Abstract

Environmental turbulence represents a double-edged sword, simultaneously fueling and hindering firm’s entrepreneurial orientation. Drawing on the entrepreneurial orientation, organizational inertia, and network relationships, we have developed and tested a conceptual model that provides a more nuanced account of the relationship between environmental turbulence and entrepreneurial orientation of the firm.

Keywords: Entrepreneurial orientation, Environmental turbulence, Organizational inertia, Network relationships, Network theory

Introduction

Entrepreneurial orientation (EO) is the entrepreneurial activity of the firm that has been defined as the firm’s propensity relating to take calculated risks, be innovative, and execute strategic proactiveness by the firm’s manager to adopt (de Clercq et al., 2013; Morris et al., 2011; Rauch et al., 2009; Covin and Slevin, 1989; Miller, 1983). It reflects the firm’s behavior on exploiting new opportunities, materializing innovations, and developing new products or services (Covin and Wales, 2011; Lumpkin and Dess, 1996). Previous studies have extensively tested the relationships among EO, various moderators, and firm performance of these relationships with finding that EO has different effects on performance (Anderson and Eshima, 2013; Zhao et al., 2009; Wiklund and Shepherd, 2005; Lumpkin and Dess, 2001).

Although these studies have generated powerful and enduring insights of EO-performance relationships, as well as helped catapult EO to critical strategy-making processes as a means for understanding the firm’s entrepreneurial behaviors and intentions, limited efforts have centered on pointing out the driven factors of environmental challenges (Miller, 2011; Rauch et al., 2009; Tan and Tan, 2005), particularly with respect to the pressure of the firm’s creating under unpredictable condition. Turbulent environment which is subject to rapid change and high level of uncertainty provides opportunities for firms to break traditional industry boundaries because firms can enter the new marketplace with develop new products and technologies.
under risk-taking condition (Calantone et al., 2003). On the contrary, environmental turbulence can cause firms to exit the market quickly or diminish the performance rapidly as they lose profitable competitive advantage without catching up the information accessing and market changing (Dai et al., 2013; Ichtenthaler, 2009). Since environmental element is the critical consideration for firms to make strategic decision on innovating and new product development, entrepreneurial orientation enable firm’s entrepreneurial behavior and intention to advance made decision process for firms to increase opportunities on extending market and competing in the industry. That is, the strength of the entrepreneurial behavior and intention of the firm depends on the characteristics of the turbulent environment for the firm to execute the strategy-making process (Dai et al., 2013; Miller, 2011; Perez-Luno et al., 2011; Rauch et al., 2009). Therefore, the relationship between environmental turbulence and entrepreneurial orientation may apparently be explored firms’ entrepreneurial activities.

In addition, network relationships which are defined as interactions among firms facilitate resources exchange and transference among firms to reduce uncertainty for the future decisions because they provide channels and opportunities for firms to access the knowledge (Phelps et al., 2012; Hansen, 2002), utilize the resources (Prashantham and Dhanaraj, 2010; Tsai, 2000; Tsai and Ghoshal, 1998), and construct the advantages (Wang and Fang, 2012; Hagedoorn et al., 2006; Walter et al., 2006). The firm can expand its knowledge searches and reception by communicating frequently with other firms to establish its strong interactive relationships in the network (Oh et al., 2004; Tsai, 2000) because these resources assistant the firm to confirm directions of new product development and technology creation without concerning limited information and knowledge in the industry (Matusik and Fitza, 2012). On the contrary, the organizational inertia which is the stability in product, processes, and business operation that underlies the inadequate adaptation to changing condition (Hannan and Freeman, 1984). The firm will establish routines and standard process to reach goals. When these operation rules embedded within the firm over time, these might limit firm’s responses by past experiences and knowledge to build up resistance against changing environment (Zhou and Wu, 2010). Conceptualizing the influence of network relationships and organizational inertia, strategy-making process is adopted by actions of the firm to acquire various resources and suffer internal defense on changing.

Accordingly, in this research we aim to make contributions to literature of entrepreneurial orientation. First, even though entrepreneurship research has devoted substantial attention to the relationships between entrepreneurial orientation and firm performance, we have focused mostly on the role of the environmental turbulence in the processes of the firm’s entrepreneurial behaviors (Dai et al., 2013; Miller, 2011; Rauch et al., 2009; Calantone et al., 2003). Less attention addresses the antecedence of firms’ entrepreneurial behavior and intention how the environmental turbulence can be leveraged to entrepreneurial orientation. The results of our study will add to extant literature by providing empirical evidence for the influence of environmental turbulence that it has an inverted U-shaped relationship with firms’ entrepreneurial orientation. Second, we delineate decision making of firms’ entrepreneurial behavior in which network relationships exhibit the advantage of resources accessing and organizational inertia resists the creation of radical innovation for the relationship between environmental turbulence and entrepreneurial orientation, which contributes to a discussion of how the application of network relationships can be utilized (Phelps et al., 2012; Perez-Nordtvedt et al., 2010; Yi-Renko et al., 2001; Tsai and Ghoshal, 1998) and the limitation of organizational inertia can be considered for the firm (Dobrev et al., 2003; Zhou and Wu, 2010). We elaborate on how network relationships and organizational inertia moderate the inverted U-
shaped relationship between environmental turbulence and entrepreneurial orientation of the firm by understanding the function of network relationships which is channels for the firm to access resources from other firms and the utilization of organizational inertia which is the internal resistance for the firm to face radical changing.

In response to these concepts, we develop a framework based on insights from the relevant structures by using a sample of 94 R&D managers and 462 employees from 94 high-technology firms. The following sections of literature provide a comprehensive review on entrepreneurial orientation and we hypothesize the model to explain environmental turbulence’s relationship with firms’ entrepreneurial orientation. Moreover, we also highlight that the relationship between environmental turbulence and entrepreneurial orientation is complex and propose the benefits of a contingency model by discussing the network relationships and organizational inertia how they moderate this relationship. We then describe the research method including sampling, measures, analysis and test our hypotheses. Finally, details and discussions are explored to understand the impact of environmental turbulence, entrepreneurial orientation, network relationships, and organizational inertia including implications for scholars and practitioners.

LITERATURE REVIEW

Entrepreneurial orientation (EO) represents entrepreneurial perspectives of decision-making models, methods, and execution for the firm to adopt with considering strategic direction (Dai et al., 2013; de Clercq et al., 2013; Kreiser, 2011; Wiklund and Shepherd, 2005). Miller (1983) suggests that EO is the entrepreneurial activity of the firm to engage in product market innovation for beating rivals. Top managers of the firm would adopt activities of entrepreneurial decisions to stage their firm’s vision, extend organizational purpose, or construct competitive advantages if they have high level of EO (Rauch et al., 2009). It contributes to strategic approaches on firms’ specific entrepreneurial behavior and actions for firms to create benefit and improve performance by seeking, exploring, and utilizing potential opportunities under the competitive environment (de Clercq et al., 2013; Kreiser, 2011; Zhao et al., 2011). According to this, entrepreneurial researchers divided EO into three salient dimensions: innovativeness, proactiveness, and risk taking (Dai et al., 2013; Kreiser, 2011; Miller, 2011; Covin and Slevin, 1991; Covin and Slevin, 1989; Miller, 1983). EO represents the willingness of the firm to innovate for responding market request, take risks for creating uncertain technologies or products by trying them out, and be more proactive in executing opportunities toward new marketplace or technological field.

The innovativeness dimension of EO is the tendency to engage in creativity, support new experimentation, develop novel articles, and establish creative processes through introducing technologies, skills, or practices (Rauch et al., 2009; Lumpkin and Dess, 1996). The firm can use innovative behaviors to figure out the new opportunities or trends in the marketplace if there is a high level of product or technological innovation in the firm. Risk taking is the willingness to commit the high level of failures or cost for the firm to invest resources in the significant technologies or projects in the unknown and uncertain environment (Kreiser, 2011; Miller, 1983). It implies that the firm can undertake the damage and cost to venture in the unpredictable situation without considering outcomes are good or not. It also reflect the willingness of the firm to break through original conditions with trying-and-error and venturing behavior into the uncertain environment. Proactiveness represents the aspiration of anticipating and acting opportunity-seeking and forward-looking behavior on the future wants and needs in the
marketplace to create the first-mover advantage of the firm in the competitive environment (Rauch et al., 2009; Wiklund and Shepherd, 2005). Therefore, the proactive firm will act and introduce new product or technologies to be the forerunner in the market with capitalizing on novel creativities or burgeoning chances to compete with rivals.

Moreover, Lumpkin and Dess (1996) provide two additional dimensions of EO. They suggest that autonomy and competitive aggressiveness should be considered in EO construct. Autonomy is identified as the independent action undertaken by entrepreneurial leaders or team focused on the firm’s vision or strategy to complete for its fruition (Rauch et al., 2009; Lumpkin and Dess, 2001). In the organizational context, the managers need to have the will and ability to pursue opportunities for constructing a firm’s competitive advantage and competing in the market by the autonomous action in venturing. Competitive aggressiveness is the intensity of a firm’s effort to challenge its rivals to achieve its organizational goals or strengthen industrial position for outperforming in the marketplace (Lumpkin and Dess, 2001; Lumping and Dess, 1996). It reflects that the firm will try to compete by different and unconventional methods with strategic tactics.

According to previous studies, many entrepreneurship researches on EO focuses on the relationship between EO and firm performance, the contingencies underlying it (Boso, et al., 2013; Dai et al., 2013; de Clercq et al., 2010; Stam and Elfring, 2008), or the investigation of EO antecedents, such as knowledge exchanges (de Clercq et al., 2013), characteristics of top managers (Simsek et al., 2010), and strategic decision (Baron and Tang, 2011). We focus on how the environmental turbulence the firm posit in the uncertain condition of market and technology development affect the intention of the firm’s entrepreneurial behaviors and action because turbulent environment would shift the strategic decision of the firm’s manger to predict and act for future directions. With this focus, EO represents the firm’s entrepreneurial intention under organizational phenomenon by considering the mode of strategic making whether the resources are utilized for creating new marketplace or constructing competitive advantage in the industry (Dai et al., 2013; Miller, 2011; Rauch et al., 2009; Calantone et al., 2003). Our focus resonates with different arguments that the firm’s entrepreneurial behavior and action are affected by the positive and negative perspective of environmental turbulence (Baron and Tang, 2011; Miller, 2011; Rauch et al., 2009). It causes the nonlinear relationship between environmental turbulence and EO. In view of this focus, we consider the role of network relationships that underline such interaction (Boso et al., 2013; Miller, 2011).

Environmental Turbulence and Entrepreneurial Orientation of the Firm

Environmental uncertainty has been defined as an inability to anticipate fast changes in economic conditions (Krishnan et al., 2006). It has also been defined as unpredictability or instability in markets or technological fields (Moorman and Miner, 1997). This requires significant scanning of the industrial condition in order to acquire accurate and reliable information that will enable the new venture to interpret and act upon the risks and threats facing it (Krishnan et al., 2006).

This scanning needs to be carried out constantly so that strategies can be changed and adjusted at a moment’s notice, as unpredictable and uncertain conditions have a considerable impact on firms’ decision on product or technology development (Krishnan et al., 2006; Moorman and Miner, 1997). Tsai and Ghoshal (1998) suggested that the firm is able to integrate the acquisition of resources and information by interacting with partners well in the industrial network. Network relationships in the industrial environment are a critical factor in increasing and obtaining resources and information, which are required for the firm to compete and survive
in an uncertain condition. Finally, the network relationships that the firm interacts in the industrial network means that it need not fear pressure from the outside; instead, it can rely on unpredictable and complex conditions to help it compete with rivals since it holds the power of acquisition to multi-information sources.

However, environmental turbulence weakens positive relations with entrepreneurial orientation. Unpredictable and uncertain environments cause a lack of similar understanding of the logical linkages between inputs and outputs, actions and outcomes, and causes and effects that are related to technological or process know-how (O'Neill et al., 1998; Simonin, 2004). In the presence of high environmental uncertainty, knowledge and information provided from coopers or partners may not be transferred or provide tacit (i.e., intangible) insights in a new setting. Consequently, the firm is unable to forecast the usability of knowledge and skills to make decision. In summation, under highly uncertain conditions, we expect that the firm’s entrepreneurial orientation will decrease. Hypothesis encapsulates this finding:

**Hypothesis 1:** The degree of environmental turbulence the firm suffers has an inverted U-shaped relationship with its entrepreneurial orientation.

### The Moderating Role of Network Relationships

Network relationships among the firm and its collaborative partners imply a critical role in the network because they provide opportunities and channels for the firm to exchange resources and construct competitive advantages (Wang and Fang, 2012; Shipilov et al., 2010; Stam and Elfring, 2008; Oh et al., 2004; Tsai, 2001; Tsai and Ghoshal, 1998). According to Tsai (2001), the firm is better able to acquire resource and knowledge from different sources by communicating and interacting more frequently because these different resources and knowledge could assist the firm to develop novel creativities and improve its performance. Acquaah (2012) showed that network relationships provide the value to the firm by embedding in such relationships with accessing resources for its benefit. Network relationships developed through interacting and exchanging as conduits for delivering resources, knowledge, and new opportunities that could be improved the firm’s advantage and capabilities. Moreover, de Carolis et al. (2009) considered that network relationships enable the firm to collect diverse knowledge because they provide the firm to acquire plentiful resources from “bonding (dense connections among the firm and its partners)” and “bridging (extendable connections in the industrial interactions)” form of relations in the network. Thus, high network relationships enhance the capacity of the firm to access and utilize various resources from other firms. These resources are the primary source of competitive advantage for the firm to extend its current knowledge scope and technological field. Taken together, a high level of network relationships enhances the amount of knowledge and information available because of advantageous interactions. This research views network relationships as an important moderator based on the contention of firms’ network capabilities (Bell, 2005; Hagedoorn, 1993).

The firm interacts with others well within the network can capture whole pictures of industrial and technological tendency by pooling abundant information (Ozman, 2010; Gulati, 1999). These firms are less likely than others to miss vital information and are more likely to assess the potential value of knowledge (Bell, 2005). Hence, network centrality can improve the firms’ absorptive capacity. Second, strong interactions among the firm and its partners in the network expose the firm to a rich flow of knowledge, allowing them to accumulate substantial knowledge bases (Bell, 2005). When acquiring new knowledge in similar areas, these knowledge bases help the firm expedites the process of assimilating and exploiting. This in turn makes its product and technology development more effective and efficient. In particular, the
firm encounters a dilemma if it derives new knowledge from its partners that is valuable to them but differs significantly from its current knowledge bases. Accordingly, the firm with strong network relationships is able to comprehend and absorb the new external knowledge. That is, the difficulties attributable to environmental turbulence are partially offset by the advantage of network relationships. Taken collectively, by enhancing the absorptive capacity of firms, network relationships may alter the influence of environmental turbulence on firm’s entrepreneurial orientation. This reasoning suggests the following hypothesis:

Hypothesis 2: The degree of network relationships positively moderates the inverted U-shaped relationship between environmental turbulence and entrepreneurial orientation of the firm. Specifically, when the degree of network relationships is higher, the rate of firm’s entrepreneurial orientation increase associated with increasing environmental turbulence is faster, whereas the rate of firm’s entrepreneurial orientation decrease is slower when the degree of network relationships is lower.

The Moderating Role of Organizational Inertia

Organizational inertia indicates that the firm underlines the inadequate adaptation to environmental changing for the stability in business operation, product development, and processes (Hannan and Freeman, 1984; Zhou and Wu, 2010). In order to increase the firm’s efficiency on production or operation, the firm will establish routines and standard operations to reach grate performance. It is the efficiency manner to facilitate firm’s creations and productive operation because the firm can follow rules to complete missions and achieve setting goals (Dobrev et al., 2003). However, when these routines and rules embedded within the firm, they might resist the firm to act and respond the rapid changing market because the firm would depend on its previous experience and knowledge to solve the problem on fast changing. It shows the strong internal resistance on external changing and developing (Shimizu and Hitt, 2005).

Zhou and Wu (2010) consider that the firm might not put more efforts on changing in the rapidly changing conditions because it is afraid to alter routines and rules what it executed on existing behaviors and directions. It inhibits the support of the firm to adopt, allocate, and utilize resources for creating and developing novel ideas on technologies, knowledge, or exploitative innovation. Under this inhibit of organizational inertia, especially for the firm, it is critical dangerous and less advantages to compete with rivals in the rapidly changing market. Previous experience of the firm constrains divestiture of the acquisition on accessing different novel or innovative ideas (Shimizu and Hitt, 2005). It limits opportunities for the firm to innovate and adopt various knowledge and technologies when the firm needs plenty creations to rival in the dynamic environment in which the firm can not predict and respond quickly. Therefore, we consider that:

Hypothesis 3: The degree of organizational inertia negatively moderates the inverted U-shaped relationship between environmental turbulence and entrepreneurial orientation of the firm. Specifically, when the degree of organizational inertia is higher, the rate of firm’s entrepreneurial orientation decrease associated with increasing environmental turbulence is faster, whereas the rate of firm’s entrepreneurial orientation decrease is higher when the degree of organizational inertia is higher.
METHOD

Population and Sample Collection

Data for this research were collected through a survey of high-technology firms from Hsinchu Science Park (HSP) in Taiwan. High-technology firms tend to undertake innovative activities where can reflect firms’ entrepreneurial orientation (Lumpkin and Dess, 1996; Thornhill, 2006). Second, high-technology capability is the core of Taiwan’s industries and, moreover, it guides the Taiwan’s IT industries (e.g. semiconductor and IC design) to become key players in the global market (Chu, 2009; Wang and Fang, 2012). About the HSP, it is the first science park in Taiwan and there are worldwide top 20 semiconductor and foundry sales leaders (e.g. MediaTech, Taiwan Semiconductor Manufacturing Company, United Microelectronics Corp., and Vanguard International Semiconductor Corporation). The annual output per capital of HSP runs close to US$ 0.3 million which is 2.5 times the average of the country’s overall manufacturing sector. Therefore, HSP is the world-famous high-technology position to impressive economic benefits for Taiwan. It presents that HSP with considering high-technology industry in Taiwan provides a rich and suitable context in which to study the entrepreneurial orientation.

The original data contains multi-actor data of managers and their employees within 297 firms which are professional on semiconductor, photoelectric and communication in HSP. In order to make sure that firms’ managers and their employees could fill in the questionnaires and send their surveys back, a courtesy phone call was made to request them to join in this research. Finally, 94 firms participated in this research and questionnaire mailed to the R&D manager and three to six employees of R&D department in each of the firms. The rate of participate was 15.82%. Totally, we received surveys with 94 R&D managers and 462 employees from 94 high-technology firms, and this guaranteed a response rate of approximately 100 percent. This implies an average of 4.91 respondents of R&D department by employees directly supervised by each manager in this study. For the measurement of entrepreneurial orientation of the firm we aggregated scores from employees. 46.81 percent of these managers were male and 53.19 percent female. Average age of the participating managers was 41.87 years. Table 1 presents the number of managers and the number of employees of department.

![Figure 1. Theoretical model of environmental turbulence and entrepreneurial orientation](image-url)
that rated the managers per industry. This table also shows the means for each R&D department and entrepreneurial orientation per industry.

Table 1. Sample size and mean scores on the main variables per industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>No. of firms</th>
<th>No. of managers</th>
<th>No. of employees</th>
<th>Average no. of employees per dept.</th>
<th>Entrepreneurial orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semiconductor</td>
<td>66</td>
<td>66</td>
<td>330</td>
<td>5.00</td>
<td>3.79</td>
</tr>
<tr>
<td>Photoelectric</td>
<td>18</td>
<td>18</td>
<td>82</td>
<td>4.56</td>
<td>3.84</td>
</tr>
<tr>
<td>Communication</td>
<td>10</td>
<td>10</td>
<td>50</td>
<td>5.00</td>
<td>3.76</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>94</td>
<td>462</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dependent variable**

*Entrepreneurial orientation.* We used Covin and Slevin’s (1989) nine-item scale which was argued by Miller (1983) to comprise a basic to measure entrepreneurial orientation. Entrepreneurial orientation was defined as the strategic posture of the firm that involves a propensity to be innovative, proactive and risk taking. It is a viable instrument for capturing firm-level entrepreneurship under identified at least twelve studies based on this scale (Wiklund, 1998). By considering innovative which was referred to create new ideas and experimentation, proactive which cracked rivals to new market opportunities, and risk taking which adventured to explore new products and markets, a scale ranging from 1, “strongly disagree,” to 5, “strongly agree” was used to answer these items. Cronbach’s alpha for the scale of entrepreneurial orientation is 0.80.

**Independent variables**

*Environmental turbulence.* We defined environmental turbulence as the level of uncertainty and unpredictable in industrial environment, which included the market and technological turbulence (Jaworski and Kohli, 1993; Akgun et al., 2006). Market turbulence was the rate of change in the composition of clients and their preferences (Jaworski and Kohli, 1993) and technology turbulence showed the extent to which the technology in an industry was in a state of flux and the opportunities changing provided for new products and competitive chances (Wang and Fang, 2012). Therefore, the environmental turbulence questions were adapted from Jaworski and Kohli (1993) and Wang and Fang (2012), which were consistent with market and technological turbulence. A scale ranging from 1, “strongly disagree,” to 5, “strongly agree” was used to answer these six items. Cronbach’s alpha for the scale of environmental turbulence is 0.89.

*Network relationships.* The measures of network relationships were adapted from the research of Yli-Renko et al. (2001) and Perez-Nordtvedt et al. (2010). Network relationships were defined as the level to which the firm could obtain resources from its collaborative partners. Accordingly, we used four items to measure the effect of strength between the firm and its partners with considering the advantage of interaction conduits for the firm to access knowledge and information to sustain its competitive advantage (Wang and Fang, 2012). A scale ranging from 1, “strongly disagree,” to 5, “strongly agree” was used to answer these six items. Cronbach’s alpha for the scale of network relationships is 0.80.

*Organizational inertia.* The measure of organizational inertia was adapted from the research of Argyres et al. (2015) and Shimizu and Hitt (2005). Organizational inertia was measured as the logarithm of each firm’s total number of employees. They suggest that if the
firm with the bigger size of its scale on operation, it constructs organizational routines for seeking the stability in business operation, products, and processes under the changing environment (Argyres et al., 2015).

3.4 Control variables

**Firm age.** Younger and small firms might suffer difficult and various challenges in disclosing opportunities because they did not possess plenty resource to compete with their rivals (Stam and Elfring, 2008; Wang and Fang, 2012). We therefore controlled for firm age by calculating the number of years since a firm was founded.

**Firm capital.** We controlled for firm capital, which was operationalized as the logarithm of the actual dollar amount raised at the point of founding (Eisenhardt & Schoonhoven, 1990), since the firm with great capital might extend the firm growth and speed on product development with attempting to venture (Beckman, 2006).

**Dealer in the foreign market and IPO.** Stam and Elfring (2008) and Wang and Fang (2012) suggested that the experiences of the firm might indicate difference in firm capabilities on learning and absorbing. Dealer in the foreign market indicated that the firm had branch firms in the foreign market. The parent firm might access novel knowledge and technology from its branch firms to reduce the uncertainty of product development (Buckley et al., 2002). In addition, IPO referred to the stock by the firm to the public market. Zimmerman and Zeitz (2002) suggested that the firm could access more resources to make decision on venturing if it had been issued the stock in the market. We thus controlled for dealer in the foreign market and IPO by dummy variables.

**Industry.** The extent of industry competition might affect the firm’s risk-tasking ability in its strategic decision (Lin et al., 2009). In addition, different industries indicated differences in developing technology, knowledge and skills. Therefore, we controlled for industry, which was operationally defined as types of industry by dummy variables. Three industries were controlled: semiconductor, photoelectric and communication industry.

**RESULTS**

The descriptive statistics and correlations are presented in Table 2, and the results of the hierarchical regression analyses are presented in Table 3. As shown in Table 2, entrepreneurial orientation of the firm correlates positively with dealer in the foreign market. Because the firm has great experience on foreign market and resources for venturing in technologies or products, it would contribute to highly entrepreneurial orientation for firm to develop and create. Network relationships positively correlated with the effect of the environmental turbulence which the firm suffers, since the firm requires information and resources to reduce the industrial or environment uncertainty. For organizational inertia, it shows the positively correlated with firm capital because the firm with more capital will depend on its knowing and resources without considering outside information and opinions.

Model 1 of Table 3 includes all the control variables, which explained 14.3% of the variance in firm’s entrepreneurial orientation. These results suggest that firm’s entrepreneurial orientation increased with an increase in firm age, firm capital, and firm with IPO and dealer in the foreign market. Hypothesis 1 posits that the relationship between environmental turbulence and entrepreneurial orientation of the firm is an inverted U-shaped pattern. Model 2 shows that the coefficient for environmental turbulence is positive and significant ($\beta=1.27$, $t=2.44$, $p<0.05$) while the coefficient for the squared term of environmental turbulence is negative and significant ($\beta=-1.38$, $t=-2.66$, $p<0.01$), indicating the inverted U-shaped relationship between environmental turbulence and firm’s entrepreneurial orientation (Aiken and West, 1991). The $R^2$ for Model 2
Table 2. Descriptive statistics and correlations $^a$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Firm age</td>
<td>23.62</td>
<td>15.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Firm capital (LN)</td>
<td>8.93</td>
<td>9.16</td>
<td>-.452$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Dealer in the foreign market (Dummy)</td>
<td>.67</td>
<td>.47</td>
<td>.503$^*$</td>
<td>-.345$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. IPO (Dummy)</td>
<td>.32</td>
<td>.47</td>
<td>-.010</td>
<td>-.434$^*$</td>
<td>.202$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Industry (Dummy1)</td>
<td>.32</td>
<td>.47</td>
<td>-.404$^*$</td>
<td>.249$^*$</td>
<td>-.069</td>
<td>.230$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Industry (Dummy2)</td>
<td>.19</td>
<td>.40</td>
<td>-.031</td>
<td>.111</td>
<td></td>
<td>.005</td>
<td>.340$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Industry (Dummy3)</td>
<td>.11</td>
<td>.31</td>
<td>-.126</td>
<td>.020</td>
<td>-.049</td>
<td>.207$^*$</td>
<td>-.238$^*$</td>
<td>-.168$^*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Environmental turbulence</td>
<td>3.50</td>
<td>.72</td>
<td>.384$^*$</td>
<td>-.189</td>
<td>.258$^*$</td>
<td>-.043</td>
<td>.000</td>
<td>-.099</td>
<td>-.208$^*$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Network relationships</td>
<td>3.82</td>
<td>.63</td>
<td>.032</td>
<td>.090</td>
<td>.109</td>
<td>-.209$^*$</td>
<td>.126</td>
<td>-.291$^*$</td>
<td>-.238$^*$</td>
<td>.423$^*$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Organizational inertia</td>
<td>5.51</td>
<td>1.99</td>
<td>-.119</td>
<td>.243$^*$</td>
<td>.075</td>
<td>.449$^*$</td>
<td>.342$^*$</td>
<td>.135</td>
<td>-.004</td>
<td>.005</td>
<td>-.237$^*$</td>
<td></td>
</tr>
<tr>
<td>11. Entrepreneurial orientation</td>
<td>3.82</td>
<td>.32</td>
<td>.054</td>
<td>.175$^*$</td>
<td>.167$^*$</td>
<td>.095</td>
<td>.135</td>
<td>.060</td>
<td>-.042</td>
<td>.020</td>
<td>-.089</td>
<td>.147</td>
</tr>
</tbody>
</table>

$^a$ N = 94 firms
* p<.05, ** p<.01

indicates that the model explained 21.4% of the variance for firm’s entrepreneurial orientation in the dependent variable. As expected, the relationship between environmental turbulence and firm’s entrepreneurial orientation formed an inverted-U pattern. Thus, Hypothesis 1 is supported.

Hypotheses 2 and 3 explore whether network relationships and organizational inertia will moderate the relationship between environmental turbulence and entrepreneurial orientation of the firm. In Table 3, Model 3 shows that the coefficient for the interaction between network relationships and environmental turbulence squared is positively significant ($\beta=1.15, t=3.05$, p<0.01). On the contrary, the coefficient for the interaction between organizational inertia and environmental turbulence squared is negatively significant ($\beta=-2.20, t=-3.10$, p<0.01). Therefore, Hypothesis 2 and 3 are supported.

DISCUSSION AND CONCLUSION

This work contributes to the literature in several aspects. First, our study deepens our understanding of the firm’s entrepreneurial orientation (de Clercq et al., 2013; Morris et al., 2011; Rauch et al., 2009; Covin and Slevin, 1989; Miller, 1983) by weighing the pros and cons of environmental turbulence. Previous studies have proposed a moderating effect to reconcile two compelling but contrary arguments (e.g., Lumpkin and Dess, 2001). We adopted this approach
and our results confirmed that an inverted U-shaped relationship existed between environmental turbulence and the firm’s entrepreneurial orientation. This finding echoes the assertion that the relationship between environmental turbulence and EO is complex and may even be nonmonotonic (Baron and Tang, 2011; Rauch et al., 2009; Lumpkin and Dess, 2001). Furthermore, this study extends the empirical evidence for such a relationship across a broader range of industries than was previously documented. Drawn from the wide range of industries, the results of this study are not subject to an industry-specific bias. Thus, our findings provide important insight into the overall relationship between environmental turbulence and EO.

Second, this study constitutes an initial attempt to identify the moderators of the inverted U-shaped relationship between environmental turbulence and EO. We found that network relationships and organizational inertia moderated the curvilinear relationship between environmental turbulence and EO. Specifically, the positive effect of environmental turbulence on the firm’s EO was significantly nullified by network relationships, at high levels of network relationships. That is, those firms with strong network relationships might actively access resources from other network contacts. On the contrary, the negative effect of environmental turbulence on the firm’s EO was significantly nullified by organizational inertia. It indicates that the inertia of the firm will limit the firm to create new ideas in the rapid changing environment.

In addition, environmental turbulence is known to contribute to entrepreneurial orientation (Rauch et al., 2009). A low level of environmental turbulence in the industrial condition suggests that the costs of managing resources would be relatively low (Baron and Tang, 2011; Lumpkin and Dess, 2001). Initially, at extremely low levels of environmental turbulence, the firm tends to perform high EO because the firm is able to predict the future for its decision on knowledge or technology development. However, as the uncertainty of the environment increases, the costs

Table 3. Results of regression analyses predicting entrepreneurial orientation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
<th>Model 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm age</td>
<td>.17</td>
<td>1.72</td>
<td>.12</td>
<td>1.15</td>
<td>.19</td>
<td>1.84</td>
</tr>
<tr>
<td>Firm capital</td>
<td>.37</td>
<td>3.64</td>
<td>***</td>
<td>.53</td>
<td>4.31</td>
<td>***</td>
</tr>
<tr>
<td>Dealer in the foreign market</td>
<td>.18</td>
<td>2.13</td>
<td>*</td>
<td>.22</td>
<td>2.61</td>
<td>**</td>
</tr>
<tr>
<td>IPO</td>
<td>.21</td>
<td>2.03</td>
<td>*</td>
<td>.38</td>
<td>3.09</td>
<td>**</td>
</tr>
<tr>
<td>Industry</td>
<td>YES</td>
<td></td>
<td>YES</td>
<td></td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>Environmental turbulence (ET)</td>
<td>1.27</td>
<td>2.44</td>
<td>*</td>
<td>.65</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Environmental turbulence squared</td>
<td>-1.38</td>
<td>-2.66</td>
<td>**</td>
<td>-.97</td>
<td>-1.73</td>
<td></td>
</tr>
<tr>
<td>Network relationships</td>
<td>.17</td>
<td>1.86</td>
<td>*</td>
<td>.24</td>
<td>2.61</td>
<td>**</td>
</tr>
<tr>
<td>Organizational inertia</td>
<td>-.20</td>
<td>-1.95</td>
<td>*</td>
<td>-.98</td>
<td>-4.32</td>
<td>***</td>
</tr>
<tr>
<td>Network relationships X ET</td>
<td>-.36</td>
<td>-3.50</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network relationships X ET squared</td>
<td>1.15</td>
<td>3.05</td>
<td>**</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Organizational inertia X ET</td>
<td>2.76</td>
<td>3.45</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational inertia X ET squared</td>
<td>-2.20</td>
<td>-3.10</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>.143</td>
<td></td>
<td>.214</td>
<td></td>
<td>.323</td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>.108</td>
<td></td>
<td>.162</td>
<td></td>
<td>.261</td>
<td></td>
</tr>
<tr>
<td>Model F</td>
<td>4.058***</td>
<td></td>
<td>4.117***</td>
<td></td>
<td>5.171***</td>
<td></td>
</tr>
<tr>
<td>ΔR²</td>
<td>.071</td>
<td></td>
<td>.109</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔF</td>
<td>3.760**</td>
<td></td>
<td>6.557***</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

N = 94 firms
+p<.10, *p<.05, ** p<.01, ***p<.001
of maintaining the resources acquiring increase and start to erode the profit margin; thus, EO begins to decline. This decline continues until environmental turbulence is beyond a certain moderate level. Afterward, the benefits from the synergy of network relationships and environmental turbulence exceed the costs, thereby improving firm EO on venturing. In brief, network relationships can enhance a firm’s absorptive capacity, which enables the firms to fully capitalize on its turbulence, externally-acquired capabilities to gain a competitive advantage. From the results, we infer that network relationships and environmental turbulence act synergistically only when both variables occur at high levels. In addition, organizational inertia reduces the opportunities for the firm to create novel innovations in the changing environment, especially the condition of plenty needs for the firm to develop new creations to fit with market required. It indicates that the manager should pay attention on how to reduce the limitation of organizational routines and rules which are adapted in the firm over time because this restriction would destroy the firm’s advantage on existing knowledge and technologies.

REFERENCES


