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Two's a Crowd? Implications of Economic Geography for Corporate Governance

Matthew Farrell
Old Dominion University, mfarr002@odu.edu

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TWO'S A CROWD? IMPLICATIONS OF ECONOMIC GEOGRAPHY FOR CORPORATE GOVERNANCE

By

Matthew Farrell

B.A. June 2017, Virginia Commonwealth University

M.T. June 2011, Virginia Commonwealth University

B.A. June 2011, Virginia Commonwealth University

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Approved by:

Dr. Shaomin Li (Chair)

Dr. Brian K. Boyd

Dr. Orhun Guldiken

Dr. Anil Nair

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Director: Dr. Shaomin Li

ABSTRACT

Although literature on corporate governance and economic geography often explores similar constructs, theories, and other matters, little work has been done examining their joint effects. This two-essay dissertation integrates these literatures in order to partially fill this gap by asking the following research questions:

1.) Do geographic proximity and multiple directorships function as substitutes or complements?
2.) How is the governance of highly innovative firms affected by the presence of Marshallian externalities?

While some scholars suggest that multiple directorships lead to board members neglecting their advisory and monitoring obligations, others have embraced the idea that holding multiple board seats can benefit both the firm and the director. The nature of the relationship between multiple directorships and a variety of firm outcomes has remained the subject of theoretical debates, and findings are often contradictory. Essay 1 offers a possible explanation for these issues by incorporating the geographically bounded nature of multiple directorships in an analysis of their effects on firm acquisition activity. Results offer support for a positive contribution to acquisition performance, with that relationship becoming stronger as geographic distance between the target and acquirer increases. My findings suggest that multiple directorships and geographic distance are complements, but substitutes when they overlap with one another.

Essay 2 reexamines the relationship between corporate governance at the board level and innovation, examining whether and how agglomeration economies influence these relationships. Using a sample drawn from the semiconductor industry, I demonstrate that while firms within an agglomeration configure their governance in a manner consistent with agency theoretic predictions, more remote firms do the opposite. Thus, this essay extends prior research by incorporating agglomeration theory into governance, and specifically exploring the ways in which Marshallian externalities affect intra-firm safeguards against opportunism.

DEDICATION

This dissertation is dedicated to my wife Melissa, whose love and support has always given me strength and brightened my life. Thank you for standing by me as I have embarked upon and achieved this goal.

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It truly does take a global village to raise a PhD graduate!

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CHAPTER 1

TWO'S A CROWD? EXPLORING THE PARADOX OF MULTIPLE DIRECTORSHIPS AND SPATIAL PROXIMITY FROM AN INFORMATION ECONOMICS PERSPECTIVE

ABSTRACT

For decades, scholars have examined the influence of the quantity of board seats that a firm's directors hold. Critically, management and finance scholarship has largely ignored a key insight from sociological research in that the holding of multiple board seats tends to happen within a tight geographic perimeter. In this essay, I explore the competing influence of geographic proximity and multiple directorships. I examine the semiconductor industry across a five year period and consider their influence on acquisition success. The results indicate that the benefits accrued to the firm from multiple board appointments are most easily observed at a larger geographic distance since these phenomena act as substitutes in terms of effects, yet complements in terms of functional benefits due to the limited reach of geographic proximity. Multiple directorships are further positively related to acquisition success for firms that acquire frequently. Implications for theory, practice, and policymaking are discussed.

1. INTRODUCTION

Over the past few decades, multiple directorships, which occur when board members serve on two or more boards (as defined by Ferris, Jagannathan, & Pritchard, 2003), have been the focus of a great deal of scholarly attention, especially within the fields of both finance (e.g., Perry & Peyer, 2005; Fich & Shivdasani, 2006; Ferris, Jayaraman, & Liao, 2018, 2020) and strategic management (e.g., Harris & Shimizu, 2004; Khanna, Jones, & Boivie, 2014; Krause, Wu, Bruton, & Carter, 2019). That this phenomenon has been researched so extensively is not surprising. As noted by Davis (1996), interlocks have been found to be related to almost all of the elements of corporate governance that are of any import - though critics charge that this is in large part due to the easy availability of the data (Stinchcombe, 1990).

Despite being the subject of a voluminous body of work over a long period of time, evidence regarding the effect of multiple directorships on a variety of firm outcomes remains split on both a theoretical and empirical level. Theoretically, some scholars argue that multiple directorships will prove to be distracting to those who serve on multiple boards, with directors' attention being too divided to adequately fulfill board duties such as monitoring and resource provision (e.g., Fich & Shivdasani, 2006). At the same time, others have argued that directors who serve on multiple boards are likely to have been offered these positions due to their extensive experience and past success, and as such the presence of these directors is likely to contribute to firm performance either through superior service (Fama & Jensen, 1983) or by reflecting positively on the firm's prestige (cf. Podolny, 2001).

Some consensus, however, has been reached regarding specific aspects of the phenomenon. For example, one of the primary benefits of such directorships is the channeling of important information regarding the firm's external environment (e.g., Haunschild, 1993; Sarkar & Sarkar, 2009; Shropshire, 2010; Connelly, Johnson, Tihanyi, & Ellstrand, 2011). Intuitively, it would be expected that the more such directorships exist, the greater the quantity of information that flows into the firm (as noted by Haunschild & Beckman, 1998), an expectation which seems to be consistent with findings such as Boyd's (1990), who argued and showed that boards form more interlocks during periods of environmental turbulence in order to better cope with external resource dependencies, many of which are information-based.

Yet, it has long been noted in sociological research that multiple directorships tend to co-occur within close spatial proximity (Kono, Palmer, Friedland, & Zafonte, 1998), which tends to have the same effect in terms of reducing information asymmetries. Building on Akerlof's (1970) insights regarding the ways in which information asymmetries can adversely affect markets, researchers have generated a great deal of evidence regarding the effect of geographic proximity on information asymmetry reduction, with some studies using geographic distance as a proxy for information asymmetries (e.g., Coval and Moskowitz, 2001; Malloy, 2005; Ragozzino and Reuer, 2011). That a main benefit of both spatial proximity and multiple directorships is to introduce novel information to the firm suggests that these mechanisms might substitute for one another. Why, then, do they tend to occur in geographic clusters?

Given the importance of answering this question on a practical and theoretical level, it is surprising that this has not been examined. In order to unravel this puzzle, I gathered data on 97 acquisitions of US-based semiconductor firms from 2010 to 2015, since acquisitions are strongly consequential for firm performance (Haleblian, Devers, McNamara, Carpenter, & Davison,

2009) and typically merit board involvement (Lorsch & MacIver, 1989), carrying the additional advantage of being more proximal to the board's influence than more holistic outcomes such as firm performance. Incorporating insights from spatial economics and corporate governance literatures, I attempted to demonstrate what the effects of multiple directorships might be when taking the geographic distance between target and acquiring firms into account.

My findings suggest that they do act as substitutes, but due to the limited reach of spatial information asymmetry reduction (50 miles at best according to Orlando, 2004), are also complementary on a functional level, which seems to be consistent with recent work that has argued for, and found, positive relationships between multiple directorships and international acquisitions (Xia, Ma, Tong, & Li, 2018; Ahsan, Popli, & Gubbi, 2019; Wang & Peng, 2019). Further, the experience of directors who hold multiple seats is valuable, as this information can prevent the mis-application of prior firm experience or routines which frequently cause acquisitions to fail (Haleblian & Finkelstein, 1999; Finkelstein & Haleblian, 2002; Zollo & Singh, 2004).

In answering the call for strategic management studies which examine the effect of information asymmetries on acquisition outcomes (Bergh, Ketchen, Orlandi, Heugens, & Boyd, 2019), I was able to develop a study which has a number of implications for management theory and practice, as well as policy implications. First, there is a heretofore unobserved obfuscation of the benefits of multiple directorships due to spatial concerns, suggesting that previous studies which do not account for the reduction of information asymmetries within close quarters may be seriously misspecified. Second, reduction of information asymmetries at the board level in the form of experience can bolster the resource provisioning role of boards by providing a variety of acquisition experiences that can be drawn from to better advise the firm's management. Third,

practitioners have been cautioned to limit the number of directorships in which their boards can participate, with numbers of "overboarded" directors trending downwards in recent years in the face of the disapproval of investors and discouragement within corporate governance codes (Popadopoulos, 2019). Specific to the US, the National Association of Corporate Directors (1996) as well as the Council of Institutional Investors (2003) passed resolutions urging limits on directorships held by directors of public companies. The findings of this and those of other recent studies suggest that reducing the quantity of directorships held by a firm's board may not lead to improvements in performance (through a variety of metrics) or overall corporate governance quality.

2. LITERATURE REVIEW

Scholarly work on multiple directorships spans several decades and disciplines, particularly if interlocking directorships are considered a subset therein. In a literature review, Mizruchi (1996; p. 271) defines interlocks thusly: "...when a person affiliated with one organization sits on the board of directors of another organization." Since this affiliation refers to the board level, an interlock, by the definition proffered earlier in this paper, constitutes a multiple directorship. This being the case, a thorough, comprehensive review is well outside of the scope of this study. I will attempt, however, to outline some of the major findings and discussions of the past few decades, particularly as they pertain to my research question.

Table 1 provides an overview of scholarly findings regarding multiple directorships across several different and important subjects. These studies span numerous distinct institutional environments and encompass many theoretical perspectives, but taken as a whole, they all provide conflicting evidence related to the outcome in question. For example, some evidence exists that fast-paced corporate social responsibility (CSR) activities benefit from the presence of interlocks, which the study's author attributes to the directors' social networks (Al-Dah, 2019). Yet, other scholars, arguing from an agency perspective, found that outside directors who hold multiple board seats negatively moderate the effect of corporate philanthropy on firm performance (Su & Sauerwald, 2018).

Broadly, many studies pit the "busyness hypothesis" against the "reputational" or "experience" hypotheses, which, despite being at loggerheads in terms of their implications, are also both rooted in agency theory. The busyness hypothesis, as defined by Jiraporn and

colleagues (2009), holds that directors with too many board appointments will be overextended in terms of their time commitments. This in turn will lead to shirking at the board level, resulting in negative outcomes for the firm as a whole. The busyness hypothesis has been tested, and has found support, in a wide array of studies (e.g., Core, Holthausen, & Larcker, 1999; Shivdasani & Yermack, 1999; Fich and Shivdasani, 2006). For example, Fich and Shivdasani (2006) found that corporate governance was weaker in firms where the majority of outside directors held more than three seats. Specifically, firms with busy boards experienced reduced profits, inferior market-to-book ratios, and a lowered likelihood that under-performing CEOs would be dismissed. In contrast, the reputational, or "experience" hypothesis, as argued for by Fama and Jensen (1983), holds that multiple board appointments are clear indicators of a director's quality and experience. The reputational hypothesis has also received broad empirical support (e.g., Kaplan & Reishus, 1990; Coles & Hoi, 2003; Masulis & Mobbs, 2011). An exemplar study in this vein is that of Harris and Shimizu (2004), who found, contrary to their expectations, that directors who held multiple board seats (what they termed "overboarded" directors) tended to enhance firms' acquisition performance.

The busyness and reputational hypotheses have been utilized frequently in efforts to integrate the broad literatures on multiple directorships and acquisition activity (see Peng & Wang, 2019 for a review), though the results remain contentious. Noting the informational advantages enjoyed by firms that share directors, some scholars have found positive effects of multiple directorships in terms of both pre- and post-acquisition success via superior target selection and post-acquisition integration (Cai & Sevilir, 2012; Renneboog & Zhao, 2014). Other scholars have argued for the busyness hypothesis and found support for their claims (Jiraporn, Kim, & Davidson, 2008), as firms with multiple directorships tend to face relatively

high diversification discounts, particularly when the quantity of such directorships reaches a particular threshold (Ahn, Jiraporn, & Kim, 2010).

Despite these diversification discount arguments, there are other factors at play that may positively influence acquisition outcomes when multiple directorships are involved. For example, several studies examine the importance of director experience in achieving acquisition success (e.g., McDonald, Westphal, & Graebner, 2008; Harford & Schonlau, 2013; Field & Mkrtchyan, 2017), and that directors who hold multiple board seats are highly likely to have more experience has been observed in several studies (e.g., Fama & Jensen, 1983; Viviers & Mans-Kemp, 2019). In finding a positive relationship between multiple directors and acquisition success, Harris and Shimizu (2004) offered as a possible explanation that holders of several board seats may simply be more efficient than others as a consequence of this experience, allowing them to discharge their duties despite having relatively less time than directors who do not serve elsewhere.

The positive influence of geographic proximity on acquisition success has been less controversial, even when the distinct, but often overlapping influence of agglomeration economies (e.g., Marshall, 1920; Porter, 1990) is accounted for. Prior scholarship has argued that geographic proximity should play a role even within an agglomeration (Pouder & St. John, 1996; McCann et al., 2016) due to the increased salience of the available information and to firms' increased absorptive capacity in terms of assimilating information from nearby firms. Further, although agglomeration economies are often defined by their limited geographic scope (Rosenthal & Strange, 2001; Orlando, 2004), there are other factors at play that influence the spread of information therein. That is, proximity does not imply a cluster-level architectural knowledge or the development of common, cluster-level norms (Storper, 1995; Tallman,

Jenkins, Henry, & Pinch, 2004; Arikan, 2009), although proximate (but not agglomerated) firms may also benefit from reduced information asymmetries through some of the same mechanisms (e.g., a shared labor pool, both formal and informal interactions among customers and suppliers, or new organizations emerging from parent firms as noted by Keeble and Wilkinson (1999)).

There are other advantages of geographic proximity in abetting acquisition success, too. As noted by Grote and Umber (2006), it becomes easier to integrate an acquired firm when it is more proximate due to relatively lower transportation costs for both goods and workers. Second, geographic proximity facilitates monitoring of managers or firm sub-units, as evidenced by findings regarding nearby subsidiaries (Bockerman & Lehto, 2003) or VC firms (Lerner, 1995; Sorenson & Stuart, 2001; Zook, 2002). Finally, proximity influences information quality. Several studies (e.g., Daft & Lengel, 1986; Storper & Venables, 2004) note the benefits of transmitting information face-to-face versus some other medium, and Malloy (2005), for example, found that geographically proximate analysts have more accurate forecasts than their peers due to the higher-quality information and ease of tacit knowledge exchange that is available in close proximity.

All of the advantages outlined above may explain the consistent support that geographic proximity has displayed regarding acquisition success. Given that information availability increases the likelihood of acquisitions occurring (McCann et al., 2016) and that geographic proximity increases such availability (Coval & Moskowitz, 1999; Petersen & Rajan, 2002), it is small wonder that many studies note its importance in the literature (e.g., Chakrabarti & Mitchell, 2013, 2016; Rabier, 2017).

The meaning of what makes an acquisition successful is more subjective. As described by Nadolska and Barkema (2014), motives for acquisitions can include increasing the scope of

the organization, organizational learning, market entry (or competitor pre-emption), and achieving scale economies. This, combined with the difficulty inherent in assessing what a firm's performance might have been had the acquisition not taken place, complicates the use of accounting measures or cumulative abnormal returns, though some studies have utilized them anyway (e.g., Morosini, Shane, & Singh, 1998; Haleblian & Finkelstein, 1999; Pangarkar & Lie, 2004). Perceptual measures of acquisition success have also been employed by some scholars, though these may be subject to difficulties inherent in using survey data (Haleblian et al., 2009) such as monomethods and recall biases. Retention of the acquired firm is also a common measure (e.g., Shaver, Mitchell, & Yeung, 1997; Vermeulen & Barkema, 2001; Hebert, Very, & Beamish, 2005). Although firm survival must be carefully interpreted, scholars have found a positive relationship between it and perceived success of a business (Geringer & Hebert, 1991), while divestments are often instigated by poor growth in sales or financial underperformance (Bethel & Liebeskind, 1993; Mitchell & Singh, 1993)

HYPOTHESES

There are several reasons to predict that the influence of geographic proximity is stronger than that of multiple directorships in achieving acquisition success, and not only in light of the disparity in empirical support displayed in the literature review for each. First, geographic proximity extends not only to the board but to all levels of the organization's headquarters, increasing the availability of information regarding a target's resources and capabilities. This increase across organizational levels should be beneficial, as shown by prior research. For

example, several studies have noted the importance of middle management in strategy formation (e.g., Wooldridge & Floyd, 1990), and implementation (Huy, 2011); additionally their support may be crucial to acquisition success since they are more severely impacted by acquisition activity (Fried, Tiegs, Naughton, & Ashforth, 1996). It follows that information regarding positive qualities of the target will lead to greater likelihood of an acquisition, or avoiding one altogether if it is a poor fit.

Second, there is an increased availability of tacit knowledge regarding acquisition targets in close proximity that is typically not available at long distances (Coval & Moskowitz, 1999; Grote & Umber, 2006), facilitating the post-acquisition integration that is critical for acquisition success in technology firms such as those in my sample (Ranft & Lord, 2002; Puranam, Singh, & Zollo, 2006). For instance, in examining factors specific to high technology industries, Ranft and Lord (2000) proposed that richer communication between an acquirer and target during the acquisition process should maintain the value of technologies for which the target was acquired.

Finally, acquirers are more likely to be involved in firm governance choices such as replacing poorly-performing managers when a target is proximate geographically (Kang & Kim, 2008). This implies that board functions such as monitoring are weaker with greater distance, a finding which is supported by some studies. For instance, banks face higher transportation costs in assessing the qualities of loan applicants or in monitoring loans, which can be reflected in the terms of the loan (Petersen & Rajan, 1995; Sussman & Zeira, 1995). In the context of manufacturing firms, proximity of headquarters to production facilities lowers communication and monitoring costs (Henderson & Ono, 2008). Kalnins and Lafontaine (2013) also attribute higher failure rates of firms that have distant headquarters to monitoring costs and localized information asymmetries.

Taken together, I argue that measuring proximity may also capture the most efficacious governance effects. Further, the more rich quality of the transfer of information across multiple levels of the organization should facilitate successful acquisition outcomes. I posit:

Hypothesis 1: The positive effect of geographic proximity on acquisition success will

be greater than the effect of multiple directorships.

While they may be most effective within closer geographic proximity, I expect that the effect of multiple directorships will remain positive, and their effects will become more apparent in cases where appreciable distance exists between targets and acquirers. They should remain positive in part since director expertise in performing acquisitions is highly valuable. For instance, prior research has indicated that directors' expertise in product markets and in relatedness to the firm's primary line of business is positively related to acquisition performance (McDonald, Westphal, & Graebner, 2008). Similarly, Harford and Schonlau (2013) discovered that CEOs with both value-creating and value-destroying acquisition experiences still experienced positive and significant outcomes in the directorial labor market, implying that such experience is highly valuable for firms. Field and Mkrtchyan (2017) found similar results, stating that board acquisition experience was positively related to subsequent acquisition performance, although they disputed that poor previous acquisition performance would be helpful.

Some evidence exists that this expertise can be accessed and/or spread through multiple directorships. For example, Haunschild (1993) found evidence that while information regarding

acquisition opportunities were not disseminated through interlocks, general know-how and normative information were. It is intuitive, however, to predict that opportunities might be transmitted through these channels. Private information about a target may lead managers to execute an acquisition if their information is superior to that of other firms (Bradley, Desai, & Kim, 1983), and we can presume that there is a positive relationship between the odds of getting this "better" information and the number of boards on which a director sits (Haunschild, 1993). Although Haunschild did not find evidence of opportunity transmission through interlocks (which are only a two-way tie), empirical support for this idea has been found in other work that examines more broad conceptions of board busyness. Specifically, multiple directorships, especially when a director sits on the boards of both firms, can be valuable in reducing information asymmetries between the acquirer and the target (Cai & Sevilir, 2012; Cukurova, 2012), since fit can be assessed and richer information regarding the target is more readily available.

In sum, prior research has found mixed results regarding the benefits of multiple directorships through an agency lens; however, both abductive reasoning and information economics suggest that they are beneficial to firm outcomes, and these benefits should become more apparent over the distances between targets and acquirers. I thus posit:

Hypothesis 2: As geographic distance between the target and acquirer increases, the positive effect of busy directors on acquisition success also increases.

When firms are serial acquirers, I expect that multiple directorships will prove especially valuable in advising upper management. This expectation is also rooted in the reduction of information asymmetries. Often, firms experience poor acquisition outcomes, even having had past successes, because they mis-apply learning or routines from previous acquisitions (Haleblian & Finkelstein, 1999; Finkelstein & Haleblian, 2002; Zollo & Singh, 2004). Holders of multiple directorships are typically more experienced; it stands to reason that a greater repository of acquisition experience in the boardroom indicates a greater likelihood that the board has encountered this phenomenon previously.

Further, having served on the boards of several firms, busier directors are more likely to avoid simply duplicating previous, firm-specific routines since their experience is by definition spread across multiple firms. This argument is also consistent with prior studies that have demonstrated a positive relationship between directorial experience and acquisition success (e.g., McDonald, Westphal, & Graebner, 2008; Field & Mkrtchyan, 2017).

Finally, the positive relationship between busier directors and serial acquirers should be bolstered by another causal direction, also. Specifically, a series of successful acquisitions is likely to enable firms to attract or retain highly skilled and experienced directors, who in many cases hold multiple board appointments.

To summarize, a greater quantity of multiple directorships should allow the firm to resolve information asymmetries in terms of their own managers' experiences and knowledge. I submit:

Hypothesis 3: Multiple directorships positively moderate the relationship between

acquisition experience and acquisition success.

3. METHODOLOGY

Sample and Data

The sample consists of 97 acquisitions in the semiconductor industry (SIC code 3674) from 2010 to 2015. The semiconductor industry was selected since it has been used in management research that studies spatial phenomena (e.g., Almeida & Kogut, 1999; Rosenkopf & Almeida, 2003), acquisition success (e.g., Kapoor & Lim, 2007; Phene, Tallman, & Almeida, 2012), and both (e.g., McCann et al., 2016), so it is uniquely suited to the task of joining the two streams of research. All acquisitions and related data were drawn from CompuStat. Information regarding firm directors, their other directorships, and firm headquarter locations were manually pulled from DEF 14A reports from the SEC and, where possible, corroborated by data from directors' LinkedIn accounts and CrunchBase. Finally, the data regarding acquirer diversification were drawn from SDC Platinum. Due to the relatively small size of the sample, means were imputed where data was missing. All continuous variables were Winsorized at the 1 and 99 percentile levels to reduce the impact of outliers.

Variables

3.1 Dependent Variable: Following prior research, I operationalized *acquisition success* as being whether the acquisition was retained (coded as '1') or divested (coded as '0') after a 5 year period (e.g., Bergh, 2001; Delios & Beamish, 2001; Nadolska & Barkema, 2014). While financial performance is often used as an indicator of financial success, there are a plethora of other potential motivations to acquire, including organizational learning, strategic reorientation, and entry into new markets. It is also difficult to evaluate what the firm's performance might have been had the acquisition not occurred, and to what degree the acquisition drove performance in any particular case.

3.2 Independent Variables: I calculated the straight-line *geographic distance* between the target and acquiring firm headquarters using Google's API. Although colocation of various branches of the firms in question could reduce information asymmetries, it has been found that plant-level managers are not frequently involved in decisions such as acquisitions (Grote & Umber, 2006). This being the case, I opted to use the distance between headquarters following prior research (e.g., Malloy, 2005; Ragozzino & Reuer, 2011; Belderbos, Du, & Goerzen, 2017).

Multiple directorships was operationalized following Perry and Peyer (2005), with a count of the total number of directors on the board with public and/or privately-held firm directorships, omitting nonprofit and other board service. This carries the benefit of including board experience which may confer knowledge regarding acquisitions or related for-profit activities.

I used the natural log of distance in calculating the interaction between geographic distance and multiple directorships in order to keep all variance inflation factors below the recommended threshold of 3 to alleviate multicollinearity concerns.

3.3 Control Variables: I controlled for a variety of factors that might affect firm acquisition success. Companies that acquire frequently may have gleaned experience that either enhances their management of the acquired firm or the process itself. This being the case, I controlled for the quantity of *recent acquisitions* a firm had made. Specifically, I operationalized this as the number of acquisitions in the past 3 years (Haleblian & Finkelstein, 1999; Bergh, 2001). I also controlled for *acquirer diversification,* or the number of industries that the acquiring firm operated within. Since diversified firms are potentially more likely to acquire related firms than focused firms are (Mitchell & Shaver, 2003), this variable accounts for differences in their respective behaviors.

Some financial measures of the acquiring firms were also important to include. For example, since the capital structure of acquiring firms has been shown in prior literature to influence the choice of target, market value of acquisitions, and returns to the acquirer (Bruner, 1988), I measured *acquirer debt* as the firm's debt (in millions of dollars) following many of the studies examined in King, Wang, Samimi, and Cortes (2020). Further, *acquirer performance* is often accounted for in studies that examine acquisitions (e.g., Haunschild & Beckman 1998, de Sousa Barros, Cardenas, & Mendes-da-Silva, 2020) to reflect empire-building and other perceived managerial tendencies (Eisenhardt, 1989). I measured acquirer performance using the acquirer's yearly return on assets (ROA) following Bettinazzi and Zollo (2017).

I also controlled for size-related factors. The acquisition of a much smaller target should, ceteris paribus, exert less influence on acquisition performance than the acquisition of a larger one. As such, I controlled for this using the quotient of target and acquirer size following prior literature (e.g., Haleblian & Finkelstein, 1999; Harris & Shimizu, 2004), measuring size using the number of firm employees with the variable *size ratio*. I also controlled for *board size* since

directors serving on larger boards are likely to hold more directorships (as noted in Ferris et al., 2003). Further, board size has been the subject of some discussion in the literature, much of it related to acquisitions and decision-making (see Dalton, Daily, Ellstrand, & Johnson, 1999 for a meta-analytic review). Since target distress can affect acquisition performance (Kusewitt, 1985; Weitzel & Jonsson, 1989; Bruton, Oviatt, & White, 1994), I also included *target performance* measured as the target firm's ROA. Finally, larger deals tend to be more complex, which in turn affects the relationships of interest in the study. As such, I controlled for this using the total dollar value, or *deal value,* of the transaction (Harris & Shimizu, 2004).

3.4 Results

Given that my dependent variable (*acquisition success*) was binary, I opted to use logistic regressions to test my hypotheses. I used clustered standard errors. Table 1 shows descriptive statistics of the variables, and table 2 contains the correlation matrix. Each variable was tested for multicollinearity, but all variance inflation factors were below the recommended threshold of 3, suggesting that multicollinearity was not a concern.

Table 3 provides the results of the tests of my hypotheses. Model 1 contains only control variables. Interestingly, acquisition experience is strongly and significantly negative, which is consistent with prior research that has failed to find a positive effect of firm-level experience on desirable outcomes, possibly due to poor codification of acquisition know-how or the lack of applicability of prior knowledge (Haleblian & Finkelstein, 1999; Finkelstein & Haleblian, 2002; Zollo & Singh, 2004).

Model 2 incorporates all of the control variables and adds geographic distance, while Model 3 incorporates the impact of multiple directorships. The coefficient is smaller for multiple directorships and only weakly significant at the .1 level, which is consistent with hypothesis 1. Model 4 tests hypothesis 2 by adding the interaction effect between geographic distance and multiple directorships. This is significant and positive, supporting hypothesis 2, which stated that multiple directorships would be more beneficial for geographically distant acquisitions. In Model 5, I tested the interaction effect between multiple directorships and recent acquisition experience. The result was significant and positive, supporting hypothesis 3, which stated that multiple directorships would be beneficial for serial acquirers. Model 6 presents the full model.

As argued by Hoetker (2007), it is important to examine marginal effects in addition to the significance of coefficients in logistic regressions. My marginal effects analysis was run at the means and is depicted in the correlation matrix.

My results are qualitatively unchanged when probit or linear probability models are used.

4. DISCUSSION

Scholars have frequently examined the phenomenon of multiple directorships through a dichotomous agency perspective - either directors are self-motivated to assume too many board seats, and consequently offer low quality service, or their superior experience and qualifications enable them to discharge their duties in a competent fashion, with maintenance of their good reputations motivating them to perform well. In incorporating spatial economics, I have demonstrated some support for the reputational hypothesis, with the important caveat that geographic distance between targets and acquirers is a boundary condition due to substitutional effects. Although prior research has long observed that multiple directorships are a spatial phenomenon (Kono et al., 1998), this insight has not, to my knowledge, been incorporated in the large body of research over the intervening period, nor has it been tested as it relates to corporate governance concerns. Further, the positive effect of multiple directorships can potentially ameliorate the negative effects of acquisition experience through enhancing the board's resource provision capabilities. Specifically, more experienced directors are better able to avoid the mis-application of prior acquisition experience and routines that drive acquisition failure, making "overboarded" directors particularly valuable for firms that acquire frequently.

The results of this study are consistent with recommendations of governance scholars who argue in favor of examining mechanisms as they operate in tandem rather than in isolation (e.g., Misangyi & Acharya, 2014). Information asymmetries lie at the root of agency, transaction cost, resource-based, and other major theories frequently used in management (Bergh et al., 2019); this being the case, future research might profit from close examination of substitutive

and complementary effects between mechanisms that reduce such asymmetries in order to enhance the predictive accuracy of the theoretical perspective that is employed.

Specific to this study, I argued and found evidence to the effect that multiple directorships are more beneficial than previous research has shown due to a dearth of attention to spatial considerations. The lack of statistical significance for the effect of multiple directorships on acquisition success on its own may actually strengthen this case inasmuch as that when geographic proximity's effects are not accounted for, benefits of multiple directorships which accrue to the firm often go unrecognized.

Interestingly, my results also have implications for the debate surrounding the effect of prior experience on merger and acquisition outcomes. Prior research has been inconclusive on this point. While some studies show that skills in performing acquisitions can be built with experience (Fowler & Schmidt, 1989; Hitt, Harrison, Ireland, & Best, 1998), others find prior experience is prone to being poorly applied (Haleblian & Finkelstein, 1999; Zollo & Singh, 2004) or that its positive effects depend on characteristics of the top management team (Nadolska & Barkema, 2014). Regrettably, it is beyond the scope of this study to establish the exact reason. The result may be an artifact of my operationalization of acquisition success as it echoes findings in other studies which measure such success in the same way (e.g., Bergh, 2001; Delios & Beamish, 2001; Nadolska & Barkema, 2014).

My study is not without limitations. For example, board involvement was not measured despite being critical to my arguments, and to firm outcomes (Judge & Zeithaml, 1992; Judge & Talaulicar, 2017). It was simply assumed, since it has been noted in the literature that board involvement peaks at critical junctures such as acquisitions (Lorsch & MacIver, 1989). Further, I did not take into account the relative size of the firms that directors were tied to, which can be

used as a proxy for their skill given that monitoring larger firms should be more difficult (Rubin & Segal, 2019). Another limitation was that I did not establish the direction of causality regarding multiple directorships and serial acquirers in an empirical sense. That is, while multiple directorships may be useful in achieving acquisition success for the reasons outlined, it might also be the case that successful acquisitions result in larger, more prestigious firms, who in turn are more attractive for directors to join.

My results offer several possible avenues for future research. One suggestion might be to examine the locales in which multiple directors are situated. A more detailed network analysis might indicate that directors with homogeneous ties to external information, or similar experiences in performing acquisitions, equates to redundancies that add little value. Relatedly, multiple directorships across several agglomerations could potentially lead to the ability to access a wide variety of cluster-level competencies or knowledge (Lawson, 1997; Tallman et al., 2004), which could be highly beneficial for firm outcomes such as innovation or performance. There is also an inherent selection bias at play in that some firms may opt to forego M&A activity entirely due to the potential for value destruction (see Bruner, 2002 for a detailed review). As such, further explorations of different dependent variables would be ideal.

5. REFERENCES

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CHAPTER 2

CORPORATE GOVERNANCE, AGGLOMERATIONS, AND INNOVATION

ABSTRACT

Although much prior research has focused on leadership structures and the composition of boards of directors, it is difficult to predict how the deployment of these characteristics might be affected by the presence of agglomeration economies. Joining the literatures on the topics of corporate governance and Marshallian externalities, we utilize fuzzy set qualitative comparative analysis in order to determine how these factors might act in concert. Our findings broadly indicate that while predictions rooted in an agency perspective are largely valid for agglomerated firms, highly innovative firms which are more geographically remote tend to utilize a dual CEO, appoint a preponderance of inside directors, and diversify into a broad range of industries. Implications for theory and practice are discussed.

1. INTRODUCTION

Building on insights stemming from the separation of ownership of a firm and control (e.g., Bearle & Means, 1935), scholars have identified one crucial role of the board of directors as managerial oversight (i.e., monitoring) in order to curtail managerial opportunism (Jensen & Meckling, 1976; Fama & Jensen, 1983). In order to act as effective monitors, directors on the board may require attributes that facilitate impartiality and curb conflicts of interest (Eisenhardt, 1989; Daily, Dalton, & Cannella, 2003). This can be of particular importance in high-technology industries, where innovation imposes additional agency costs by increasing the gap between innovator and investor knowledge (cf. Zahra, 1996). Consequently, much corporate governance scholarship has placed emphasis on board attributes that facilitate monitoring of management, such as employing directors who are independent of the firm (e.g., Fama, 1980) and the separation of the CEO and board chair roles (e.g., Finkelstein & D'Aveni, 1994). Yet, empirical support for the agency perspective remains inconsistent despite a strong theoretical basis for the idea that these attributes should curb opportunism and thereby enhance firm outcomes such as innovation (e.g., Dalton, Daily, Ellstrand, & Johnson, 1998; Krause, Semadeni, & Cannella, 2014; Boivie, Bednar, Aguilera, & Andrus, 2016).

Given this lack of consistency in the literature, many scholars have moved beyond examining a direct relationship between board attributes and outcomes and have examined institutional (e.g., Chen, Peng, & Saparito, 2002) or contextual factors (e.g., Coff, 2003) that might influence managerial opportunism. One example of such a context is economic geography. Economic geography scholarship has also examined the effect of managerial opportunism on firm outcomes as well as how it can be relatively constrained or enabled by the

presence of "clusters," or "agglomerations," which are characterized by the collocation of firms within the same industry (Marshall, 1920; Porter, 1998). Although clustering should influence opportunism, the direction of that effect is also the subject of some debate. Some studies hold that opportunism should be relatively constrained in clusters due to social factors such as trust (Hervas-Oliver, Lleo, & Cervello, 2007; Bonte, 2008), market characteristics (Helsley & Strange, 2007), or social sanctions (Diez-Vial & Alvarez-Suescun, 2011), while others contend and find that firms in clusters are prone to knowledge appropriation concerns (Shaver & Flyer, 2000) and that monitoring mechanisms such as formal contract provisions might be more important in an agglomerated context in order to prevent such "spillovers" (Devarakonda, McCann, & Reuer, 2018).

Given the relative lack of cross-pollination between corporate governance and agglomeration literature, while it is clear that both board attributes and clustering can affect opportunistic behavior, guidance is limited for theorists and practitioners as to how they might act in concert. In this study, we aim to help bridge this gap by asking, "How is the governance of highly innovative firms affected by the presence of Marshallian externalities?" In order to answer this question, we employ a neoconfigurational approach (Misangyi, Greckhamer, Furnari, Fiss, Crilly, & Aguilera, 2017) that allows us to examine how these factors operate in tandem. Specifically, we identify ways in which successful firms deploy governance mechanisms in the face of agency costs, substituting or complementing them for each other to reach multiple pathways to innovation.

Given the difficulty in ascertaining *ex ante* the manner in which these causal conditions might combine to produce successful innovation outcomes as well as the possibility of causal asymmetry (i.e., the idea that some factors which lead to innovation success might also lead to

failure), we utilized fuzzy set qualitative comparative analysis (fsQCA), a set-theoretic technique that permits the researcher to examine multiple configurations of attributes that lead to high (and low) innovation performance on a consistent basis. Our results indicate that non-diversified agglomerated firms tend to do well with a greater percentage of outside directors on the board, whereas firms that are more geographically remote defy the expectations of an agency theoretic lens, utilizing a dual CEO, a relatively low proportion of outside directors, and high levels of factors which increase agency costs (i.e., diversification and R&D spending) to obtain superior innovative outcomes. This technique is well-suited for our research question since it allows us to refine and extend prior research regarding the manner in which these causal conditions promote innovation success.

Our study contributes to theory by establishing an important boundary condition to agency prescriptions that have characterized much corporate governance research, namely that firms in an industry can obtain competitive advantage through the lower monitoring costs which agglomerations facilitate. At the same time, more remote firms should not attempt to compete in a similar fashion, as they will face higher monitoring costs and a reduced threat of knowledge spillovers. Finally, our results are consistent with some studies (e.g., Boyd, 1995; He & Wang, 2009; Krause, Semadeni, & Canella, 2014) which hold that CEO duality is a complicated phenomenon whose contribution to firm outcomes can vary depending upon both external and internal conditions. Given the dramatic difference between successful governance configurations for agglomerated and non-agglomerated firms, it may be the case that prior governance research which has not accounted for agglomeration effects has been misspecified.

We also extend agglomeration literature, specifically as it pertains to opportunism. While we do not directly answer the question of whether clusters mitigate or enable opportunism, we do

note that firms in close proximity to competitors tend to deploy more intra-firm safeguards

against it, an observation which is consistent with prior research on inter-firm collaborations

within clusters (Devarakonda et al., 2018).

2. LITERATURE REVIEW

In management research, scholars have frequently examined the implications of agglomeration economies as they pertain to firm outcomes, in industries such as semiconductors (Saxenian, 1994; Almeida & Kogut, 1999; Rosenkopf & Almeida, 2003), biotechnology (Folta, Cooper, & Baik, 2006; Casper, 2007; McCann & Folta, 2011), or hotels (Chung & Kalnins, 2001; Kalnins & Chung, 2004; Canina, Enz, & Harrison, 2005). These externalities tend to provide local firms with advantages in terms of cost, productivity, and innovation, although scholarly consensus as to their effects on firm performance is decidedly weaker (see Mathias et al., 2020 for a meta-analytic review).

This literature is rooted in the work of Marshall (1920), who offered three possible explanations (beyond geographic proximity of production factors) for improved firm outcomes within agglomerations. First, sharing of suppliers can result in benefits such as internal scale economies. Second, labor market pooling permits specific matches between employee skills and employers' demand for those skills, which decreases risk for both parties. Third, knowledge spillovers tend to occur within localized industries, allowing the exchange and recombination of knowledge. These characteristics tend to positively affect regional wages, productivity, and economic growth (Rosenthal & Strange, 2004).

Such impacts can also extend beyond innovation, performance, or other factors identified by previous studies. As an example, geographic proximity, a characteristic of agglomerations, reduces information asymmetries between parties to the extent that it has served as a proxy for reduction of information asymmetry in prior research (e.g., Ragozzino, 2009; Ragozzino &

Reuer, 2011). Given that information asymmetry plays a significant role in several prominent theoretical perspectives (Bergh, Ketchen, Orlandi, Heugens, & Boyd, 2019), including those commonly employed in corporate governance research such as agency or resource dependence theory (e.g., Hillman & Dalziel, 2003), we contend that the degree of industry agglomeration should affect the monitoring costs of a firm and consequently, the configuration of various elements of a firm's board of directors.

Cluster-level Constraints on Opportunism

Supporting this contention, a sizable body of work suggests that opportunism should be limited within agglomerations. The reasons are, broadly, threefold. First, geographic proximity tends to facilitate monitoring, which in turn reduces principal-agent conflicts. Second, monitoring costs should be lower within agglomerations for other reasons, too. For example, social interactions and networks can facilitate monitoring activities and discourage opportunistic behaviors. Finally, organization- or industry-level factors such as thicker input markets should, ceteris paribus, provide suppliers with a certain degree of protection against opportunism. Below, we discuss each of these elements in turn.

Geographic Proximity and Monitoring

That geographic proximity facilitates monitoring is not novel - indeed, North (1989) notes that distance between the Spanish monarchy and their colonies exacerbated the problem of monitoring agents abroad. More recent studies have argued and found similar results. For example, Sussman and Zeira (1995) developed a model in which banks face monitoring costs that increase with distance, and later empirical studies had findings that were consistent with this model (e.g., Peterson & Rajan, 2002; Degryse & Ongena, 2005). Other investors, such as blockholders (i.e., those who hold 5 percent or more of a company's outstanding shares) have also been shown to prefer targets within a close vicinity due to informational advantages, of which ease of monitoring is a significant factor (Kang & Kim, 2008).

Much of the evidence regarding geographic proximity and monitoring comes from studies that examine venture capital firms and their investments. The logic underlying these findings is fairly straightforward. That is, a venture capital firm's monitoring and advising role for firms in their portfolio tends to involve frequent visitation. Monitoring and advising consumes about half of a venture capitalist's time, and their time spent onsite at firms in their portfolio is typically anywhere from 4 to 5 hours per month (if they are playing a leading role in the investment) or at least once per quarter if another firm is leading the investment (Gorman & Sahlman, 1989). As a consequence, venture capitalists tend to invest in geographically proximate firms in order to minimize the cost of their involvement (Gompers & Lerner, 1999). This finding has been repeated even in industries which, in theory, should be independent of geography, such as internet-based firms (Zook, 2002).

One example of the importance of geographic propinquity in venture capital monitoring is found in the work of Lerner (1995), who found that venture capital representation on the boards of private biotechnology firms in their portfolios was greater when the need for

monitoring also increased, and that the need for monitoring was higher with greater geographic distance. These findings are in accordance with the predictions of Fama and Jensen (1983) and Williamson (1983), who contend that board composition will align with the need for oversight. Specifically, they note that outside directors should have greater representation when managers are more likely to pursue self-interest at the expense of shareholders. Lerner (1995) extended this argument to venture capital firms, arguing and finding that if venture capitalists are effective monitors, they should have greater representation on boards when additional oversight is necessary.

This finding is comparable to those of Sorenson and Stuart (2001), who explored the effects of geographic propinquity on venture capital monitoring as well as moderating factors. The authors found that, as expected, venture capital firms tended to invest in nearby prospects, though prior experience with syndicated investments meant that they would be more likely to invest in an opportunity when a trusted partner was involved. Venture capital experience within an industry widened the geographic area in which they might invest, as did general investment experience and venture capital firm network centrality.

Other Factors Which Affect Monitoring Within Clusters

Other studies contend that monitoring costs are lower within clusters, which should lead to increased monitoring (Burkart et al., 1997). Firms in clusters also have access to superior information (Porter, 1990; Bianchi & Bellini, 1991; Pouder & St. John, 1996) through factors such as chance meetings between firm executives facilitated by geographic proximity (Saxenian,

1994), and some evidence suggests that such common knowledge that is accessible to cluster members (e.g., Geroski, 1995) includes information that might be relevant to monitoring.

For example, several studies have found that frequent face-to-face interactions, which often occur within agglomerations (e.g., Marshall, 1920; Porter, 1998), reduce the need for formal monitoring. In their study of young, technology-based firms in the United Kingdom, Yli-Renko and colleagues (2001) argued and found that frequent social interactions led to higher levels of product innovation, in part because these interactions reduced the perception of the necessity of monitoring, allowing relationships to focus on information processing and knowledge exchange. Catalini (2018), in a study of university scientists, noted that the monitoring facilitated by physical proximity allowed parties to lower joint execution costs. Extending this logic to regional economies, Laursen, Masciarelli, and Principe (2012) argued and found that product innovations, driven in part by reduced monitoring costs, were more effectively bolstered by externally acquired R&D.

Another mechanism by which face-to-face interactions partially obviate formal monitoring requirements is trust. Trust reduces the need for formal monitoring (Dyer & Singh, 1998); the creation of trust is greatly facilitated by proximity and face-to-face interactions (Dupuy & Torre, 2006) and may be necessary for clusters to be effective (Mesquita, 2007). At the cluster level, prior research has shown that trust between firms within a cluster is greater than that between more geographically distant firms. For example, in the context of German aeronautical companies, knowledge spillovers and agglomerations were found to be positively associated with trust, albeit negatively moderated by appropriability problems (Bonte, 2007). Other studies have argued for, and found, an inverted U-shaped relationship between trust and innovation performance in clusters, contending that time and effort which engenders strong

levels of trust could instead be directed towards monitoring of a relationship and/or forging new professional relationships with other firms (Molina-Morales & Martinez-Fernandez, 2009). Social networks also constrain opportunism (Granovetter, 1985); and although these networks are distinct from clusters, their effects often overlap (see for example Bell, 2005 for a detailed disaggregation of these effects).

Vertical Disintegration Within Clusters

Constraints on opportunism within agglomerations are further argued to be reflected within organizational forms (although some studies attribute this to cost-reduction factors rather than a reduction in opportunism, e.g., Goldstein & Gronberg, 1984; Holmes, 1999). For example, Helsley and Strange (2007) develop a model wherein agglomerated firms are less likely to vertically integrate thanks to thicker input markets, which consequently mitigate the threat of opportunism.

This finding has also held in empirical studies which show that agglomerated firms are more likely to externalize transactions rather than vertically integrate them thanks to scale economies, property rights concerns, or the reduced likelihood of opportunism within a shared social milieu (Cainelli & Iacobucci, 2009; Figueiredo, Guimaraes, & Woodward, 2010; Diez-Vial & Alvarez-Suescun, 2011). Such findings have also been observed in developing economies as well (e.g., Li & Lu, 2009; Ali, Peerlings, & Zhang, 2014), although Ali and colleagues (2014) attribute this vertical disintegration to inefficient capital markets. Nevertheless, employing an instrumental variable approach, Li and Lu (2009) established

causality for vertical disintegration by geographic concentration of industrial activity, attributing

their findings to both cost reduction concerns and mitigation of opportunistic behaviors. This is

despite China, the setting of that study, having a relatively low degree of industrial concentration

when compared to other settings that are frequently employed in the study of industrial clusters

(Lu & Tao, 2009).

3. METHODOLOGY

Sample

Our sample consists of 135 public and private firms in the semiconductor industry that are based in the United States. The semiconductor industry offers numerous advantages that make it well-suited for the present study. First, semiconductors have been the setting of prior research in both corporate governance (e.g., Boeker & Goodstien, 1993; Boyd, 1995; Krause, Filatotchev, & Bruton, 2016) and agglomeration economies (e.g., Almeida & Kogut, 1999; Cheyre, Klepper, & Veloso, 2015; McCann, Reuer, & Lahiri, 2016). Second, as noted by Phene and Almeida (2008), the semiconductor industry carries several benefits for studies pertaining to innovation. Specifically, since the United States is a major market, design, and manufacturing hub for semiconductors, all major semiconductor companies utilize the United States' system for patenting. Finally, firms may opt to avoid patenting as a strategic choice, thereby limiting the effectiveness of patents as an innovation measure. However, competitive factors within the industry lead semiconductor firms to patent innovations frequently, and all semiconductor companies of import have a large patent portfolio (Almeida, 1996).

Our sample was assembled from multiple data sources. First, data related to the board of directors and CEOs were drawn from Standard & Poor's ExecuComp database and cross-checked with DEF-14A proxy statements filed with the SEC where possible, as well as LinkedIn and Crunchbase. Next, patent data were gleaned from the WRDS patent database. Finally, information regarding the SIC codes in which the firms were active as well as their research and development intensity were gathered from the Reuters ThompsonOne Financial Database.

Analytical Technique

We utilize qualitative comparative analysis (QCA) in the present study. Specifically, we use fuzzy set QCA (fsQCA), a QCA variant which allows the researcher to assign graduated membership levels to variables in sets. This technique has increasingly been adopted by corporate governance researchers (Misangyi & Acharya, 2014; Lewellyn & Fainshmidt, 2017; Mellewigt, Hoetker, & Luetkewitte, 2018) and agglomeration scholars (e.g., Speldekamp, Knoben, & Saka-Helmhout, 2020) as it offers several unique advantages over traditional methodological approaches.

First, it allows the researcher to assess causal asymmetry, or the idea that factors which lead to the outcome variable will not necessarily lead to its absence. This is somewhat intuitive as successes are not always mirror images of failure in a causal sense. Second, fsQCA permits examination of equifinal outcomes. If asked to add two integers to obtain a value of four, you might provide an answer of two plus two, three plus one, or zero plus four. Similarly, there may be multiple legitimate pathways towards reaching a high-performance outcome. Finally, conjunctural causation effects can be examined within these outcomes. An example of this would be driving a car: One presses the accelerator pedal to travel forwards and the brake pedal to stop but pressing both will not necessarily result in a medium rate of speed. In the same way, causal conditions that have a particular impact on an outcome when used on an individual basis will not necessarily combine in like fashion. The use of fsQCA allows us to examine these effects.

Measurement and Calibration of Conditions

We utilized one outcome condition to examine innovation quantity and five causal conditions - two which represent agency costs, two which represent board-level factors which should mitigate them, and an agglomeration measure. We operationalized innovation quantity as a simple count of the number of patents applied for and granted to an assignee firm over a specific time period (the year 2013, in our case) following prior research (e.g., DeCarolis & Deeds, 1999; Corredoira & Rosenkopf, 2010).

The agency cost conditions were operationalized in a manner consistent with prior literature. *R&D Intensity* was calculated as the ratio of research and development spending to the organization's total annual sales (e.g., Haleblian, McNamara, Kolev, & Dykes, 2012; Certo, Withers, & Semadeni, 2017). Similarly, *Diversification* was a simple count of the quantity of 4-digit SIC codes in which a firm was active over the sample period (Villalonga, 2004; Choi, Menon, & Tabakovic, 2021).

For the conditions concerning the board of directors, we obtained data regarding CEO duality and board independence. *CEO Duality* was operationalized as a dummy variable following many prior cross-sectional studies (as noted in a meta-analytic study by Garcia-Meca & Sanchez-Ballesta, 2009). *Board Independence* was also operationalized with a common measure in governance literature, i.e., a ratio of outside to total directors (e.g., Westphal & Graebner, 2010; Witt, Fainshmidt, & Aguilera, 2021).

As discussed in previous studies, agglomeration economies have been operationalized in a variety of ways which carry distinct advantages (McCann & Folta, 2008). We opted to utilize the percentage of our sample that was active in a specific metropolitan statistical area (MSA) (Folta et al., 2006; McCann & Folta, 2011) to operationalize *Agglomeration* as agglomeration

effects tend to dissipate at more distant levels (Jaffe, Trajtenburg, & Henderson, 1993). We used

firm zip codes in conjunction with crosswalk files from the US Department of Housing and

Urban Development to assign sample firms to an MSA (2021).

Before an fsQCA analysis is performed, the data must be calibrated. This entails

assigning set membership scores for each causal condition (see Ragin, 2008 for an in-depth

discussion). This is an advantage of fuzzy-set QCA; while crisp-set analyses can only examine

full members (i.e., those with a score of 1) or non-members (i.e., those with a score of 0) of a set,

fuzzy set analyses allow the researcher to assign thresholds in between these extremes, reflecting

potential ambiguity regarding set membership. Calibration thresholds can be based on theory or

previous findings (Rihoux & Ragin, 2009), or, when those factors provide little guidance, can be

assigned based on sample-specific measures such as quartile splits (Crilly, 2010; Judge,

Fainshmidt, & Brown, 2014). We utilized quartile splits in our analysis. Specifically, we used

fsQCA 3.1's calibration algorithm to split firms into full set membership (i.e., the 75th

percentile), maximum ambiguity in membership (i.e., the 50th percentile), and full non-

membership (i.e., the 25th percentile) following prior research (e.g., Mallon, Lanivich, &

Klinger, 2018). We altered variables which fell precisely at .5 by coding them with a value of

.499 in order to prevent them from being dropped during the analysis (Crilly, Zollo, & Hansen,

2012; Lewellyn & Fainshmidt, 2017).

Data Analysis

Necessity Analysis. A necessary condition in QCA is one that is required in order for the

outcome to be reached (Rihoux & Ragin, 2009), and it is appropriate to check for the necessity

of each individual variable before running the analysis (Ragin, 2009). A condition that has a

consistency value between .9 and .99 is deemed to be almost always necessary, while a condition

that has a consistency value of 1 would be considered to be always necessary (Schneider,

Schulze-Bentrop, & Paunescu, 2010). Given that none of our conditions were within this range,

they were retained for the subsequent QCA analysis. Table 1 shows the results of our necessity

analysis, confirming that no conditions were necessary for the presence (or absence) of high

innovation quantity.

Insert Table 1 about here

Frequency Threshold. The fsQCA 3.1 program creates a truth table which consists of all

of the combinations of causal conditions which are logically possible in order to associate

configurations of agency costs and controls which correspond to high (and low) levels of

innovation quantity. The total ways in which this truth table can be arranged is represented by

2^k, with k representing the quantity of causal conditions employed within the analysis. This

being the case, there are 32 configurations which are possible (in theory) in our analysis. We

further narrowed the truth table by assigning a frequency threshold of three observations at

minimum. That is, a minimum of three firms had to be assigned to a particular configuration in

order for the configuration to be incorporated into our analysis (Garcia-Castro, Aguilera, &

Arino, 2013; Lewellyn & Fainshmidt, 2017). This enhances the analysis by removing

configurations which rarely occur, essentially acting as a robustness measure. In establishing a

frequency threshold, it is critical that relatively few observations be eliminated. Specifically, the

base level recommended is 75 percent of a sample's observations (Ragin, 2008). After setting

our threshold, 86 percent of the firms in our sample remained, well exceeding the recommended minimum.

Consistency Values. The next step in our analytical procedure involved employing consistency values in order to determine whether any of the remaining configurations indicated a high level of innovation quantity. Consistency values are displayed as a matter of degree, with a higher consistency value indicating greater commonality between membership in the configuration and membership in the outcome of interest (Ragin, 2008). Consistent with prior literature, we assigned a consistency cutoff of 0.80 for high levels of our outcome of interest (i.e., innovation quantity) (e.g., Speldekamp et al., 2020). The fsQCA 3.1 software subsequently minimized the configurations with the Quine-McCluskey algorithm, producing an array of configurations which were sufficient for high levels of innovation quantity. These consistency values were complemented with a proportional reduction in inconsistency (PRI) value of greater than .70. The PRI helps to avoid combinations of attributes which are present in both the desired outcome as well as its absence (Greckhamer, 2016).

We repeated the frequency and consistency procedures outlined above, setting the outcome condition as the negation of high innovation quantity in order to determine which configurations would consistently lead to low levels of innovation quantity. This produced no configurations, however. In order to obtain our results for low innovation quantity, it was necessary to lower the frequency threshold to 1 and the consistency threshold to the minimum recommended level of .75 (Ragin, 2008).

3.1 RESULTS

A correlation matrix containing descriptive statistics for our causal and outcome

conditions is displayed in Table 2, which was calculated using raw (i.e., pre-calibrated) data.

The significant and negative correlation between outside directors and R&D intensity is

consistent with the findings of prior research (e.g., Baysinger, Kosnik, & Turk, 1991). This is in

alignment with our theorizing as the joint effects of these conditions should affect outcomes

depending upon their configuration.

Insert Table 2 about here

Table 3 demonstrates the configurations of causal conditions that our analysis indicates

are sufficient for producing both high and low levels of innovation quantity. Consistent with

prior governance research that has employed fsQCA, we report the complex solution rather than

the intermediate and/or parsimonious ones (Garcia-Castro et al., 2013; Jackson & Ni, 2013;

Lewellyn & Fainshmidt, 2017). This made sense in our case as incorporating the intermediate

and/or parsimonious solutions into our results involves employing counterfactuals - that is,

"theory-guided hunches" regarding the manner in which causal conditions will affect the

outcome (Schneider & Wagemann, 2012, p. 168). Given the aforementioned uncertainty

regarding the ways in which our causal conditions might consistently produce high or low

innovation quantity, we chose to have the findings represent the data to the extent possible rather

than employing assumptions that might be considered subjective.

Insert Table 3 about here

These results show three total configurations of causal conditions; two of those lead to high innovation quantity, while one leads to the negation of high innovation quantity. In the first configuration, we observe firms with high R&D intensity, high board independence, high degrees of agglomeration, and low levels of diversification achieving high innovation quantity. CEO duality is blank, indicating that some firms in this configuration utilized dual leadership structures, while others did not. For the second configuration, firms with high R&D intensity, high diversification, and CEO duality consistently achieved high innovation quantity. These firms were relatively low in terms of their board independence and degree of industrial agglomeration. In the final configuration, in which the outcome condition was set to the negation of innovation quantity, we observe a high degree of diversification, but a low degree of all other causal conditions.

Also displayed are the coverage and consistency values calculated by the fsQCA software for both each configuration as well as the overarching solution. Coverage denotes the amount of the outcome that is explained by each configuration (and all configurations, at the solution level), while consistency scores illustrate the degree to which a configuration results in an outcome (and again, all configurations at the solution level). See Ragin (2006) and Woolside (2013) for a thorough explanation of both coverage and consistency values. Within coverage, fsQCA calculates both raw and unique coverage values. The raw coverage specifies the proportion of cases which contain both that configuration and the outcome (Ragin, 2008), while

the unique coverage denotes the coverage by a specific path (Schneider & Wagemann, 2012).

All of these fall in acceptable ranges, and each configuration helps to explain organizational

innovation since the unique coverage values are greater than zero (Ragin, 2008).

Robustness Analyses. We followed best practices as outlined by prior research in testing

to see whether different consistency thresholds would merit a substantively dissimilar

interpretation of our results (Schneider & Wagemann, 2012). Specifically, we chose a higher

consistency threshold of 0.84 to overcome an observed lacuna in the truth table (Crilly, 2010;

Lewellyn & Fainshmidt, 2017). With this increase in threshold, configuration 2 is removed from

the solution set. Solution-level coverage dropped to 0.29, while the solution-level consistency

increased slightly to 0.87. This alteration is expected and consistent with the results reported in

Table 3. Since the negation of our outcome variable only produced one configuration at

minimum recommended values, this result should be interpreted with caution.

4. DISCUSSION

Although large literatures in corporate governance (e.g., Wu, 2008; Balsmeier, Buchwald, & Stiebale, 2014; Zhang, Chen, & Feng, 2014) and geographic economics (e.g., Jaffe et al., 1993; Mathias et al., 2020) have explored innovation, to our knowledge, the two have not been previously joined in an effort to understand how corporate governance might be differentially affected by the firm's presence in a Marshallian externality. Our study contributes to these literatures by demonstrating that firm location relative to competitors has direct implications for the efficaciousness of various board characteristics as they pertain to firm outcomes, and provides some empirical examples as to how.

In keeping with recommended practices for configurational theorizing, we examine each configuration for overarching themes (Furnari, Crilly, Misangyi, Greckhamer, Fiss, & Aguilera, 2021). The first configuration in Table 3 is largely consistent with an agency perspective for agglomerated firms, being characterized by a preponderance of outside directors and limited diversification (Jensen & Meckling, 1976; Fama & Jensen, 1983). It may be the case that although clustered firms have fewer monitoring needs due to factors such as predictability in non-opportunistic behavior (Iammarino & McCann, 2006), there is a "crowding out" effect where the efforts spent in developing trust with local firms might be better directed towards innovation (Molina-Morales & Martinez-Fernandez, 2009).

The exception to the above is that while CEO duality is thought to increase agency costs (e.g., Finkelstein & D'Aveni, 1994), our results indicate that within configuration 1 it was present for some firms and absent for others. Following prior research, we opted to examine the

cases within the solution set of the analysis (Greckhamer, Furnari, Fiss, & Aguilera, 2018). Of

the firms with dual CEOs in configuration 1, two were led by founder CEOs, which should face

reduced agency costs (Boivie, Lange, McDonald, & Westphal, 2011); yet, two others rejoined

the CEO and chair roles after a succession event, which some evidence suggests should increase

agency problems (Quigley & Hambrick, 2012). The explanation may lie elsewhere. For

example, CEO duality has been shown to positively moderate the relationship between

innovative knowledge assets (such as patents) and firm performance (He & Wang, 2014), and

has been shown to be substituted for by other governance mechanisms in the context of firm

performance (Misangyi & Acharya, 2014).

The second configuration consists of firms which are relatively more geographically

remote and runs counter to what we would expect from an agentic view. Despite the higher

agency cost of being diversified, these firms utilize a dual CEO and a relatively high percentage

of inside directors to achieve high innovation quantity. This finding is consistent with studies

that have argued and found that agglomerated firms may face greater appropriation concerns

from proximate competitors (e.g., Shaver & Flyer, 2000; Devarakonda et al., 2018).

While it is conceivable that geographic remoteness means a reduced need for governance

mechanisms designed with oversight in mind, an alternative interpretation might be that for

diversified firms, insiders' firm-specific knowledge is more beneficial (e.g., Raheja, 2005). If

that is the case, we should observe diversified firms with more inside directors as being

consistently innovative regardless of the degree of industrial agglomeration that is present. In

order to test this argument, we split the sample, deleting all cases with an agglomeration value

below .5 (i.e., those cases which were more "outside" than "inside" of agglomerated sets). This

result is presented in Appendix A. The new sample consists of 64 observations and the results

presented possess a frequency threshold of 1. Although a variety of configurations were consistently successful at achieving innovation quantity, all of them included outside directors, even for diversified firms.

There is also a normative argument to be made in both configurations (e.g., DiMaggio & Powell, 1983; Scott, 1995) in that the adoption of CEO duality and a relatively high level of outside directors might simply reflect pressures for mimetic isomorphism moreso than an effort towards effective governance but given the lack of conformity among firms in our sample, the evidence indicates that this is not the case. For example, in configuration 1, only 11 firms out of the 45 within the same agglomeration were present in the solution set, indicating a lack of isomorphism among the cluster more generally. Similarly, the low coverage value for configuration 2 indicates that even if this were a widespread norm within the industry among diversified, remote firms, this specific combination of causal conditions was rarely employed, which implies the absence of isomorphism. Since under- or over-conformity to corporate governance norms have been argued to affect firm outcomes at the national (Aguilera, Terjesen, & Judge, 2018) and global (Witt. Fainshmidt, & Aguilera, 2021) levels, it may be the case that norms are less likely to be observed among highly innovative firms. Little is known about differential responses to normative pressures between agglomerated and nonagglomerated firms, although some exploratory work has been done (e.g., Tan, Shao, & Li, 2013).

Our third configuration demonstrates that for firms which consistently reached the negation of innovation quantity. In other words, these firms consistently failed to produce a relatively high level of innovation output. Firms in configuration 3 exhibited a high degree of diversification but a low degree of all other qualities. Among other things, this means that firms which do not invest heavily in R&D might not be able to compensate in terms of their innovative

output with scope economies, as some previous studies suggest (e.g., Baysinger & Hoskisson, 1989; Alonso-Borrego & Forcadell, 2010).

One limitation of our study is the cross-sectional nature of QCA. Since prior research indicates that firms may go through "phases" of exploratory and exploitative innovation (Mudambi, Swift, & Hannigan, 2015), it may be the case that firms which we found to be highly innovative in one year were not consistently highly innovative beyond the study period.

5. CONCLUSION

This study examined the effect of Marshallian externalities on the adoption of governance structures. Our results indicated that agglomerated firms tended to benefit from the adoption of agency-based thinking in terms of innovation. At the same time, non-agglomerated firms tended to benefit from the opposite. To theory, our study contributes the idea that economic geography is a central concern in disentangling the effects of the adoption of governance mechanisms. For firms that were not successful in producing innovations in a significant quantity, our data provides some evidence that R&D spending cannot be substituted for in respect to producing innovation, a non-obvious finding given some prior research on the topic (e.g., Baysinger & Hoskisson, 1989; Alonso-Borrego & Forcadell, 2010). Agglomeration policy is a frequent topic of scholarly discussion (see Mathias et al., 2020 for a recent meta-analytic review) and our results indicate that corporate governance policymakers might profitably incorporate agglomeration economies into their decisionmaking. Corporate governance research has often benefited from a fusion of extant theoretical perspectives (e.g., Hillman & Dalziel, 2003); the addition of agglomeration theory to the discourse provides exciting possibilities for future work.

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Table 1.1 Multiple Directorships Literature

Subject Examined in Study	Positive or Insignificant Influence	Negative or Curvilinear Influence
Monitoring of the Board of Directors	Current industry associations equal better monitoring (Chou & Feng, 2019); reputational concerns should lead to superior monitoring (Fama & Jensen, 1983); superior monitoring when tied to similar firms (Carpenter & Westphal, 2001) positive effects (Mendez, Pathan, & Garcia, 2015; Mendez, Garcia, & Pathan, 2017); reduces agency cost (Katti & Raithatha 2018); Better director quality in terms of being older, more qualified, more specialized backgrounds (Viviers & Mans-Kemp, 2019)	Poor monitoring (Core, Holthausen, & Larcker, 1999; Shivdasani & Yermack, 1999; Fich and Shivdasani, 2006; Jiraporn, Kim, & Davidson, 2008; Devos, Prevost, & Puthenpurackal, 2008; Renneboog & Zhao, 2011; Mendez, Pathan, & Garcia, 2015; Brown, Dai, & Zur, 2019); reduce likelihood of firing an underperforming CEO (Handschumacher, Behrmann, Ceschinski, & Sassen, 2019); higher shareholder dissatisfaction with monitoring (Hillman, Shropshire, Certo, Dalton, & Dalton, 2011); curvilinear relationship with monitoring (Hashim & Rahman, 2011); insured directors are more likely to be busy, and their insurance also increases their propensity for moral hazard (Jia & Tang, 2018)
Acquisitions	Better acquisitions (Chou & Feng, 2019); similar acquisition behavior (Haunschild, 1993); More valuable acquisition-related information than other sources (Haunschild & Beckman, 1998)	Higher diversification discount (Jiraporn, Kim, & Davidson, 2008); More unrelated geographic/product diversification when directors tied to other industries (Chen, Dyball, & Wright, 2009); curvilinear relationship (Ahn, Jiraporn, & Kim, 2010)
CEO/Managerial Compensation	CEO compensation (reducing opportunism therein) (Cherry	CEO compensation overly high (Core, Holthausen, & Larcker,

	& Gatchev, 2019); higher pay-performance and pay-risk sensitivity (Pathan, Wong, & Benson, 2019); higher pay-performance sensitivity (Handschumacher, Behrmann, Ceschinski, & Sassen, 2019) lower compensation (Mendez, Pathan, & Garcia, 2015; Mendez, Garcia, & Pathan, 2017); compensation more equity-based due to limited time for monitoring (Ferris, Liao, & Tamm, 2018)	1999); higher pay and lower equity compensation (Pathan, Wong, & Benson, 2019); overcompensation of mgmt (Andres, van den Bongard, & Lehmann, 2013; Handschumacher, Behrmann, Ceschinski, & Sassen, 2019); CEO compensation higher (Hallock, 1997)
Board Meeting Attendance	No difference in meeting attendance (Harris & Shimizu, 2004; Viviers & Mans-Kemp, 2019)	Reduced meeting attendance (Jiraporn, Davidson, DaDalt, & Ning, 2009; Chiranga, Chiwira, Sarker, & Sarker, 2014)
Firm Performance	Positive firm performance (Ferris, Jagannathan, & Pritchard, 2003; Ong, Wan, & Ong, 2003; Pombo & Gutierrez, 2011; Field, Lowry, & Mkrtchyan, 2013; Larcker, So, & Wang, 2013; Li, Tian, & Yan, 2013; Omer, Shelley, & Tice, 2014; Blanco-Alcantara, Diez-Esteban, & Romero-Merino, 2019 (when tied to related industries)); Positive long-term performance (Geletkanycz & Boyd, 2011); no influence (Fligstein & Brantley, 1992)	Firm value negative effect (Okazaki, Sawada, & Yokoyama, 2005; Santos, da Silveira, & Barros, 2012; Andres, van den Bongard, & Lehmann, 2013; Brown, Dai, & Zur, 2019), higher likelihood of firm failure (Susi & Lukason, 2019); poor performance (Core, Holthausen, & Larcker, 1999; Jiraporn, Kim, & Davidson, 2008; Fich & Shivdasani, 2006; Niu & Berberich, 2015)
Advisory and Resource Provision Roles	Advisory role emphasized (Chen, 2008); greater likelihood of receiving private equity offers (Stuart & Yim 2010); busy directors help in re-emerging from bankruptcy when they have financial	Superior strategic advising occurs when multiple directorships are destroyed via acquisitions (Brown, Dai, & Zur, 2019)

	connections (Arora, 2018)	
Accounting Measures	No effect on voluntary disclosures (Haniffa & Cooke, 2002); No relationship between multiple directorships and fraud investigations (Schnake & Williams, 2008); Positive association with firm credit rating (Benson, Iyer, Kemper, & Zhao, 2018)	Curvilinear relationship with financial reporting quality (Zheng, 2008); Negative relationship with corporate internet reporting (Abdelsalam & Street, 2007); increase earnings management (Sarkar & Sarkar, 2009); lead to increased incidence of fraud (Beasley, 1996); poor reporting quality and greater earnings management (Ferris & Liao, 2019)
CSR	Fast-paced CSR activities benefit from interlocks (Al-Dah, 2019)	Negatively moderate the relationship between CSR and firm performance (Su & Sauerwald, 2018)

TABLE 1.2 Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Acquisition Success	1.000										
(2) Acquirer Performance	0.029	1.000									
(3) Acquirer Debt	-0.186	0.095	1.000								
(4) Acquirer Diversification	0.004	-0.002	-0.089	1.000							
(5) Recent Acquisitions	-0.276	0.209	0.247	-0.027	1.000						
(6) Size Ratio	-0.092	-0.094	-0.063	0.048	0.097	1.000					
(7) Deal Value	0.022	0.062	0.012	0.126	0.222	0.300	1.000				
(8) Target Performance	-0.074	0.117	0.045	0.065	0.114	0.034	0.094	1.000			
(9) Board Size	0.001	0.201	0.216	0.297	0.089	-0.026	0.177	0.176	1.000		
(10) Geographic Distance	-0.161	0.132	-0.140	0.028	0.111	0.001	0.096	-0.032	-0.051	1.000	
(11) Multiple Directorships	0.096	0.281	0.248	-0.085	0.017	-0.023	0.068	0.032	0.603	-0.102	1.000

TABLE 1.3 REGRESSION ANALYSES

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6	(6) Margins
Recent Acquisitions	-0.446***	-0.444***	-0.423***	-0.369***	-1.277***	-1.331***	-.2283328
	(0.101)	(0.101)	(0.108)	(0.111)	(0.403)	(0.442)	
Acquirer Diversification	-0.0283	-0.0212	0.0122	-0.00629	0.0263	-0.00259	-.0004446
	(0.102)	(0.100)	(0.0963)	(0.0874)	(0.119)	(0.115)	
Acquirer Debt	-0.000335**	-0.000358**	-0.000354**	-0.000353**	-0.000367***	-0.000352***	-.0000605
	(0.000148)	(0.000154)	(0.000151)	(0.000153)	(0.000142)	(0.000134)	
Acquirer Performance	1.092	1.640	0.696	1.461	1.707	2.030	.3481609
	(1.325)	(1.268)	(1.253)	(1.361)	(1.443)	(1.748)	
Size Ratio	-1.236**	-1.079**	-1.306**	-1.436**	-0.985*	-1.223	-.2097708
	(0.516)	(0.438)	(0.559)	(0.657)	(0.591)	(0.775)	
Board Size	0.0465	0.0346	-0.0586	-0.0653	-0.123	-0.133	-.0227824
	(0.124)	(0.117)	(0.119)	(0.116)	(0.138)	(0.139)	
Target Performance	-0.00292	-0.00390	-0.00203	-0.00219	-0.00104	0.000200	.0000343
	(0.00696)	(0.00652)	(0.00703)	(0.00547)	(0.00669)	(0.00556)	
Deal Value	8.00e-05***	8.76e-05***	8.08e-05***	9.48e-05***	9.13e-05***	9.91e-05***	.000017
	(1.90e-05)	(1.68e-05)	(1.81e-05)	(1.96e-05)	(1.71e-05)	(1.94e-05)	
Geographic Distance		-0.166**		-0.519***	-0.129	-0.530***	-.0909041
		(0.0837)		(0.188)	(0.0951)	(0.195)	
Multiple Directorships			0.123*	-0.202	-0.0227	-0.390**	-.0668172
			(0.0725)	(0.189)	(0.0684)	(0.187)	
Geog. Dist.*Mult. Directorships				0.0572**		0.0638**	.0109489
				(0.0266)		(0.0259)	
Mult. Directorships*Recent Acquisitions					0.141**	0.156**	.0268228
					(0.0644)	(0.0700)	
Constant	-0.0140	0.952	0.119	3.023**	2.146**	4.527***	.1193926
	(0.918)	(1.068)	(0.903)	(1.455)	(1.017)	(1.512)	
Observations	97	97	97	97	97	97	

Table 2.1

Analysis of necessary conditions

Condition tested	Patents		Negation of Patents	
	Consistency	Coverage	Consistency	Coverage
R&D Intensity	0.621012	0.622894	0.460924	0.466850
Diversification	0.458025	0.562799	0.450382	0.558830
CEO Duality	0.358607	0.523652	0.323048	0.476348
Board Independence	0.588975	0.611884	0.468428	0.491416
Agglomeration	0.664096	0.670999	0.455734	0.464982

Table 2.2

Correlation table

		Mean	SD	1	2	3	4	5
1	Innovation Quantity	119.28	612.00					
2	R&D Intensity	43.37	172.15	-0.03				
3	Diversification	2.87	1.68	-0.13	-0.06			
4	CEO Duality	0.34	0.48	0.09	-0.11	-0.01		
5	Board Independence	0.75	0.13	0.10	-0.33	-0.09	0.01	
6	Agglomeration	0.12	0.12	-0.01	-0.04	0.02	-0.02	0.09

N = 135

TABLE 2.3:
Results from Truth Table Analysis

Outcome	Patents Awarded		Negation of Patents Awarded
Attribute	**P1**	**P2**	**P3**
R&D Intensity	●	●	Ø
Diversification	Ø	●	●
CEO Duality		●	Ø
Board Independence	●	Ø	Ø
Agglomeration	●	Ø	Ø
Raw Coverage	0.29	0.05	0.13
Unique Coverage	0.05	0.03	0.13
Consistency	0.88	0.81	0.86
Solution Coverage	.33		.13
Solution Consistency	.86		.86

TABLE 2.4, Appendix A:
Results from Truth Table Analysis

Outcome	Patents Awarded		
Attribute	**P1**	**P2**	**P3**
R&D Intensity	Ø		●
Diversification		●	Ø
CEO Duality	●	Ø	
Board Independence	●	●	●
Raw Coverage	0.10	0.21	0.38
Unique Coverage	0.07	0.09	0.22
Consistency	0.83	0.83	0.85
Solution Coverage		.54	
Solution Consistency		.81	

VITA
Matthew R. Farrell
Department of Management and Entrepreneurship

Education

Ph.D.   2022   Strategic Management, Old Dominion University
                         Dissertation proposal successfully defended August 6, 2021
                         Final defense conducted June 10th, 2022
B.A.   2017   Economics, Virginia Commonwealth University
M.T.   2011   Master of Teaching, Virginia Commonwealth University
B.A.   2011   History, Virginia Commonwealth University

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