case of Business-to-Business Internet Firms," *Journal of Accounting Research* (40:2), 2002, pp. 529-556.
- Rindova, V. P., and Kotha, S. "Continuous 'Morphing': Competing Through Dynamic Capabilities, Form, and Function," *Academy of Management Journal* (44:6), 2001, pp. 1263-1280.
- Roberts, L. G. "Beyond Moore's Law: Internet Growth Trends," *IEEE Computer* (33:1), January 2000, pp. 117-119.
- Sambamurthy, V., Bharadwaj, A., and Grover, V. "Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms," *MIS Quarterly* (27:1), 2003, pp. 237-263.
- Shapiro, C., and Varian, H. *Information Rules*, Harvard Business School Press, Boston, 1999.
- Smith, K. G., Grimm, C. M., Gannon, M. J., and Chen, M. "Organizational Information Processing, Competitive Responses, and Performance in the U.S. Domestic Airline Industry," *Academy of Management Journal* (34:1), 1991, pp. 60-85.
- Straub, D. W., and Watson, R. "Transformational Issues in Researching IS and Net-Enabled Organizations," *Information Systems Research* (12: 4), 2001, pp. 337-345.
- Subramani, M. R., and Venkatraman, N. "Safeguarding Investments in Asymmetric Interorganizational Relationships: Theory and Evidence," *Academy of Management Journal* (46), 2003, pp. 237-263.
- Teece, D. J., Pisano, G., and Schuen, A. "Dynamic Capabilities and Strategic Management," *Strategic Management Journal* (18:7), 1997, pp. 509-530.
- Thomas, L. G. "The Two Faces of Competition: Dynamic Resourcefulness and the Hypercompetitive Shift," *Organization Science* (7:4), 1996, pp. 221-242.
- Weiss, A. R., and Birnbaum, P. H. "Technological Infrastructure and the Implementation of Technological Strategies," *Management Science* (35:8), 1989, pp. 1014-1026.
- Wheeler, B. C. "NEBIC: A Dynamic Capabilities Theory for Assessing Net-Enablement," *Information Systems Research* (13:2), 2002, pp.125-146.
- Wysocki, B. "Why an Acquisition? Often it's the People," *Wall Street Journal*, October 6, 1997, pp. 1.
- Young, G., Smith, K. G., and Grimm, C. M. "Austrian and Industrial Organization Perspectives on Firm-Level Competitive Activity and Performance," *Organization Science* (7), 1996, pp. 243-55.

Appendix: Examples of Reports of Typical Actions

Creating and Integrating Resources

Intellectual Resources

Infoseek Corp has received a patent covering a new approach for decentralized searching of the Web to provide more accurate results and combat what is widely seen as a breakdown of the current generation of search engines. The new Infoseek technique uses multiple indexes and searches across numerous databases and Web sites throughout the Internet. Each query yields a list of documents ranked correctly according to their relevance to the search. The system then uses the ranking systems of all of the participating servers to assemble an aggregated listing displayed in the user's Internet browser program. The technique is designed for use in conjunction with emerging Internet standards for distributed searches, including the STARTS protocol, developed at Stanford University in cooperation with leading search vendors. Currently, Infoseek has 17.5 percent of the search engine market, behind Yahoo with 36.8 percent and Excite with 18.8 percent. Lycos has a 15.9 percent share, while Alta Vista has 12.2 percent of the search engine market.

Relational Resources

Internet domain name registrar Register.com, New York, and Concentric Network, San Jose, CA, announced a strategic partnership last week to provide newly registered customers with a complete solution for building a customized Web site and Web store. Through the agreement, the companies will host a variety of co-marketing programs and will link directly to each other's Web sites. Once registrants complete their domain name registration with register.com, Concentric will be featured as one of the recommended Web-hosting providers. Visitors to Concentric's Web site will be able to link to register.com and will be able to use its services to register and reserve a domain name.

Financial Resources

VeriSign Inc. (Mountain View, CA), a provider of digital certificates that serve as identification cards in the digital world, is launching a \$40 million proposed common stock offering, with about \$5 million going to fund 1998 expenditures. The ID cards authenticate the user's membership in an organization or community and establish the owner's authority to participate in online transactions. VeriSign aims to enhance its position as the leading provider of digital certificate solutions used in millions of copies of Microsoft and Netscape browsers, thousands of Web servers and other software applications. Forrester Research Inc. (Cambridge, MA) expects the market for Internet protocol networks to grow to over \$327 billion by 2002, vs \$8 billion in 1997. Such systems are increasingly used for business-to-business commerce transactions, electronic data interchange and online retail purchases and payments. Full text lists firms with which VeriSign has agreements, its shareholders, and rivals.

Bundling and Deploying Resources

New Products

Netscape Communications has launched a personal finance channel on its Netcenter portal. Citibank is the anchor tenant for the channel, and will receive front-page positioning and exposure throughout the site. The personal finance channel features free real-time stock quotes and daily mutual fund updates, as well as content from Standard & Poor's, Morningstar, and Reuters, among other providers. The personal finance channel includes an investing sub-channel. Netscape plans to launch a tax sub-channel later this month, followed by online banking, mortgage, insurance and retirement sub-channels over the next several months.

Capital Expenditure

Dell is planning to invest around Euro16.5 million in the establishment of a new call center on a 10 hectare tract of land in Montpellier, France. The company will transfer the activities of its existing call center in Montpellier, which employs 300 people, to the new centre and create a further 500 jobs within three years. A further expansion, with a further 300 jobs, may be implemented after that. Dell is expanding its telemarketing activities in Montpellier in order to cover southern Europe. Meanwhile, France Telecom is considering setting up an online technical help center for its Wanadoo Internet service in Montpellier.