Takeover defense, collective action and the top management team

Mark A. Tribbitt
Graziadio School of Business and Management, Pepperdine University, Malibu, California, USA, and

Yi Yang
Management Department, Manning School of Business, University of Massachusetts Lowell, Lowell, Massachusetts, USA

Received 13 July 2017
Revised 26 December 2017
27 March 2018
Accepted 2 June 2018

Abstract

Purpose – The purpose of the study is to examine the interaction between the structure of the top management team, takeover defense mechanisms and firms rate of collective actions.

Design/methodology/approach – The study uses elements of agency theory, prospect theory and competitive dynamics research to develop a model for examining heterogeneity in the rate of collective actions among firms in the technology sector. A sample of 299 firm-year observations arrayed into panel regression analyses is used.

Findings – The findings from this study show a positive relationship between the size of the top management team and the count of collective actions when takeover defense mechanisms are present. Further this study finds a negative relationship between top management team ownership and collective actions when these same takeover defense mechanisms are present. Additionally, the female ratio of the top management team is negatively related to collective actions.

Research limitations/implications – This study was conducted using a sample of technological firms. These relationships may not be generalizable to firms in other contexts. Further, other elements of the firm's governance structure (i.e. board of directors or shareholders) may play an important role in the strategic decision-making process.

Originality/value – This study expands on existing research by linking several blocks of literature, top management team literature, competitive dynamics literature and corporate governance literature, into a model to examine firm structural characteristics on the heterogeneity in the propensity to formulate collective actions among firms.

Keywords Management, Governance, Team, Corporate, Strategic management and leadership, Action, Collective, Top

Paper type Research paper

Introduction

Collective actions tend to occur when a group of actors desire to generate common interests that are difficult to achieve when acting individually (Olson, 1971). At different levels of analysis, theorists provide examples of common benefits that may generate collective actions, including social change (Polletta and Jasper, 2001), establishing industrial standards (Garud *et al.*, 2002; Hargrave and Van De Ven, 2006), mobilizing capital investment (Aguilera and Jackson, 2003) and achieving better team performance (Dreu and Weingart, 2003). The impact of collective actions can be tremendous. One example illustrating such impact is the Civil Rights Movement of the 1960s.

Management Research Review
Vol. 41 No. 12, 2018
pp. 1375-1394

2040-8269
DOI 10.1108/MRR-07-2017-0209

A basic characteristic of the Civil Rights Movement is that a few *activists* envisioned common benefits of social change and then mobilized the collective efforts of the public to accomplish these intended goals (Polletta and Jasper, 2001). From an institutional theoretical point of view, Hargrave and Van De Ven (2006) argued that the emergence of technological standards share much in common with social movements. In both cases, collective action is mobilized to produce institutional change that is otherwise unable to be accomplished (Garud *et al.*, 2002; Navis and Glynn, 2010). In related literature, researchers highlighted the role of *activists* and in particular their strategies to identify the value of collective action and allocate the benefits across different interest groups (Maguire *et al.*, 2004). Following this line of logic, Garud and Kumaraswamy (1993) discussed how Sun Microsystems pursued an open-source strategy in an effort to establish a technological standard. Annabelle and Cusumano (2002) described the processes in which Cisco, Intel and Microsoft used the platform strategy to manage technological co-evolution, which eventually established their technological leadership in respective industries.

In the extant literature on technological innovation, research based on the collective action view has primarily focused on two topics: first, the interactive processes of collective action (Garud *et al.*, 2010; Garud *et al.*, 2002; West, 2003); and second, how collective action will drive change either at the firm level or industrial level (Suarez, 2004; Waguespack and Fleming, 2009). Our paper examines a third topic, the antecedents to collective action. More specifically, we examine the roles of the top management team (TMT) and corporate governance in influencing a firm's propensity to engage in collective action.

Olson (1971), the leading scholar in collective action theory, suggested that collective action is in fact very hard to mobilize due to the likely conflicts of interests among actors whose participation makes collective action possible. In addition, even though collective action is mobilized, the uncertainty with regard to outcomes may reduce actors' intention to initiate collective efforts in the first place. These challenges have often created a dilemma for collective action. Some researchers on technology standards have offered evidence that firms demonstrate heterogeneity in terms of their propensity to formulate collective actions. For example, West (2003) discussed distinct business models to facilitate collective efforts to promote technological standards. Nevertheless, the understanding of the driving forces that encourage firms into or discourage them from collective actions in this setting is incomplete.

In this paper, we investigate why firms demonstrate heterogeneity in their involvement in collective actions in competition related to technological innovation. We particularly focus on the *activists* who introduce technological change to shape industrial standards. We argue that firms' heterogeneity in their engagement in collective actions may be explained by the structural characteristics within the TMT. Using a panel data set of 299 firm-year observations in technology-intensive industries, we find that the size and ownership structure of the TMT may influence the firm's decision to participate in collective actions when corporate takeover defense mechanisms are injected into the model. Moreover, the TMT's gender ratio may also influence these collective actions.

Our contribution to the literature is threefold. First, our research provides implications on factors that are likely to influence collective actions in standards related competition, providing some insights into the formulation of technological ecosystems. Moreover, our research extends the extant literature on the dynamics of TMTs to incorporate the concurrent issue of collective innovation, echoing the call of Teece (2007) on this issue. Finally, we introduce a contingency perspective to examine the relationship between the TMT and competitive actions with a focus on corporate governance structures. We consider that executives may be constrained by the monitoring mechanisms from shareholders when they decide to undertake collective actions, particularly those likely to generate long ranging outcomes.

Theoretical background and hypothesis development

Collective action in technology innovation

Collective action presents a key facet of strategies to devise institutional change: actors collectively possess the skills and resources required to formulate changes, and therefore, real changes will only occur when the actors are mobilized to act in a collective manner (Hargrave and Van De Ven, 2006). For example, it is essential for leading technological firms to use collective actions to achieve intended leadership in the technological paradigm (Garud *et al.*, 2002). In addition, collective action theory cautions that collective actions can be inefficient due primarily to the fact that self-interested actors may fail to act in accord with group benefits (Olson, 1971). This is primarily because actors differ substantially in their needs. In view of this challenge, the extant literature has focused on how to manage the interactive processes of collective action (Garud *et al.*, 2010; Garud *et al.*, 2002; West, 2003). In particular, the role of *institutional entrepreneurs* has been highlighted in the literature (Cusumano and Gawer, 2002; Hargrave and Van De Ven, 2006). These *institutional entrepreneurs* are influential individuals or organizations such as Dr Martin Luther King, Jr lobbyists and technological leaders (e.g. Microsoft or Sun Microsystems), who make purposive efforts to link together different interest groups that collectively possess the skills and resources required to enact institutional change. To mobilize such collective actions, institutional entrepreneurs often subjugate their own benefits at the very beginning to coordinate the disconnected interests among actors (Hargrave and Van De Ven, 2006). In the context of industries where collaborated innovation is essential, the technological leader often needs to play the role of institutional entrepreneur and attract complementary assets, at least partially by sharing its core technologies with supporting firms (West, 2003).

Another research stream based on the collective action view has paid attention to the consequences of such actions. In spite of the benefits, collective actions are risky investments due to the uncertainties associated with both the outcome and coordination processes, which may discourage leading technological firms from such investments. There is no guarantee that these "sacrifices" will be rewarded based on two reasons. First, institutional change is a highly uncertain process, and opposing institutional paradigms may struggle fiercely to establish their own practices as the universal norm (Kuhn, 1962). Second, even if institutional changes are successfully established, self-interested actors may break the formal or informal contracts to act opportunistically. Transaction costs economics has provided theorizing in this regard (Williamson, 1985, 1993). In addition to the transaction costs, the relationship between actors within the same institutional space may also experience substantial change as they transition from coordinators to competitors: The common need for legitimacy is over time replaced by firm-specific profit maximization mechanisms (Navis and Glynn, 2010).

In this study, we attempt to investigate a third topic, the antecedents to collective actions, which has not been extensively examined in the literature. As some of the researchers pointed out, in spite of the shortcomings, collective action has become a means of shaping the industrial competition landscape (Annabelle and Cusumano, 2002; Axelrod *et al.*, 1995; Garud *et al.*, 2002), and therefore, a series of important strategic decisions await top managers, such as whether, when and how to participate in collective actions. Such decisions are critical as they directly lead to different collective action processes and outcomes. Thus, it is essential to identify the factors that influence such decision-making processes. One such factor that may influence managers' willingness to participate in collective actions is the protection afforded to them in the event that the firm is taken over by another party. These takeover defense mechanisms have been examined within the corporate governance literature, and in this study, we examine them within the context of fostering collective action.

Takeover defense and collective action

Takeover defense represents an important dimension in corporate governance – a set of mechanisms to limit TMT discretion in pursuing interests, which are not in line with shareholder value (Kabir *et al.*, 1997; Kacperczyk, 2009). Theorists of corporate governance in general viewed takeover defense as entrenchment strategies against shareholder interests (Manne, 1965; Pound, 1987). Agency theory arguments suggest that corporations are a nexus of contrasts, and that the TMT is viewed as agents of the shareholders (Sundaramurthy, 1996; Sundaramurthy *et al.*, 1997). In the agency context, the external market for corporate control serves as the external mechanism to limit management's self-interested behaviors (Jensen and Meckling, 1976; Sundaramurthy, 1996). Under high takeover defense, TMTs are protected from the threats from the external market and therefore have increased bargaining power in the agency situation (Sundaramurthy, 1996).

On the other hand, takeover defense may present positive mechanisms to encourage TMTs to take more risky actions toward firms' long-term performance. As finance literature has pointed out, the external market could be myopic, and investors tend to be short-term oriented. Facing pressures from investors and potential threats from the external market, management teams may become cautious toward explorative activities on technological innovation, which could only deliver long-run outcomes (Kacperczyk, 2009; Sykes, 1994). Thus, takeover defense mechanisms such as antitakeover provisions may provide TMTs with a necessary protection so that they might focus on long-term-oriented strategic decisions such as collective actions.

Aforementioned, research suggests that takeover defense mechanisms may have both positive and negative influences on a firm. But, more specifically, we examine the utilization of these mechanisms within the context of collective action. We suggest that with the uncertainty associated with the coordination of collective action efforts along with the uncertain outcome of these collective actions, the TMT may be less willing to engage with their counterparts within other firms. This may lead to a form of management entrenchment, where the protection afforded the TMT might allow them to "go it alone", taking their time and relying on their own resources to develop technological innovation. As such, we propose:

H1. Takeover defense is negatively related to collective actions within the firm.

While we propose a negative relationship between the level of takeover defense and engagement in collective action within a firm, there may be a number of other characteristics within the TMT that might further influence this relationship. In the following section, we examine structural characteristics of the TMT and their influence on the relationship between takeover defense and collective action.

Moderator effects of top management team characteristics

Innovation theorists argue that the TMT involves key decision-makers that formulate the firms' technology strategy, particularly with respect to the hard decisions regarding how to organize coordination in the industry without losing firm-specific capabilities required to differentiate (McGrath *et al.*, 1992; Teece, 2007). Competitive dynamics research considers TMT characteristics as key determinants of firms' competitive actions in the marketplace

(Hambrick *et al.*, 1996; Marcel *et al.*, 2010). In addressing the firms' competitive strategy in technology-intensive industries, Teece (2007, p. 1332) argued that the success of a technology-based enterprise will depend largely on managers' "uncommon foresight and the ability to shape outcomes". Inspired by these authors, we extend their theories into the collective action context. Through the theoretical lenses of TMT literature, we explain the antecedents of technology leaders' engagement in initiating such collective actions with a focus on the role of the TMT. Specifically, we focus on several structural characteristics of the TMT that are likely to shape decision-making in regard to the firm's collective actions, including TMT size, TMT stock ownership, TMT gender ratio and takeover defense position.

Top management team size. In his influential book *The Logic of Collective Action*, Olson (1971) used a chapter to discuss the relationship between group size and effectiveness. For him, team size represents an essential structural characteristic of coordinating agents. Olson (1971) has inspired a number of TMT researchers. For instance, Haleblian and Finkelstein (1993) considered size of the TMT as linked to firm performance. Hambrick and Daveni (1992, p. 1449) argued that "at a basic level, the resources available within a team results from how many people are on it". Amason *et al.* (2006) found that TMT size was related to cognitive capability. Haleblian and Finkelstein (1993) suggested that although the work position of the TMT is substantially different than other work teams in terms of both scope and impact, they share some basic characteristics such as the need for communication. Here, size has a direct effect. Researchers on TMT size explicitly or implicitly linked TMT size to the decision-making process. In this paper, we consider TMT size as a predictor of firm's collective actions.

A small-sized team is often associated with greater effectiveness (Olson, 1971). From an economic point of view, James (1951) offered evidence from various public and private institutions that "action taking" groups tend to be smaller in size. In the TMT literature, Haleblian and Finkelstein (1993) suggested that smaller TMTs tend to be more cohesive and members in general have higher satisfaction compared with larger TMT groups.

In contrast, some researchers found that larger TMTs are associated with firm growth due to their exposure to more capabilities and resources to solve problems (Eisenhardt and Schoonhoven, 1990). Haleblian and Finkelstein (1993) summarized three mechanisms of larger TMTs that enhance the firm's problem-solving capabilities:

(1) A larger TMT may have more absorptive capacity.

(2) There will be more conflicting views in larger TMTs to generate error identification and correction mechanisms.

(3) Larger TMTs will be equipped with more perspectives and solutions to drive in-depth understandings.

Amason and colleagues (2006) found larger TMTs to have more cognitive conflicts within the team, generating more heterogeneous cognitive frameworks. Team heterogeneity has been viewed as a source of broader cognitive resources to enhance creativity and innovation (Hoffman and Maier, 1961; Bantel and Jackson, 1989; Jackson, 1992). Linking TMT heterogeneity to firms' competitive behavior, Hambrick *et al.* (1996) found that TMT heterogeneity is positively associated with firms' competitive actions that are large-scaled, noteworthy and strategically more significant. While the authors found that firms with larger TMTs are slower in action, they also found that these firms demonstrate higher action propensity and magnitude.

Researchers have argued that collective actions are often long-term focused. For instance, Miller and Chen (1994) considered formulation of an alliance as a strategic action. In the innovation field, collective actions are typically undertaken to develop long-term innovation and co-specialization (Suarez, 2004). Some examples of frequently launched innovation-based collective actions include product development alliances, technological collaboration, compatibility design and cross licensing. As these actions are explorative in nature, immediate payoffs are unlikely. Thus, engaging in these actions requires management to not only be forward-looking but also have the capabilities to handle the complexity of long-term group interactions. Linking these considerations to the work of Hambrick *et al.* (1996), it seems that larger TMTs may be associated with more collective actions.

A low level of takeover defense may weaken the positive relationship between TMT size and collective actions because management teams may be cautious in undertaking long-term investments as investors tend to be short-term oriented and thus undervalue long-run outcomes (Kacperczyk, 2009; Sykes, 1994). The value of explorative activities that accrue to the firm is often difficult to discern due to lack of shareholder expertise in the technological field. In particular, collective actions in the technological field often involve unusually competitive strategies such as open-source technological structures (Garud and Kumaraswamy, 1993). Given complexity and uncertainty, these strategies may be misinterpreted as negative to a firms' competitive strength, which in turn may increase negative views of these actions. For instance, Benner (2010) provided evidence that security analysts often have negative views about explorative innovation. The external corporate governance mechanism such as the threat of takeovers forces the otherwise forward-looking executives to refrain even in a large TMT. On the contrary, when the TMT is protected from such threats by antitakeover provision, it is more likely for them to be forward-looking, and a larger TMT will be more likely to have the capabilities to handle the complexity of long-term oriented strategic actions due to more absorptive capacities, heterogeneous perspectives and in-depth understandings. Accordingly, we hypothesize:

H2. When takeover defense is high, the positive relationship between TMT size and collective actions becomes stronger than when takeover defense is low.

Top management team stock ownership. TMT stock ownership refers to the total shares the TMT members possess. This concept captures the incentive structure shareholders use to generate consistency between the benefits of the TMT members and the interests of shareholders (Certo *et al.*, 2003). With substantial stock ownership, TMT members will gain or lose money as other shareholders do when the stock price changes. As the interests of the TMT members are positively matched with those of shareholders, the TMT members tend to develop a shareholder view when they make decisions on the firm's competitive strategies (Zhang *et al.*, 2008). Sanders (2001) found that CEO stock ownership is linked to the organizational actions the firm undertakes. While Sanders' (2001) work has focused on the CEO, the same logic can be reasonably extended to the overall stock ownership of TMT members. In addition, some other researchers argued that as executive stock ownership increases, the firm becomes more "owner-managed" (Pollock *et al.*, 2002), which in turn changes the power structure of the firm. For instance, some researchers have found that the increase in managerial stock ownership can result in accumulation of power and overtime lead to entrenchment (Demsetz, 1983; Fama and Jensen, 1983; Sundaramurthy, 1996).

Agency theory and prospect theory offer alternative logics to view the relationship between executive stock ownership and decision-making processes. Agency theory suggests that due to stock-based incentives, executives will be less risk-averse and therefore more active in investing in projects that will benefit the shareholders because this will increase their interests as well (Sanders, 2001). Such an incentive structure resolves the conflict of interest in the TMT versus shareholder relationship (Zhang *et al.*, 2008). Based on the analysis of CEO compensation packages, Sanders (2001) differentiated stock ownership from stock options to argue that stock ownership may highlight the downside risk to increase the CEO's risk aversion in decision-making, while stock options do not offer such a function. This same logic is essentially embedded in prospect theory in which loss aversion is considered as a determinant of decision-making (Kahneman and Tversky, 1979). According to prospect theorists, when decision-makers are faced with uncertainty of loss, they tend to be extremely risk-averse (Kahneman and Tversky, 1979). Sanders (2001) then predicted a negative association between CEO stock ownership and the firm's acquisition action due to two reasons:

(1) Acquisition may erode shareholder's benefits to which the CEO is aligned.

(2) The CEO is faced with potential loss in the stock market in the post-acquisition period.

Sanders' (2001) risk aversion logic may be reasonably extended to predict the group behaviors of the TMT members when they possess stock ownership. As we have mentioned, when a technological leader initiates collective actions, the payoff is unwarranted because of two uncertainties:

(1) technological uncertainty associated with the technology race; and

(2) competitive uncertainty due to in-group competition, which partially relates to the strategy of technological openness practiced by the technological leader to enhance co-specialization networks.

The increased risk aversion due to increased stock ownership may discourage the TMT members from participating in collective actions even when the latter could lead to long-term performance. High takeover defense will make such self-interested behavior become possible as takeover defense to some extent reflects TMT entrenchment strategies against shareholder interests (Manne, 1965; Pound, 1987). Furthermore, staying away from collective actions may present potential threats to the TMT members. Consequences such as being technologically locked out (Schilling, 2002) may result in the firm's poor performance, which in turn threatens the TMT members' positions in the firm. However, if the TMT members are protected from such corporate governance mechanisms, they will act opportunistically. On the other hand, TMT agency behaviors may be alleviated due to the potential threats from the external markets and shareholders. Thus, we hypothesize:

H3. When takeover defense is high, the negative relationship between TMT stock ownership and collective actions becomes stronger than when takeover defense is low.

Top management team female ratio. TMT female ratio refers to the portion of women leading the organization. While women represent a minority in corporate leadership positions, their presence in these positions continues to increase (Branson, 2006). As such, Kanter (1977) has suggested that changing the gender composition of TMTs may have implications for organizations as they evolve. Researchers have followed this call and have begun to fill this void in academic research by examining gender diversity and its impact on multiple firm outcomes. In their seminal article, Hillman *et al.* (2002) find that female executives tend to come from non-business backgrounds, hold advanced degrees and join multiple boards at a faster rate than their male counterparts. Research examining organizational dynamics found that the presence of women in the board room leads to reduced intra-group conflict (Nielsen and Huse, 2010) and more focus on corporate social responsibility (Huse *et al.*, 2009). Krishnan and Park (2005) have found a positive relationship between women in the TMT and organizational performance as measured by financial outcomes such as return on assets and return on sales. Kanter (1977) has suggested that gender diversity within the TMT may impact the organization, and recent research has delved into these varied phenomena. More specifically, we examine the role of women as part of the TMT as it relates to the engagement in collective action. Research suggests that women may examine issues more deeply than their male counterparts and tend to ask more questions while serving in leadership positions (Huse and Solberg, 2006). Women may also tend to add diverse ways of thinking based on their listening skills and sensitivity to others (Bilimoria, 2000).

Research also suggests that women in the TMT may be more risk-averse than their male colleagues. A psychological study found that in most risk-taking categories, men took greater risks than women (Byrnes *et al.*, 1999). Further, studies suggest that these differences in the propensity to accept risk may depend on the type of task (Bromiley and Curley, 1992) and task context (He *et al.*, 2007).

From these two varying instances, we suggest that when takeover defense mechanisms are high, the in-depth analysis and diverse ways of thinking exhibited by women in the TMT will be positively related to collective action, because the downside of risk-taking actions such as technology innovation and collective actions for long-term performance is alleviated as their personal benefits are protected by takeover defense clauses. Additionally, when takeover defense mechanisms are low, the risk aversion propensity of women in the TMT may become salient because now the severe consequences of collective actions may jeopardize their careers, and therefore, TMT members may become cautious to collective action. More formally, we propose:

H4. When takeover defense is high, the relationship between TMT female ratio and collective actions is positive; when takeover defense is low, such a relationship becomes negative.

Method

Sample and data source

To test our hypotheses, we focused on public firms in the information technology sector who participated in varying levels of collective actions. This population is appropriate to test our theoretical model as the information technology sector is characterized as a high-clock-speed sector (Nadkarni and Narayanan, 2007). In these fast-paced industries, firms must rapidly respond to initial changes, which make collective actions important strategic decisions for these firms.

Our sample covers collective actions over the time period from 1990 to 2006. This time frame allows us access to a longitudinal set of data elements, which in turn allows us to conduct more robust analyses suggesting stronger tests of causality. In addition, it allows us to control for economic upturns and downturns to mitigate confounding influences of each economic condition. During an economic upturn, an abundance of resources might be available, which might increase a firm's willingness to "go it alone", thus decreasing their willingness to engage in collective actions, relying more on their own resources to create change. After matching the data from Computstat North America, Execucom and the G-index data set, we finally constructed a sample of 299 firm-year observations with 46 firms from 18 industries (SIC four digits). A large number of firms were excluded from the final sample due to missing G-index data.

Measures

Collective actions. The operationalization of this variable involved count data (on a yearly base) for typical actions of the firm to develop collective efforts in the technology field. These actions include new product/innovation alliances, compatibility agreements, licensing contracts and open-source participation. Rothaermel and Deeds (2004) operationalized new product/innovation alliances as a firms' collaborative exploration. While some researchers have considered licensing as a revenue strategy (Fosfuri, 2006), research on technology standards in general considered licensing as an important way of generating collaborated innovation to the advantage of the technological paradigm (Suarez, 2004; Teece, 2007). Thus, we considered licensing contracts for this purpose. To collect information about the collective actions of the firms in our sample, we searched the Lexis-Nexis database for newspaper titles that contained the firm's name. We downloaded all the newspaper titles and converted them into a spreadsheet (arrayed chronologically) whereby we performed a computer-aided content analysis to identify collective actions using a thesaurus[1]. The computer software package used in this analysis is developed by SPSS (now an IBM company) and is highly advanced in coding sentences into meaningful categories. We then used manual coding to test the reliability of the computer-aided coding. The results were consistent (greater than 80 per cent agreement). A total number of 1,116 collective actions were identified for the firms in our sample from 1990 through 2006.

Top management team size. Consistent with the literature, TMT size was measured by the total number of individuals with executive level titles (Amason *et al.*, 2006). To collect this information, we used the WRDS database, where information about the members of the TMT of public companies is reported yearly. In our sample, the TMT size ranged from 3 to 12, with an average of 6.76.

Top management team stock ownership. Following Zhang and colleagues (2008), we measured this variable using the sum of the shares TMT members possess. We obtained this information from the WRDS Execucomp database, where this information is available on a yearly base.

Top management team female ratio. We measured this variable using the number of female TMT members divided by the total number of TMT members. We obtained this information from the WRDS Execucomp database. In our sample, the average TMT female ratio is 8 per cent, ranging from 0 to 40 per cent.

Takeover defense. We used the G index (Gompers *et al.*, 2003) as a measure of takeover defense within the firm. Gompers *et al.* (2003) developed the G index by using 24 governance provisions divided into five thematic groups. The index was constructed by adding one point for every provision that reduces shareholder rights. Since its development in 2003, the index has been used in academic literature to study firm performance (Bozec *et al.*, 2010), shareholder value (Heron and Lie, 2006), shareholder rights (Windsor, 2009) and corporate attention (Kacperczyk, 2009). Most recently, the G index has been operationalized as a measure of takeover defense (Chava *et al.*, 2009). A higher index score represents a stronger takeover defense. G index data for our sample of firms were retrieved from the WRDS database for the period of 1990-2006. In our sample, G index scores ranged from 4 to 12, with an average of 7.89.

Control variables. To rule out alternative explanations, we controlled a number of variables. We controlled for *firm size* by using the logarithm of the total number of employees of the firm in a given year. Firm size should be controlled because larger firms may demonstrate different patterns of competitive actions compared with small-sized firms (Chen and Hambrick, 1995). We controlled for *R&D expense* due to the concern that if the firm invests heavily in R&D expense, it will be more likely to engage in innovation-related action, thus generating confounding results in our hypothesis testing. We also controlled for *CEO salary* as this variable may influence the CEOs' incentives in decision-making. Finally, we controlled for *CEO age* to address researchers' (Hambrick *et al.*, 2005) concern that CEOs' demographics may affect their decisions. All the control variables were collected from the WRDS database.

We also controlled for firms' overall *competitive complexity* in the previous year. This control variable reflects the firm's propensity to act against rivals (Chen *et al.*, 2010). The complexity was calculated by the following equation:

$$C_{i,t} = \sum_{j,t} \left(N_{i,j,t}/N_{i,t}\right)^2$$

where *Ni, j* and *t* denote the total number of actions the firm has undertaken in a particular type of action *j* in year *t*.

Analysis

Our main dependent variable, *collective action*, was measured with count data, requiring us to use non-linear estimators. Traditional treatments for such data include Poisson and negative binomial regression models (Henderson and Cockburn, 1994; Penner-Hahn and Shaver, 2005). Poisson regression models require the assumption that the dependent variable is drawn from a Poisson distribution. However, in cases where this assumption does not hold, the likelihood function could be wrongly specified. While negative binomial regression models also require assumption with regard to the likelihood function, Poisson models have one more disadvantage of underestimating the rate of dispersion in the outcome variable (Chen *et al.*, 2007). Given these concerns, we followed prior research (Chen *et al.*, 2007) in similar data analysis to use negative binomial regression as the analytical method. Nevertheless, we also performed Poisson regression, and similar results were reported. To further enhance the robustness of our tests, we tested both fixed effects and random effects, and the results remained consistent. We used one-year lag for all independent variables in the analysis. We also conducted sensitivity tests to observe any differences that may have arisen if we used non-lagged variables, and the results remained consistent. All the independent variables were standardized before we performed the analyses.

The general form of model specification is:

$$\begin{aligned} \textit{Rate of Collective Action} = f\,(&\textit{TMT Size} + \textit{TMT Stock Ownership} + \textit{TMT female ratio} \\ &+ \textit{Takeover Defense} + \textit{TMT Size} \times \textit{Takeover Defense} \\ &+ \textit{TMT Stock Ownership} \times \textit{Takeover Defense} \\ &+ \textit{TMT female ratio} \times \textit{Takeover Defense} + \textit{Controls}) \end{aligned}$$

Results

Table I shows descriptive statistics and correlations for the variables in our models.On average, the firms in our sample made 13.21 collective actions and spent \$314.48m in R&D

	Mean	SD	Minimum	Maximum	1	2	3	4	5	6	7	8	9
Collective actions$_t$	13.21	17.56	0	117	1.00								
Firm size$_{t-1}$ (log of employee #)	1.49	1.00	0	4.34	0.45**	1.00							
Firm R&D expenses$_{t-1}$ (in millions)	314.48	660.04	16	4,777	0.56**	0.67**	1.00						
CEO salary$_{t-1}$ (in thousands)	11,437	23,059	253	176,280	0.49**	0.33**	0.48**	1.00					
CEO age$_{t-1}$	63.42	6.37	50	85	0.17**	0.27**	0.09	0.04	1.00				
Competitive Complexity$_{t-1}$	0.31	0.17	0	1	−0.19**	−0.20**	−0.11	−0.11**	−0.14*	1.00			
Takeover defense$_{t-1}$	7.89	1.88	4	12	−0.37**	−0.05	−0.32**	−0.19**	−0.14	−0.34**	1.00		
TMT size$_{t-1}$	6.76	1.47	3	12	0.06	0.21**	0.05	0.03	0.27**	0.01	−0.01	1.00	
TMT stock ownership$_{t-1}$ (in thousands)	1,100	1709	0	10,295	0.13*	0.21**	0.11	0.22**	0.13*	0.14*	−0.07	0.08	1.00
TMT female ratio $_{t-1}$	0.08	0.11	0	0.4	−0.10	−0.04	−0.12	−0.03	−0.08	0.03	0.31**	0.03	−0.12

Notes: $N = 225$. *Correlation is significant at the 0.05 level (two-tailed); **correlation is significant at the 0.01 level (two-tailed)

Table I.
Descriptive statistics and correlation matrix

per year in the period between 1990 and 2006. The average age of their CEOs is approximately 63, and the annual salary of the CEOs is \$11.437m. In addition, the TMTs, on average, hold 1,100,000 shares of their companies. The average size of a TMT is 6.76, ranging from 3 to 12. The average takeover defense (G index) is 7.89, ranging from 4 to 12.

The correlation matrix indicates that all the control variables except for competitive complexity are significantly positively correlated to the dependent variable – collective actions. As for the independent variables, takeovers defense measured by G index are significantly negatively correlated with collective actions ($\rho = -0.37$, $p < 0.01$) while TMT stock ownership is positively correlated with such actions ($\rho = 0.13$, $p < 0.05$). Both results are consistent with our theoretical arguments. In addition, several control variables show significant correlations with each other. Larger than desirable intercorrelations are found between firm R&D expenses and firm size ($\rho = 0.67$, $p < 0.01$).

Table II presents the main results of this study based on the fixed effects models (Models 1-3) Model 1 presents the baseline fixed effect model including only control variables. The results suggest that firms with less competitive complexity tend to undertake more collective actions ($\beta = -1.577$, $p < 0.001$). Then, we test the direct effects of takeover defense on collective actions along with TMT stock ownership, TMT size and TMT female ratio (see Model 2). The main effect of takeover defense is negative but just marginally significant ($\beta = -0.103$, $p < 0.1$). Among the three TMT characteristics, only female ratio shows a significant negative relationship with collective actions ($\beta = -1.292$, $p < 0.05$). Thus, *H1* is not supported. Based on Model 3, we add three interaction items to test the two-way interactive impacts of TMT stock ownership, TMT size, TMT female ratio and takeover defense on collective actions. The coefficients of interaction items for TMT size and stock ownership are significant at the levels of 0.01 and 0.05, respectively, whilst the signs are opposite ($\beta = -0.792$; $\beta = 0.713$, respectively).

To further investigate the directions of these moderation effects, we draw interaction plots for TMT size × G-Index and TMT stock ownership × G-index on collective actions. Figure 1 shows that if a firm's TMT takes a high takeover defense

		Fixed effects	
	Model 1	Model 2	Model 3
Firm size$_{t-1}$	0.278****	0.444**	0.465**
Firm R&D$_{t-1}$	−0.047	−0.101	−0.215*
CEO salary$_{t-1}$	0.043	0.042	0.075*
CEO age$_{t-1}$	0.077	0.079	0.084
Competitive complexity$_{t-1}$	−1.577***	−1.515***	−1.796***
Year 2000	0.497	0.488***	0.408**
Takeover defense$_{t-1}$		−0.103****	−0.116
TMT size$_{t-1}$		−0.038	−0.792**
TMT stock ownership$_{t-1}$		−0.008	0.713*
TMT female ratio$_{t-1}$		−1.292*	3.267
TMT Size$_{t-1}$ × takeover defense$_{t-1}$			0.102**
TMT stock ownership$_{t-1}$ × takeover defense$_{t-1}$			−0.105*
TMT female ratio$_{t-1}$ × takeover defense$_{t-1}$			−0.574
Industry control	Yes	Yes	Yes
Observations	225	225	225
Wald χ^2	64.71***	86.02***	102.36***

Notes: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; ****$p < 0.1$ (one-tailed)

Table II.
Negative binomial regression results using collective actions as the dependent variable

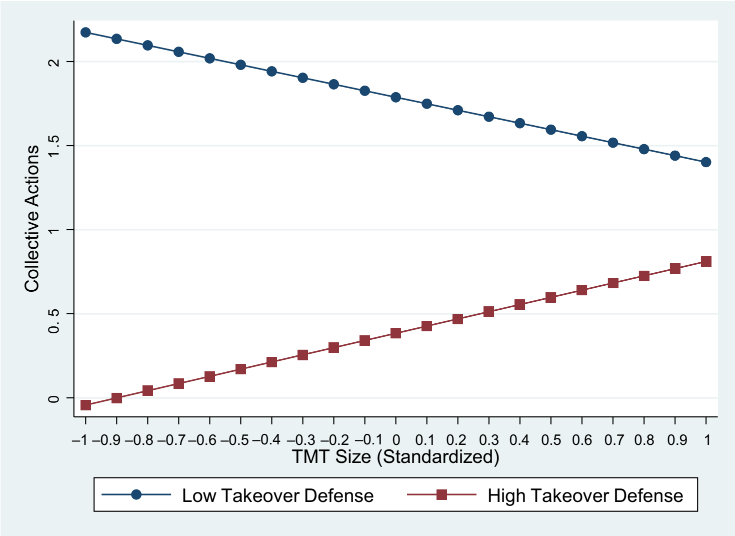

Figure 1.
Interactive effects of TMT size and takeover defense

position, it will make more collective actions when the TMT is large than small, while if a firm's TMT takes a low takeover defense position, the relationship between TMT size and collective actions becomes negative. Thus, *H2* is fully supported. The interaction plot presented in Figure 2 also provides evidence in support of *H3*. Figure 2 reveals that when takeover defense is high, TMT stock ownership is strongly and negatively related to collective actions. Such a relationship becomes slightly positive when takeover defense is low.

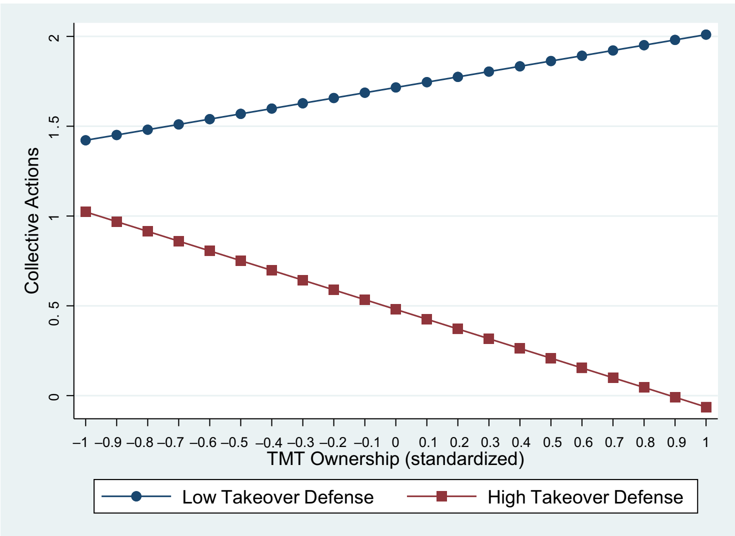

Figure 2.
Interactive effects of TMT ownership and takeover defense

We find that *H4* is not supported. As shown in Model 2, the direct effects of TMT female ratio on the number of collective actions are negative and significant ($\beta = -1.292, p < 0.05$); additionally, in Model 3, the moderating effects are also negative but are not significant. These results are counter to the proposed relationship, which will be addressed further in the discussion section.

As part of robustness check, we also ran the random effect models. The results from the random effects models are slightly different from those from the fixed effects models in that the negative main effects of takeover defense become more significant at the level of 0.05 in the random effects models and the interactive effects of TMT size and ownerships become less significant. The results pertaining to TMT female ratio remain the same. The likelihood ratio test at the end of the random effects models provided by STATA is highly significant at the level of 0.001, which suggests certain omitted variables bias in the random effects model, and therefore, the fixed effects models are a better choice for the analysis.

Discussion

In this paper, we addressed the question: Why do firms demonstrate heterogeneity in their involvement in collective actions in competition related to technological standards? We particularly focused on firms that introduce technological change to shape or reshape industrial standards and investigated how TMT characteristics impact such firm's engagement in collective actions. Based on a sample of 299 firm-year observations involving technology standards during the period between 1990 and 2006, we found that when a firm's TMT size was large and there was higher takeover defense in the governance structure, the firm tended to increase the number of collective actions. The results suggested an interactive impact of TMT dynamics and corporate governance structure; that is, the capability of the TMT will only be able to translate into competitive actions when an appropriate governance structure is offered. In addition, we found that when the TMT had more stock ownership and there was higher takeover defense in the governance structure, the firm tended to decrease the number of collective actions. This finding is consistent with what agency theory and prospect theory predict. The stock-related compensation structure for the TMT has been linked to a dual role of executives as both shareholders and institutional leaders (Sanders, 2001). Our results further suggest that interacting with compensation structure, governance structure may moderate the TMT orientation between these two roles, thereby influencing its strategic decision-making, for instance, whether and how to initiate collective actions in the competition of technology standards. We did not find support for the proposed impact of increased female ratios in the TMT. Although we proposed that these higher ratios would yield increased collective actions at higher levels of takeover defense protection and decreased collective actions at lower levels, we found that the direct effect of increased female TMT ratio leads to decreased collective actions. Further, adding the moderating influence of takeover protection mechanisms yielded insignificant results. It may be that the risk aversion propensity of women in the TMT may have a stronger effect than previously suggested. Additionally, it is possible that women in the TMT may conduct the aforementioned in-depth analysis that could lead to a slower move toward action. Future research should further explore this relationship between women TMT ratio and firm collective actions under varying contexts.

In addition, our research has extended the ongoing discussion in the innovation literature about how firms' collective actions could shape industrial standards (Hargrave and Van De Ven, 2006). While the extant literature has primarily focused on either the patterns of cooperation to shape industrial standards (Navis and Glynn, 2010) or the outcome of collective efforts on industrial or organizational change (Garud *et al.*, 2002), the consequences of collective actions in technology races are full of uncertainty, and thus, such actions present challenges in a TMT's strategic decision-making. Extending but differing from the extant literature, our research provides some explanations of firms' heterogeneity of collective actions from the perspective of the structural characteristics within the TMT. For instance, our findings may provide some implications regarding why some firms choose to compete with open-source strategies while others pursue proprietary platforms to formulate standards (West, 2003) – the structural characteristics within the TMT of the firm may be the driving forces behind determining firms' choices in the marketplace.

Our research also echoes the call of Teece (2007) to further investigate the role of management in the competition based on technological ecosystems. As Teece argued in 2007, the complexity in firms' strategy formulation in the area of interlacing dynamic capabilities requires management to have uncommon capabilities and foresights. Our research findings suggested that structural characteristics of a TMT – size and stock ownership – may serve as mechanisms to facilitate or constrain the transformation of capabilities into strategic actions.

In addition, linkages between the TMT structure and the concurrent issue of collective action may be contingent upon monitoring structures in corporate governance, for example, takeover defense and TMT position in the governance structure. This contingency perspective extends the literature on the dynamics of TMT and corporate governance. Indeed, due to the complexity and uncertainty in competition, firms sometimes need to use unusual strategies (e.g. open source) to obtain intended outcomes (e.g. dominant design); however, corporate governance structures may force the otherwise forward-looking top management to refrain from these activities (Kacperczyk, 2009). Our findings also suggested that CEOs may be constrained by the monitoring mechanisms from the shareholders when they decide to undertake actions that are only likely to generate long-ranging outcomes.

Limitations and future research

Our research takes an initial step to link three blocks of literature: TMT literature, competitive dynamics literature and the literature on technological standards and collective actions. This bold approach allows us to investigate the interactions between factors from different research streams, but it may lead to some limitations that future research needs to address. As an initial attempt, this study provides some answers to why firms take different approaches in technology competition; however, it also reveals that there are many more issues in the area that need further investigation.

First, a counterpart of the TMT in a firm's governance structure, shareholders, especially the large-block shareholders, may play an important role in the strategic decision-making process. Compared to the TMT, shareholders may have relatively limited expertise and have difficulty in discerning the strategic importance of collective actions in the competition for technology standards. Given the nature of collective actions with high-risk and uncertainty, shareholders may not support such actions and even have negative reactions. Indeed, Benner (2010) offered evidence that securities analysts tend to have negative reactions toward firms' strategies that depart from existing technologies. In our study, we do not directly observe the effect of shareholders, as it is not our research focus. Future research should develop instruments to investigate the functionality of shareholders and board of directors in the context of technology competition. This line of research would also help to advance our knowledge on the dual role of the TMT and its managerial implication.

Second, the sample used in our study to test our hypotheses was relatively small (46 firms and 299 firm-year observations) and constrained due to the limited availability of the corporate governance measure (takeover defense). However, for each of the firms in our sample, we used a longitudinal research design to capture the potential variance within the firm. The longitudinal data also enhanced our confidence in terms of causalities between the variables. In spite of our effects to reduce the potential biases, it is still beneficial for future research to test the theoretical model using a larger sample.

Third, our research findings are limited to firms pursuing technology standards. This unique research setting assumes the presence of network externalities as a nature of competitive dynamics in the competition for technology standards (Garud *et al.*, 2002) and enhances our contribution to the technology innovation literature. However, our conceptualization in regard to network externalities was not directly measured with empirical data. Future research may develop fine-grained measures to capture this important driver of collective action. In addition, while the mechanisms presented in our theory may offer implications on other forms of collective action, the boundary condition of technology competition constrains the generalizability of our results. For example, the assumption of network externality may not necessarily hold in other institutional spaces. Future research may take a further step to investigate the drivers of collective action in more generalized research settings.

Finally, and methodologically, our hypothesis testing was mainly focused on the interaction effects. Researchers have argued that the interpretation of interaction terms in nonlinear models could be tricky (Hoetker, 2007). While researchers have suggested the use of graphical presentation to generate more meaningful interpretations, an approach we take in this paper, the statistical complexity is not fully addressed.

Conclusion

This paper offered empirical evidence to explain the heterogeneity of leading technology firms in using collective action as a competitive strategy. We propose a contingency model to link TMT dynamics with corporate governance structure in predicting firms' choice in a competitive industry. We offer two logics– capability-based and incentive-related – to explain how the TMT drives firms' behavior in the setting of technology competition. With a longitudinal data set, we found support for several of the hypothesized linkages.

Note

1. A complete library of the keywords used in the computer-aided is available upon request.

References

Aguilera, R.V. and Jackson, G. (2003), "The cross-national diversity of corporate governance: dimensions and determinants", *Academy of Management Review*, Vol. 28 No. 3, pp. 447-465.

Amason, A.C., Shrader, R.C. and Tompson, G.H. (2006), "Newness and novelty: relating top management team composition to new venture performance", *Journal of Business Venturing*, Vol. 21 No. 1, pp. 125-148.

Annabelle, G. and Cusumano, M.A. (2002), *Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation*, Havard Business School Press, Boston, MA.

Axelrod, R., Mitchell, W., Thomas, R.E., Bennett, D.S. and Bruderer, E. (1995), "Coalition formation in standard-setting alliances", *Management Science*, Vol. 41 No. 9, pp. 1493-1508.

Bantel, K.A. and Jackson, S.E. (1989), "Top management and innovations in banking: does the composition of the top team make a difference?", *Strategic Management Journal*, Vol. 10, pp. 107-124.

Benner, M.J. (2010), "Securities analysts and incumbent response to radical technological change: evidence from digital photography and internet telephony", *Organization Science*, Vol. 21 No. 1, pp. 42-62.

Bilimoria, D. (2000), "Building the business case for women corporate directors", in Burke, R. and Mattis M. (Eds), *Women on Corporate Boards of Directors*, Kluwer Academic, Dordrecht, pp. 25-40.

Bozec, R., Dia, M. and Bozec, Y. (2010), "Governance-performance relationship: a re-examination using technical efficiency measures", *British Journal of Management*, Vol. 21 No. 3, pp. 684-700.

Branson, D. (2006), *No Seat at the Table: How Corporate Governance Keeps Women out of America's Boardrooms*, New York University Press, New York, NY.

Bromiley, P. and Curley, S. (1992), "Individual differences in risk taking", in Yates, J.F. (Ed.), *Risk-Taking Behavior*, Wiley, New York, NY.

Byrnes, J.P., Miller, D.C. and Schafer, W.D. (1999), "Gender differences in risk taking: a meta-analysis", *Psychological Bulletin*, Vol. 125 No. 3, pp. 367-383.

Certo, S.T., Daily, C.M., Cannella, A.A., Jr and Dalton, D.R. (2003), "Giving money to get money: how CEO stock options and CEO equity enhance IPO valuations", *Academy of Management Journal*, Vol. 46 No. 5, pp. 643-653.

Chava, S., Livdan, D. and Purnanandam, A. (2009), "Do shareholder rights affect the cost of bank loans?", *The Review of Financial Studies*, Vol. 22 No. 8, pp. 2973-3004.

Chen, M.J. and Hambrick, D.C. (1995), "Speed, stealth, and selective attack: how small firms differ from large firms in competitive behavior", *Academy of Management Journal*, Vol. 38 No. 2, pp. 453-482.

Chen, M.J., Lin, H.C. and Michel, J.G. (2010), "Navigating in a hypercompetitive environment: the roles of action aggressiveness and TMT integration", *Strategic Management Journal*, Vol. 31 No. 13, pp. 1410-1430.

Chen, M.J., Su, K.H. and Tsai, W. (2007), "Competitive tension: the awareness, motivation, and capability perspective", *Academy of Management Journal*, Vol. 50 No. 1, pp. 101-118.

Cusumano, M.A. and Gawer, A. (2002), "The elements of platform leadership", *IEEE Engineering Management Review*, Vol. 31 No. 1, pp. 51-58.

Demsetz, H. (1983), "The structure of ownership: theory and consequences", *Journal of Political Economy*, Vol. 93, pp. 1155-1177.

Dreu, C.K.W.D. and Weingart, L.R. (2003), "Task versus relationship conflict, team performance, and team member satisfaction: a meta-analysis", *Journal of Applied Psychology*, Vol. 88 No. 4, pp. 741-749.

Eisenhardt, K.M. and Schoonhoven, C.B. (1990), "Organizational growth: linking founding team, strategy, environment and growth among US Semiconductor ventures, 1978-1988", *Administrative Science Quarterly*, Vol. 35 No. 3, pp. 504-529.

Fama, G.F. and Jensen, M.C. (1983), "Separation of ownership and control", *Journal of Law and Economics*, Vol. 26 No. 2, pp. 327-349.

Fosfuri, A. (2006), "The licensing dilemma: understanding the determinants of the rate of technology licensing", *Strategic Management Journal*, Vol. 27 No. 12, pp. 1141-1158.

Garud, R. and Kumaraswamy, A. (1993), "Changing competitive dynamics in network industries: an exploration of sun microsystems' open systems strategy", *Strategic Management Journal*, Vol. 14 No. 5, pp. 351-369.

Garud, R., Gehman, J. and Karnoe, P. (2010), "Categorical associations: nuclear power in the energy field", Academy of Management Annual Meeting, Montréal.

Garud, R., Jain, S. and Kumaraswamy, A. (2002), "Institutional entrepreneurship in the sponsorship of common technological standards: the case of sun microsystems and java", *Academy of Management Journal*, Vol. 45 No. 1, pp. 196-214.

Gompers, P., Ishii, J. and Metrick, A. (2003), "Corporate governance & equity prices", *The Quarterly Journal of Economics*, Vol. 118 No. 1, pp. 107-155.

Haleblian, J. and Finkelstein, S. (1993), "Top management team size, CEO dominance, and firm performance: the moderating roles of environmental turbulence and discretion", *Academy of Management Journal*, Vol. 36 No. 4, pp. 844-863.

Hambrick, D. and Daveni, R. (1992), "Top team deteriorations as part of the downward spiral of large corporate bankruptcies", *Management Science*, Vol. 38 No. 10, pp. 1445-1466.

Hambrick, D., Cho, S. and Chen, M.-J. (1996), "The influence of TMT heterogeneity on firm's competitive moves", *Administrative Science Quarterly*, Vol. 41 No. 4, pp. 659-684.

Hambrick, D.C., Finkelstein, S. and Mooney, A.C. (2005), "Executive job demands: new insights for explaining strategic decisions and leader behaviors", *Academy of Management Review*, Vol. 30 No. 3, pp. 472-491.

Hargrave, T.J. and Van De Ven, A.H. (2006), "A collective action model of institutional innovation", *Academy of Management Review*, Vol. 31 No. 4, pp. 864-888.

He, X., Inman, J.J. and Mittal, V. (2007), "Gender jeopardy in financial risk taking", *Journal of Marketing Research*, Vol. 45 No. 4, pp. 414-424.

Henderson, R. and Cockburn, I. (1994), "Measuring competence? Exploring firm effects in pharmaceutical research", *Strategic Management Journal*, Vol. 15, pp. 63-84.

Heron, R. and Lie, E. (2006), "On the use of poison pills and defensive payouts by takeover targets", *The Journal of Business*, Vol. 79 No. 4, pp. 1783-1807.

Hillman, A.J., Cannella, A.A. and Harris, I.C. (2002), "Women and minorities in the boardroom: how do directors differ?", *Journal of Management*, Vol. 28 No. 6, pp. 747-763.

Hoetker, G. (2007), "The use of logit and probit models in strategic management research: critical issues", *Strategic Management Journal*, Vol. 28, pp. 331-343.

Hoffman, L.R. and Maier, N.R.F. (1961), "Quality and acceptance of problem solutions by members of homogeneous and heterogeneous groups", *Journal of Abnormal and Social Psychology*, Vol. 62 No. 2, pp. 401-407.

Huse, M. and Solberg, A.G. (2006), "Gender related boardroom dynamics: how women make and can make contributions on corporate boards", *Women in Management Review*, Vol. 21 No. 2, pp. 113-130.

Huse, M., Nielsen, S. and Hagen, I.M. (2009), "Women and employee-elected board members, and their contributions to board control tasks", *Journal of Business Ethics*, Vol. 89 No. 4, pp. 581-597.

Jackson, S.E. (1992), "Consequences of group composition for the interpersonal dynamics of strategic issue processing", *Advances in Strategic Management*, Vol. 8, pp. 345-382.

James, J. (1951), "A preliminary study of the size determinant in small group interaction", *American Economic Review*, Vol. 16 No. 4, pp. 474-477.

Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.

Kabir, R., Cantrijn, D. and Jeunink, A. (1997), "Takeover defenses, ownership structure and stock returns in The Netherlands: an empirical analysis", *Strategic Management Journal*, Vol. 18 No. 2, pp. 97-109.

Kacperczyk, A. (2009), "With greater power comes greater responsibility? Takeover protection and corporate attention to stakeholders", *Strategic Management Journal*, Vol. 30 No. 3, pp. 261-285.

Kahneman, D. and Tversky, A. (1979), "Prospect theory: an analysis of decision under risk", *Econometrica*, Vol. 47 No. 2, pp. 263-292.

Kanter, R.M. (1977), *Men and Women of the Corporation*, Basic Books, New York NY.

Krishnan, H. and Park, D. (2005), "A few good women on top management teams", *Journal of Business Research*, Vol. 58, pp. 1712-1720.

Kuhn, T.S. (1962), *The Structure of Scientific Revolutions*, United Chicago Press.

Mcgrath, R.G., Macmillan, I.C. and Tushman, M.L. (1992), "The role of executive team actions in shaping dominant designs: towards the strategic shaping of technological progress", *Strategic Management Journal*, Vol. 13, pp. 137-161.

Maguire, S., Hardy, C. and Lawrence, T.B. (2004), "Institutional entrepreneurship in emerging fields: Hiv/aids treatment advocacy in Canada", *Academy of Management Journal*, Vol. 47 No. 5, pp. 657-679.

Manne, H.G. (1965), "Mergers and the market for corporate control", *The Journal of Political Economy*, Vol. 73 No. 2, pp. 110-120.

Marcel, J., Barr, P.S. and Duhaime, I.M. (2010), "The influence of executive cognition on competitive dynamics", *Strategic Management Journal*, Vol. 32 No. 2, pp. 115-138.

Miller, D. and Chen, M.J. (1994), "Sources and consequences of competitive inertia: a study of the US Airline industry", *Administrative Science Quarterly*, Vol. 39 No. 1, pp. 1-23.

Nadkarni, S. and Narayanan, V.K. (2007), "Strategic schemas, strategic flexibility, and firm peformance: the moderating role of industry clock-speed", *Strategic Management Journal*, Vol. 28, pp. 243-270.

Navis, C. and Glynn, M.A. (2010), "How new market categories emerge: temporal dynamics of legitimacy, identity, and entrepreneurship in satellite radio, 1990-2005", *Administrative Science Quarterly*, Vol. 55 No. 3, pp. 439-471.

Nielsen, S. and Huse, M. (2010), "The contribution of women on boards of directors: going beyond the surface", *Corporate Governance: An International Review*, Vol. 18 No. 2, pp. 136-148.

Olson, M. (1971), *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press, Cambridge, MA.

Penner-Hahn, J. and Shaver, J.M. (2005), "Does international research and development increase patent output? An analysis of Japanese pharmaceutical firms", *Strategic Management Journal*, Vol. 26 No. 2, pp. 121-140.

Polletta, F. and Jasper, J.M. (2001), "Collective identity and social movements", *Annual Review of Sociology*, Vol. 27 No. 1, pp. 283-305.

Pollock, T.G., Fischer, H.M. and Wade, J.B. (2002), "The role of power and politics in the repricing of executive options", *The Academy of Management Journal*, Vol. 45 No. 6, pp. 1172-1182.

Pound, J. (1987), "The effects of antitakeover amendments on takeover activity: some direct evidence", *Journal of Law and Economics*, Vol. 30 No. 2, pp. 353-367.

Rothaermel, F.T. and Deeds, D.L. (2004), "Exploration and exploitation alliances in biotechnology: a system of new product development", *Strategic Management Journal*, Vol. 25 No. 3, pp. 201-221.

Sanders, W.G. (2001), "Behavioral responses of CEOs to stock ownership and stock option pay", *Academy of Management Journal*, Vol. 44 No. 3, pp. 477-492.

Suarez, F.F. (2004), "Battles for technological dominance: an integrative framework", *Research Policy*, Vol. 33 No. 2, pp. 271-286.

Sundaramurthy, C. (1996), "Corporate governance within the context of antitakeover provisions", *Strategic Management Journal*, Vol. 17 No. 5, pp. 377-394.

Sundaramurthy, C., Mahoney, J.M. and Mahoney, J.T. (1997), "Board structure, antitakeover provisions, and stockholder wealth", *Strategic Management Journal*, Vol. 18 No. 3, pp. 231-245.

Sykes, A. (1994), "Proposals for internationally competitive corporate governance in Britain and America", *Corporate Governance: An International Review*, Vol. 2 No. 4, pp. 187-195.

Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350.

Waguespack, D.M. and Fleming, L. (2009), "Scanning the commons? Evidence on the benefits to startups participating in open standards development", *Management Science*, Vol. 55 No. 2, p. 210.

West, J. (2003), "How open is open enough? Melding proprietary and open source platform strategies", *Research Policy*, Vol. 32 No. 7, pp. 1259-1285.

Williamson, O.E. (1985), *The Economic Institutions of Capitalism*, Free Press, New York, NY.

Williamson, O.E. (1993), "Calculativeness, trust and economic organization", *Journal of Law and Economics*, Vol. 36, pp. 453-486.

Windsor, D. (2009), "Tightening corporate governance", *Journal of International Management*, Vol. 15 No. 3, pp. 306-316.

Zhang, X., Bartol, K.M., Smith, K.G., Pfarrer, M.D. and Khanin, D.M. (2008), "Ceos on the edge: earnings manipulation and stock-based incentive misalignment", *Academy of Management Journal*, Vol. 51 No. 2, pp. 241-258.

Further reading

Eisenhardt, K.M. (1989), "Making fast strategic decisions in high-velocity environments", *Academy of Management Journal*, Vol. 32 No. 3, pp. 543-576.

Corresponding author

Mark A. Tribbitt can be contacted at: mark.tribbitt@pepperdine.edu