MIT Sloan School of Management

Working Paper 4563-05
October 2005

ORGANIZATIONAL DESIGN, ORGANIZATIONAL LEARNING, AND THE MARKET VALUE OF THE FIRM

Timothy N. Carroll, Starling D. Hunter

This paper also can be downloaded without charge from the
Social Science Research Network Electronic Paper Collection:
http://ssrn.com/abstract=829006

ORGANIZATIONAL DESIGN, ORGANIZATIONAL LEARNING, AND THE MARKET VALUE OF THE FIRM*

Timothy N. Carroll

Georgia Institute of Technology

College of Management

800 W. Peachtree Street, NW

Atlanta, GA 30309

Tel: 404.894.4387

Fax: 404.894.6030

Email: tim.carroll@mgt.gatech.edu

Starling D. Hunter

Massachusetts Institute of Technology

Sloan School of Management

50 Memorial Drive, E52-553

Cambridge, MA 02142

Tel: 617.252.1427

Fax: 617.253.2660

Email: starling@mit.edu

ORGANIZATIONAL DESIGN, ORGANIZATIONAL LEARNING,
AND THE MARKET VALUE OF THE FIRM

Abstract: We compare market returns associated with firms' creation of new units focused on e-business. Two aspects of organization design - governance and leadership - are considered with regard to exploitation- and exploration-oriented organization learning. We find that exploitation in governance (high centralization) is associated with a lower mean and variance in returns; that exploitation in leadership (appointment of outsiders) is associated with the same mean yet higher variance; and, among units exhibiting both modes of learning, the variance of returns are *not* equal.

INTRODUCTION

Scholars of organization studies, studying a variety of outcome measures and mechanisms at different levels of analysis, are in general agreement that organizational effectiveness depends in large measure on the demonstrated ability of the organization to maintain a balance between two distinct yet complementary modes of organizational learning known as exploration and exploitation (March, 1991, 1995; Levinthal and March, 1993; Sorenson & Sorensen, 2001; Sorensen, 2002; Hunter, 2003). The former is characterized by the experimentation with new ideas, paradigms, technologies, strategies, and knowledge. The latter is characterized by the elaboration upon, the refinement and improvement of, existing capabilities, ideas, etc. And while researchers in the field of organization design and its impact on firm performance have yet to explicitly examine this theoretical distinction, our reading of the literature finds its broad outline discernable in the long-term concern of that literature on the performance impacts of organization design choices such as delegation of authority, leadership and governance, incentives, and internal processes on firm performance. We briefly examine each in turn.

Organization structures may tend to lead to one type of learning, such as the use of decentralized, autonomous structures to encourage exploratory goals like innovation and new product development, and the use of centralized structures to achieve efficiency and economies of scale (Burns and Stalker, 1961; Hedberg et al, 1976). Organization structures may also exhibit or seek to strike a "balance" between thee two modes of learning, e.g. by combining firm-wide incentives that encourage broad search and exploration with an active

hierarchy that provides stability or exploitation (Rivkin and Siggelkow, 2003) or via a switch between centralization and decentralization at various points in time (Siggelkow and Levinthal, 2003). Modular product and organization designs also enable both exploration and exploitation by decomposing complex systems into loosely coupled subsystems (Sanchez and Mahoney, 1996).

In franchise governance systems firms achieve the exploration/exploitation balance by maintaining a mixture of company-owned and entrepreneurial franchises (Sorenson and Sorensen, 2001). This is because company-owned franchises are more likely to focus on exploitation, whereas entrepreneurs managing franchise units tend to focus on exploration. In firms within a single governance structure, Vera and Crossan (2004) argue that leaders must achieve the balance themselves by performing roles involving both "transactional" (the institutionalization, reinforcement, and refinement of existing routines) and "transformative" (changing the existing strategy and routines) behaviors. Combining a focus on structure, process, and leadership, Benner and Tushman (2003) argue that ambidextrous organization designs achieve the balance by employing relatively autonomous subunits free to either explore or exploit with the required coordination managed at the senior executive level.

Incentives also promote or are indicative of different types of learning. A balanced approach may be achieved by combining decentralized decision making with a strong identification with top management goals (Child, 1984; Nagar, 2002). Another approach is to rely on compensation schemes that reward company-wide performance (Harris and Raviv, 2002) over both the short and long-term.

Finally, there is a robust literature focused on the role of organizational processes and the two types of learning. Sitkin et al (1994) distinguish between Total Quality Management activities focused on control versus activities focused on learning. Firms pursue control and reliability while simultaneously developing new, innovation-enhancing competencies (Sutcliffe et al, 2000). Firms employ design elements to balance the need to search broadly for new possibilities in its environment as well as to stabilize around a good set of opportunities once discovered (Rivkin and Siggelkow, 2003). Firms may adapt over time by changing processes by "opening up" (exploitation generating exploration) or "focusing" (exploration encouraging exploitation) (Holmquist, 2004).

Most recent studies propose that successful organization designs achieve the required dual focus by some mixture of structures, processes, incentives, and leadership. A structure that encourages exploration, for example, is mitigated by incentives that foster exploitation. This contrasts with older studies of organization design that imply that consistent or "pure" designs are optimal. While organization design scholars believe that there is no one best way to organize, the optimal organization design is asserted to employ consistent design elements.

Contingency theory, for example, suggests that organizations that demonstrate a fit between their internal structural elements and contextual factors are more likely to succeed (Burton and Obel, 1998), and conversely when systems are poorly attuned to contextual requirements problems ensue. Similarly, configuration theory focuses on the interdependencies between elements of an organization design (Miller 1999). Ketchen et al (1997) find that organization performance is partially explained by its configuration, and that

internally consistent sets of firms perform better. "Configurations, at their most useful, represent common, thematically driven alignments of elements or dimensions." (Miller, 1999: p. 28). If we regard exploration and exploitation as configuration types then, we might question whether alignment is achieved by mixing exploration-encouraging and exploitation-encouraging elements or whether alignment is achieved by focusing solely on one or the other in a consistent or "pure" form. Rivkin and Siggelkow (2003), for example, find that their results "call into question the recommendation that firms pursue pure "consistent" configurations" (ibid, p. 309).

Given all of the above, it remains unclear whether a consistent organization design or configuration is one that consistently pursues exploration or exploitation, or is one where the balance is maintained through a mixture of the aforementioned mechanisms. After all, we believe that there are traps that encourage an excessive focus on either exploration or exploitation, at the expense of the other (Levinthal and March, 1993). And if there are "balanced" types that make sense, are they all the same? Are some balanced or mixed organization designs better than others?

We focus on the effects of alternative organization designs that promote exploration and/or exploitation in new e-commerce focused business units, specifically their governance (whether to establish a stand-alone subsidiary or a centralized department or division) and leadership (whether the venture will be lead by an outsider or insider). We develop four hypotheses and test them on a sample of 373 press releases describing the creation of dedicated business units focused on e-business during the years 1993-2002. We address the

consequences of design and governance choices on two dimensions of performance: the mean level and the variance (Jemison, 1987) of market returns. The results indicate that the market values "exploitative" and "exploratory" design choices differentially. First, market returns associated with centralized units have equal mean values and lower variance than decentralized units. Second, units led by insiders have similar means but higher variance than those led by outsiders. Finally, "pure" types, i.e. those that are either exploitative or exploratory have equal mean returns and higher variance than "balanced" designs, i.e. those that mix elements of exploration and exploitation. One mixed type in particular, the combination of a decentralized unit with an inside appointment, is shown to have higher variance in returns that all three other combinations.

The remainder of this paper is organized as follows. The following section contains an overview of March's (1991, 1995) theory of organizational learning. This overview draws on that found in Hunter (2003) and establishes the rationale for our attention to variance, rather than mean levels of performance. The third section contains our literature review and statement of four hypotheses. Following this is a section that describes our research methods. The fifth section contains a discussion of the results of our empirical tests of the four hypotheses. The paper ends with a discussion of the implications of our findings.

OVERVIEW OF EXPLORATION-EXPLOITATION THEORY

March (1991, 1995) described two fundamentally distinct, yet complementary ways that organizations learn and, thereby, change their performance: exploration and exploitation. While there are many bases for differentiating between these two types of learning, three of the most important are their goals and objectives; the means by which each is accomplished; and their implications for firm performance, especially the time period over which that performance is realized. Table 1, below, summarizes those differences. The objective of exploration, according to the theory, is frequently the attainment of flexibility and the development of new knowledge and new means of solving problems that the organization faces (March 1991, p. 72; March 1995, p. 432). Exploration is associated with and is accomplished by way of a host of activities which *increase* variation in organization processes, tasks, and functions. These include complex search, basic research, invention, innovation, risk-taking, relaxed control, and loose discipline (March 1991, p. 71; March 1995, p. 432).

By contrast, the goals of exploitation are typically more objective and particular, i.e. they are intended to meet clearly-defined and short-term objectives and immediate targets; to improve short-run efficiency; to reduce slack; and to increase the reliability, accuracy, and precision of, and control over core processes and activities (March 1995, p. 431). Learning of the exploitative variety is achieved by way of actions that emphasize the *reduction* of variation in organizational activities. These include standardization of procedures, heuristic problem solving, relatively tighter control and discipline, risk-aversion, the emulation of

successes (e.g. benchmarking and best practice adoption), institutionalization, systematic reason, and by acting in an "appropriate manner "(March 1995, p. 432)

The effects of exploration and exploitation are realized in categorically-distinct changes in the performance distribution of the firm (March 1995, p. 432). The benefits or returns to exploration are described as being more uncertain than those associated with exploitation (March 1991, p. 85). This uncertainty has both spatial and temporal aspects (March 1995, p. 432). The spatial component concerns the supposition that exploration produces outcomes that tend toward both tails of the historical performance distribution. Exploitation, however, is less likely to produce performance outcomes that deviate significantly from the historical levels (March 1995, p. 432). Temporally, returns to exploration, be they positive or negative, are more remote, i.e. they lie farther in the future than those associated with exploitation. This difference has important implications. March argues that survival, let alone sustained superior performance, requires that firms engage in "sufficient" exploitation to ensure the current viability of the organization while exploring "enough" to ensure its future viability (March 1991, p. 71, 72). What constitutes "sufficient" exploitation and "enough" exploration is in large part determined by the characteristics and demands of the external environment (Sorenson and Sorensen 2001; Sorensen 2002).

Table 1: Key Characteristics of Exploration and Exploitation[1]

Characteristic	Exploration	Exploitation
Core Features	• Experimenting with new ideas, paradigms, technologies, strategies, and knowledge	• Elaborating on existing ideas, paradigms, technologies, strategies, and knowledge. • Improving and refining existing capabilities, technologies, etc.
Goals	• (To find) new alternatives that improve old ones; Flexibility; New Knowledge	• (To meet) Clearly-defined, short-term objectives and immediate targets; Short-run efficiency and improvement; Legitimacy; Reduced costs; slack; Reliability
Returns	• Distant in Time; High Variance; Tails of performance distribution	• Proximal in Time; Low Variance; Near historical mean of performance
Means/Methods of Implementation	• Searching for new ideas; Deviating from standards; Variation; Innovating; Inventing	• Acting in an appropriate manner; Adopting standardized procedures; Assuming proper organizational form; Defining and measuring performance; Downsizing and Re-engineering; Emulating success; Pursuing legitimacy; Eliminating redundancies Tightening slack; Focusing effort; Routinizing; Specializing; Total quality management; Managing the capabilities of the organization; Tying competencies to produce joint products; Linking activities to performance measures
Other Characteristics	• Novel • Serendipitous • Risky	• Choice • Risk-aversion • Sane (Sanity)
Facilitators	• Free Association; Loose Discipline; Madness; Play; Relaxed Control; (Stimulated by) Failure	• Analysis; Close Attention; Control; Discipline; Execution; Focused Attention; Hard Work; Institutionalization; Precision; Production; Refined Detail; Repetition; Sharp Focus

---

[1] *As described in March (1991, 1995) and Levinthal and March (1993).*

LITERATURE REVIEW AND HYPOTHESES

We measure the impact of announcements of new e-commerce business units on

firms' stock prices, focusing on the choices the firms make in the governance and leadership

of the new units. The efficient markets hypothesis holds that (1) stock prices incorporate all

currently known information about firms' future profit streams and are, thus, the net present

value of those profits and (2) that that new information about organizational or

environmental changes that affect firms' future profit streams are rapidly reflected in stock

price (Fama et al, 1969). Several empirical studies have demonstrated that firm performance,

especially market value, is positively impacted by firm's investments information technology,

in general (Hunter, Kobelsky, and Richardson, forthcoming; Brynjolfsson & Hitt, 1995, 1996)

and by the pursuit of e-commerce initiatives, in particular (Subramani & Walden, 2001).

Thus, we expect the announcement of the creation of new e-commerce-focused

organizational units to have a significant and positive effect on the market value of the firm,

primarily because such announcements are indicative of companies' enhanced net profit

streams due to new market gains and/or operational efficiencies.

Hypothesis 1: The announcement of a new electronic commerce focused business unit will

have a positive cumulative abnormal return.

Governance and Organization Learning

Theories of the organization-environment relationship predict that as the external

environment increases in complexity, organizations should and do increase the

11

differentiation of their internal structures (Lawrence & Lorsch, 1967; Galbraith, 1973). One way in which this is achieved is through the creation of subsidiaries, strategic business units, or internal divisions whose missions are to address the new and specific source(s) of complexity. These theories also predict that as environmental uncertainty increases, organizations should and do decentralize decision-making authority and/or adopt organizational practices and designs that are more decentralized (Burton & Obel, 1998). Less autonomous business units may be expected to search locally by using knowledge that is closely related to their existing knowledge (e.g. Stuart and Podolny, 1996). Spin-outs and autonomous business units involve a conscious effort to employ more exploratory search processes that develop new organizational routines and knowledge (March, 1991; Miner, Bassoff, and Moorman, 2001).

Strategic choice theories predict that the creation of more autonomous organizational units creates value for firms because the unit's managers have greater latitude to pursue new market opportunities and thus will tend toward more purely profit-maximizing strategies. Christensen (1998) argues that because of customer preferences and existing resource allocation processes, firms pursuing radical innovation must create independent spinouts to be successful. Similarly Leifer (Leifer, et al, 2000) found that new businesses escape the inertia of existing businesses by creating radical innovation hubs and corporate venture units. Such units are not without their shortcomings, however. In particular, more autonomous groups make it more difficult for the main organization to monitor behavior, to use hierarchies, and/or to maintain a common culture.

Over-reliance on exploitation is thought to result in obsolescence. Certainly, there is a strong literature showing the difficulty firms have in responding to radical technological change because of a propensity to rely on exploiting current capabilities (Tushman and Anderson, 1986; Henderson and Clark, 1990). Consistent with this, previous studies provide uneven support for the notion that local search (exploitation) results in higher returns (Stuart and Podolny, 1996). And even though in uncertain environments, more exploratory behavior is assumed to be more successful (Rivkin and Siggelkow, 2003), there is no clear indication of how much exploitation or exploration is too much.

Thus, in the absence of any clear and specific guidance from the literature on this matter, we would have to expect that, all else equal, the creation of new e-commerce focused business units that are relatively more centralized have lower variance in performance compared to units given more autonomy, e.g. spin-outs and subsidiaries. Accordingly, we hypothesize that:

$$\text{Hypothesis 2: } \sigma_{\text{CAR (Centralized)}} < \sigma_{\text{CAR (Decentralized)}}$$

Leadership and Organizational Learning

Several research traditions demonstrate that hiring an insider to lead the new unit captures or exploits existing capabilities and routines, while outsiders bring new capabilities and routines. The resource based view of the firm holds that insiders may be expected to bring known routines and knowledge to the new organizational unit, while outsiders represent the opportunity to acquire new capabilities (Barney, 1991). And work in

13

organizational demography shows that firms are likely to hire outsiders in times of change

(Haveman, 1995). If it is the case that at times of change, existing routines and

organizational processes are less appropriate or efficient for the requirements of the new

market opportunity (Sorensen, 2002), then it follows that higher variance in returns will be

associated with the appointment of insiders who have more knowledge about the

organization's current capabilities but less knowledge about and experience with the

requirements of the new market environment. Thus, we hypothesize that

$$Hypothesis\ 3:\ \sigma\ _{CAR\ (outsider)} < \sigma\ _{CAR\ (insider)}$$

Comparison of Pure and Balanced Cases

While the previous hypotheses focused on exploration or exploitation alone, as

reflected in the choice of governance and leadership, we next consider the effect of

combining these choices in both "pure" or internally consistent and "mixed" organization

designs.

Recent work suggests that internally consistent organization designs drive short-term

effectiveness at the expense of long-term viability (Benner and Tushman, 2003). At first

blush, such findings could lead us to predict that internally consistent e-commerce focused

business units, i.e. those that combine exploration (exploitation) in governance with

exploration (exploitation) in leadership, would have superior performance to those which

"mix" the two modes of learning across these two elements of organization design. However,

further examination reveals this to be a fairly naïve assumption in large part because it

ignores the crucial distinction between exploration and exploration- the distinction between

activities which increase variance in organizational processes and, by extension, in firm performance (exploration) and those that decrease variance in those processes and, by extension, in firm performance.

With that distinction clearly in mind, we are in the position of making more specific claims about the impacts on performance associated with "pure" or internally consistent designs. In Hypotheses 2 and 3 we argued that greater centralization of authority and the presence of an outsider were both indicative, in this context, of exploitation and would be associated with lower variance in performance than the exploratory design choices. From these two hypotheses, two more hypotheses concerning internally consistent designs would seem to naturally follow. The first is that new, ecommerce business units that involve both types of exploitation, i.e. that combine centralization with a leader from the outside, will have lower variance in performance than either internally consistent exploration or either of the mixed types. Expressed formally, we have

(1) $\sigma_{\text{Internally Consistent Exploitation}} < \sigma_{\text{Internally Consistent Exploration}}$ and σ_{Mixed}

In addition, we could also argue from the same premises that firms whose units combine the exploratory design choices, i.e. insiders with decentralization, have higher variance than the three other design options. In a fashion similar to Eq. (1) above, we express this relationship below:

(2) $\sigma_{\text{Internally Consistent Exploration}} > \sigma_{\text{Internally Consistent Exploitation}}$ and σ_{Mixed}

The combination of these two equations give us our fourth hypothesis- that exploitation in both elements of design are associated with lower variance in organizational performance while exploration in both elements is associated with greater variance. Expressed formally we have our fourth and final hypothesis:

H4: σ Internally Consistent Exploration $>$ σ Mixed $>$ σ Internally Consistent Exploitation

If it is indeed the case that internally-consistent designs occupy opposite ends of a performance continuum whose center is occupied by mixed types, we are perhaps amiss if we fail to theorize about their impacts on performance relative to one another.

A key assumption of the contingency approach to organization design is that none of the different types of organizational structures are inherently better any of the others. Rather, the state of the external environment is an important determinant of the appropriateness of one organization form over the other (Burton & Obel, 1998), that is, which design will lead to better firm performance. The relationship between environment, organization design, and performance has its analog in the strategy literature, as well. For example, Sorensen (2002) found that organizations with more balanced levels of organizational learning exhibited lower reliability in firm performance, i.e. higher variance, in stable environments and more reliable, i.e. less variable, performance in more volatile environments.

Because we consider the period of the introduction and commercialization of the internet and the emergence of the market for e-commerce related goods and services to be

one of high environmental volatility, as opposed to stability, it would follow that we would expect to find less variance in performance among newly created, e-commerce focused business units which mix the two modes of learning than in those that don't mix them. However, an important shortcoming exists with this argument as well. First of all it does not help us distinguish between the performance of mixed modes, in general, and the two types of internally consistent designs. Secondly, it does not answer the matter of whether there are important differences between the two types of mixed designs. This second point has not been lost on organizational theorists of late.

Some scholars argue for organization designs that are "ambidextrous" by creating efficient, exploitative subunits that coexist with relatively autonomous exploratory subunits (Benner and Tushman, 2003). Similarly, other recent studies have shown that organization performance can be enhanced when there is a balance via governance mechanisms (Sorenson and Sorensen, 2001) or a mix of internal mechanisms (Rivkin and Siggelkow, 2003). Such findings, combined with the intuitive observation that there are many ways in which this balance can be achieved, lead us to the conclusion that all mixed types are not necessarily created equal or, more importantly do not have the equal impacts on performance. As such, it behooves us to consider more closely whether in the case of the creation of new, e-commerce focused units during a period of high environmental volatility, one of the mixed forms might be superior to the other.

In short, distinguishing between the two mixed options, between the two types of designs that occupy the middle ground of our performance continuum, involves determining

whether in this context the governance decision dominates the leadership decision, or vice versa. In other words, it comes down to a determination of the relative importance of the centralization/decentralization choice and the outsider/insider choice. This relationship is perhaps best understood when rendered as Equation 3 below, i.e. as a performance continuum, the right end of which signifies lower variance in performance.

$$(3) \; \sigma_{\text{Pure: Decent + Insider}} > \sigma_{\text{Mixed: Decent + Outsider}} > \sigma_{\text{Mixed: Cent + Insider}} > \sigma_{\text{Pure: Cent + Outsider}}$$

The right end, we hypothesized earlier, is the domain of newly-formed, ecommerce-focused units that are purely exploitative, i.e. centralized and lead by an outsider. The left end of the spectrum signifies higher variance in performance and is the domain of units that purely exploratory, i.e. decentralized and led by insiders. If the second position, moving from left to right, is occupied by the mixed type which features decentralization and an outside leader, then we can readily recognize that the "high variance" end of the spectrum is inhabited by decentralized units. That is to say, the two designs with the highest variance are the decentralized ones. Conversely, this means that the right or lower-variance end of the spectrum is where we find the centralized organizations. Such a state of affairs where high variance is associated with decentralization and lower variance with centralization is one in which the governance decision can be said to dominate the leadership decision: if high variance is the goal, pick decentralization and then adjust that level by who is picked to lead.

Equation 4, below, depicts a different state of affairs to that portrayed in Equation 3, shown above:

$$(4)\ \sigma_{\text{Pure: Decent + Insider}} > \sigma_{\text{Mixed: Cent + Insider}} > \sigma_{\text{Mixed: Decent + Outsider}} > \sigma_{\text{Pure: Cent + Outsider}}$$

Here, the end points of the spectrum are the same but the middle positions have switched places and the mixed type characterized by centralization and an insider is in the second highest variance slot while the decentralized, outsider-led unit is the nearer to the low-variance end. In this set of relationships, higher variance is associated with the selection of an insider while lower variance is associated with selection of outsiders. Here, it would be the case that the governance decision is dominated by the leadership decision: obtain higher (lower) variance by choosing an insider (outsider) and then adjust that level by the choice of whether to have the unit centralized or decentralized.

By our estimation, the literature does not provide strong priors on how to determine whether Equation 3 or 4 is the more accurate depiction of the middle ground between the two pure types. There is ample literature linking leadership and governance to organizational performance and effectiveness in times of high volatility. Rather than attempt to adjudicate between these two positions, a task whose difficulty is compounded by the fact of the uniqueness of the time period and phenomenon in which this study take place, we instead opt to articulate two competing hypotheses and to allow the data to resolve the matter.

In summary, if the environment is one that requires that firms superior value on higher levels of organizational control to monitor the success of the new venture than on the

need to acquire from outside the skills and capabilities to run it, then it can be said that the centralization question dominates leadership and, thus:

H5a: $\sigma_{\text{Pure: Decent + Insider}} > \sigma_{\text{Mixed: Decent + Outsider}} > \sigma_{\text{Mixed: Cent + Insider}} > \sigma_{\text{Pure: Cent + Outsider}}$

If, however, the environment necessitates that a firm's need for an outsider who possesses skills and capabilities to lead the unit is greater than its need to control and monitor the new venture, then our prediction would be that

H5b: $\sigma_{\text{Pure: Decent + Insider}} > \sigma_{\text{Mixed: Cent + Insider}} > \sigma_{\text{Mixed: Decent + Outsider}} > \sigma_{\text{Pure: Cent + Outsider}}$

RESEARCH METHODS

Press releases obtained from two newswires – PR Newswire and Business Wire- form the primary data for this study. Press releases were gathered through a systematic search of the Dow Jones Interactive® press release database for the years 1993-2002, inclusive. Our search term contained two groups of keywords: (1) organization design, e.g. terms like division, subsidiary, group, department, and unit and (2) internet, e.g. terms like e-business/commerce, electronic business/commerce, internet, web, online, multimedia, digital, new media, and interactive

Because of the potentially large number of articles that could contain these keywords, the search term limited press releases to those containing at least one keyword from each group in its headline or lead paragraph. After the press releases were collected and organized, three rounds of screening followed. The first round had the objective of screening for

relevance: ensuring that the collected press releases did in fact describe the creation, by an established business, of a new organization dedicated to conducting e-business, broadly defined. Thus, press releases about the formation or IPO of a new company were excluded, as were new companies created via, merger, acquisition, buy-out. Also excluded were instances of relatively larger firms taking major equity stakes in smaller, e-business focused start-ups.

Following McWilliams & Seigel (1997), the second round of screening involved eliminating press releases which were confounded by the contemporaneous announcements events such as: reports of sales and/or earnings, the appointment of C-level executives; all manner of legal matters, e.g. the disposition of lawsuits or other litigation; new product launches unrelated to the newly-founded business units; and mergers with, acquisitions of, or investments in/by other firms.

The third round of screening involved removing all firms from the sample which had not been actively traded for at least a full year prior to the date of the announcement or which had otherwise incomplete stock returns data. What remained, then, at the completion of these three rounds was 373 press releases by 323 firms operating 108 different 4-digit SIC Codes.

After screening was completed, content analysis ensued. Each press was read and coded for the presence of two pieces of information: (1) whether or not the announcement described the creation of a largely autonomous organizational unit and (2) whether or not the announcement stated that the person appointed to lead the unit was a current employee or was recently hired from another organization. In all, two rounds of content analysis were

required to reach complete agreement among the authors as to the value of each variable for each announcement. Here are two typical examples of the kinds of statements appearing in the press releases which we used to determine the governance and leadership variables:

- *Creation of a Decentralized Unit:* DAOU Systems, Inc. today announced that it has formed a new eBusiness subsidiary, named Enosus(TM), Inc., to provide end-to-end Internet professional services and solutions to health care and other commercial organizations executing an eBusiness strategy.

- *Appointment of Outsider(s):* To support the continued growth of the Internet division and build new initiatives, VersaTel has also recruited four key senior executives with over 20 years of combined Internet experience, most recently at MCI Worldcom's Internet subsidiary, UUNet.

Event Study Methodology

The dependent variable employed in this study was the equally-weighted, market model, cumulative abnormal return over a three trading-day event window: the trading day immediately prior to, the trading of, and the trading day which followed the firm's announcement of its intent to restructure for participation in electronic-commerce related markets and activities.

As has been well-documented, the event study methodology measures the reaction of investors to new information which has the potential to affect the earnings of certain publicly traded firms (Fama, et al 1969; Brown and Warner, 1985). This new information typically, though not always, comes in the form of news reports issued by or on behalf of these companies. The event study methodology is grounded in the efficient market hypothesis, i.e. that new information about a firm's activities which can materially affect its current and future earnings is evaluated by investors and rapidly reflected in changes to the

firm's stock price (McWilliams and Siegel, 1997). That the information is "new" means that it was unexpected, i.e. unknown to or unanticipated, by investors at the time it was released. Under these assumptions, the abnormal returns associated with a firm's stock which follow the release or discovery of new information are taken to represent the capital markets' estimate of the net present value of the change in future earnings streams attributable to the new information.

In this study we employ the market model, i.e. one which posits a linear relationship between the return of any stock to the return of a market portfolio (Fama, et al 1969). The market portfolio is used to predict a "normal" return during an event window. The abnormal return is defined as the difference between the actual return and the predicted or "normal" return. The event window in this study is defined as the three-day period extending from the trading day prior to the announcement date through first trading day after it.

Market model returns for all firms in this study were obtained by using the Eventus ® event study software via the Wharton Research Data Services website. Eventus performs event studies with data contained in the Center for Research in Security Prices (CRSP) stock databases. Eventus output includes both the cumulative abnormal return (CAR), as well as the CAR standardized by firm, over any user-defined event window. Because we are mostly concerned with how returns differ *across* design options and not just whether they are significantly positive or negative, we undertake a cross-sectional analysis of these returns, via multiple regression analysis. Doing so affords us the ability to explicitly control for

determinants of the abnormal returns, something that simple tests of significance would not allow.

And since our hypotheses concern both the expected value and variance of returns, we employ Multiplicative Heteroscedastic (MH) regression, also known as variance decomposition (Weesie, 1998; Greene, 2003). MH regression allows simultaneous estimation of both the expected value and the variance of the dependent variable using maximum likelihood methods, something that ordinary least squares (OLS) regression does not permit. MH regression extends the standard linear regression of the expected value of a dependent variable to include a log-linear model of the heteroscedasticity in the dependent variable relative to each independent variable. Thus, like OLS, an MH regression assesses the impact of an independent variable on the expected value of the dependent variable. Unlike OLS, it also assesses whether the data points move closer to or further from the regression line as the independent variable changes. MH regression has seen use in several studies of the impact of organizational learning on firm performance (e.g. Sorenson & Sorensen, 2001; Sorensen, 2002; Hunter, 2003).

Tables 1 and 2, below contains descriptive statistics and the correlation matrix of several potential predictors of the cross-sectional variance in cumulative abnormal returns. That none of the five (5) firm-level variables – announcement year; log of sales, quick ratio, capital intensity, and yearly close price- were significantly correlated with abnormal returns is consistent with the strong form of the efficient market hypothesis which states that all public information is already calculated into the stock's price and, hence, not predictive of

abnormal returns. As such, cross-sectional analysis includes only industry fixed effects as controls.

Insert Table 1 about Here

RESULTS

The first hypothesis, which posited that the three-day CAR associated with the creation of the organizational units in question would be positive, is strongly supported. The CAR for the 373 events averaged 2.22% ($z = 5.76$, $p < 0.0001$, 1-tailed test). The ratio of positive to negative returns was 203:170 and is highly significant ($z = 3.26$, $p < 0.001$, 1-tailed generalized sign test). Figure 1, below, provides the average returns for all 373 events over a period extending 30 trading days prior to and 30 days following the events' announcement dates (day 0). Several things about this graph are noteworthy. First of all, while there is clearly a build up in the mean CAR in the trading days leading up the event announcement, the two day with the highest-absolute values and statistical significance are days -1 (CAR = 0.90%, $z = 3.57$), and 0 (CAR = 1.70%, $z = 6.55$) i.e. the trading just prior to and the trading prior to the announcement of the creation of the organizational unit. This suggests that the market were indeed responding, and positively so, to the announcements and to the new information contained therein.

Secondly, returns in the 29 trading days before the event window were significantly higher than those in the 29 days which followed ($p < 0.005$, 2-tailed test). A significantly

higher and rising pattern of returns prior to an announcement seems to indicate that the event may have been partially anticipated.

<div align="center">Insert *Figure 1* about Here</div>

Table 2, below, contains the results of the MH regression analyses conducted in the test of hypotheses 2-5, respectively. In the first equation the dependent variable, 3-day standardized cumulative abnormal returns, is an industry and year fixed effects model. That is to say, it includes a total of 14 categorical variables used as dependent variables. Eight of these dummy variables are for each of the eight years 1995-2002. Events announced prior to 1995 serve as the comparison group. Six additional dummy variables were also specified, one for each of the first seven, 1-digit standard industrial classification (SIC) codes represented in the data set, with a seventh SIC code serving as the comparison group. The model uses 28 degrees of freedom because the fourteen variables appear in both the mean and the variance estimation portions of the MH regression model. The chi-square for this baseline model equals 48.8, which for 28 degrees of freedom is significant at the $p < 0.01$ level.

Model 2, which pertains to hypotheses 2 and 3, adds the governance and leadership variables. These results suggest strong support for the second hypothesis which proposed that the creation of relatively more centralized business units would be associated with lower variance in abnormal returns ($\gamma = -0.656$, $z = -4.05$, $p < 0.001$, 1-sided test).

Similarly, we also find strong support for Hypothesis 3 which proposed that the choice of an "outsider" would also associated be with lower variance (γ = -0.853, z = -4.34, p < 0.001).

Recall that H4 concerned whether pure exploration and pure exploitation occupied opposite ends of the performance variance continuum- exploration the higher end and exploitation the lower. In our models, this hypothesis is confirmed if it can be shown that two conditions are met- that the coefficient on the pure exploration variable is positive and significant and the pure exploitation variable is negative and significant when mixed types are used as the comparison group.

As shown in Model 3 of the Table 2, the results are strongly supportive of this hypothesis. As we expected, the coefficient on the pure exploration variable is positive and highly significant (γ = 0.554, z = 3.24, p < 0.001, one-sided test[2]). Also as we expected, the coefficient on the pure exploitation variable is negative and highly significant (γ = -1.160, z = -4.65, p < 0.001).

Recall that Hypotheses 5a and 5b concern the question of which positions on the performance variance continuum are occupied by the two mixed types. The former posited that the decentralized-outsider combination would have higher variance while the latter posited that centralized, outsider-led organizations would have higher variance.

As can be observed from Models 4 and 5 of Table 2, it is clear that H5a is supported. The coefficients in Model 4, where pure exploitation business units, i.e. centralized and

---

[2] All results are 1-sided test unless stated otherwise.

outsider-led, are the comparison group, the coefficients on the three other combinations are positive and significant. More importantly, the coefficient for the decentralized, outsider-led mixed type ($\gamma = 1.211$, $z = 3.19$, $p < 0.001$) is larger than the coefficient for the other mixed type ($\gamma = 1.156$, $z = 4.59$, $p < 0.001$). Model 5 of Table 2 also supports H5a, although it does so from the opposite direction. Here we have the pure exploration organizations as the comparison group. The coefficients on the other three types are negative, significant, and most importantly in the same relative positions. The coefficient on the decentralized, outsider-led organization variable is significantly lower than the comparison group, though only marginally so, indicating that it has less variance ($\gamma = -0.509$, $z = 1.54$, $p < 0.10$). The other mixed type, centralized and insider-led, has even more significantly lower variance in its returns ($\gamma = -0.565$, $z = -3.22$, $p < 0.001$). Taken together then, these two models make clear that the high end of the variance continuum is occupied by the two decentralized combinations- decentralized with insiders (pure exploration) has the most variance and decentralized with outsiders has the second highest. This suggests that the decentralization choice dominates the leadership choice even though both are significant individually and in their own right.

Insert Table 2 about Here

SUMMARY

Based on cumulative abnormal stock returns over a three day trading window (H1), we find strong evidence that the market positively valued firm's creation of new business units directed at providing ecommerce-related goods and services. Also, as expected (H2), governance elements focused on exploitation (centralization) had lower variance than those focused on exploration (decentralization). We also find that, as expected, hiring outsiders, those presumably possessing more information about and experience with the demands of the new market environment, resulted in lower variance (H3). We also find that the impact on performance of internally-consistent combinations of these two modes of learning is similar to what is observed with regard to their individual impacts. In particular, we observe that internally-consistent exploitation to be associated with the lowest variance in abnormal returns and internally-consistent exploration to be associated with the highest (H4). Finally, we explain, post-hoc, the governance choice explains the relative placement of the internally-inconsistent design options on the performance continuum. The highest and the second highest variance values of the four design options are characterized by decentralization while the lowest and second lowest variance values are found among the centralized units. This suggests to us that the crucial or dominant design consideration is the one of the delegation of authority.

CONCLUSION

The need for "balance" between the goals of exploration and exploitation is a key concept in contemporary organization studies. However, the specific mechanisms and limiting conditions are not as well understood or articulated. From an organization design perspective, recent work suggests that a balanced configuration of design elements will lead to improved performance. Our results indicate understanding this question requires careful consideration of what is meant by both "balance" and by performance. The findings of our fourth and fifth hypotheses speak directly to the importance of this issue. Recall that these hypotheses concern the differences in performance among the four design choices. One of the findings associated with these hypotheses, the one that revealed significantly lower variance in returns for the centralized, outsider-lead unit, is especially illustrative of why we need clarity in our terminology the finding. From our reading of the press accounts and the theory, this finding may be explained from the nature of the task that the leaders were asked to perform. E-commerce represented a new endeavor for many, if not most, of the firms launching these new businesses. In many cases the outsider hired to lead the effort was someone with experience in e-commerce from other firms. Indeed, "recent knowledge can enhance a firm's ability to expand to new technological areas" (Katila, 2002: 995). But had it not been for our focus on the variance in performance, rather than its mean, we would not only would have had inconclusive results (there were after all, no mean differences in any of our hypothesis tests, only differences in variance) we would not have ever seen the link between these design choices and performance in a volatile environment. That link, as we see it, is that both greater centralization and an experienced outsider, are means for reducing

or moderating the variance in performance that inevitably results from the creation of a new business unit, especially in a highly volatile environment.

Perhaps this result should not be surprising. While the decision to hire a high-potential outsider and then constrain their activities by keeping the unit closely controlled by senior management does not, a priori, seem like a better option, it may be the case that tighter organizational control enhances the degree to which the new capabilities brought in by the outsider can be diffused throughout the organization. Put another way, centralization of an outsider-led new business unit may facilitate the transfer of new skills to the rest of the organization so that in time, they can become old and well-known skills rather than the knowledge remaining the province of one business unit or division.

What these results demonstrate is that although there is no one best way to organize, there are differential returns to different approaches. If the desire is to seek the highest returns and there is a willingness to also bear the associated high variance, then the market believes that centralized governance, coupled with outsider leadership, represents a preferred approach and that centralized governance with an insider is the second best approach, probably because again, centralization is a more efficient means of the knowledge diffusion which is vital to organization learning of either variety.

Finally, let us again underscore that this paper investigates the question of balance in organization design in what we believe is a novel manner. First of all we use a measure of performance not typically considered by organization design theorists- the market reaction to firm's announcement of new business units focused on e-commerce. We find considerable

variation in that measure – a fact which on its face indicates that all such announcements were not greeted with the same degree of enthusiasm. Perhaps the most novel aspect of our approach is our attention on the *variance* in our chosen measure of firm performance rather than the *mean*. The decision to focus on variance stems directly from our reading of March's theory of organizational learning, a theory which we believe is, at its core, a theory about the relationship between firm performance and actions taken by the firm to increase and/or reduce variation in the organizational processes that underlie firm performance. In light of our reading of the theory and its application in this study, we come to see some of the extant literature on organization design and firm performance in a new light. In particular, we now see that it is possible to see organization design choices, e.g. the choice between a centralization and decentralization as choices between the need or desire of a firm to decrease or increase variation in the organizational processes, either of which can contribute to a higher mean level of firm performance, albeit by different means.

REFERENCES

Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*. 17: 99-120.

Benner, M.J. and Tushman, M.L. 2003. Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review.* 28: 238-256.

Brown, S. and Warner, J. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics.* 14: 3-32.

Burns, T. and Stalker, G.M. 1961. *The management of innovation*. London: Tavistock.

Burton, R.M. and Obel, B. 1998. *Strategic organization diagnosis and design: Developing theory for application.* Boston: Kluwer Academic Publishers.

Child, J. 1984. *Organization: A guide to problems and practice.* London: Harper & Row.

Christensen, C.M. 1998. *The innovator's dilemma: When new technologies cause great firms to fail.* Boston, MA: Harvard Business School Press.

Fama, E., Fisher, L., Jenson, M.C., and Roll, R. 1969. The adjustment of stock prices to new information. *International Economics Review*. 10(1): 1-21.

Galbraith, J.R. 1973. *Designing Complex Organizations.* Reading, MA: Addison-Wesley.

Greene, W.H. 2003. *Econometric Analysis*. Upper Saddle River, NJ: Prentice Hall.

Harris, M. and Raviv, A. 2002. Organization design. *Management Science*. 48(7): 852-865.

Haveman, H.A. 1995. The Demographic Metabolism of Organizations: Industry Dynamics, Turnover, and Tenure Distributions. *Administrative Science Quarterly*. 40(4): 586-618.

Hedberg, B., Nystrom, P., and Starbuck, W. 1976. Camping on seesaws: Prescriptions for self-designing organizations. *Administrative Science Quarterly*. 21(1): 41-65.

Henderson, R.M. and Clark, K.B. 1990. Architectural innovation: The reconfiguring of existing product technologies and the failure of established firms. *Administrative Science Quarterly*. 35(1): 9-30.

Holmquist, M. 2004. Experiential learning processes of exploitation and exploration within and between organizations: An empirical study of product development. *Organization Design*. 15(1): 70-81.

Hunter, S.D. 2003. Information technology, organizational learning, and the market value of the firm. *Journal of Information Technology: Theory & Application*. (5)1: 1-28.

Hunter, S.D, K. Kobelsky, and V. Richardson 2005. Information Technology and the Volatility of Firm Performance. *MIT Sloan Working Paper No. 4449-03*

Jemison, D.B. 1987. Risk and the relationship among strategy, organizational processes, and performance. *Management Science*. 33(9): 1087-1101.

Katila, R. 2002. New product search over time: Past ideas in their prime? *Academy of Management Journal*. 45(5): 995-1010.

Ketchen, D.J. et al. 1997. Organizational configurations and performance: A meta-analysis. *Academy of Management Journal*. 40(1): 222-240.

Lawrence, P. and Lorsch, J. 1967. Differentiation and integration in complex organizations. *Administrative Science Quarterly*. 12 (1): 1-47.

Leifer, R., McDermott, C., O'Connor, G., Peters, L., Rice, M., and Veryzer, R. 2000. *Radical innovation: How mature companies can outsmart upstarts*. Boston: Harvard Business School Press.

Levinthal, D. and March, J.G. 1993. The myopia of learning. *Strategic Management Journal*. 14(Winter): 95-112.

March, J.G. 1991. Exploration and exploitation in organizational learning. *Organization Science*. 2(1): 71-87.

March, J.G. 1995. The Future, Disposable Organizations, and the Rigidities of Imagination. *Organization*, 2(3/4): 427-440.

McWilliams, A. and Siegel, D. 1997. Event studies in management research: Theoretical and empirical issues. *Academy of Management Journal*. 40(3): 626-657.

Miller, D. 1999. Notes on the study of configuration. *Management International Review*. Special Issue 1999: 27-39

Miner, A.S., Bassoff, P., and Moorman, C. 2001. Organizational improvisation and learning: A field study. *Administrative Science Quarterly*. 46(2): 304-337.

Nagar, V. 2002. Delegation and incentive compensation. *Accounting Review*. 77(2): 379-395.

Rivkin, J.W. and Siggelkow, N. 2003. Balancing search and stability: Interdependencies among elements of organization design. *Management Science*. 49(3): 290-311.

Sanchez, R. and Mahoney, J.T. 1996. Modularity, flexibility, and knowledge management in product and organization design. *Strategic Management Journal*. 17(Winter):63-76.

Siggelkow, N. and Levinthal, D.A. 2003. Temporarily divide to conquer: Centralized, decentralized, and reintegrated organizational approaches to exploration and adoption. *Organization Science*. 14(6): 650-669.

Sitkin, S.B., Sutcliffe, K.M., and Schroeder, R.G. 1994. Distinguishing control from learning in Total Quality Management: A contingency perspective. *Academy of Management Review*. 19(3): 537-564.

Sorensen, J. 2002. The strength of corporate culture and the reliability of firm performance. *Administrative Science Quarterly.* 47(1): 70-91.

Sorenson, O. and Sorensen, J.B. 2001. Finding the right mix: Franchising, organizational learning, and chain performance. *Strategic Management Journal.* 22(6-7): 713-724.

Stuart, T.E. and Podolny, J.M. 1996. Local search and the evolution of technological capabilities. *Strategic Management Journal*. 17(Special Summer Issue): 21-38.

Subramani, M. and Walden, E. 2001. The impact of e-commerce announcements on the market value of firms. *Information Systems Research.* 12(2): 135-154.

Sutcliffe, K.M., Sitkin, S.B., and Browning, L. 2000. Tailoring process management to situational requirements. In Cole, R. and Scott, W.R. (Eds.). *The Quality Movement and Organization Theory*. London: Sage, 315-330.

Tushman, M.L. and Anderson, P. 1986. Technological discontinuities and organizational environments. *Administrative Science Quarterly*. 31(3): 439-465.

Vera, D. and Crossan, M. 2004. Strategic leadership and organizational learning. *Academy of Management Review*. 29(2): 222-240.

Weesie, J. 1998. Regression analysis with multiplicative heteroscedasticity. *Stata Technical Bulletin,* 42: 28-32.

Figure 1 Mean Abnormal Returns for all 373 Events Beginning 30 Trading Days Prior to the Announcement Date and Extending for 30 Days Afterwards
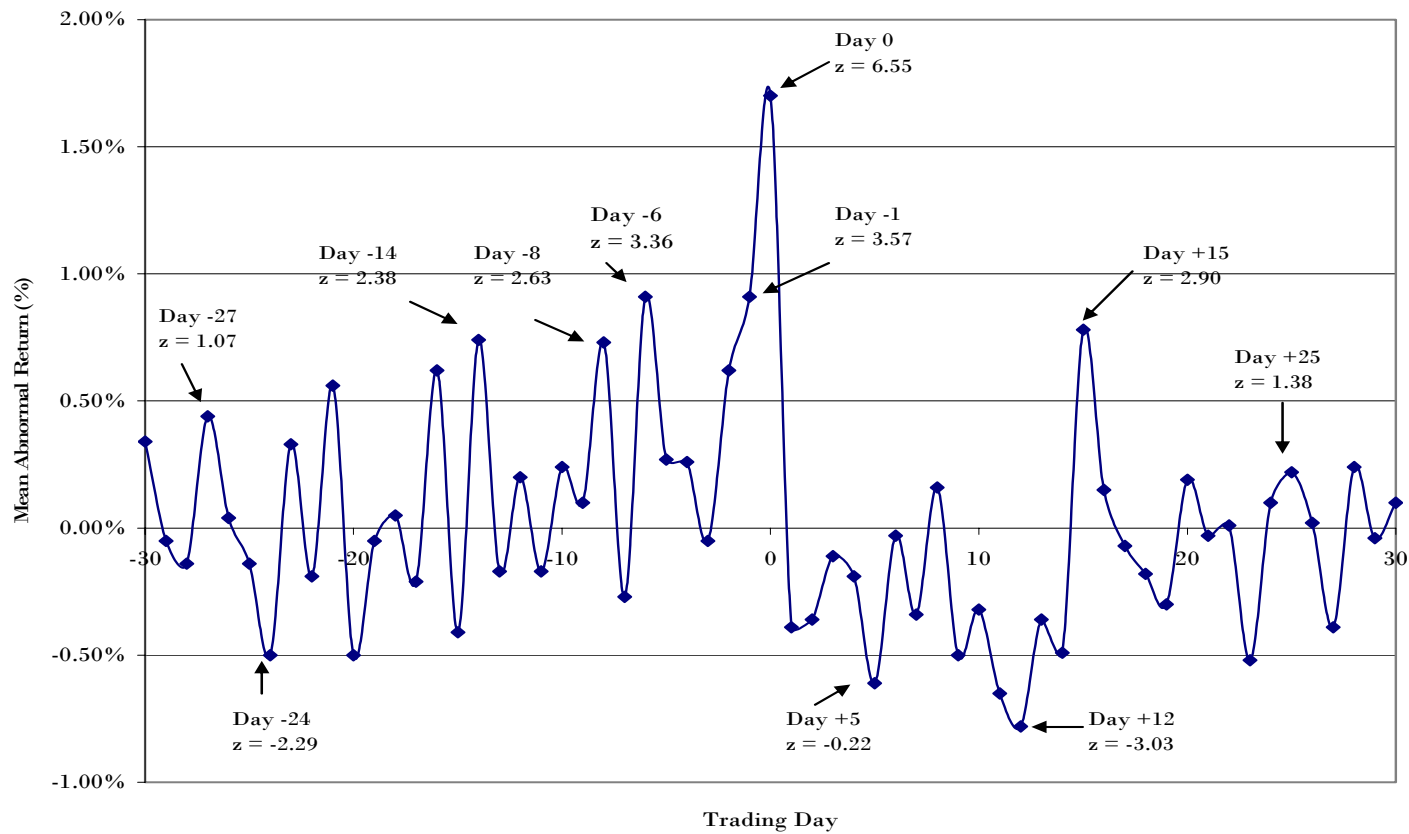
Table 1   Descriptive Statistics & Correlation Matrix

	Mean	Std. Dev.	1	2	3	4	5	6	7	8
(1) Cumulative Abnormal Returns	2.21	10.47	---							
(2) Standardized Cumulative Abnormal Returns	.29	1.33	.854***							
(3) Centralized	.63	.48	-.049	-.091#						
(4) Insider	.83	.37	-.001	.001	.000					
(5) Log (Sales)	2.61	1.24	-.062	-.057	.001	.124*				
(6) Log (Quick Ratio)	.16	.36	.145*	.174**	.066	-.027	-.315***			
(7) Log (Capital Intensity)	.30	.30	-.052	.041	.039	-.019	-.278***	.290***		
(8) Log (Yearly Close Price)	1.16	.59	.019	.025	-.035	.022	.643***	.115#	.057	
(9) Year of Announcement	1998.4	1.88	-.013	-.022	-.086	-.017	-.019	-.129*	.030	-.238***

*Legend: # p < 0.10,   * p < 0.05,   ** p < 0.01,   *** p < 0.001, All two-sided tests*

Table 2 Multiplicative Heteroscedastic Regression of Learning-Related Independent Variables on Standardized Cumulative Abnormal Returns

	Model 1	Model 2 (H2, H3)	Model 3 (H4)	Model 4 (H5a)	Model 5 (H5b)
MEAN PANEL					
Governance = Centralized		-0.172 (-1.20)			
Leadership = Outsider		0.022 (0.18)			
Pure Type: Exploration = (Decentralized + Insider)			0.148 (0.91)	0.144 (0.178)	
Mixed Type: (Decent + Outsider)				0.157 (0.57)	0.013 (0.04)
Mixed Type: (Cent + Insider)				-0.034 (-0.26)	-0.178 (-1.08)
Pure Type: Exploitation = (Centralized + Outsider)			0.014 (0.11)		-0.144 (-0.78)
Industry & Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
VARIANCE PANEL					
Governance = Centralized		-0.656*** (-4.05)			
Leadership = Outsider		-0.853*** (-4.34)			
Pure Type: Exploration = (Decentralized + Insider)			0.554*** (3.24)	1.721*** (6.26)	
Mixed Type: (Decent + Outsider)				1.211*** (3.19)	-0.509# (-1.54)
Mixed Type: (Cent + Insider)				1.156*** (4.59)	-0.565*** (-3.22)
Pure Type: Exploitation = (Centralized + Outsider)			-1.160*** (-4.65)		-1.721*** (-6.26)
Industry and Year Dummies	Yes	Yes	Yes	Yes	Yes
N	373	373	373	373	373
df	28	32	32	34	34
Model x²	48.8**	76.7***	78.1***	78.6***	78.6***
change in df	---	4	4	6	6
Change in Model x²	---	27.9***	29.3***	29.8***	29.8***
Pseudo R2	3.8%	6.0%	6.1%	6.2%	6.2%
VWLS R2	9.9%	12.7%	14.1%	13.9%	13.9%

*Legend: # p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001 All one-sided tests*