13. Strategic Management
Competitive Session

Strategy in turbulent environments:

Learning from firms in transition economies

George A. Shinkle

Australian School of Business

The University of New South Wales

g.shinkle@unsw.edu.au

Aldas P. Kriauciunas

Purdue University - Krannert School of Management

akriauci@purdue.edu

Greg Hundley

Purdue University - Krannert Graduate School of Management

ghundley@purdue.edu

Mirjam Goudsmit

Australian School of Business

The University of New South Wales

m.goudsmit@unsw.edu.au

Acknowledgements: We appreciate the support of the William Davidson Institute, CASE-Ukraine, Central Securities Depository of Lithuania, Institute for Market Economics, Institute for Privatization and Management, and Kaunas Technological University.

Strategy in turbulent environments: Learning from firms in transition economies

ABSTRACT: *We theoretically and empirically investigate the efficacy of four traditional strategic management views in turbulent conditions. We argue the relationships of strategy purity (generic strategy), resources, networks, and governance to performance weaken with increasing environmental turbulence. We draw empirical data from firms in transition economies – former Communist countries of Central and Eastern Europe. This unique context enables our investigation by providing quantifiable variance in environmental turbulence. We find only governance follows traditional expectations as environments increase in turbulence. As a result, our analysis reveals an important boundary condition on traditional strategy theory and offers contrary recommendations. As a preliminary investigation in the area, our work also highlights the need for future research to investigate other theoretical relationships in turbulent conditions.*

Keywords: business level strategy, strategy, competitive environment, resource based view

INTRODUCTION

The external environment is a long standing component of strategic management research (e.g. Ansoff, 1965; Child, 1972). External environments are heterogeneous in their levels of turbulence (Ansoff, 1979). Strategy scholars have addressed aspects of turbulent environments in the literatures on dynamic capabilities (Eisenhardt & Martin, 2000; D. J. Teece, Pisano, & Shuen, 1997), hypercompetition (D'Aveni, 1994), volatility and dynamism (Bourgeois, 1985), and adaptability (Doz & Kosonen, 2010; Reeves & Deimler, 2011). Even with this recognition, contemporary strategic management research has largely ignored heterogeneity in environmental turbulence as an explicit factor. This oversight is troubling given that prior work, while limited, has indicated that successful strategy is influenced by the level of turbulence in the firm's environment (e.g. Ansoff et al., 1993). Furthermore, scholars and managers argue that environments are becoming more turbulent over time due to globalized competition, rapid technology advancement, and information ubiquity (e.g. Eisenhardt, Furr, & Bingham, 2010). To investigate this incomplete understanding, our research considers the question: *How successful are mainstream strategic management views*[1] *in environments of different levels of turbulence?*

As a first step in beginning to address this ambitious question, we investigate the contingent influence of environmental turbulence on four mainstream theoretical views of strategic management on performance; 1) strategy purity, i.e. generic strategy (Porter, 1980), 2) resources (Barney, 1991; Jaffe, 1986), 3) networks (Granovetter, 1985; Gulati, 1998), and 4) governance (Fama & Jensen, 1983; Zahra,

[1] We use the term "*views*" to recognize the debate over these perspectives – views or theories?

Ireland, Gutierrez, & Hitt, 2000). We selected these theoretical views since they are widely recognized in scholarly studies, teaching, and business practice. Given that these strategic management views were developed in relatively stable contexts (Chakravarthy, 1997), their level of efficacy is unclear in turbulent environments. Our research begins by aggregating the logic of how turbulent environments are different from stable environments drawing upon the literatures on environmental dynamism, volatility, hypercompetition, and turbulence. We build upon this prior work to go beyond the overarching recommendation to be flexible to change. We create hypotheses explaining how turbulent environments weaken the efficacy of the four traditional strategy-performance relationships. Our arguments are grounded in the distinct differences between turbulent and stable environments and how those differences influence the logic underpinning each of the traditional strategy relationships.

In addition to theory being underdeveloped, rigorous empirical research on environmental turbulence has been held back by a lack of adequate empirical test environments. Our study takes a unique approach and draws empirical evidence from firms exposed to an environment of significant, uncertain change (Hoskisson, Eden, Lau, & Wright, 2000; Svejnar, 2002). We investigate the turbulent business environment of transition economies - former Communist countries of Central and Eastern Europe. We contend that transition economies provide a natural experimental setting to analyze the appropriateness of strategies with varying levels of environmental turbulence. We provide an analytical comparison of transition economy and hypercompetitive environments to justify our analogical reasoning and contention that we can learn vicariously by investigating transition economy environments.

Our results contribute to the strategic management literature in two ways. First, our theory develops arguments for *how* turbulent environments influence strategy-performance relationships. Surprisingly, scholars have yet to present such theory. Second, our empirical results indicate that only governance follows traditional expectations. This provocative result suggests our field needs more attention to the level of environmental turbulence. Overall, our results indicate that environmental turbulence is a boundary condition for the application of traditional strategic management views.

THEORY AND HYPOTHESES

Traditional strategic management research is concerned with performance heterogeneity. Within this large literature, we selected four highly accepted views that are widely recommended to practicing managers. First, choose only one generic business strategy – either cost leadership or differentiation (Porter, 1980) to prevent getting '*stuck in the middle*' by trying to pursue both pure strategies simultaneously. Second, acquire or develop resources and capabilities to meet market and competitive requirements. According to the resource-based view of strategy, resources and capabilities are important for competitive advantage, innovation, and adaptation (Barney, 1991; Jaffe, 1986). Third, build connectedness with others thus develop and exploit external information networks. Information from external networks provides new ideas and solutions (Granovetter, 1985; Gulati, 1998; D. J. Teece et al., 1997). Fourth, establish a governance system that protects the owners (shareholders) of the firm. Governance is recognized to influence the behavior of managers and the performance results of firms (Fama & Jensen, 1983; Zahra et al., 2000). The advice is to assure governance structures monitor, direct, and incentivize the desired behaviors of managers and employees in order to reduce the principal-agent problem, as proposed by agency theory (Fama & Jensen, 1983).

External environment

Environments are heterogeneous in their level of turbulence – ranging from stable (low turbulence) to highly turbulent. We define the level of environmental turbulence as the degree to which the environment is rapidly changing and uncertain in comparison to stable environments. This definition follows the work of (Ansoff, 1965, 1979; Ansoff et al., 1993). This uncertain change may be in an array of areas including competition, regulation, customers, and technology. Ansoff et al. (1993) characterize turbulence as being a continuous variable of high importance in strategy selection. Ansoff argues that turbulence encompasses complexity of the market, familiarity of events, and visibility of the future. Others indicate that dynamic and/or volatile environments include dimensions such as ambiguity and unpredictability (Eisenhardt et al., 2010).

Building upon our definition of environmental turbulence, we explain the key characteristics of turbulent environments that influence the strategy-performance relationship. With rapid change in the

environment, firm's strategies, resources, and processes have some probability of not fitting the new situation and therefore will require changing and alignment (Chandler, 1962; Lawrence & Lorsch, 1969). With uncertainty, firms are less able to predict future situations or the outcomes of current actions for future positioning. Firms have therefore a reduced ability to plan and make future-oriented decisions effectively. In essence, in uncertain environments experience is a less reliable guide to the future and lessons of the past do not guarantee future performance (Eisenhardt and Martin, 2000).

Rapid change with its ensuing lack of fit and uncertainty with its ensuing lack of predictability lead to a general recommendation to increase organizational flexibility with increasing turbulence. Various literature streams discuss this in terms of strategic flexibility, adaptability, or agility (e.g. Doz & Kosonen, 2010; Reeves & Deimler, 2011). Flexibility can be required in various aspects of firms' management, resources, investments, and processes. Such flexibility is in tension with efficiency (Eisenhardt et al., 2010) and therefore is theorized to have a negative influence on performance. However, existing research lacks clarity regarding the relationship between the traditional strategic management views and performance, or flexibility, as a function of environmental turbulence.

Strategy purity

Cost leadership and differentiation are the two pure business strategies (Porter, 1980). In a cost leadership strategy, a firm emphasizes costs, efficiency, and/or execution. In a differentiation strategy, a firm emphasizes product leadership, innovation, and/or responsiveness. In a mixed strategy, a firm simultaneously pursues cost leadership and differentiation. A pure strategy is argued to produce better performance than a mixed one (Campbell-Hunt, 2000; Porter, 1980; Thornhill & White, 2007). Performance benefit is derived from 1) simple and clear direction for the business, 2) avoidance of mutually exclusive trade-offs (Thornhill & White, 2007), and 3) a clear market position which reduces competitor attacks from two flanks (Miles & Snow, 1978; Thornhill & White, 2007; Treacy & Wiersema, 1995). Firms pursuing a mixed strategy are 'stuck-in-the-middle' due to the conflicts between two distinct strategies, since each strategy requires different underlying capabilities and systems. Strategy purity is a fundamental prescription to enhance performance as it provides high organizational efficiency.

We hypothesize that the positive effect of pure strategies on firm performance is weaker in turbulent environments. First, since the environment is rapidly changing and uncertain, it is unclear to the firm how to best position itself in the competitive environment. The assumption, that a firm is able to identify a simple and clear direction, is therefore unrealistic the more turbulent the environment. Second, the argument that pure strategies allow firms to avoid mutually exclusive trade-offs assumes that firms can largely focus on efficiency by following one strategy. However, rapidly changing and uncertain environments have been argued to require flexibility (e.g. Doz & Kosonen, 2010). We contend that pure strategies reduce flexibility as compared to mixed strategies. A focus on one strategy hinders a firm's ability to adapt to unpredictable change because the skills and systems are necessarily limited. When firms lack predictability, mixed strategies will better enable flexibility and, where appropriate, adaptation to rapidly changing situations. In this way, instead of a pure strategy, a mixed strategy provides more options (Trigeorgis, 1996) to pursue future strategies for higher performance. Third, a clear market position, to reduce competitor attacks from two flanks, is assumed possible in the last argument. That means a firm can possess and maintain a cost leadership or differentiation leadership position to isolate a flank from competitor attack. However, market positions and competition are inherently uncertain and less predictable the more turbulent a firm's environment (c.f. Chakravarthy, 1997; D'Aveni, 1994). This argument for a pure strategy also presumes that the efficiency advantage of a pure strategy outweighs the flexibility advantage of a mixed strategy. However, turbulent environments include unpredictable change in competitor strategies (D'Aveni, 1994). This makes a competitive advantage, resulting from a pure strategy that provides a clear market position, unsustainable (D'Aveni, Dagnino, & Smith, 2010).

In total, the rapid change and uncertainty of turbulent environments increases the performance benefit of flexibility over efficiency. As a result, a mixed strategy will be more effective as environments become more turbulent because it enhances flexibility.

Hypothesis 1*: The positive relationship between strategy purity and a firm's performance weakens with increasing turbulence in the environment.*

Resources

The resource-based view is a widely-held perspective of how to create sustainable competitive advantage (Barney, 1991). A view that capabilities, or competences, are important to performance has a long standing place in strategic management theory (Penrose, 1959; Schumpeter, 1942). Competencies, capabilities, the knowledge based view of the firm, and innovation research all point to the critical nature of knowledge-based resources with respect to firm performance (Miller, Eisenstat, & Foote, 2002). Knowledge-based resources, such as R&D personnel, are expected to generate new, economically useful services and products that enable firms to maintain or grow their performance (Jaffe, 1986). In total, knowledge-based resources are generally agreed to be critical to the ability to compete and to performance.

However, we predict that internal knowledge-based resources will have a less positive effect in turbulent environments. While resources may aid adaptation (Lei, Hitt, & Bettis, 1996) or provide dynamic capabilities (D. J. Teece et al., 1997), they may also constrain adaptation (Leonard-Barton, 1992). We contend that higher levels of knowledge-based resources will constrain adaptation in environments that are highly turbulent. Turbulent environments may change the basis of competition, the regulatory requirements, or the appropriate technology. Therefore, the more turbulent the environment, the higher the probability pre-existing resources do not fit the new situation.

It is widely acknowledged that investments in specific knowledge-based resources have a high probability of becoming a 'core rigidity' (Leonard-Barton, 1992). Resource rigidity has been linked to expertise level of the resource (Leonard-Barton, 1992). Similarly, studies of inertia indicate that organizational size increases resistance to change (Hannan & Freeman, 1984). This means that higher levels of knowledge-based resources within the boundaries of the firm may constrain the ability to adapt products and services to meet the needs of turbulent conditions. The dynamic capabilities literature indicates that a firm's ability to possess dynamic capabilities with internal knowledge-based resources is of low probability (David J. Teece, 2012). The more probable outcome is inertia-laden and rigid resources that hinder a firm's ability to adapt swiftly and efficiently in highly turbulent environments.

Hypothesis 2*: The positive relationship between internal knowledge-based resources and a firm's performance weakens with increasing turbulence in the environment.*

Network connections

A firm's critical capability may lie outside the boundary of the firm in its network of relationships. Research has documented performance benefits due to relationships, agreements, and networks that the firm can utilize without ownership (Granovetter, 1985; Gulati, 1998; Uzzi, 1997). Suppliers, customers, partners, distributors, consultants, and social contacts may be included in the network of an organization. Such networks of external contacts are important because they provide a bridge between the firm and external solutions to problems (Dyer & Singh, 1998; Hagedoorn & Duysters, 2002; Zahra & Nielsen, 2002). Networks are known to provide informational advantages (Gulati, 1998) as they are a source of technological, marketing, and management information that can increase a firm's performance and survival prospects (Bonaccorsi, 1992; Park & Luo, 2001).

In contrast, we argue that networks are of less importance to a firm's performance in turbulent environments. Uncertainty reduces the ability to predict future network requirements. This unpredictability results in two outcomes. First, pre-established networks will have a low probability of fit in changing conditions. For example, if a network provides information and capabilities and those have become obsolete due to changes in the environment, then the network weakens in its overall usefulness to the firm, as it does not fit the new conditions. Second, analogous to a resource, a network can become a 'core rigidity' in itself, thereby hindering a firm's ability to adapt to a changing environment.

> ***Hypothesis 3****: The positive relationship between networks and a firm's performance weakens with increasing turbulence in the environment.*

Governance

Governance is concerned with the way a company is controlled. There are numerous mechanisms for governance in the literature, such as managerial incentives, boards of directors, and ownership structures (Bruton, Filatotchev, Chahine, & Wright, 2010; Fama & Jensen, 1983). Board of director influence on governance is supported by diverse external perspectives and information that provide both enhanced guidance and monitoring (e.g. Hillman & Dalziel, 2003; Johnson, Ellstrand, & Daily, 1996; Rutherford, Buchholtz, & Brown, 2007). Overall, the governance literature argues that

external monitoring and guidance as well as establishment of proper incentives enhance organizational performance.

In contrast, we argue that such governance is of less benefit to a firm's performance in turbulent environments. First, we contend that governance structures and processes are established based on decision makers' (Board of Director members') experience and prior learning. As such, the knowledge governance is built on may become less relevant in an uncertain and rapidly changing environment. Second, we contend that governance structures that are intended to guide the flexibility-efficiency choice, over time become part of the embedded organizational system and therefore do not provide the necessary external oversight as environments rapidly change. In other words, governance structures become inertia-laden and rigid in a manner analogous to knowledge-based resources.

Hypothesis 4*: The positive relationship between governance and a firm's performance weakens with increasing turbulence in the environment.*

DATA AND METHODS

Rigorous empirical research on environmental turbulence has been held back by a lack of adequate empirical test environments. In seeking an appropriate empirical context to test our hypotheses, we observe highly varying environments with significant uncertain change across transition economies. Transition economies have dynamically and unpredictably evolving economic institutions (Hermelo & Vassolo, 2010). The regulatory regimes and business environments in transition economies have been changing in multitudinous ways, reflecting differing approaches to the development of free-markets (Hoskisson et al., 2000; Svejnar, 2002), with periods of steady progress punctuated by reversals, stops, and re-starts (Peng, 2003). So across transition economies, we observe countries with highly turbulent, uncertain economic environments and countries with more stable, certain economic environments. We contend this variance in environmental turbulence provides an excellent empirical context to test our theoretical model. To examine this contention, we comparatively assess transition economy environments and highly competitive environments in Table 1. This comparison indicates that both environments have analogous aspects that are rapidly changing and are unpredictable. Based on

this assessment, we take the view that strategy-performance relationships can be compared across the two environments. (More complete details are available upon request.)

[Insert Table 1 about here]

Our empirical analysis is based on a survey undertaken in 2002 of firms in Belarus, Bulgaria, Lithuania, and Ukraine since these four transition economy countries reflect a wide variance in progress from a centrally controlled government through 1990s toward free markets and substantial differences in the level of institutional turbulence. The survey examines a parallel set of questions for four functions of the firm - quality assurance, human resource management, marketing, and technology. The response rate by country was Belarus (81.0%), Bulgaria (15.8%), Lithuania (18.6%), and Ukraine (68.9%) for an overall response rate of 39.5%. The data set includes 656 firms. Our analysis is based on 443 firms in 12 industries that provided complete data.

Dependent variable

Unlike most studies in this area, which focus on determinants of financial performance (e.g. Ansoff et al., 1993), our investigation examines ***Success of Change,*** a context-relevant proxy of performance. This is because the transition economy setting required firms to undertake frequent change across most, if not all, of their functions (Kriauciunas & Kale, 2006). *Success of change* also provides insight into the firm's resultant adaptation to change – its flexibility. The more successful a firm is in changing, and with higher levels of flexibility, the higher the performance is in more turbulent conditions (e.g. Doz & Kosonen, 2010). The survey asked the respondent to: indicate the success of changes implemented in their function from January 1999 to December 2001. Since four functions responded to the survey, we average the scores to calculate success of change.

Independent and control variables

The investigated ***Strategy choices*** are a pure strategy (cost leadership or differentiation) and a mixed strategy. Our survey items follow the established practices to investigate generic strategies (Reitsperger, Daniel, & Tallman, 1993; Thornhill & White, 2007). The measure for differentiation strategy averages the two items and factor analysis confirmed these two items loaded on one latent

variable. Our indicator of the mixed strategy is the interaction of the two strategy choices. For the remaining independent variables, we used the average variable values for 1999 to 2001 using end of year data as directly reported in the survey (unless otherwise noted). ***R&D density*** is measured as the number of employees in R&D divided by the total number of employees. ***Information networks*** are measured using survey responses. Respondents were asked to indicate the importance of foreign business partners as a source of ideas for their function from January 1999 to December 2001 on a seven point Likert scale. We utilize the average response across the four functional areas. Governance is proxied through two context relevant indicators – private and foreign ownership in comparison to state ownership (Filatotchev, Dyomina, Wright, & Buck, 2001). ***Private ownership*** is the percent privately owned. ***Foreign ownership*** is the percent foreign owned. In the context of transition economies, researchers in the area of governance have focused on ownership structures due to their influence on monitoring, direction, and incentives relative to prior state ownership and Communist control. These ownership types are relevant to our arguments because they reflect distinct governance control mechanisms and incentives.

Environmental turbulence captures the level of turbulence in the institutional environment. While we, in general, consider transitioning economies to be turbulent relative to non-transitioning economies, our study considers differences in the level of turbulence between countries. We selected the World Bank indicator for 'political stability and absence of violence' because it aligns with our theoretical framework and is an important dimension of turbulence in the context of transition economies. We invert the scale to indicate turbulence rather than stability. This indicator captures perceptions of the likelihood that the government will be destabilized (Kaufmann, Kraay, & Mastruzzi, 2008). Since governments establish the regulations and policies regarding economic exchange, government turbulence is of critical importance. We used the average scores for 1998 and 2000.

We include control variables to address alternative explanations: Export experience during evaluation period; Privatized thus former state ownership; Firm size, GDP growth; Industry diversity in terms of number and importance of industry segments; Industry dummy variables.

Empirical Results

Estimates from a weighted ordinary least squares (OLS) regression analysis were used to test our hypotheses. Variable means, standard deviations, and correlations are in Table 2. Table 3 shows the regression models with each strategy individually and a complete specification with interactions in Model 11. These full models (10 and 11) are the most insightful since each individual strategy may be considered as an alternative explanation for performance (success of change). First, we find support for Hypothesis 1 regarding strategy purity (generic strategy). The significant and positive coefficient (0.28, $p<0.05$) on the three-way interaction of cost, differentiation, and environmental turbulence in Model 11 indicates that a mixed strategy is more beneficial in a turbulent environment. Second, we do not find support for Hypothesis 2 regarding the effect of resources. Our results indicate R&D resources are not significantly related to performance and the level of environmental turbulence does not significantly influence this effect. Third, we find support for Hypothesis 3. Fourth, we do not find support for Hypothesis 4 regarding governance. The significant and positive coefficient (0.02, $p<0.05$) on the interaction of foreign ownership and environmental turbulence in Model 11 indicates that more foreign ownership is beneficial in turbulent environments.

[Insert Tables 2 & 3 and Figures 1 & 2 about here]

DISCUSSION

Several important findings emerge from this research as shown in Table 4. First, as hypothesized, strategy purity is less effective as environmental turbulence increases. Our findings support Porter's (1980) arguments for pure strategies but *only* when environments are relatively stable. In turbulent environments, a mixed strategy results in higher performance. We believe a mixed strategy builds agility – ability to rapidly and efficiently adapt – due to experimentation and learning across multiple activities of the firm creating more strategic options for future implementation.

Second, the results for resources do not follow traditional expectations nor do the results support our hypothesis. While the literature includes arguments that resources support performance (Hoskisson et al., 2000) or constrain performance following core rigidity arguments (Leonard-Barton, 1992), we do not find a constraining force or a supporting force in our data. To better understand this

result we performed secondary analysis and confirmed a significant inverted u-shaped relationship. We further constrained the data set to obtain a more informed estimate of the level of resources where returns to R&D diminish as shown and described in Figure 3. The resulting relationship indicates that resources are beneficial to a point and at above ~20% R&D density and additional R&D resources are detrimental. Thus, some knowledge-based resource is beneficial, but too many resources within the firm reduce performance. This resource relationship does not vary with environmental turbulence, thus, in our data, resources are equally important to performance in any level of turbulence.

[Insert Figure 3 and Table 4 about here]

Third, as hypothesized, networks are less effective in more turbulent environments. This may be due to turbulent environments' uncertainty that reduces the probability of having critical information available in external networks on how to adapt to the turbulent environment. Also the constraints on managerial time may allow limited opportunity to process and act upon the available external information. Our data suggests in turbulent environments firms should limitedly invest in networks. This provocative point is not to suggest that beneficial ideas do not lie in the network, but rather that, the probability of discovering such ideas is lower the more turbulent the environment.

Fourth, our findings do not support the governance hypothesis since the performance benefit of governance, both private and foreign ownership, increases with environmental turbulence. We believe this benefit results from the ability of foreign owners to supply expertise (monitoring and guidance), access to foreign markets, and to help stimulate change in the organization (incentives). This finding may be also due to our specific context where access to foreign markets was often a primary path to success. However, we believe this finding also applies to competitive environments where governance from other regions of the world (through foreign ownership) or other industries may change support structures, capabilities, incentives, and markets that may enhance adaptation to turbulent environments – resulting in higher performance.

Overall, our results indicate performance in turbulent environments may be best achieved through strategies that are largely opposite of traditional strategic management recommendations. While future research may benefit from investigating these relationships with more precise indicators and with turbulence of other types, one lesson is clear from our study: environmental turbulence matters!

Table 1: Comparison of hypercompetitive and transition economy environments

Highly Competitive Environments	Transition Economy Environments
High competitive rivalry	Uncertain institutional environment
Uncertain competitive situation	Uncertain competitive situation
Complex competitor actions and reactions	Complex political relationships
Fast technology change (innovation)	Fast technology change (imitation)
Unpredictable consumer/buyer behavior	Unpredictable government behavior
↘	↙
Turbulent (rapidly changing and unpredictable)	

Table 2: Descriptive statistics

Variables	Mean	s.d.	Min.	Max.	1	2	3	4
1. Success of Change	4.65	1.08	1	7				
2. Cost Leadership Strategy	5.27	1.30	1	7	0.26***			
3. Differentiation Strategy	5.82	1.06	1	7	0.41***	0.59***		
4. R&D Density	0.06	0.13	0	1	0.07	0.03	0.06	
5. Information Networks	2.65	1.79	1	7	0.30***	0.21***	0.26***	0.03
6. Private Ownership	78.55	35.62	0	100	0.11*	0.15**	0.15**	0.09*
7. Foreign Ownership	2.80	12.67	0	100	0.15**	0.01	-0.03	-0.07
8. Environmental Turbulence	0.06	0.29	-0.53	0.30	-0.24***	-0.16***	-0.23***	-0.11*
9. Export Experience	0.39	0.49	0	1	0.14**	0.15**	0.14**	0.03
10. Privatized	0.60	0.49	0	1	0.05	0.03	0.09†	-0.21***
11. Size (ln)	5.08	1.57	0.69	10.36	0.01	-0.05	0.01	-0.36***
12. Industry Diversity	0.89	0.19	0.22	1	-0.06	0.05	0.03	-0.03
13. GDP Growth	4.43	1.04	3.25	5.55	0.25***	0.10	0.04	0.06

Variables	5	6	7	8	9	10	11	12
6. Private Ownership	0.05							
7. Foreign Ownership	0.17***	0.12*						
8. Environmental Turbulence	-0.28***	-0.12*	-0.09†					
9. Export Experience	0.44***	0.02	0.13**	-0.28***				
10. Privatized	0.02	0.24***	-0.03	0.21***	0.05			
11. Size (ln)	0.22***	-0.34***	0.07	0.06	0.31***	0.32***		
12. Industry Diversity	0.03	0.03	0.04	0.06	-0.02	0.07	0.06	
13. GDP Growth	-0.11*	-0.08	-0.05	-0.10*	-0.03	-0.13**	-0.22***	-0.35***

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 3: Regression model results for success of change (number of firms 443)

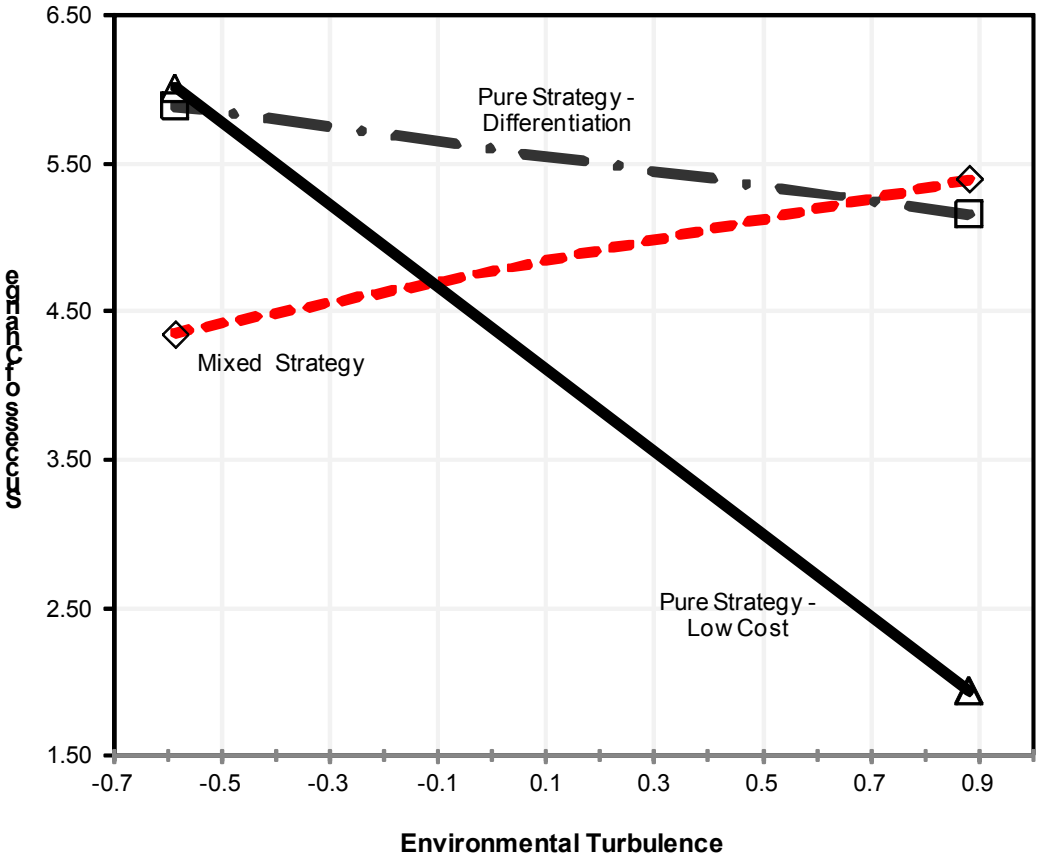
		Strategy Purity		Resources		Networks		Governance		Full Model	
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Cost Leadership Strategy [a]		0.01 *(0.04)*	0.00 *(0.05)*							-0.002 *(0.04)*	-0.01 *(0.05)*
Differentiation Strategy [a]		0.31*** *(0.06)*	0.34*** *(0.06)*							0.25*** *(0.06)*	0.32*** *(0.06)*
Cost x Differentiation [a]		-0.06* *(0.03)*	-0.06* *(0.03)*							- 0.08** *(0.03)*	- 0.09** *(0.03)*
R&D Density [a]				0.42 *(0.34)*	0.84* *(0.48)*					0.23 *(0.31)*	0.48 *(0.43)*
Information Networks [a]						0.19*** *(0.03)*	0.17*** *(0.03)*			0.16*** *(0.03)*	0.10*** *(0.03)*
Private Ownership [a]								0.01** *(0.002)*	0.01** *(0.002)*	0.002 *(0.002)*	0.002 *(0.002)*
Foreign Ownership [a]								0.01† *(0.003)*	0.01** *(0.005)*	0.01* *(0.003)*	0.02*** *(0.004)*
Environmental Turbulence [a]		-0.48*** *(0.14)*	-0.60*** *(0.16)*	-0.80*** *(0.14)*	-0.81*** *(0.14)*	-0.56*** *(0.14)*	-0.51*** *(0.14)*	-0.74*** *(0.15)*	-0.76*** *(0.15)*	-0.26* *(0.14)*	-0.35* *(0.16)*
Cost x Environmental Turbulence			-0.17† *(0.13)*								-0.16† *(0.12)*
Differentiation x Environmental Turbulence			0.26† *(0.18)*								0.37* *(0.17)*
Cost x Differentiation x Environmental Turbulence			0.17† *(0.11)*								0.28** *(0.11)*
R&D x Environmental Turbulence					1.14 *(0.93)*						0.91 *(0.85)*
Information Networks x Environmental Turbulence							-0.12* *(0.07)*				-0.26*** *(0.07)*
Private Ownership x Environmental Turbulence									0.01† *(0.004)*		0.002 *(0.004)*
Foreign Ownership x Environmental Turbulence									0.02* *(0.01)*		0.02* *(0.01)*
Controls											
Export Experience	0.37***	0.14†	0.14†	0.11	0.12	-0.07	-0.06	0.09	0.12	-0.07	-0.02
Privatized	-0.13	-0.05	-0.06	-0.01	0.01	0.05	0.06	-0.12	-0.14	-0.03	-0.03
Size (Ln)	0.01	0.03	0.02	0.05	0.04	0.00	0.00	0.07*	0.06†	0.04	0.02
Industry Diversity	0.11	0.05	0.00	0.10	0.09	-0.12	-0.18	0.15	0.17	-0.18	-0.40†
GDP Growth	0.24***	0.25***	0.25***	0.25***	0.25***	0.29***	0.28***	0.28***	0.28***	0.29***	0.28***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	2.99***	2.86***	2.86***	2.48***	2.54***	2.57***	2.59***	2.28***	2.32***	2.73***	2.83***
F	4.87***	9.31***	8.30***	6.52***	6.26***	9.77***	9.46***	6.70***	6.44***	10.31***	9.19***
R^2	0.155	0.306	0.313	0.217	0.219	0.293	0.298	0.231	0.243	0.372	0.409
Adjusted R^2	0.123	0.273	0.275	0.183	0.184	0.263	0.267	0.197	0.205	0.336	0.365

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001, [a] Mean-centered, Tests are one-tailed, Standard errors for independent variables in parentheses.

Table 4: Strategic agility framework for turbulent environments

	Strategy Purity	Resources	Networks	Governance
Developed Economy Theory	Only cost or differentiation strategy	Resources improve performance	Networks improve performance	Block shareholders influential
Our Study: Turbulent Environments	Pure strategy detrimental	R&D resources – no differential influence	Information networks less beneficial	Foreign ownership beneficial
Lessons for strategic agility in turbulent environments:	A mixed strategy enhances agility	Agility not enhanced by additional R&D resources	Agility not enhanced by external information networks	Non-local or foreign ownership enhances agility

Figure 1: Predicted success of change by environmental turbulence and strategy choice.



Note: Mixed strategy is at maximum level of differentiation and maximum of cost strategy (this is 7 on 7-point Likert scale in raw data). High Purity Strategy is represented by one strategy (differentiation or cost leadership) set at the maximum and the other at three standard deviations below the mean. We plotted environmental turbulence three standard deviations above the mean on the high end to better show the relationships in more turbulent environments.

Figure 2: Predicted success of change by environmental turbulence and information networks.

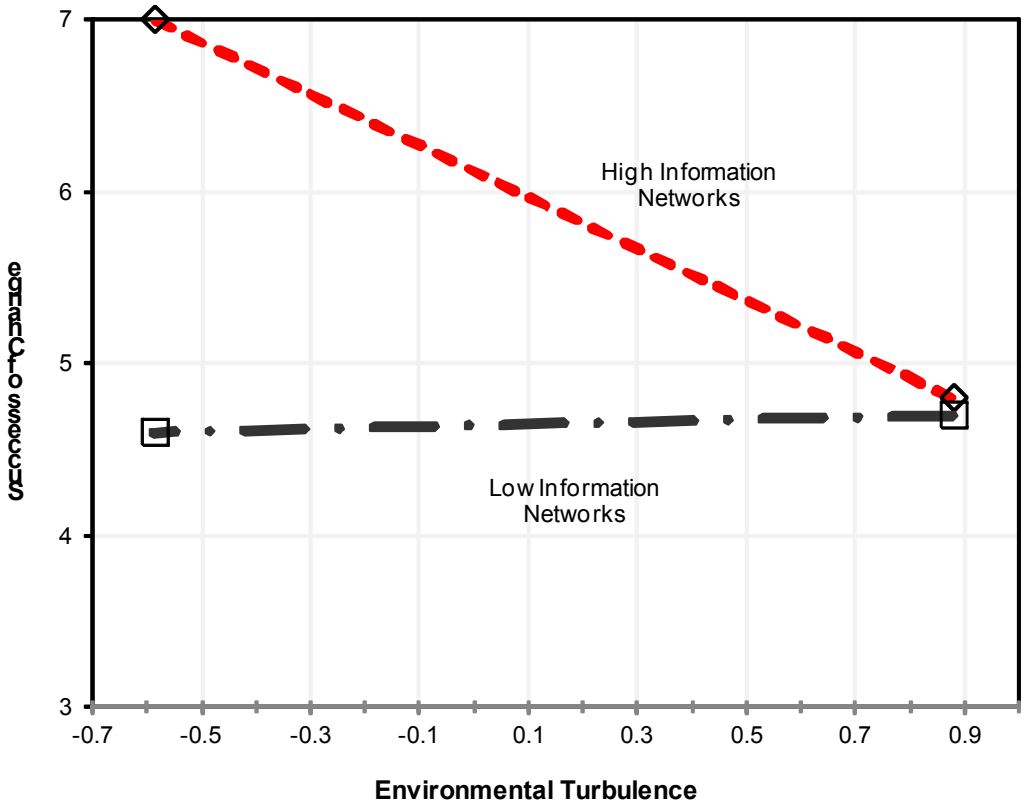
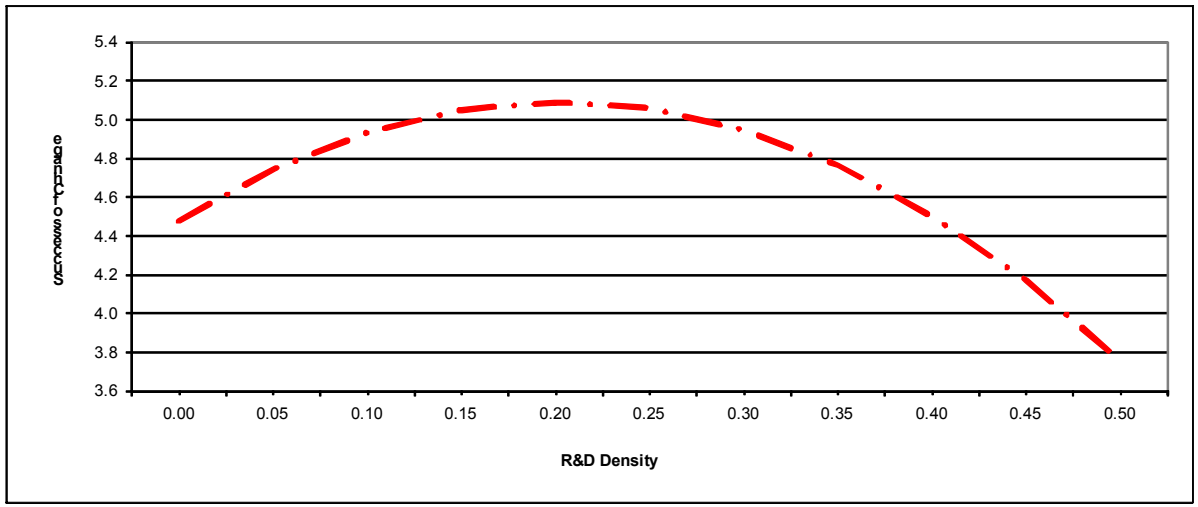


Figure 3: Predicted success of change by level of R&D resources.



Regression Results	
Variables	**Model**
R&D Density [a]	3.71*
R&D Density Squared	-13.21*
Institutional Environment [a]	-1.03***
Controls	Yes
Industry Dummies	Yes
Intercept	3.63***
n	295
F	5.96***
R^2	0.256
Adjusted R^2	0.213

[a] Mean-centered, Tests are one-tailed

Note: We constrained firm size to be larger than 10 employees to eliminate small / entrepreneurial firms, R&D to be less than 50% to exclude research firms, and excluded service firms which have a lower probability of utilizing R&D resources. This resulted in 295 firms in the remaining sample.

REFERENCES

Ansoff, H. I. (1965). *Corporate strategy: An analytic approach to business policy for growth and expansion*. New York: McGraw-Hill.

Ansoff, H. I. (1979). *Strategic management*. London: London : Macmillan.

Ansoff, H. I., Sullivan, P. A., Antoniou, P., Chabane, H., Djohar, S., Jaja, R., . . . Wang, P. (1993). Empirical proof of a paradigmic theory of strategic success behaviors of environment serving organizations. In D. E. Hussey (Ed.), *International review of strategic management.* (Vol. 4, pp. 173-202). Chichester, New York: Wiley.

Barney, J. (1991). Firm resources and sustained competitive advantage. [Article]. *Journal of Management, 17*(1), 99-120.

Bonaccorsi, A. (1992). On the relationship between firm size and export intensity. *Journal of International Business Studies, 23*(4), 605-635.

Bourgeois, L. J., III. (1985). Strategic Goals, Perceived Uncertainty, and Economic Performance in Volatile Environments. *The Academy of Management Journal, 28*(3), 548-573. doi: 10.2307/256113

Bruton, G. D., Filatotchev, I., Chahine, S., & Wright, M. (2010). Governance, ownership structure, and performance of IPO firms: the impact of different types of private equity investors and institutional environments. *Strategic Management Journal, 31*(5), 491-509. doi: 10.1002/smj.822

Campbell-Hunt, C. (2000). What have we learned about generic competitive strategy? A meta-analysis. *Strategic Management Journal, 21*(2), 127-154.

Chakravarthy, B. (1997). A new strategy framework for coping with turbulence. [Article]. *Sloan Management Review, 38*(2), 69-82.

Chandler, A. D. (1962). *Strategy and structure: Chapters in the history of the industrial enterprise*. Cambridge, Mass.: M.I.T. Press.

Child, J. (1972). Organizational structure, environment and performance: The role of strategic choice. *Sociology, 6*(1), 1-22. doi: 10.1177/003803857200600101

D'Aveni, R. A. (1994). *Hypercompetition: Managing the dynamics of strategic maneuvering*. New York: The Free Press.

D'Aveni, R. A., Dagnino, G. B., & Smith, K. G. (2010). The age of temporary advantage. *Strategic Management Journal, 31*(13), 1371-1385. doi: 10.1002/smj.897

Doz, Y. L., & Kosonen, M. (2010). Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal. *Long Range Planning, 43*(2–3), 370-382.

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review, 23*(4), 660-679.

Eisenhardt, K. M., Furr, N. R., & Bingham, C. B. (2010). CROSSROADS—Microfoundations of Performance: Balancing Efficiency and Flexibility in Dynamic Environments. *Organization Science, 21*(6), 1263-1273.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal, 21*(10/11), 1105-1121. doi: 10.2307/3094429

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics, 26*(2), 301-325.

Filatotchev, I., Dyomina, N., Wright, M., & Buck, T. (2001). Effects of post-privatization governance and strategies on export intensity in the former Soviet Union. *Journal of International Business Studies, 32*(4), 853-871.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology, 91*(3), 481-510.

Gulati, R. (1998). Alliances and networks. *Strategic Management Journal, 19*(4), 293-317. doi: 10.1002/(sici)1097-0266(199804)19:4<293::aid-smj982>3.0.co;2-m

Hagedoorn, J., & Duysters, G. (2002). External sources of innovative capabilities: The preferences for strategic alliances or mergers and acquisitions. *Journal of Management Studies, 39*(2), 167-188. doi: 10.1111/1467-6486.00287

Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review, 49*(2), 149-164. doi: 10.2307/2095567

Hermelo, F. D., & Vassolo, R. (2010). Institutional development and hypercompetition in emerging economies. *Strategic Management Journal, 31*(13), 1457-1473. doi: 10.1002/smj.898

Hillman, A. J., & Dalziel, T. (2003). Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives. *The Academy of Management Review, 28*(3), 383-396. doi: 10.2307/30040728

Hoskisson, R. E., Eden, L., Lau, C. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal, 43*(3), 249-267.
Jaffe, A. B. (1986). Technological opportunity and spillovers of R&D: Evidence from firms' patents, profits, and market value. *The American Economic Review, 76*(5), 984-1001.
Johnson, J. L., Ellstrand, A. E., & Daily, C. M. (1996). Boards of Directors: A Review and Research Agenda. [Article]. *Journal of Management, 22*(3), 409.
Kaufmann, D., Kraay, A., & Mastruzzi, M. (2008). *Governance matters VII: Aggregate and individual governance indicators, 1996-2007*. [working paper]. (No.4654). World Bank Policy Research.
Kriauciunas, A., & Kale, P. (2006). The impact of socialist imprinting and search on resource change: A study of firms in Lithuania. *Strategic Management Journal, 27*(7), 659-679. doi: 10.1002/smj.537
Lawrence, P. R., & Lorsch, J. W. (1969). *Organization and environment : managing differentiation and integration*. Homewood, Ill: R. D. Irwin.
Lei, D., Hitt, M. A., & Bettis, R. (1996). Dynamic Core Competences Through Meta-Learning and Strategic Context. [Article]. *Journal of Management, 22*(4), 549.
Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal, 13*, 111-126. doi: 10.1002/smj.4250131009
Miles, R. E., & Snow, C. C. (1978). *Organizational strategy, structure, and process*. New York: McGraw-Hill.
Miller, D., Eisenstat, R., & Foote, N. (2002). Strategy from the inside out: Building capability-creating organizations. [Article]. *California Management Review, 44*(3), 37-54.
Park, S. H., & Luo, Y. D. (2001). Guanxi and organizational dynamics: Organizational networking in Chinese firms. *Strategic Management Journal, 22*(5), 455-477.
Peng, M. W. (2003). Institutional transitions and strategic choices. *Academy of Management Review, 28*(2), 275-296.
Penrose, E. T. (1959). *The theory of the growth of the firm*. New York,: Wiley.
Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*. New York: Free Press.
Reeves, M., & Deimler, M. (2011). Adaptability: The New Competitive Advantage. [Article]. *Harvard Business Review, 89*(7/8), 134-141.
Reitsperger, W. D., Daniel, S. J., & Tallman, S. B. (1993). Integrating generic strategies: A question of strategic intensity? *Research in Global Strategic Management, 4*, 65-79.
Rutherford, M. A., Buchholtz, A. K., & Brown, J. A. (2007). Examining the Relationships Between Monitoring and Incentives in Corporate Governance*. *Journal of Management Studies, 44*(3), 414-430. doi: 10.1111/j.1467-6486.2007.00683.x
Schumpeter, J. A. (1942). *Capitalism, socialism, and democracy*. New York: Harper & Brothers.
Svejnar, J. (2002). Transition economies: Performance and challenges. *Journal of Economic Perspectives, 16*(1), 3-28.
Teece, D. J. (2012). Dynamic Capabilities: Routines versus Entrepreneurial Action. *Journal of Management Studies, 49*(8), 1395-1401. doi: 10.1111/j.1467-6486.2012.01080.x
Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533.
Thornhill, S., & White, R. E. (2007). Strategic purity: A multi-industry evaluation of pure vs. hybrid business strategies. *Strategic Management Journal, 28*(5), 553-561. doi: 10.1002/smj.606
Treacy, M., & Wiersema, F. (1995). *The discipline of market leaders*. Reading, MA: Addison-Wesley.
Trigeorgis, L. (1996). *Real options: Managerial Flexibility and Strategy in Resource Allocation*. Cambridge, MA: MIT Press.
Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly, 42*(1), 35-67.
Zahra, S. A., Ireland, R. D., Gutierrez, I., & Hitt, M. A. (2000). Privatization and entrepreneurial transformation: Emerging issues and a future research agenda. *Academy of Management Review, 25*(3), 509-524.
Zahra, S. A., & Nielsen, A. P. (2002). Sources of capabilities, integration and technology commercialization. *Strategic Management Journal, 23*(5), 377-398. doi: 10.1002/smj.229