CEO NARCISSISM AND STRATEGIC ENTREPRENEURIAL BEHAVIORS: THE MODERATING ROLE OF INDUSTRY ENVIRONMENT

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DOCTOR OF PHILOSOPHY

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ABSTRACT

The role of firm-level entrepreneurial behavior in explaining firm performance is well established in the entrepreneurship literature. Scholars can capture firm-level entrepreneurial behavior employing strategic entrepreneurial behavior (SEB) that embodies innovativeness and proactiveness of firms as its dimensions. SEB constitutes one of the strategic outcomes of firms, and Upper echelon theory argues that executives' characteristics and experience explain strategic actions. This dissertation draws from Upper echelon theory and argues that the psychological attributes of CEOs influence SEB.

This dissertation focuses on CEO Narcissism, the escalated self-importance among CEOs. Narcissists seek constant attention and admiration and emphasize personal goals over organizational goals. Therefore, this dissertation argues that while striving to achieve admiration, narcissistic CEOs commit a vast amount of resources in projects entailing innovations and new markets, as they are likely to garner
accolades from such projects. Therefore, firms with narcissistic CEOs are likely to exhibit higher SEB than other firms.

Though CEOs perform a prominent role in explaining SEB, firm-level entrepreneurship research remains incomplete if researchers ignore the environmental externalities. Therefore, we examine the contingency role of the industry environment on the relationship between CEO narcissism and SEB. Narcissists inherently love to stand out in the crowd, and therefore narcissistic CEOs push their firms to become more entrepreneurial than other firms. However, when the environment shifts from munificent to hostile, while other CEOs curb the entrepreneurial behaviors of their firms, narcissistic CEOs find higher incentives to push their firms to become more entrepreneurial. If they succeed at growing their firms during a hostile environment, stakeholders will likely celebrate them as heroes. In addition, narcissists believe they retain higher control over their surroundings. Therefore, environmental hostility moderates the relationship between CEO narcissism and SEB such that the relationship is stronger in a hostile environment.

This dissertation conducts two separate studies to test its hypotheses. Both studies render consistent findings suggesting that, contrary to the hypotheses, (1) CEO narcissism deters SEB and (2) environmental hostility does not moderate the relationship between CEO narcissism and SEB. In other words, firms with narcissistic CEOs exhibit lower SEB, and this relationship remains unaltered with conditions of the environment.
The faculty listed below, appointed by the Dean of the Henry W. Bloch School of Management have examined a thesis titled "CEO Narcissism and Strategic Entrepreneurial Behaviors: The Moderating Role of Industry Environment", presented by Puspa Shah, candidate for the Doctor of Philosophy Degree in Entrepreneurship & Innovation, and certify that in their opinion it is worthy of acceptance.

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Entrepreneurship scholars have recognized entrepreneurial orientation (EO) as a predictor of firm performance (Rauch et al., 2009). Research suggests that firms exhibiting higher EO — a strategic posture of firms toward entrepreneurship (Anderson et al., 2009; Covin and Slevin, 1991) — achieve higher performance because EO enables firms to focus on premium market segments, charge higher prices, and stay ahead of their competitors (Zahra and Covin, 1995). Prior research associates EO with sales growth, profitability, and business expansion, among other performance outcomes (Rauch et al., 2009).

The construct of EO encapsulates the decision-making philosophies exhibited by firm management and the strategic behaviors undertaken by firms that are entrepreneurial in nature (Anderson et al., 2009). Under the common Miller (1983) and Covin and Slevin (1991) conceptualization, three dimensions compose EO: innovativeness, proactiveness, and risk-taking (Anderson et al., 2009). Despite burgeoning EO scholarship, several ontological issues persist in EO literature, including dimensionality of EO (Lumpkin and Dess, 1996); specification of a formative versus reflective measurement model (Covin and Wales, 2012); whether the construct is attitudinal or behavioral in nature (Covin and Lumpkin, 2011; Miller, 2011); and the extent to which we expect dimensional covariance. In contrast to the Miller/Covin and Slevin conceptualization, the EO reconceptualization offered by Anderson et al. (2015) represents EO as a two-dimensional formative construct embodying distinct behavioral and attitudinal elements.
While Anderson et al. (2015)’s reconceptualization addresses certain ontological issues in the literature, room for improvement exists (Anderson et al., 2018). For example, the multidimensionality of the reconceptualized EO construct presents difficulty in specifying antecedent relationships (MacKenzie et al., 2011; Anderson et al., 2018). In addition, the multidimensional EO exhibits higher measurement error (Bollen, 1989) and creates difficulty when dealing with endogeneity (Anderson et al., 2018).

To address these issues, Anderson et al. (2018) offered a unidimensional construct of strategic entrepreneurial behaviors (SEB), focusing on the behavioral elements of EO — innovativeness and proactiveness. According to Anderson et al. (2018), this conceptualization simplifies specifying antecedent relationships, lowers measurement error, and improves researchers’ ability to address endogeneity concerns when studying firm-level entrepreneurial behaviors. Anderson et al. (2018) argues that SEBs exhibit these advantages without materially altering many of the nomological relationships of the popular Miller/Covin and Slevin EO conceptualization. Thus, SEB offers a parsimonious theoretical rationale and minimizes potential interpretational confounding in EO-related research (Anderson et al., 2018), thereby facilitating the development of predictive theory about strategic entrepreneurship (Anderson et al., 2018).

SEB constitutes a recently conceptualized construct, and identifying the antecedents of SEB will allow researchers to understand it better and navigate future studies in the field. Prior research indicates entrepreneurial behaviors of firms are effected by a broad range of factors, both internal and external to firms. For example,
Upper echelon theory argues that individual characteristics of the top management team affect strategic decisions and actions (Hambrick and Mason, 1984); entrepreneurship research in this area specifically suggests that CEO narcissism affects EO such that narcissistic CEOs are more likely to enhance EO of firms (Wales et al., 2013). Because CEO narcissism may relate to a firm’s EO, we argue that CEO narcissism also likely impacts SEBs, and unpacking this relationship is the central focus of this study.

Narcissism entails superior perception about oneself and one’s competencies, and due to these perceptions, narcissists become better performers and leaders (Farwell and Wohlwend-Lloyd, 1998); that is, the confidence of narcissistic CEOs is often reflected in strategic decisions and consequences (Chatterjee and Hambrick, 2007). Additionally, narcissists crave attention and admiration and undertake bolder actions to gratify their personal needs (Wales et al., 2013). Thus, we argue that narcissistic CEOs are likely to commit a significant portion of resources for innovation and the pursuit of new markets because such projects are likely to enhance their image, thereby fulfilling the need for attention and admiration.

Although individual characteristics of CEOs are important in comprehending firm-level entrepreneurial behavior, the study of entrepreneurial behaviors of firms should not be limited to identifying the predictors of the entrepreneurial phenomenon. Research should also explain the phenomenon by incorporating the context in which the phenomenon occurs (Low and MacMilan, 1988). The study of firm-level entrepreneurial behaviors remains incomplete if the characteristics of management and firms receive exclusive focus while ignoring the environmental context as
externalities (Van de Ven, 1993). Thus, examining the entrepreneurial behaviors of firms in relation to the external environment is necessary. My study addresses this concern by arguing that in addition to CEO narcissism, environmental hostility exhibits a contingency effect on the relationship between CEO narcissism and SEB, such that the association between CEO narcissism and SEB is stronger when the environment is hostile.

My study contributes to the literature in three ways. The first contribution of this study comprises integrating Upper echelon theory into the SEB literature, thereby grounding the study of firm-level entrepreneurial behavior within a well-accepted theoretical paradigm. As with the broader EO literature, the nascent SEB perspective is decidedly atheoretical — lacking a theoretical foundation (Covin and Lumpkin, 2011). My study addresses that concern by employing the Upper echelon theory, which provides a foundation to ground discussion of governance and managerial characteristics, and their relationship to the allocation of resources by firms to pursue entrepreneurial behaviors.

The second contribution of my study constitutes connecting scholarship of CEO narcissism with that of SEB. In prior literature, CEO narcissism relates with several positive and negative strategic outcomes such as firm growth (Galvin et al., 2015; Eisenhardt and Schhonhoven, 1990) and entrepreneurial failure (Liu et al., 2019). Prior research indicates that though certain characteristics of CEOs are beneficial in some circumstances, they fail to provide benefits in others (Finkelstein et al., 2008). My study highlights that despite the negative connotation associated with the term
‘narcissism,’ narcissistic CEOs are not necessarily detrimental to firms and may prove crucial in elevating the entrepreneurial behaviors of firms.

The final contribution of this study constitutes identifying the moderating effect of hostility on the relationship between CEO narcissism and SEB. Current research on environmental hostility suggests either a positive relationship (Kreiser et al., 2019) or a negative relationship (Tang and Hull, 2012) between hostility and EO. My study provides a possible scenario under which an increase in environmental hostility results in increased entrepreneurial behavior of firms by exhibiting that narcissistic CEOs drive SEB of firms with an increase in environmental hostility. In other words, for some firms operating in some environments, having a narcissistic CEO yields positive gains in firm-level entrepreneurial behaviors. In contrast, for other firms in other environments, the same CEO characteristics do not make a significant difference in SEBs.

My study begins with the introduction section, followed by a review of relevant literature. The literature focuses on the following issues: EO, the reconceptualization of EO, development of SEB and its advantages, Upper echelon theory and its relevance, narcissism and its implications to the strategy literature, and environmental hostility as these constitute central concepts of the study. The literature review section ends with the theoretical model and hypotheses development and follows the research methods section.

The research methods section encompasses details regarding the studies — survey-based and secondary data-based studies. While I collected the data for the survey-based study from Japanese firms, I have based the secondary data-based
study on data extracted from the COMPUSTAT and Bloomberg financial databases. For the survey-based study, I measured SEB, CEO narcissism, and environmental hostility using the scale developed by Anderson et al. (2018), Ames et al. (2006), and Covin and Selvin (1991) respectively. In Study 1, I use CFA followed by ordinary least squares regression, and in Study 2, I use Bayesian multilevel modeling for analyzing the data. For the secondary data-based study, I measured SEB in line with Kreiser et al. (2018), such that proactiveness relies on retention ratio, and innovativeness depends on the R&D intensity of the firm. I measured CEO narcissism as the relative compensation of the CEO and environmental hostility as “the 5-year average growth in net industry sales at the four-digit SIC code level” (Keats and Hitt, 1988). I carried out the data analysis using a Bayesian multilevel model as the Bayesian technique addresses multiple comparisons and offers more efficient estimates, thereby improving the causal inference (Gelman et al., 2012).
2.1 Entrepreneurial orientation

The study of firm-level entrepreneurial behaviors dates to Mintzberg (1973), where he elucidates the entrepreneurial mode as one of the three modes of strategymaking. He suggests the entrepreneurial mode is not limited to creating new firms but also incorporates operating incumbent firms. He further points out four characteristics of such mode: the ongoing pursuit of new opportunities, power centralized in the hands of the chief executive, bold undertakings during uncertain conditions, and growth as the ultimate target. Khandwalla (1976) reiterates the points articulated by Mintzberg (1973) and proposes that a set of the following explains firm performance: strategic decision-making, characteristics of firms, and exigencies of the environment.

Building on Mintzberg (1973) and Khandwalla (1976), Miller (1983) distinguished between entrepreneurial and non-entrepreneurial firms. Miller (1983) argues entrepreneurial firms pursue innovation, engage in risky projects, and remain forward-looking. Miller (1983) further argues that all three features have to be portrayed to some degree by such firms, and the absence of any of these features makes a firm non-entrepreneurial.

The prior work of Mintzberg (1973) and Miller (1983) was extended by Covin and Slevin (1989, 1991) by introducing strategic posture as a continuum ranging from conservative firms to entrepreneurial firms. The continuum by Covin and Slevin (1989, 1991) aligns with the typology by Miller (1983). Thereafter, Covin and Slevin (1989, 1991) conceptualized entrepreneurial orientation (EO), initially referred to as strategic
posture, as a construct with three distinct dimensions: innovativeness, proactiveness, and risk-taking. While innovativeness refers to introducing new products/services, proactiveness indicates the degree to which a firm seeks new market. Risk-taking indicates the interest of the firm to undertake uncertain projects. Covin and Slevin (1989, 1991) further argued that these dimensions comprise a recurring pattern of an entrepreneurial firm.

Following Covin and Slevin (1991), several perspectives emerged in the related field. Lumpkin and Dess (1996) extended the conceptual domain of the EO construct by adding competitive aggressiveness and autonomy to the existing dimensions. While competitive aggressiveness constitutes the strength utilized by new entrants in competing against existing firms, autonomy indicates the degree to which members of the firm prefer to be self-directed while pursuing opportunities on behalf of the firm.

The conceptualization of EO by Miller/ Covin and Slevin was compared and contrasted with that of Lumpkin and Dess (1996) by Rauch et al. (2009). The results suggested the conceptualization of EO by Miller/ Covin and Slevin was predominantly used in entrepreneurship scholarship, though the one by Lumpkin and Dess (1996) was well recognized. Based on a meta-analysis, Rosenbusch et al. (2013), followed by Covin and Wales (2012), agreed with Rauch et al. (2009) regarding the dominance of Miller/ Covin and Slevin’s conceptualization of EO. Thus, we can conclude that EO with three dimensions — innovativeness, proactiveness, and risk-taking — constitutes a widely utilized and studied conceptualization of EO. Initially formulated to capture “strategic behavioral proclivities,” EO represents one of the most prevalent constructs within the entrepreneurship literature (Anderson et al., 2015). EO enables firms to
identify and exploit new opportunities and attain higher firm performance and growth (Anderson and Eshima, 2013; Covin and Slevin, 1991; Rauch et al., 2009).

2.2 Limitations of entrepreneurial orientation

Despite the prominence of EO in the entrepreneurship literature, EO is not free of limitations. An ongoing debate regarding the ontology of the EO construct persists: (i) whether EO represents an attitudinal construct or behavioral construct; (ii) whether a reflective or a formative measurement model best captures EO; and (iii) multiple conceptualizations of EO with varying dimensions.

One of the recurring debates among EO scholars is whether EO represents an attitudinal construct or a behavioral construct (Covin and Lumpkin 2011). Covin et al. (2006) defines EO as a firm-level phenomenon reflecting firm-level decision-making and behaviors and, as such, incorporates both attitudes and behaviors (Covin and Wales, 2011). Covin and Wales (2019) argue scholars can capture EO employing either behavioral indicators or a combination of attitudinal and behavioral indicators. However, merging behavioral and attitudinal components of EO generates two challenges (Anderson et al., 2015). First, attitude and behavior impact each other; while attitude predicts behavior, studies suggest behavior can also explain attitude, such as when a situation incorporates long-term engagement with a particular behavior (Koslowsky et al., 1997). Second, although we presume these two components of EO share explanatory variables, it seems unlikely that they do — beliefs, values, and preferences explain attitudinal variables (Rosenberg, 1960); attitudes explain behavioral variables (Flanders et al., 1975).
The second debate surrounding the EO conversation entails whether EO constitutes a formative construct or a reflective construct (George and Marino, 2011). Covin and Slevin (1991) illustrates EO as a reflective measure with a shared variance between its dimensions — proactiveness, innovativeness, and risk-taking (Covin and Wales, 2012). The reflective measure of EO relies on the assumption that all the dimensions share the same explanatory variables (Covin and Lumpkin, 2011). However, it seems unlikely that the same predictor(s) explains the three dimensions because proactiveness and innovativeness constitute behavioral components, whereas risk-taking is attitudinal component (Flanders et al., 1975).

Another assumption underlying the reflective model is that the change in the construct causes corresponding and simultaneous change to all its indicators. According to Bollen (1989), when we assume indicators of a construct are equally valid, those indicators will share the common cause, will be interchangeable, and will perfectly covary with each other (Anderson et al., 2015). However, George and Marino (2011) argue the construct of EO — the relationship between EO and its indicators and vice-versa — fails to align with these assumptions of a reflective model. Lumpkin and Dess (2011) also corroborate George and Marino (2001)'s argument by suggesting that innovativeness, proactiveness, and risk-taking manifest varying relationships. Lumpkin and Dess (2001) follow suit and articulate a concern regarding the dimensions of EO failing to covary perfectly. Although Covin and Wales (2012) argue all the indicators of a reflective model donot need to share a common predictor(s), measurement theory argues otherwise (Bagozzi et al., 1991; MacKenzie et al., 2011).
The final debate surrounding EO involves its measurement (George and Marino, 2011). There exists more than one measure of EO: the original one with three dimensions (Covin and Slevin, 1991) and the one with five dimensions (Lumpkin and Dess, 1996). Each of these measures retains its pros and cons; however, when different scholars employ different measures to study the same phenomenon, the field suffers from a lack of uniformity in conclusions and interpretations of findings. Therefore, despite the proliferating EO research, the healthy growth of the field can be hindered due to the lack of consistent measures.

The controversies surrounding the nature of a construct are constructive for a scholarly field (Bagozzi et al., 1991) as conflicting views motivate novel research and findings in the field. However, when such controversies persist despite the growth of the field, the ontological assumptions of the construct need to be revisited (Anderson et al., 2015), thereby refining the construct.

2.3 Reconceptualization of entrepreneurial orientation

To address the existing issues associated with EO, Anderson et al. (2015) reconceptualized EO as a second-order firm-level construct entailing two lower-order dimensions: entrepreneurial behaviors (EB) and managerial attitudes towards risk (MATR). Anderson et al. (2015) merged innovativeness and proactiveness of former EO to form EB, signifying the process of introducing new products/processes/business models and commercializing them in a new market or product area. They further transformed the risk-taking of former EO into MATR, signifying the interest of top-level managers in undertaking projects with uncertain outcomes. Thus, they
transformed EO by Miller/Covin and Slevin into a formative conceptualization of EO comprising both behavioral and attitudinal dimensions but with dimensions as distinct.

EB constitutes the behavioral dimension, and Anderson et al. (2015) offered two reasons for fusing proactiveness and innovativeness into a single dimension of EB. The first reason incorporates the lack of face validity in the prior assumption of proactiveness and innovativeness (Anderson et al., 2015). In other words, innovativeness fails to exist if a firm doesn’t develop new products, and proactiveness fails to exist before a firm enters a new market. The second reason for merging these two components lies in their entangled relationship (Anderson et al., 2015). That is, innovativeness is not meaningfully independent from proactiveness, even though it is a necessary condition for EB (Rosenbusch et al., 2011) — A firm does not innovate without the intention of commercializing.

MATR differs from EB and constitutes the attitudinal component of EO. March and Shapira (1987) argue attitudes toward risk are stable and fail to covary perfectly with entrepreneurial behavior (Douglas and Shepherd, 2002). As such, the entrepreneurial actions of a firm do not correlate perfectly with MATR (Anderson et al., 2015). Anderson et al. (2015) further argues that though there is an underlying risk in innovativeness and proactiveness, EB and MATR are conceptually distinct and constitute two independent lower-order dimensions of EO that jointly define the conceptual domain of the higher-order construct.

The reconceptualized EO by Anderson et al. (2015) addressed the controversy surrounding the ontology of EO by redefining EO as a multidimensional formative construct comprising distinct behavioral and attitudinal dimensions. However, the
multidimensionality of the reconceptualized EO remains the source of pain for entrepreneurship scholars.

2.4 Strategic entrepreneurial behaviors

Though Anderson et al. (2015) addressed issues related to the ontology of EO, the issue of multidimensionality persists. While a multidimensional measure enables researchers to capture the broader aspects of the phenomenon, it comes with the price of measurement error (Bollen, 1989). Measurement error tends to induce endogeneity (Antonakis et al., 2010), rendering model estimates inconsistent (Loken and Gelman, 2017). Moreover, one of the assumptions underlying a multidimensional construct is that predictors must share a relationship of the same magnitude and direction with all the dimensions of the construct (MacKenzie et al., 2011). However, it is unlikely that predictors shares such a relationship with the dimensions of EO because it is unlikely for the same predictor(s) to explain both attitudinal and behavioral variables (Anderson et al., 2018). Furthermore, attitudes are generally more stable than behaviors, and thus the effect of a predictor on MATR manifests over a longer period and with a smaller magnitude than on EB (Anderson et al., 2018). Therefore, multidimensionality in EO can cause interpretational confounding — a disconnect between theory and underlying proposed model (Bollen, 1989; Anderson et al., 2018) — thereby elevating the threat to internal validity (Bagozzi, 2011).

One way to address the multidimensionality of EO involves devising a unidimensional construct that captures the same underlying phenomenon. A unidimensional construct represents a single conceptual domain (Edwards and
Bagozzi, 2000), potentially reducing conceptual contamination and interpretational confounding. Consequently, it leads to a decrease in measurement error and an increase in the precision of nomological conclusions (Boyd et al., 2005).

Anderson et al. (2018) deals with the multidimensionality of EO by introducing a new construct — strategic entrepreneurial behaviors (SEB). SEB is a unidimensional construct that captures the phenomenon of developing products and exploiting market opportunities to commercialize those products. SEB is analogous to EO and focuses on behavioral components — proactiveness and innovativeness (Anderson et al., 2018). SEB builds on two assumptions: (1) The broader construct comes with the price of measurement error (Bagozzi, 2011). Therefore, rather than incorporating dimensions with differing ontological assumptions under the same higher-order construct, Anderson et al. (2018) focuses on the behavioral dimension alone. (2) Refining the measure of strategic entrepreneurial actions requires a new construct and measurement model that captures the similar nomological associations as with EO while being more reliable. By minimizing the conceptual contamination associated with EO, Anderson et al. (2018) offers a more reliable and valid construct — to capture firm-level entrepreneurial actions — that addresses issues such as ontological conflicts between underlying dimensions, interpretational confounding, and measurement error.

SEB incorporates the innovativeness and proactiveness of a firm, indicating that an entrepreneurial firm not only engages in innovation but also proactively enters a new market to establish a leadership position. Innovation could either be incremental innovation or radical innovation (Partanen et al., 2014). Therefore, SEB includes three
different types of conditions: (1) firms selling a new product in the new market, (2) firms selling an existing product in a new market, and (3) firms selling new product in the existing market (Ansoff, 1957). However, the definition of SEB does not encompass firms selling existing product(s) in the existing market. For example, Apple launching a new iPhone model (new product) in the United States (existing market) falls under the rubric of SEB, whereas Apple selling iPhone 10 in the United States does not fall under the rubric of SEB.

Fig. 1. A matrix depicting the conditions covered by SEB

<table>
<thead>
<tr>
<th>Product</th>
<th>New</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>SEB</td>
<td>SEB</td>
</tr>
<tr>
<td>Existing</td>
<td>SEB</td>
<td>No SEB</td>
</tr>
</tbody>
</table>

A change in the underlying phenomenon causes a change in SEB, and change in SEB leads to a change in its indicators (MacKenzie et al., 2005). Therefore, SEB is easier to measure, model, and theorize as it does not violate any ontological or epistemological assumptions associated with the construct (Anderson et al., 2018). SEB aligns with the behavioral dimension of Anderson et al. (2015)’s reconceptualized
EO. Although SEB is concerned with the behavioral dimension alone, it also captures the behavioral risks associated with product/market uncertainties (Schumpeter, 1934). There is an inherent risk associated with launching new products and entering the new market; a firm with high SEB attempts to capitalize on its innovation by establishing leadership in the market (Covin and Slevin., 1991). Thus, SEB represents a behavioral construct ranging in a continuum from low SEB to high SEB such that all firms possess some level of SEB (Anderson et al., 2018).

A single firm or business has a single SEB measure, irrespective of its size (Anderson et al., 2018). However, in the case of large firms encompassing multiple business units operating in different product or market areas, those units have differing SEB measures. Hence, SEB exists at a firm-level or business unit level but not at a corporate level (Anderson et al., 2018).

SEB aids the growth of entrepreneurship research by allowing entrepreneurship researchers to investigate entrepreneurial activities of firms with more precision (Boyd et al., 2005). Furthermore, the construct makes it easier to estimate the relationship between SEB and other phenomena as SEB is easier to measure and model (Anderson et al., 2018). Thus, SEB facilitates the development of better predictive theories related to firm-level entrepreneurial activities (Anderson et al., 2018).

2.5 Upper echelon theory

Upper echelon theory facilitates the growth of strategic entrepreneurship research by offering a foundation for studying governance and managerial
characteristics and their relationship with strategic outcomes. Drawing from the concept of bounded rationality (March and Simon, 1958; Cyert and March, 1963) — individuals depend on their judgment to formulate decisions due to the complexity of available information (Simon, 1988) — Upper echelon theory proposes that the characteristics and personal values of a firm’s top management team reflect in organizational behavior (Hambrick and Mason, 1984). Top executives and CEOs retain control over firms’ strategies, decisions, and policies, which impact the firm-level outcomes. CEOs are responsible for guiding firms’ strategic directions, and as such, perform crucial roles in determining the entrepreneurial behaviors of the firm (Simsek et al., 2010; Wales et al., 2013). Hambrick and Mason (1984) posits that executives’ characteristics influence strategic choices through a three-step process: field of vision, selective perception, and interpretation. Upper echelon theory underlies two assumptions (Hambrick, 2007): (1) top executives employ their judgment to interpret firm-level choices. (2) experiences, values, and personalities of the executives guide their interpretations. Thus, it is important to factor in the characteristics of the executives while understanding the behavior of the firm (Hambrick, 2007).

Hambrick and Mason (1984) argues that although executives’ demographic characteristics are related to strategic choices, psychological variables can explain strategic choices better than demographic ones. Hambrick (2007) refers to executives’ psychological variables, in the context of Upper echelon theory, as a black-box problem (Lawrence, 1997) — due to lack of studies examining the role of psychological variables of executives in explaining strategic results. Besides, demographic variables do not necessarily answer the critical questions in unpacking
the relationship between executives’ characteristics and firm-level behaviors because demographic variables influence firm-level variables through psychological variables (Khumalo et al., 2012). Thus, Hambrick (2007) urged the scholarly community to unravel the relationship between executives’ psychological characteristics and strategic outcomes. Following Hambrick’s (2007) call, studies examining the personality variables of executives and their impact on firm-level decisions proliferated, and the unobtrusive measure of CEO’s narcissism by Chatterjee and Hambrick (2007) have played a pivotal role in the growth of such studies.

Some scholars argue executives’ role is not significant in shaping strategic choices because CEOs operate under constraints — industry norms and bureaucracy (DiMaggio and Powell, 1983). Those scholars posit that situational factors negate the impact of executives’ characteristics (Lieberson and O’Connor, 1972). However, studies suggest CEOs perform a crucial role in strategic decisions such as acquisitions, product-related decisions, resource allocation, and restructuring of the firm (Hambrick and Finkelstein, 1987).

To conclude, Upper Echelon theory postulates the connection between characteristics of executives — personality and demographic variables — and strategic decisions and actions, thereby providing strong theoretical support to explain the association among variables of my study. Hence, drawing from an Upper-echelon theory, my study argues entrepreneurial behaviors of the firms are one of the strategic outcomes explained by the CEO’s characteristics.
2.6 Narcissism

Narcissism constitutes one of the individual characteristics of executives that affects the strategic outcomes of firms. Narcissism among executives is glorified due to the association of narcissistic leaders and executives with higher firm performance. For example, some of the successful CEOs of the 21st century are prominent narcissists. This dissertation intends to shed light on how narcissism among executives impacts firm-level entrepreneurial behavior.

The origin of narcissism goes back to Greek mythology when there was a boy named Narcissus. He was obsessed with himself and fell in love with his image in the water, and he eventually perished because he was obsessed with himself (Chatterjee and Hambrick, 2007). Ellis (1898) derived from this Greek mythology and named the phenomenon where an individual is self-absorbed as ‘narcissism.’ Ellis (1898)’s work influenced Freud (1957), and Freud advanced this literature by identifying various dimensions of narcissism: self-admiration, self-aggrandizement, and tendency to view others as similar to oneself. Raskin and Terry (1980) reports more than 1000 books and articles in the related field by 1980. A substantial portion of these works viewed narcissism as a disorder (Raskin and Terry, 1980). Thus, narcissism entered psychology literature as a disorder. However, over time, scholars established narcissism (Emmons, 1987; Raskin and Terry, 1980) as a personality variable, which is not necessarily problematic.

Narcissism signifies an elevated but fragile sense of self, along with an obsession for success and accolades (Ames et al., 2006). According to Emmons (1987), narcissism entails four dimensions: exploitativeness or entitlement, leadership
or authority, superiority or arrogance, and self-absorption or self-admiration. Entitlement represents the tendency to seek respect from others, whereas authority represents the tendency to seek the limelight and become the center of attention. Superiority indicates the feeling that one is better than others, and self-absorption indicates an obsession with the self. Despite these four underlying dimensions, Emmons (1987) argues that narcissism is a unitary construct.

Narcissism differs from self-esteem, self-efficacy, and hubris. Self-esteem is an individual's overall acceptance, linking, and respect for themselves (Baumeister et al., 1996). As such, it aligns with the self-admiration dimension of narcissism but lacks the other dimensions. Similarly, self-efficacy is the belief that one can accomplish the task undertaken (Bandura, 2006), and as such, aligns with the self-admiration dimension of narcissism while failing to correspond with the remaining dimensions. Similarly, hubris entails excessive pride and self-confidence (Hayward and Hambrick, 1997). Thus, hubris corresponds with arrogance and self-admiration dimensions of narcissism while failing to align with the remaining dimensions.

Narcissism constitutes a stable personality dimension but can undergo a certain degree of change with surroundings (Campbell et al., 2004). Studies suggest genetic and environmental factors can impact narcissism (Livesley et al., 1993; Millon, 1981); for example, a study conducted with 175 pairs of twins (90 identical and 85 fraternal) concluded that early childhood experiences — such as the relationship shared between a child and parents — contribute to the development of narcissistic tendencies (Livesley et al., 1993). Also, one's experiences over life can impact the
degree of narcissism (Campbell et al., 2004); for example, Felson (2014) reports success causally induces narcissism.

Literature indicates that narcissistic individuals retain high opinions of themselves and their potentials (Emmons, 1984; Robins and Beer, 2001). Also, these individuals possess elevated self-expectations (Farwell and Wohlwend-Lloyd, 1998) and a higher sense of control over their surroundings (Dhavale, 2000). Furthermore, studies suggest narcissism positively relates to both self-reported creativity (Raskin, 1980) and objective creativity (Gabriel et al., 1994). Despite a positive association between narcissism and self-reported intelligence, the study reports no association between narcissism and intelligence (Gabriel et al., 1994).

Due to elevated confidence and belief, some studies associate narcissism with high performance (Tuckman and Sexton, 1992). However, other studies suggest no significant differences in the performance of narcissistic individuals and non-narcissistic individuals (John and Robins, 1994; Robins and John, 1997), although self-reported performance ranks higher among narcissists (John and Robins, 1994; Robins and John, 1997). A study by Campbell et al. (2009) demonstrated that narcissists seek leadership positions more compared to their remaining counterparts (Brunell et al., 2008). Studies also report narcissists undergoing intense mood swings when criticized (Rhodewalt et al., 1998) and displaying hostility and belligerence (Kernis and Sun, 1994). Therefore, these studies suggest that narcissists hold elevated views about themselves and fail to respond to feedback that combats their worldview.
Narcissism embraces both motivational and cognitive components (Chatterjee and Hambrick, 2007). The belief and confidence of narcissists about themselves reflect the motivational components. Their self-reported scores for creativity, intelligence, performance, and leadership ability serve as evidence of their motivation (Farwell and Wohlwend-Lloyd, 1998). The cognitive aspect of narcissism is manifest in their superior creative ability, higher leadership ability, and their sense of control over their surroundings. Thus, due to cognitive and motivational aspects associated with narcissism, narcissists tend to perceive themselves as better performers and undertake actions to prove their superiority.

The superiority about oneself and one’s abilities (Ames et al., 2006) leads narcissists to reject others’ viewpoints and presume the situation to be under their control. Though the characteristics of narcissism sound antithetical to productivity, narcissists are likely to become better performers than others due to the associated motivational and cognitive components.

2.7 CEO narcissism and strategic outcomes

Management scholarship recognizes narcissistic dispositions among CEOs, referred to as CEO narcissism, as a relevant variable for firm-level studies (Chatterjee and Hambrick, 2007). Chatterjee and Hambrick (2007) discovered that narcissistic CEOs differ from their non-narcissist counterparts. The strategic actions of the firm reflect the idiosyncrasies of CEOs as firm-level actions are influenced to a large degree by the experiences, decisions, and dispositions of CEOs (Carpenter et al., 2004). Studies report the role played by CEOs’ characteristics on firm behaviors.
(Sanders, 2001; Eisenhardt and Schhonhoven, 1990). The cognitive and motivational elements of narcissism induce narcissistic CEOs to undertake bold decisions and actions, leading to changes in firm behaviors (Chatterjee and Hambrick, 2007).

Prior literature depicts the effect of CEO narcissism on the firm and its undertakings (Galvin et al., 2015). Narcissistic CEOs believe their competencies exert a positive impact on the firm-level outcomes (Hambrick and Mason, 1984; Vries et al., 1986) and undertake bold actions demonstrating their competencies (Wales et al., 2013). Galvin et al. (2015) posit that narcissistic CEOs are likely to fail in distinguishing between their needs and the organization’s needs because they value attention and admiration. Hence, to gratify their personal needs, they tend to place organizations at risk by undertaking actions with uncertain outcomes.

Narcissism influences strategic behavior in two ways. First, the elevated confidence of narcissistic CEOs urges them to utilize projects and firms as tools to satisfy their own needs. Thus, the needs of such CEOs influence firm-level decisions (Hambrick and Chatterjee, 2007). Second, narcissistic CEOs gravitate towards novel decisions and actions. They prefer dramatic growth to stable and steady growth (Hambrick and Chatterjee, 2007) because stability lacks mass appeal, thereby fulfilling the need for attention/admiration. Furthermore, research suggests that such CEOs pursue a defender strategy (Miles and Snow, 1978) or exploitation strategy (Levinthal and March, 1993), causing them to execute risky decisions (Chatterjee and Hambrick, 2011).

Studies also suggest some dark sides of CEO narcissism (Campbell et al., 2010). Studies indicate that firms managed by narcissistic CEOs undergo unethical
accounting practices (Olsen et al., 2014). Likewise, such CEOs overlook the needs of the organization and execute actions fitting their own needs (Foster and Trimm, 2008). Despite these drawbacks, in many cases, employees may view such CEOs as charismatic (Maccoby, 2004), motivational, and better leaders/managers compared to their non narcissistic counterparts (Campbell et al., 2010).

2.8 CEO narcissism and entrepreneurship

EO scholars argue that CEO goals and characteristics are drivers of EO (Miller and Friesen 1982). As such, CEO narcissism ought to manifest itself in firm-level entrepreneurial behaviors (Wales et al., 2013). Wales et al. (2013) report that firms with narcissistic CEOs exhibit a higher EO because such CEOs motivate their firms to become more entrepreneurial.

The characteristics of narcissistic CEOs relevant to the firm’s EO entail the following: confidence that their decisions will succeed, desire to gain accolades, desire to attain their own goal at the cost of the organization’s goal, rejection of feedback that combats their worldview (Wales et al., 2013). Narcissists tend to be overconfident about their competencies (Campbell et al., 2004) and overlook the reality of the circumstances (Lakey et al., 2008). This leads narcissistic CEOs to commit a huge portion of resources in projects involving innovation and new markets (Wales et al., 2013). Furthermore, their desire for admiration and attention urges them to pursue such projects (Wales et al., 2013) because such projects are noteworthy. Finally, they possess an elevated opinion about themselves and their competencies, and thus they reject opinions that combat their views or defeat their purpose (Watson et al., 1991).
As such, we expect that firms with narcissistic CEOs should exhibit higher SEB compared to firms led by non-narcissistic CEOs.

2.9 Level of analysis

Both independent and dependent variables need to be at the same level to avoid the level of study misspecification. From a theoretical standpoint, my study meets this condition because, while SEB represents a firm-level construct (Anderson et al., 2018), CEO narcissism was conceptualized by Chatterjee and Hambrick (2007) as a firm-level construct to assess its impact on firm-level outcomes. Strategy and entrepreneurship research has employed CEO narcissism to capture firm-level results, suggesting that CEO narcissism constitutes a firm-level variable capable of explaining firm-level outcomes (Galvin et al., 2015). Wales et al. (2013) reaffirmed CEO narcissism as a firm-level variable by presenting it as the predictor of EO — widely studied firm-level consequence in the entrepreneurship literature.

Also, Upper echelon theory states that the values, preferences, and experiences of the top managers effect firm-level consequences (Hambrick and Mason 1984), where both the personal characteristics of executives and firm-level consequences represent firm-level variables. Narcissism comprises one of the personality dimensions; therefore, CEO narcissism fits the criteria of firm-level variables and is well-fitted to explain strategic and firm-level outcomes.

From a research design standpoint, to capture a firm-level construct in survey studies, Covin and Wales (2019) urges researchers to collect data from appropriate organizational informants — CEOs — so that consistency in the level of analysis
exists. Moreover, Stevenson’s conceptualization of entrepreneurship assumes informed respondent's responses as firm-level data (Brown et al., 2001), and CEOs represent the single most informed respondents of firms. Furthermore, there is an increasing consensus within entrepreneurship/strategy literature about accepting CEOs’ responses as firm-level data (Rockart and Dutt, 2015). Most researchers agree with the existence of predictive validity and inter-respondent reliability as sufficient conditions under which CEOs’ responses count as firm-level data (Brown et al., 2001). Therefore, from theoretical and research design perspectives, my study meets the level of specification by utilizing the firm-level constructs and collecting responses from CEOs.

2.10 Environmental hostility and entrepreneurship

In addition to the characteristics of management and firms, environmental context plays a crucial role in explaining the entrepreneurial behaviors of firms. Treating environmental context as externalities can render the study of firm-level entrepreneurial behaviors incomplete (Van de Ven, 1993). The role of environmental context remains well-recognized by scholars ever since Dess and Beard (1984) introduced the concept of the task environment and proposed three dimensions of task environment: dynamism, munificence, and complexity. Dynamism represents the rate at which the environment changes, whereas munificence represents the degree to which the environment can support the growth of incumbent and new firms. Finally, complexity incorporates the range and concentration of different activities in the environment.
I utilize hostility as the moderating variable in this study. My study encompasses SEB, which is concerned with resources and opportunities. While hostility is related to resources and opportunities in the market, dynamism and complexity are not. Some scholars argue that munificence and hostility are opposite to each other (Rosenbusch et al., 2013), whereas others consider these two as close cousins of each other. My study adheres to the former view and defines a hostile environment as the one that restrains ‘organic growth’ — increasing output and expanding sales — of firms (Kreiser et al., 2019). The last resort for firms to grow in such an environment is to take over the market share of others (Chen, 1996), and a strategic error in such an environment compromises a firm’s existence (Kreiser et al., 2019).

The threat rigidity perspective suggests a negative association between hostility and EO: when the environment of the firm is hostile and untoward, the firm restrains its strategic activities (Staw et al., 1981). While some studies indicate a positive association between hostility and EO (Wales et al., 2013; Laskovaia et al., 2019), research illustrating a negative relationship between hostility and EO also persists (Tang and Hull 2012; Miles et al., 1993; Rosenbusch et al., 2013).

An abundance of opportunities and paucity of threats characterizes a munificent environment. Such an environment avails an equal chance for firms with narcissistic and non-narcissistic CEOs to become entrepreneurial. However, narcissistic CEOs are inherently inclined toward standing out in the crowd, and they accomplish that in a munificent environment by pushing their firms to become more entrepreneurial than other firms. As a result, firms with narcissistic CEOs exhibit
higher SEB than firms with non-narcissistic CEOs. The difference in SEB of these two categories of firms, nonetheless, is not significant.

Fig. 2. A graph depicting SEB in hostile and munificent environments

When the environment shifts from munificence to hostility, firms adjust their entrepreneurial behaviors to remain competitive in the market (Covin et al., 2000). During this stage, the number of opportunities decreases, and the number of threats goes up. Firms take calculated decisions and actions in this environment because a strategic error can threaten a firm’s survival (Kreiser et al., 2019). Such an environment offers a higher incentive to narcissistic CEOs because narcissists love attention and admiration. If CEOs can pull their firms successfully through such a harsh circumstance, stakeholders will revere CEOs as heroes. Hence, to satisfy the need for attention and admiration, narcissistic CEOs spend a hefty amount of resources on new products and new markets. As a result, the firms with narcissistic CEOs exhibit significantly higher SEBs than those with non-narcissistic CEOs. Therefore, based on the preceding arguments, the following hypothesis is proposed:
**Hypothesis 1.** Environmental hostility moderates the relationship between CEO narcissism and SEB such that the relationship is stronger in a hostile environment and weaker in a munificent environment.

![Conceptual Framework](image)

**Fig. 3.** A conceptual framework depicting the relationship among CEO narcissism, environmental hostility, and SEB
CHAPTER 3. METHODOLOGY

This dissertation entails two separate studies — survey-based and secondary-data-based studies. While Study 1 relies on the survey data, Study 2 relies on secondary data extracted from multiple sources. The following section entails the details of both studies.

3.1 Endogeneity

Endogeneity occurs when the error term correlates with the independent variable. Some of the common sources of endogeneity incorporate omitted variable bias, simultaneity, and measurement error (Anderson et al., 2018). Endogeneity renders inconsistent point estimates, and a randomized controlled experiment is considered the gold standard to address endogeneity — as it provides ignorability (Antonakis et al., 2010). Ignorability signifies an assumption whereby the researchers attribute the difference between the treatment group and the control group to the effect of treatment (Antonakis et al., 2010). However, a robust randomized controlled experiment is challenging to design for some research questions and settings. In such circumstances, instrument variables and models such as two-stage least squares can create conditional ignorability.

This dissertation does not encompass experiments. Hence, I planned to achieve conditional ignorability in Study 1 using Structural Equation Modeling (SEM) with instrument variables. A valid instrument effects the independent variable but does not affect the dependent variable, thereby allowing researchers to uncover the
independent variable’s effect on the dependent variable (Antonakis et al., 2010; Best and Wolf, 2013; Wooldridge, 2010). Semadeni et al. (2014) recommends employing two instrument variables for each predictor; therefore, in Study 1, I planned to utilize four instrument variables – two for CEO narcissism and two for environmental hostility. In Study 2, I employed Bayesian multilevel modeling, which aids causal inference and reduces the scope for endogeneity.

To ensure the validity of the instrument variables used in Study 1, I planned to carry out three tests: the weak instrument test, Sargan Hansen test, and Wu-Hausman test (Antonakis et al., 2010). The weak instrument test determines whether the instrument variables are weak or strong. Similarly, the Sargan Hansen test illustrates whether the instruments are individually and collectively valid or not. Likewise, the Wu-Hausman test depicts whether the Ordinary Least Squares (OLS) model is consistent with the instrument variables model.

During the actual analysis, I changed the proposed plan and utilized CFA followed by OLS to analyze the data. The model for Study 1 constitutes a moderation model. The complexity underlying the interaction effect is likely to pose challenges while estimating the moderation model using SEM (Sardeshmukh and Vandenberg, 2017). Most interaction effects are small, and therefore, identifying the measurement model and establishing starting values for the parameters is challenging with SEM.

There is a special SEM technique called the latent moderated structural (LMS) equation that models measurement error and addresses the limitations of SEM moderation. However, scholars find it arduous to interpret and make sense of the effect size using this technique (Klein and Moosbrugger, 2000). Therefore, instead of
the LMS equation, I opted for the route adopted by most researchers — OLS regression followed by confirmatory factor analysis (CFA).

3.2 Study 1

Details of Study 1 are discussed in this section.

3.2.1 Sample

In Study 1, I used survey instruments and collected data from Japanese firms utilizing the online platform of Rakuten Insight (Rakuten Insight, 2020). Rakuten Insight is one of the largest web research firms in Asia. The target respondents were executives of firms employing 10 to 299 employees. Though Rakuten can provide access to 2800 firms, Study 1 limited the respondents to 878 firms due to budgetary constraints. Rakuten automatically terminated the data collection procedure after meeting the budgetary restriction. Hence, the final sample incorporates 878 privately owned Japanese firms belonging to all major industries except forestry, agriculture, and fisheries.

3.2.2 Dependent variable

The dependent variable for Study 1 is strategic entrepreneurial behaviors (SEB). SEB signifies the degree to which firms pursue innovation in terms of products, services, or business models (innovativeness) and actively enter new markets to commercialize those innovations (proactiveness) (Anderson et al., 2018). In Study 1,
I measure SEB as a continuous variable that ranges from high to low, such that every firm exhibits entrepreneurial behaviors to a certain degree (Kreiser et al., 2019).

To measure SEB, I employed a SEB instrument by Anderson et al. (2018), comprising four items on a five-point Likert scale: (1) In general, the top managers of my firm prefer to lead our industry in new product introductions. (2) In general, my firm is often the first to introduce new products in our industry. (3) In general, the top managers of my firm respond to competitors by introducing new product innovations. (4) In general, the top managers of my firm prefer to be ahead of the competition when introducing new products. The response options ranged from strongly disagree (1) to strongly agree (5).

These four instruments align with the dimensions of proactiveness and innovativeness (Covin and Slevin, 1989). I translated the survey instrument from English to Japanese using a back-translation process. The back-translation process involves a native Japanese speaker (fluent in English) translating the instrument from English to Japanese, followed by a native English speaker (fluent in Japanese) translating the instrument from Japanese to English (Brislin, 1980).

3.2.3 Independent variable

The independent variable for Study 1 is CEO narcissism. CEO narcissism refers to an escalated but fragile opinion about oneself and one’s competencies (Ames et al., 2006). I measure CEO narcissism as a continuous variable that ranges from non-narcissist to narcissist. Several narcissism scales exist to capture narcissism (Raskin and Terry, 1988; Ames et al., 2006). Until the development of the Narcissistic
personality inventory (NPI-16) by Ames et al. (2006), the 40-item NPI-40 scale (Raskin and Terry, 1988) was widely used to capture narcissism. Even though the NPI-40 successfully captures various dimensions of narcissism (authority, superiority, entitlement, and self-absorption), its length inhibits its utilization in several settings and induces respondents’ fatigue.

To address the constraints of the NPI-40, Ames et al. (2006) reformulated the inventory and developed the NPI-16 comprising 16 items. They draw from the NPI-40 to generate a unidimensional construct of narcissism analogous to the NPI-40 in terms of its association with other personality variables and outcome variables. The NPI-16 succeeds at reflecting the four facets of narcissism — authority, superiority, entitlement, absorption — captured by the NPI-40 (Emmons, 1987). Thus, the NPI-16 is an effective instrument to capture narcissism that measures the same underlying phenomenon as the NPI-40 while overcoming the limitations of the NPI-40.

The NPI-16 is a parsimonious and reliable instrument to capture narcissism. In addition to psychology literature, management literature has also extensively adopted the NPI-16 scale (Wales et al., 2013; Liu et al., 2019). Study 1 involves CEOs as respondents, and the NPI-16 fits the purpose: (1) convenient to administer, (2) inexpensive method to obtain primary data, (3) absence of observer’s subjectivity, and (4) widely recognized in psychology and management literature. The NPI-16 by Ames et al. (2006) comprises 16 items on a 7-point Likert scale. I translated the NPI-16 from English to Japanese and then back to English using a back-translation process (Brislin, 1980).
3.2.4 Moderating variable

The moderating variable for Study 1 is environmental hostility. Environmental hostility is the degree to which an environment supports organic growth — increasing output and sales units — of firms (Kreiser et al., 2019). I conceptualize environmental hostility as the opposite of munificence and a continuous variable that ranges from low hostility to high hostility.

To measure environmental hostility, I utilize a scale by Covin and Slevin (1991), comprising seven items on a five-point Likert scale: (1) Customer loyalty is low in my industry. (2) Severe price wars are characteristic of my industry. (3) Low-profit margins are characteristic of my industry. (4) Attractive market opportunities are scarce in my industry. (5) Customer preferences are difficult to forecast. (6) Year-to-year fluctuations in total industry sales are generally major. (7) Year-to-year changes in the product or service lines of the major competitors in my industry are generally significant. The response options ranged from strongly disagree (1) to strongly agree (5). I translated the environmental hostility scale from English to Japanese and then back to English using a back-translation process (Brislin, 1980).

3.2.5 Control variables

In Study 1, I use nine control variables: sales, profit, market growth, firm size, firm age, and family firm. These variables represent some of the commonly utilized performance measures (Engelen et al., 2016). To better isolate the role of CEO narcissism, I controlled for CEO age and CEO gender (Richard et al., 2009). Finally, I controlled for the industry effect to isolate the influence of environmental hostility.
(Engelen et al., 2016); Industry-fixed effects account for variation in a dependent variable over the industry that is not attributed to predictors (Mummolo and Peterson, 2018).

3.2.6 Methods

In Study 1, I planned to utilize SEM with instrument variables to analyze the data because this dissertation deals with latent constructs — CEO narcissism, environmental hostility, and SEB. Latent constructs are not directly observable and are measured with the help of indicators. While using indicators to measure a construct, contamination and deficiency in measurement are bound to happen (Kline, 2015). These measurement errors induce endogeneity and lead to inconsistent effect sizes (Antonakis et al., 2010).

SEM addresses the measurement error by incorporating both the structural model and the measurement model. SEM allows researchers to model the error in the latent construct and adjust the effect size accordingly (Kline, 2015). Similarly, the use of instrument variables enables researchers to address various sources of endogeneity — measurement error, simultaneity, and omitted variables bias (Antonakis et al., 2010).

Even though a randomized controlled experiment is considered a gold standard to address endogeneity, it is not always feasible to carry out an experiment. Instruments aid in achieving conditional ignorability in such settings. Instrument variables correlate with the predictor but not with the outcome variable and uncover the predictor variable’s independent effect on the outcome variable. Employing SEM
with instrument variables is equivalent to using Two-Stage Least squares regression (Antonakis et al., 2014).

I planned to use the “lavaan” package in R for estimating the SEM model. However, during the actual analysis, I dropped SEM and used CFA followed by OLS due to the complexity underlying a SEM moderation model.

3.2.7 Robustness test

The robustness test involves analyzing the uncertainty of models and determining whether estimated effects are sensitive to change in the model specifications. To eliminate the possibility of alternate explanations driving the model results, I test the curvilinear effect of narcissism and hostility on SEB.

3.3 Study 2

Details of Study 2 are discussed in this section.

3.3.1 Sample

Study 2 relies on secondary data collected from public sources — the COMPUSTAT database, Bloomberg financial database, and other sources (if necessary). The target sample includes firms listed in the S&P 500 index. I extract relevant data for the last ten years (2008 to 2018). Firms in the financial services, insurance, banking industries, public service sector, and firms without primary reportable industry have no standard for financial reporting (McGahan and Potter
Therefore, I drop these firms before proceeding to further analysis. I also drop firms reporting negative and zero sales to avoid complications while taking log.

3.3.2 Dependent variable

The dependent variable for the second study is SEB, consisting of two dimensions — innovativeness and proactiveness. Covin and Wales (2019) urges the entrepreneurship research community to use secondary data indicators of EO. Hence, Study 2 draws from Miller and Le Breton-Miller (2011) and employs financial ratios to measure SEB. However, there are several challenges in measuring SEB with secondary data indicators.

The first challenge is concerned with the level of analysis. Like the wider EO, SEB exists at the business unit level such that the SEB of a unit signifies the entrepreneurial behaviors of the unit and not of the entire company (Anderson et al., 2015). Therefore, researchers rely on survey data to measure EO (Rosenbusch et al., 2013) as a survey enables the capture of entrepreneurial behaviors of units. However, large firms such as publicly traded firms comprise multiple business units where each unit has its own SEB. It is challenging to gather primary data with enough statistical power from the business units of such firms (Kreiser et al., 2018). Hence, Kreiser et al. (2018) recommends looking for secondary data indicators that would capture SEB at the corporate level rather than the unit level. Nonetheless, the theory underlying the research model should support the corporate perspective, and Upper Echelon theory does that well in my study.
While using secondary data, scholars can either use content analysis or financial ratios to measure the variables. However, there are two limitations associated with the use of content analysis. First, content analysis best captures the attitudes and intentions of the firm (McKenny et al., 2018) and is, therefore, suitable to measure the attitudinal variable. SEB represents a behavioral construct (Anderson et al., 2018) and is concerned with behaviors surrounding the entrepreneurial activities of the firm. Therefore, financial ratios are better fit to capture SEB.

The second limitation with using content analysis is the measurement error that induces endogeneity (Antonakis et al., 2010). The signal-to-noise ratio is lower with the use of content analysis (Kreiser et al., 2018). Though dictionaries used for content analysis (Short et al., 2010) have improved substantially over time, McKenny et al. (2018) reports that 48% of the variance in the innovativeness measure is random noise. McKenny et al. (2018) further reports that 45% of the proactiveness measure is random noise and recommends some techniques to address random noise while using content analysis. On the other hand, the financial ratio reflects the accurate financial picture of the firm, causing the measurement error to drop significantly (Miller and Le Breton-Miller, 2011). Thus, financial ratios are better suited for Study 2.

In Study 2, I measure innovativeness in line with Kreiser et al. (2018)’s measure of innovativeness. Kreiser et al. (2018) measures innovativeness as the industry-adjusted research and development intensity (R&D expenditure/ total assets). Reportable R&D expenditure relates directly to the development of new products, processes, and business models, and therefore, includes a significant portion of a firm’s innovation activities (Miller and Le Breton–Miller, 2011).
I measure the second dimension of SEB — proactiveness — in line with Kreiser et al. (2019). Kreiser et al. (2019) measures proactiveness as a firm’s industry-adjusted retention ratio, which depicts the percentage of profit a firm reinvests in the company each year (net income-dividends). Kreiser et al. (2019) further reasons that proactive firms grow through reinvesting gains rather than harvesting those businesses and returning profits to shareholders. Therefore, proactive firms have higher retention ratios than their non-proactive counterparts (Miller and Le-Breton Miller, 2011). However, the measure of proactiveness in Study 2 measures the broader proactive behaviors of firms rather than proactiveness related to specific investments (Kresier et al., 2018).

3.3.3 Independent variable

Narcissism constitutes the independent variable of Study 2. Study 2 relies on Chatterjee and Hambrick’s (2007) conceptualization of CEO narcissism, based on unobtrusive measures, to capture CEO narcissism. One of the major limitations of the NPI-16 scale is likely lower response rates because of the social desirability bias (Cycyota and Harrison, 2006). Individuals tend to conceal their true identities to appear more favorable and socially desirable, especially when a survey is related to personality dimensions. When survey respondents figure out what the researchers want, they are likely to portray characteristics that accommodate the need of the researchers (demand characteristics). Survey instruments are also likely to suffer from inherent researchers’ biases.
Chatterjee and Hambrick (2007) devised an unobtrusive measure to capture CEOs' narcissism that addresses the limitations of survey instruments. Chatterjee and Hambrick (2007) built their work from Page et al. (1996), wherein the researchers urged the scholarly community to employ tangible evidence associated with the routine lives of individuals as sources of data. Webb et al. (1966) posits that the use of such inconspicuous measures combats the limitations of the survey — respondents' fatigue, demand characteristics, and researchers' biases. Thus, Chatterjee and Hambrick (2007) draws from Emmons (1987) and builds an unobtrusive measure of CEO narcissism as encouraged by Webb et al. (1996).

Chatterjee and Hambrick's (2007) measure of CEO narcissism comprises four indicators: the prominence of the CEO's photograph in the company's annual report, the CEO's prominence in the company's press releases, the CEO's use of first-person singular pronouns in interviews, and the CEOs' compensation relative to that of the second-highest executive of the firm. Chatterjee and Hambrick (2007) argues these four indicators co-vary significantly, suggesting that they capture the same underlying phenomenon. They further argue that each of these indicators is congruent with the elements of narcissism — entitlement, authority, superiority, and self-absorption (Emmons, 1987).

In Study 2, I measure CEOs' photographs in annual reports using a rating scale ranging from 4 to 1. Four points represent the CEO's photograph of him/her alone and occupying more than half a page. Three points represent a photo of a CEO alone occupying less than half a page. While 3 points represent a photo of a CEO with one or more fellow executives, 1 point represents the absence of the CEO's photo. Study
2 utilizes Mergent Online, AnnualReports.com, and the companies’ website to download the annual report of S&P 500 firms.

I measured the CEO’s prominence in the company’s press releases as the ratio of the number of words used by the CEO to total words in the press release. The study uses earnings conference call (ECC) transcripts obtained from ThomsonOne Investment Banking to measure the prominence in press releases and counted the words using CATA (computer aided text analysis) software.

I measured the third indicator—CEO’s use of first-person singular pronouns in interviews by dividing the number of first-person singular pronouns (I, me, my, mine, myself) by the number of first-person plural pronouns (we, us, our, ours, ourselves) used by the CEO. I created interview transcripts by extracting the parts of ECC where the CEO speaks and used the CATA software.

Finally, the fourth indicator, the CEO’s relative compensation, signifies the total compensation of the CEO divided by that of the second-highest-paid executive of the firm. Total compensation encompasses cash (salary and bonus) and non-cash compensation (deferred income, stock grant, and stock options). I used the “Bloomberg financial database” and “Mergent Online” to obtain the compensation data of the CEO and second-highest executive.

3.3.4 Moderating variable

The moderating variable for Study 2 is environmental hostility. The study follows Kreiser et al. (2019) and measures hostility as “the 5-year average growth in net industry sales at the four-digit SIC code level — industry level” (Keats and Hitt,
1988). In line with Kreiser et al. (2019), Study 2 utilizes “year variables” as predictor variables while “net industry sales” for each industry acts as the outcome variable in the following regression equation: \( y_t = \beta_0 + \beta_1 t + \epsilon_t \), where \( y \) = log-transformed industry sales and \( t = \) year; and \( \epsilon \) = the disturbance term).

The regression slope coefficient (\( \beta_1 \)) represents the measure of environmental munificence and indicates the average change in industry sales over the period. The higher value of the regression slope coefficient indicates the higher munificence (and lower hostility) in the environment with greater opportunities for organic growth (Heeley et al., 2006). Most scholars conceptualize hostility and munificence as the opposite ends of a continuum (Dess and Beard, 1984; Walters et al., 2010). Hence, to assess the hostility, I multiply the measure of munificence (\( \beta_1 \)) by a negative one (-1) such that a higher value suggests higher environmental hostility (Kreiser et al., 2010).

3.3.5 Control variables

I use eight control variables: assets, net income, net sales, and total dividends. These variables represent some of the commonly utilized performance measures (Engelen et al., 2016). To better isolate the influence of CEO narcissism, I control for CEO duality (Richard et al., 2009). Finally, I also control for the environmental dynamism to isolate the effect of environmental hostility (Kreiser et al., 2016). I also control for year fixed-effects because some years could be drastic than others, and year-fixed effects account for variation in a dependent variable over years that is not
attributed to predictors (Mummolo and Peterson, 2018). I extract control variables from Bloomberg financial and Compustat.

3.3.6 Methods

I test hypotheses employing a Bayesian model, as it addresses the constraints of the frequentist approach (McShane et al., 2017). The frequentist approach relies heavily on the p-value, where a lower p-value (<= 0.05) is considered as evidence corroborating that the observed effect size is not spurious. In other words, a higher p-value is considered as the evidence for the null hypothesis. If researchers observe a statistically significant difference (p-value <= 0.05), they reject the null hypothesis and retain the alternate hypothesis. However, researchers do not prove the null hypothesis. Similarly, if researchers do not observe a statistically significant difference, they fail to reject the null hypothesis but do not prove or disprove the alternate hypothesis (Wasserstein and Lazar, 2016). Irrespective of whether researchers reject the null or fail to reject the null, they do not independently prove or disprove the alternative hypothesis (Dienes and Mcclatchie, 2018). The conclusion about the alternate hypothesis is always tied to the null hypothesis, but researchers never carry out an independent exercise to test the alternate hypothesis. In other words, if researchers find evidence for the null hypothesis, they assume the alternate hypothesis is not true. Likewise, if they do not find evidence for the null hypothesis, they presume the alternate hypothesis is true (McShane et al., 2017). This heavy reliance on the null hypothesis draws major criticism from Bayesian advocates.
Scholars also criticize frequentist statistics for always beginning with the null assumption of no relationship, even though prior studies have proved otherwise (Dienes and Mclatchie, 2018). Additionally, the frequentist approach ignores whether the relationship exists in the real world or not and accentuates the scope of misuse of null hypothesis testing. Researchers begin with the null hypothesis that there is no relationship between the concerned variables, allowing them to gather evidence to reject the null or fail to reject the null based on their understanding /perception of the relationship in the real world (Dienes and Mclatchie, 2018). A robust technique to address the constraints of the frequentist approach is employing a Bayesian approach (Dienes and Mclatchie, 2018).

The Bayesian approach moves away from the null hypothesis testing and offers a more pragmatic and straightforward interpretation of the credibility interval (Morey et al., 2016). Unlike the frequentist approach, the Bayesian technique relies on prior — belief in the distribution of the parameter we are trying to estimate — to yield the posterior distribution (Gelman, 2006). Nonetheless, uninformed prior leads to a poor estimate of the posterior distribution (Guo et al., 2017). Using the uninformed prior is equivalent to using the maximum likelihood model. We can draw an informed prior from related research, logic, or the posterior distribution of the prior research (Gelman, 2006). In the absence of an informed prior, a weakly informed prior comes to the rescue of researchers. Though a weakly informed prior creates so much uncertainty around the parameter, it can perform well and generate a reasonable posterior distribution when the following conditions are met: large sample size, minimized
measurement error, and steps undertaken to improve causal inference (Gelman, 2006).

Bayesian multilevel modeling offers added advantage over the non-hierarchical approaches (Feller and Gelman, 2015). First, Bayesian multilevel modeling is immune from multiple comparison problems, running the analysis numerous times to get a statistically significant ($p \leq 0.05$) result (Gelman, 2013). Second, Bayesian multilevel modeling offers more efficient estimates (Gelman, 2013). Third, it aids in causal inference by accounting for data collection, adjusting for unmeasured covariates in observational studies, and modeling variation in treatment effects (Feller and Gelman, 2015). Finally, Bayesian multilevel modeling allows to disentangle within and between-variance (Gelman et al., 2012).

The research design of Study 2 encompasses estimating within and between effects. Therefore, Bayesian multilevel modeling allows Study 2 to build a reasonable credibility interval around both the effects (Stegmueller, 2013).

3.3.7 Robustness test

To analyze the uncertainty of models and evaluate whether estimated effects are sensitive to change in model specifications, I compare the proposed model with an alternative model. Evaluating the model and making changes in the model (if necessary) is one of the steps of Bayesian analysis. Therefore, while assessing the model, I intend to compare the original model with an alternate model — built based on the results of the original model. I employ the ‘LOOIC’ function to compare the models.
CHAPTER 4. ANALYSES AND RESULTS

4.1 Study 1

As mentioned earlier in the methodology section, the sample for Study 1 comprises 878 Japanese firms belonging to all major industries except forestry, agriculture, and fisheries. The respondents included executives of firms employing 10 to 299 employees, and I collected the data using Rakuten Insights, the largest online research platform in Asia. Though in the methods section, I anticipated carrying out the analysis using structural equation modeling (SEM) with instrument variables, I dropped the prior plan in the analysis phase.

The model for Study 1 constitutes a moderation model. The complexity underlying the interaction effect is likely to pose challenges while estimating the moderation model using SEM (Sardeshmukh and Vandenberg, 2017). Most interaction effects are small, and therefore, identifying the measurement model and establishing starting values for the parameters is challenging with SEM.

Mplus developed the SEM technique called the latent moderated structural (LMS) equation that models measurement error and addresses the limitations of SEM moderation. LMS is also easier to specify; however, scholars find it arduous to interpret and make sense of the effect size using this technique (Klein and Moosbrugger, 2000). Therefore, instead of the LMS equation, I opted for the route adopted by most researchers — OLS regression followed by confirmatory factor analysis (CFA). I utilized R 4.0.2 to conduct the CFA and OLS analysis.
Table 1.
Summary statistics showing mean, standard deviations, and correlations of Study 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>2.11</td>
<td>17.3</td>
<td>0.01</td>
<td>0.04</td>
<td>0.04</td>
<td>0.39</td>
<td>0.05</td>
<td>0.03</td>
<td>-0.01</td>
<td>-0.02</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>2.22</td>
<td>0.1</td>
<td>0.01</td>
<td>0.65</td>
<td>0.78</td>
<td>0.03</td>
<td>0.09</td>
<td>0.05</td>
<td>0.03</td>
<td>0.09</td>
<td>-0.07</td>
<td>-0.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market growth</td>
<td>2.19</td>
<td>0.09</td>
<td>0.04</td>
<td>0.65</td>
<td>0.59</td>
<td>0.03</td>
<td>0.08</td>
<td>0.02</td>
<td>0.05</td>
<td>0.09</td>
<td>-0.08</td>
<td>-0.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm size</td>
<td>2.33</td>
<td>0.1</td>
<td>0.04</td>
<td>0.78</td>
<td>0.59</td>
<td>0.04</td>
<td>0.12</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.06</td>
<td>-0.04</td>
<td>-0.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm age</td>
<td>40.3</td>
<td>40.4</td>
<td>0.39</td>
<td>0.04</td>
<td>1</td>
<td>-0.1</td>
<td>0.1</td>
<td>-0.04</td>
<td>-0.17</td>
<td>-0.04</td>
<td>0.09</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family firm</td>
<td>1.37</td>
<td>0.05</td>
<td>0.05</td>
<td>0.03</td>
<td>0.03</td>
<td>0.04</td>
<td>-0.1</td>
<td>1</td>
<td>0.16</td>
<td>0.01</td>
<td>0.07</td>
<td>-0.01</td>
<td>-0.05</td>
<td>-0.01</td>
</tr>
<tr>
<td>CEO age</td>
<td>55.2</td>
<td>7.9</td>
<td>0.03</td>
<td>0.09</td>
<td>0.08</td>
<td>0.12</td>
<td>0.1</td>
<td>0.16</td>
<td>1</td>
<td>-0.07</td>
<td>-0.06</td>
<td>0.07</td>
<td>-0.06</td>
<td>-0.09</td>
</tr>
<tr>
<td>CEO gender</td>
<td>1.01</td>
<td>0.01</td>
<td>-0.01</td>
<td>0.05</td>
<td>0.02</td>
<td>0.02</td>
<td>-0.04</td>
<td>0.01</td>
<td>-0.07</td>
<td>1</td>
<td>0.06</td>
<td>-0.01</td>
<td>0.03</td>
<td>-0.03</td>
</tr>
<tr>
<td>Industry</td>
<td>8.86</td>
<td>4.66</td>
<td>-0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>-0.02</td>
<td>-0.17</td>
<td>0.07</td>
<td>-0.06</td>
<td>0.06</td>
<td>1</td>
<td>-0.03</td>
<td>-0.05</td>
<td>-0.06</td>
</tr>
<tr>
<td>SEB</td>
<td>2.87</td>
<td>0.09</td>
<td>0.03</td>
<td>0.09</td>
<td>0.09</td>
<td>0.06</td>
<td>-0.04</td>
<td>-0.01</td>
<td>0.07</td>
<td>-0.01</td>
<td>-0.03</td>
<td>1</td>
<td>-0.17</td>
<td>-0.15</td>
</tr>
<tr>
<td>CEO Narcissism</td>
<td>4.03</td>
<td>0.08</td>
<td>-0.04</td>
<td>-0.07</td>
<td>-0.08</td>
<td>-0.04</td>
<td>0.09</td>
<td>-0.05</td>
<td>-0.06</td>
<td>0.03</td>
<td>-0.05</td>
<td>-0.17</td>
<td>1</td>
<td>0.13</td>
</tr>
<tr>
<td>Environmental Hostility</td>
<td>2.96</td>
<td>0.08</td>
<td>0.05</td>
<td>-0.21</td>
<td>-0.23</td>
<td>-0.19</td>
<td>0.1</td>
<td>-0.01</td>
<td>-0.09</td>
<td>-0.03</td>
<td>-0.06</td>
<td>-0.15</td>
<td>0.13</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: N= 878; Sales value in billion. Correlations greater than 0.06 are statistically significant at p < 0.05 level.*
Table 1 presents the descriptive statistics of Study 1. Table 1 depicts that the correlation coefficients among profit, market growth, and firm size are high (r > 0.50). Nevertheless, the higher correlation coefficients among these variables are not surprising, considering these variables conceptually overlap and measure firm performance.

4.1.1 Confirmatory factor analysis

The analysis commenced with a confirmatory factor analysis (CFA) that demonstrated a misspecification of the measurement model (Chi-square = 2045.725; p < 0.001; df = 321). Chi-square statistic assesses whether the covariance structure specified in the model is equivalent to the covariance structure in the data. The statistically significant chi-square results of Study 1 suggest a difference between the covariance structure specified in the model and the covariance structure in the data and that the model may be misspecified.

To improve the measurement model, I focused on the modification index, the expected change in the chi-square statistic by dropping or freeing a specific parameter. I proceeded further by dropping the indicators with the modification index greater than ten. Dropping the indicator is permissible in the reflective measurement model because the indicators — assuming they are equally reliable and valid — are functionally interchangeable. The loss of an indicator should not introduce a deficiency in the model.
Table 2.
List of original indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic entrepreneurial behavior</strong></td>
<td></td>
</tr>
<tr>
<td>SEB1</td>
<td>In general, the top managers of my firm prefer to lead our industry in new product development.</td>
</tr>
<tr>
<td>SEB2</td>
<td>In general, my firm is often the first to introduce new products in our industry.</td>
</tr>
<tr>
<td>SEB3</td>
<td>In general, the top managers of my firm respond to competitors by introducing new product innovations.</td>
</tr>
<tr>
<td>SEB4</td>
<td>In general, the top managers of my firm prefer to be ahead of the competition when introducing new products.</td>
</tr>
<tr>
<td><strong>Environmental hostility</strong></td>
<td></td>
</tr>
<tr>
<td>HOS1</td>
<td>Customer loyalty is low in my industry.</td>
</tr>
<tr>
<td>HOS2</td>
<td>Severe price wars are characteristic of my industry.</td>
</tr>
<tr>
<td>HOS3</td>
<td>Low profit margins are characteristic of my industry.</td>
</tr>
<tr>
<td>HOS4</td>
<td>Attractive market opportunities are scarce in my industry.</td>
</tr>
<tr>
<td>HOS5</td>
<td>Customer preferences are difficult to forecast.</td>
</tr>
<tr>
<td><strong>CEO narcissism</strong></td>
<td></td>
</tr>
<tr>
<td>NAR1</td>
<td>I know that I am good because everybody keeps telling me so. When people compliment me, I sometimes get embarrassed. I like to be the center of attraction.</td>
</tr>
<tr>
<td>NAR2</td>
<td>I prefer to blend in with the crowd. I think I am a special person.</td>
</tr>
<tr>
<td>NAR3</td>
<td>I am no better or nor worse than most people. I like having authority over people.</td>
</tr>
<tr>
<td>NAR4</td>
<td>I don’t mind following orders. I find it easy to manipulate people.</td>
</tr>
<tr>
<td>NAR5</td>
<td>I don’t like it when I find myself manipulating people. I insist upon getting the respect that is due to me.</td>
</tr>
<tr>
<td>NAR6</td>
<td>I usually get the respect that I deserve. I am apt to show off if I get the chance.</td>
</tr>
<tr>
<td>NAR7</td>
<td>I try not to be a show off. I always know what I am doing.</td>
</tr>
<tr>
<td>NAR8</td>
<td>Sometimes I am not sure of what I am doing. I expect a great deal from other people. Everybody likes to hear my stories.</td>
</tr>
<tr>
<td>NAR9</td>
<td>Sometimes I tell good stories. I expect a great deal from other people. I really like to be the center of attention.</td>
</tr>
<tr>
<td>NAR10</td>
<td>It makes me uncomfortable to be the center of attention. People always seem to recognize my authority.</td>
</tr>
<tr>
<td>NAR11</td>
<td>Being an authority doesn’t mean that much to me. I am going to be a great person.</td>
</tr>
<tr>
<td>NAR12</td>
<td>I hope I am going to be successful. I can make anybody believe anything I want them to.</td>
</tr>
<tr>
<td>NAR13</td>
<td>People sometimes believe what I tell them. I am more capable than other people.</td>
</tr>
<tr>
<td>NAR14</td>
<td>There is a lot that I can learn from other people. I am an extraordinary person.</td>
</tr>
<tr>
<td>NAR15</td>
<td>I am much like everybody else.</td>
</tr>
</tbody>
</table>
The dropping process began with NAR16, as it has the highest modification index (239.35). The modification index of 239.35 suggests that when I drop NAR16, the chi-square statistic will decrease by 239.35 points. However, after dropping NAR16, the chi-square value dropped by more than 239.35 points (chi-square = 1694.72; p < 0.001; df = 296). It is because when researchers drop one indicator, its association with all other indicators ceases to exist. I kept dropping the indicator until the chi-square statistic was non-significant (p > 0.05), implying the match between the covariance structure specified in the model and the covariance structure of the data. Table 3 comprises the details of the other dropped indicators.

<table>
<thead>
<tr>
<th>S.N</th>
<th>Indicator</th>
<th>Modification index</th>
<th>Resulting $\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NAR16</td>
<td>239.35</td>
<td>1694.72 (p &lt; 0.05; df = 296)</td>
</tr>
<tr>
<td>2</td>
<td>NAR2</td>
<td>166.35</td>
<td>1220.56 (p &lt; 0.05; df = 249)</td>
</tr>
<tr>
<td>3</td>
<td>NAR15</td>
<td>63.64</td>
<td>11181.02 (p &lt; 0.05; df = 249)</td>
</tr>
<tr>
<td>4</td>
<td>NAR4</td>
<td>60.68</td>
<td>1039.83 (p &lt; 0.05; df = 227)</td>
</tr>
<tr>
<td>5</td>
<td>HOS7</td>
<td>49.19</td>
<td>868.94 (p &lt; 0.05; df = 206)</td>
</tr>
<tr>
<td>6</td>
<td>NAR10</td>
<td>41.79</td>
<td>721.92 (p &lt; 0.05; df = 186)</td>
</tr>
<tr>
<td>7</td>
<td>NAR7</td>
<td>40.18</td>
<td>545.74 (p &lt; 0.05; df = 167)</td>
</tr>
<tr>
<td>8</td>
<td>NAR8</td>
<td>36.29</td>
<td>430.55 (p &lt; 0.05; df = 149)</td>
</tr>
<tr>
<td>9</td>
<td>HOS6</td>
<td>33.11</td>
<td>357.51 (p &lt; 0.05; df = 132)</td>
</tr>
<tr>
<td>10</td>
<td>HOS2</td>
<td>26.14</td>
<td>277.28 (p &lt; 0.05; df = 116)</td>
</tr>
<tr>
<td>11</td>
<td>NAR13</td>
<td>24.52</td>
<td>205.05 (p &lt; 0.05; df = 101)</td>
</tr>
<tr>
<td>12</td>
<td>NAR3</td>
<td>17.11</td>
<td>157.19 (p &lt; 0.05; df = 87)</td>
</tr>
<tr>
<td>13</td>
<td>SEB3</td>
<td>12.66</td>
<td>131.93 (p &lt; 0.05; df = 74)</td>
</tr>
<tr>
<td>14</td>
<td>NAR5</td>
<td>12.31</td>
<td>93.24 (p &lt; 0.05; df = 62)</td>
</tr>
<tr>
<td>15</td>
<td>NAR6</td>
<td>12.18</td>
<td>70.83 (p &lt; 0.05; df = 51)</td>
</tr>
<tr>
<td>16</td>
<td>HOS1</td>
<td>10.98</td>
<td>50.12 (p &lt; 0.05; df = 40)</td>
</tr>
<tr>
<td>17</td>
<td>NAR12</td>
<td>10.33</td>
<td>30.05 (p &gt; 0.05; df = 32)</td>
</tr>
</tbody>
</table>

Thus, I dropped indicators with modification index greater than ten and retained four indicators of narcissism (NAR1, NAR9, NAR11, NAR14), three indicators of
environmental hostility (HOS3, HOS4, and HOS5), and three indicators of strategic entrepreneurial behavior (SEB1, SEB2, and SEB4). The retained indicators of narcissism capture the dimensions of narcissism: NAR1 captures superiority, NAR9 captures authority. NAR11 captures self-absorption, and NAR14 captures entitlement. Environmental hostility’s remaining three indicators embody the phenomenon of environmental hostility. Finally, each remaining indicator of SEB captures both dimensions of SEB — innovativeness and proactiveness (Anderson et al., 2018). Hence, the final measurement model obtained after dropping the indicators (chi-square = 30.05; p > 0.05; df = 32) suggests the match between the predicted model and the observed value. Table 4 reports the result of the final measurement model.

<table>
<thead>
<tr>
<th>Table 4. Final indicators of the CFA model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic entrepreneurial behavior</td>
</tr>
<tr>
<td>SEB1</td>
</tr>
<tr>
<td>SEB2</td>
</tr>
<tr>
<td>SEB4</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>HOS3</td>
</tr>
<tr>
<td>HOS4</td>
</tr>
<tr>
<td>HOS5</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>NAR1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>NAR9</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>NAR11</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>NAR14</td>
</tr>
</tbody>
</table>

Factor loading (λ) indicates shared variance between the factor and the indicator (Furr, 2014). For example, the factor loading between NAR1 and CEO
Narcissism (0.48) represents 23% \( (0.48)^2 \) shared variance \( (R^2) \) between NAR1 and CEO narcissism. All the factor loadings of the final measurement model lie above 0.32 (Furr and Bacharach, 2014), and no statistically significant measurement error covariance exists. Therefore, the indicators of CEO narcissism, environmental hostility, and SEB explain variance in their respective factors.

Table 5.
Factor loadings and fit indices

<table>
<thead>
<tr>
<th>Indicator</th>
<th>CEO Narcissism</th>
<th>Environmental hostility</th>
<th>SEB</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAR1</td>
<td>0.48 (0.037)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAR9</td>
<td>0.55 (0.036)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAR11</td>
<td>0.53 (0.036)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAR14</td>
<td>0.59 (0.036)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOS3</td>
<td></td>
<td>0.53 (0.038)</td>
<td></td>
</tr>
<tr>
<td>HOS4</td>
<td></td>
<td>0.87 (0.049)</td>
<td></td>
</tr>
<tr>
<td>HOS5</td>
<td></td>
<td>0.43 (0.037)</td>
<td></td>
</tr>
<tr>
<td>SEB1</td>
<td></td>
<td></td>
<td>0.84 (0.015)</td>
</tr>
<tr>
<td>SEB2</td>
<td></td>
<td></td>
<td>0.77 (0.017)</td>
</tr>
<tr>
<td>SEB4</td>
<td></td>
<td></td>
<td>0.85 (0.015)</td>
</tr>
</tbody>
</table>

Initial \( \chi^2 \) (df) 2045.73 (321, \( p < 0.05 \))
Corrected \( \chi^2 \) (df) 30.05 (32, \( p > 0.05 \))
CFI 1.00
SRMR 0.02
RMSEA 0.00

Notes: \( N = 878 \); Standardized parameter estimates; SE in parentheses. P-value of factor loadings <0.001.

Comparative fit index (CFI), standardized root mean square (SRMR), and root mean square error approximation (RMSEA) are other goodness of fit indices used by the scholarly community. These three indices indicate a good fit of my moderation model as CFI is 1 (CFI > 0.95), SRMR is 0.02 (SRMR < 0.05), and RMSEA is 0 (RMSEA < 0.05) (Kline, 2015).
### 4.1.2 Regression analysis

#### Table 6.
Regression results of Study 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>2.23*** (0.53)</td>
<td>3.42*** (0.56)</td>
<td>4.03*** (1.07)</td>
</tr>
<tr>
<td>log(Sales)</td>
<td>0.01 (0.02)</td>
<td>0.01 (0.02)</td>
<td>0.01 (0.02)</td>
</tr>
<tr>
<td>log(Profit)</td>
<td>0.08 (0.05)</td>
<td>0.07 (0.05)</td>
<td>0.06 (0.05)</td>
</tr>
<tr>
<td>Market growth</td>
<td>0.05 (0.05)</td>
<td>0.02 (0.04)</td>
<td>0.02 (0.05)</td>
</tr>
<tr>
<td>Firm size</td>
<td>-0.04 (0.05)</td>
<td>-0.04 (0.05)</td>
<td>-0.04 (0.05)</td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.001+ (0.001)</td>
<td>-0.001 (0.001)</td>
<td>-0.001 (0.001)</td>
</tr>
<tr>
<td>Family firm</td>
<td>-0.04 (0.06)</td>
<td>-0.03 (0.06)</td>
<td>-0.03 (0.06)</td>
</tr>
<tr>
<td>CEO age</td>
<td>0.01 (0.004)</td>
<td>0.004 (0.004)</td>
<td>0.04 (0.04)</td>
</tr>
<tr>
<td>CEO gender</td>
<td>-0.08 (0.33)</td>
<td>-0.07 (0.32)</td>
<td>-0.07 (0.32)</td>
</tr>
<tr>
<td>CEO narcissism</td>
<td>-0.17*** (0.04)</td>
<td>-0.24* (0.05)</td>
<td></td>
</tr>
<tr>
<td>Environment hostility</td>
<td>-0.13*** (0.04)</td>
<td>-0.24 (0.16)</td>
<td></td>
</tr>
<tr>
<td>Industry fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RSE</td>
<td>0.8627</td>
<td>0.8474</td>
<td>0.8477</td>
</tr>
<tr>
<td>DF</td>
<td>855</td>
<td>853</td>
<td>852</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.0406</td>
<td>0.0764</td>
<td>0.0768</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>0.01</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>F-statistics</td>
<td>1.65(22, 855)</td>
<td>2.94 (24, 853)</td>
<td>2.84(25,852)</td>
</tr>
<tr>
<td></td>
<td>(p-value&lt;0.001)</td>
<td>(p-value&lt;0.001)</td>
<td>(p-value&lt;0.01)</td>
</tr>
</tbody>
</table>

*Note: N=878; Standard error reported in parentheses; + p < 0.1. * p < 0.05. ** p < 0.01.*

After deriving the final measurement model with the help of CFA, I carried out the ordinary least squares (OLS) regression of the moderation model (model 3). I
employed sales, profit, market growth, firm size, firm age, family firm, CEO age, and CEO gender as control variables based on prior research. Table 6 reports the regression results of Study 1.

### 4.1.3 Results

Table 6 reports the unstandardized coefficients with standard errors. Contrary to the hypothesized relationship, CEO narcissism shares a negative and significant relationship ($\beta = -0.24, p < 0.05$) with SEB. Similarly, environmental hostility shares a negative but non-significant association ($\beta = -0.24, p > 0.1$) with SEB. Finally, environmental hostility positively moderates the relationship between CEO narcissism and SEB, but the moderation relationship is not significant ($\beta = 0.03, p > 0.1$).

The R-squared of the model ($R^2 = 0.0768$) implies that CEO narcissism, environmental hostility, the interaction term, sales, profit, market growth, firm size, firm age, family firm, CEO age, and CEO gender jointly explain a 7.68% variance in SEB. Table 4 depicts the adjusted $R^2$ for the moderation model is lower than that for the model without the interaction term (model2), implying that the model without an interaction term explains SEB better than the moderation model. The F-statistics of the model ($p < 0.01$) implies that the moderation model fits the data better than the model with no predictor variables.

Thus, in Study 1, I was not able to find support for any of the hypotheses. However, the proposed moderation model fits well, and evidence contradicts hypothesis1, suggesting that the influence of CEO narcissism on strategic entrepreneurial behavior is negative and significant.
4.1.4 Visualizations

Fig. 1 illustrates the relationship between CEO narcissism and SEB at varying levels of environmental hostility — low hostility, mean hostility, and high hostility. While the x-axis represents CEO narcissism, the y-axis represents SEB. The line representing the relationship between CEO narcissism and SEB is downward sloping under all conditions. Therefore, Fig. 4 suggests that CEO narcissism negatively influences SEB. However, there is no significant difference in the slope under different conditions; therefore, Fig. 4 suggests that environmental hostility does not moderate the relationship between CEO narcissism and strategic entrepreneurial behavior.

Fig. 4. Relationship between CEO narcissism and strategic entrepreneurial behavior at varying levels of environmental hostility.
4.1.5 Robustness analysis

Table 7.
Results of robustness analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>3.61***</td>
<td>3.53***</td>
</tr>
<tr>
<td></td>
<td>(0.68)</td>
<td>(0.78)</td>
</tr>
<tr>
<td>log(Sales)</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>log(Profit)</td>
<td>0.06</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Market growth</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>Firm size</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Firm age</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Family firm</td>
<td>-0.03</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>CEO age</td>
<td>0.004</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>CEO gender</td>
<td>-0.06</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>(0.33)</td>
<td>(0.33)</td>
</tr>
<tr>
<td>CEO Narcissism</td>
<td>-0.25</td>
<td>-0.17***</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>(CEO Narcissism)$^2$</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td></td>
</tr>
<tr>
<td>Environmental hostility</td>
<td>-0.13***</td>
<td>-0.17</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>(Environmental hostility)$^2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.03</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Industry fixed effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RSE</td>
<td>0.8478</td>
<td>0.8479</td>
</tr>
<tr>
<td>DF</td>
<td>852</td>
<td>852</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.0766</td>
<td>0.0764</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>0.0495</td>
<td>0.0493</td>
</tr>
<tr>
<td>F-statistics</td>
<td>2.83(25, 852)</td>
<td>2.82(25, 852)</td>
</tr>
<tr>
<td></td>
<td>(p-value&lt;0.001)</td>
<td>(p-value&lt;0.001)</td>
</tr>
</tbody>
</table>

Note: N= 878; RSE = residual standard error; Standard error reported in parentheses; + p < 0.1. * p < 0.05. ** p <0.01. *** p <0.001; DF= degree of freedom; Adj. R-squared = adjusted R-squared.

To determine whether the proposed moderation model is sensitive to changes in model specifications, I estimated two additional relationships: the curvilinear impact
of CEO narcissism on SEB (model 4) and the curvilinear impact of environmental hostility on SEB (model 5). The results suggested that neither narcissism nor environmental hostility shares a curvilinear relationship with SEB, thereby corroborating the results of the original moderation model that narcissism shares a negative association with SEB.

Fig. 5 illustrates the curvilinear relationship between CEO narcissism and SEB. While the x-axis represents CEO narcissism, the y-axis represents SEB. The line representing the relationship between CEO narcissism and SEB is flat, indicating the absence of a curvilinear relationship.

![Fig. 5. Curvilinear relationship between CEO narcissism and SEB](image)

Fig. 6 visualizes the curvilinear relationship between environmental hostility and SEB. While the x-axis represents environmental hostility, the y-axis represents SEB. The line representing the relationship between environmental hostility and SEB is flat, indicating the absence of a curvilinear relationship.
Fig. 6. Curvilinear relationship between environmental hostility and SEB

4.1.6 Supplemental analysis

In Study 1, I fitted two additional models — a model without an interaction effect (model 2) and a model with only control variables (model 1). While the model with only control variables did not present anything noteworthy, the model without the interaction term indicated that not only CEO narcissism ($\beta = -0.17$, $p < 0.05$) but also environmental hostility ($\beta = -0.13$, $p < 0.04$) negatively influences the SEB.

4.2 Study 2

For Study 2, I extracted the data of S&P 500 companies from the year 2008 to 2018 using multiple sources: Compustat, Bloomberg financial database, Mergent Online, AnnualReports.com, ThomsonOne Investment Banking, and website of companies. Based on McGahan and Porter (1997), I dropped the following firms: financial services, insurance, banking, public services, firms without primary reportable industry. I dropped these firms because financial reporting standards vary
widely among these firms. I also dropped firms reporting negative and zero sales. After deleting missing data and firms reporting negative and zero sales with the help of the list-wise deletion technique, the final sample comprises 3529 observations from 399 companies belonging to 162 different industries (four-digit SIC code).

Out of the 3529 observations, I eliminated one observation due to the extremely high environmental hostility. The environmental hostility for SIC 3663 (radio and television broadcasting and communications equipment) was significantly higher in 2010. In our dataset, SIC 3663 includes Apple and Motorola. In Study 2, I measure environmental hostility based on the 5-year average growth in net industry sales at the industry level (four digit SIC). 2005-2010 witnessed a paradigm shift in the mobile phone industry. While market leaders were losing significant chunks of their market share each year, Apple was moving upwards in terms of sales. However, Apple's sales during the period were not strong enough to offset the overall environmental hostility.

Though the dataset for Study 2 comprises two firms from the mobile phone industry (Apple and Motorola), I had already deleted Apple’s observation for 2010 while dropping the observations with missing data. Thus, the final dataset for Study 2 comprises only one observation (Motorola for 2010) with extremely high environmental hostility. Hence, I deleted Motorola’s observation for 2010, and the final sample for Study 2 consists of 3528 observations belonging to 399 firms and 162 industries. Table 8 presents the descriptive statistics of Study 2.
Table 8.
Summary statistics showing mean, standard deviations, and correlations of Study 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td>CEO duality</td>
<td>0.52</td>
<td>0.50</td>
<td>1</td>
<td>-0.06</td>
<td>0.13</td>
<td>0.07</td>
<td>0.08</td>
<td>0.13</td>
<td>-0.08</td>
<td>-0.07</td>
<td>0.04</td>
<td>0.05</td>
<td>-0.03</td>
</tr>
<tr>
<td>Environmental dynamism</td>
<td>1.06</td>
<td>0.06</td>
<td>-0.06</td>
<td>1</td>
<td>-0.06</td>
<td>0.05</td>
<td>-0.03</td>
<td>-0.05</td>
<td>-0.06</td>
<td>-0.24</td>
<td>0.00</td>
<td>0.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Assets</td>
<td>27.6</td>
<td>44.45</td>
<td>0.13</td>
<td>-0.06</td>
<td>1</td>
<td>0.71</td>
<td>0.73</td>
<td>0.82</td>
<td>0.11</td>
<td>-0.04</td>
<td>0.00</td>
<td>0.07</td>
<td>-0.03</td>
</tr>
<tr>
<td>Net income</td>
<td>1.82</td>
<td>4.13</td>
<td>0.07</td>
<td>-0.05</td>
<td>0.71</td>
<td>1</td>
<td>0.59</td>
<td>0.70</td>
<td>0.06</td>
<td>-0.03</td>
<td>0.07</td>
<td>0.00</td>
<td>-0.01</td>
</tr>
<tr>
<td>Net sales</td>
<td>20.96</td>
<td>40.54</td>
<td>0.08</td>
<td>-0.03</td>
<td>0.73</td>
<td>0.59</td>
<td>1</td>
<td>0.59</td>
<td>0.05</td>
<td>-0.01</td>
<td>0.03</td>
<td>0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>Dividends</td>
<td>0.71</td>
<td>1.54</td>
<td>0.13</td>
<td>-0.05</td>
<td>0.82</td>
<td>0.70</td>
<td>0.59</td>
<td>1</td>
<td>0.11</td>
<td>-0.08</td>
<td>0.04</td>
<td>0.04</td>
<td>-0.07</td>
</tr>
<tr>
<td>Year</td>
<td>2013.13</td>
<td>3.14</td>
<td>-0.08</td>
<td>-0.06</td>
<td>0.11</td>
<td>0.06</td>
<td>0.05</td>
<td>0.11</td>
<td>1</td>
<td>0.01</td>
<td>0.02</td>
<td>0.19</td>
<td>-0.02</td>
</tr>
<tr>
<td>SIC</td>
<td>4271.45</td>
<td>1792.41</td>
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<td>-0.24</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.01</td>
<td>-0.08</td>
<td>0.01</td>
<td>1</td>
<td>0.01</td>
<td>-0.14</td>
<td>-0.03</td>
</tr>
<tr>
<td>CEO narcissism</td>
<td>0.64</td>
<td>0.27</td>
<td>0.04</td>
<td>0.00</td>
<td>0.00</td>
<td>0.07</td>
<td>-0.03</td>
<td>0.04</td>
<td>0.02</td>
<td>-0.01</td>
<td>1</td>
<td>0.02</td>
<td>-0.15</td>
</tr>
<tr>
<td>Environmental hostility</td>
<td>-0.06</td>
<td>0.08</td>
<td>0.05</td>
<td>0.03</td>
<td>0.07</td>
<td>0.00</td>
<td>0.02</td>
<td>0.04</td>
<td>0.19</td>
<td>-0.14</td>
<td>0.02</td>
<td>1</td>
<td>-0.01</td>
</tr>
<tr>
<td>SEB</td>
<td>0.33</td>
<td>1.04</td>
<td>-0.03</td>
<td>0.05</td>
<td>-0.03</td>
<td>0.01</td>
<td>-0.02</td>
<td>-0.07</td>
<td>-0.02</td>
<td>-0.03</td>
<td>0.15</td>
<td>-0.01</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: N = 3528; Assets, net income, net sales, dividends in billion. Correlations greater than 0.05 are statistically significant at p < 0.05 level.
I calculated the summary statistics using R 4.0.2. The above table depicts that the correlation coefficients among assets, net income, net sales, and dividends are high \((r > 0.50)\). However, the higher correlation coefficients among these variables are not baffling. These variables constitute common measures of firm performance and hence are bound to overlap conceptually.

4.2.1 Bayesian estimation of the model

As proposed in the methods section, I carried out the analysis of Study 2 using Bayesian multilevel modeling. Study 2 encompasses estimating within effect (CEO narcissism and environmental hostility within the industry) and a between effect (CEO narcissism and environmental hostility among different industries). Bayesian multilevel modeling offers advantages over the non-hierarchical approaches (Feller and Gelman, 2015). First, Bayesian multilevel modeling is immune from multiple comparison problems (Gelman, 2013). Second, it offers more efficient estimates (Gelman et al., 2012). Third, it aids in causal inference by accounting for data collection, adjusting for unmeasured covariates in observational studies, and modeling variation in treatment effects (Feller and Gelman, 2015). Finally, Bayesian multilevel modeling enables disentangling within and between variance (Gelman et al., 2012).

In Study 2, I utilize within-between analysis because it integrates the benefits of random and fixed effects models (McNeish and Kelley, 2019) while compensating for each other’s boundaries. The within-between analysis imports the ability to deal with endogeneity from the fixed-effects model. The fixed-effects model handles the
endogeneity in a multilevel model stemming out of the correlation between the lower-level predictor (level 1) and the entity-level (level 2) disturbance term (Antonakis et al., 2010). The fixed-effects model estimates the within effect but falls short at estimating the between effect. It also restrains researchers from including level 2 predictors.

The within-between analysis addresses the constraints of a fixed-effects model by estimating the between effect and incorporating level 2 predictors. The within-between model draws its abilities to estimate the between effect and include level 2 predictors from a random model. However, the random model yields a biased estimate when the level 1 predictor correlates with the level 2 disturbance term – endogeneity. The within-between model addresses the endogeneity by importing its abilities from a fixed-effects model. Thus, the within-between model integrates the benefits of the fixed and random-effects model.

In a within-between analysis, scholars integrate random effects and fixed effects by creating an industry (group) mean-centered predictor and the mean of the predictor for each endogenous variable. The mean-centered predictor is exogenous to the industry-level disturbance, thereby addressing endogeneity between the level 2 disturbance term and targeted level 1 predictor and generating consistent parameter estimates (McNeish and Kelley, 2019). While the industry mean-centered variable represents the estimated within-industry effect, the industry mean predictor represents the estimated between-industry effect (Certo et al., 2017).

In Study 2, I employ the Bayesian within-between multilevel model as it allows scholars to build a reasonable credibility interval around both within and between effects (Stegmueller, 2013). Although several Bayesian estimators for R exists, I utilize
an estimator called “rstan.” “Rstan” uses a wrapper called “rstanarm,” which translates the common modeling syntax employed in R into a complicated syntax expected by Rstan. Scholars can mathematically express Bayesian estimation as follows:

\[ \text{Posterior} = \text{Prior} \times \text{Likelihood} \]

\[ Pr(\theta|y) = P(\theta)L(\theta|y) \]

While \( \theta \) represents SEB’s estimate, \( P(\theta) \) represents the prior assumption about the distribution of SEB’s estimate. \( L(\theta|y) \) is the likelihood function of SEB’s estimate, and \( Pr(\theta|y) \) is the posterior distribution of SEB’s estimate. Bayesian analysis typically involves the following steps: (1) specifying a prior distribution, (2) specifying the joint distribution, (3) drawing from the posterior distribution, (4) evaluating model fit, (5) and visualizing predicted probabilities (Gelman et al., 2020).

### 4.2.2 Specifying a prior

The first step in Bayesian analysis involves specifying the prior distribution, where prior distribution signifies the mathematically expressed belief in the distribution of the parameter the researcher is trying to estimate (Gelman et al., 2020). Bayesian encompasses uncertainty and variation by representing prior as a distribution of possible outcomes. Though a relationship looks a certain way, scholars cannot be entirely sure. Therefore, the Bayesian technique creates a range of possible values around a probability distribution, with a mean and standard deviation.

Priors can be uninformed, weakly informed, and informed. An uninformed prior is equivalent to setting the prior probability of \( \theta \) equal to zero. When scholars use an uniformed prior, the estimates of the Bayesian model would be the same as that of
the maximum likelihood model, and benefits of Bayesian analysis ceases to exist. On the other hand, a weakly informed prior provides better advantages than an uninformed one by reducing the uncertainty around the belief about \( \theta \). In contrast to uninformed and weakly informed priors, an informed prior offers strong confidence in the expected mean and standard deviation of \( \theta \).

However, researchers rarely enjoy the comfort of employing a well-informed prior, especially in social science. Even in the areas where an established body of research prevails, substantial uncertainty about the prior exists. Because social science deals with stochastic data and dynamic phenomena, researchers settle down with weakly informed priors. Researchers quantify uncertainty around the belief about \( \theta \)'s distribution with parameters that make sense relative to the posterior distribution in weakly informed prior. There is substantial debate about the utility value of weakly informed priors. Most researchers, however, argue that in the absence of informed prior, a weakly informed prior works well and produces a reasonable posterior probability as long as the following conditions are met: large sample size, minimized measurement error, probability of effect size zero considered, and maximizing the causal inference (Statiscat, 2013). An exciting feature about a Bayesian prior is that it is updated continuously with new research. For example, the posterior distribution for research at time \( t \) becomes the prior for a study at time \( t+1 \), the posterior at time \( t+1 \) then becomes the prior for a study at time \( t+2 \), and so on.

In the absence of informed prior, I use a weakly informed prior in Study 2. As mentioned earlier, Study 2 employs a Bayesian estimator called "rstan" with a wrapper called "rstanarm." This wrapper sets the values of the weakly informed priors by
default and then scales those priors based on the standard deviation of the SEB (dependent variable).

4.2.3 Specifying joint distribution

After specifying the priors, I estimate the joint distribution, which is also called specifying the model. I obtain the joint distribution by multiplying the prior with its likelihood. Bayesian estimation of the model relies on Marko Chain Monte Carlo (MCMC) to create the sampling distribution of the posterior. By default, rstaram uses four chains to draw from the posterior distribution. Each MCMC chain comprises “warmup” and “sampling.” The warmup MCMC draws are part of “burn-in.” The initial MCMC draws from the posterior are highly variable and may bias the posterior mean and median calculation. Therefore, “burn-in” discards a certain number of the early draws assuming that the later draws are sufficient to produce a robust estimate of the posterior distribution. However, scholars debate the necessity and value of disregarding burn-in draws. While estimating the model, I set the “seed,” a pseudorandom number. The value of the seed does not impact the result but simply allows the generation of consistent results.

4.2.4 Drawing from posterior distribution

Following the estimation of joint distribution (model 2), I draw from the posterior distribution (Gelman et al., 2020). “Bayesian point estimates” are the posterior medians. Their variance is represented by the Mean Absolute Deviation (MAD_SD),
which is conceptually similar to the standard error of the coefficient in a frequentist approach. Table 7 depicts the details of the posterior distribution.

Table 9.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-0.22 (0.42)</td>
<td>0.03 (0.45)</td>
</tr>
<tr>
<td>CEO duality</td>
<td>-0.02 (0.04)</td>
<td>-0.02 (0.04)</td>
</tr>
<tr>
<td>Environmental dynamism</td>
<td>0.99 (0.34)</td>
<td>0.94 (0.33)</td>
</tr>
<tr>
<td>Assets</td>
<td>0.003 (0.02)</td>
<td>0.004 (0.02)</td>
</tr>
<tr>
<td>Net income</td>
<td>0.05 (0.03)</td>
<td>0.05 (0.03)</td>
</tr>
<tr>
<td>Sales</td>
<td>0.008 (0.02)</td>
<td>0.005 (0.03)</td>
</tr>
<tr>
<td>Dividend</td>
<td>-0.10 (0.03)</td>
<td>-0.10 (0.03)</td>
</tr>
<tr>
<td>CEO narcissism (within effect)</td>
<td>-0.53 (0.07)</td>
<td>-0.53 (0.07)</td>
</tr>
<tr>
<td>Environmental hostility (within effect)</td>
<td>0.16 (0.23)</td>
<td>0.16 (0.26)</td>
</tr>
<tr>
<td>CEO Narcissism (between effect)</td>
<td>-0.59 (0.17)</td>
<td>-0.90 (0.28)</td>
</tr>
<tr>
<td>Environmental hostility (between effect)</td>
<td>-0.33 (0.43)</td>
<td>2.85 (2.40)</td>
</tr>
<tr>
<td>CEO narcissism * environmental hostility (within effect)</td>
<td>-0.28 (1.05)</td>
<td></td>
</tr>
<tr>
<td>CEO narcissism * environmental hostility (between effect)</td>
<td>-5.04 (3.69)</td>
<td></td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Random effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\sigma^2)</td>
<td>1.05</td>
<td>1.03</td>
</tr>
<tr>
<td>(T_{00})</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>N id</td>
<td>162</td>
<td>162</td>
</tr>
</tbody>
</table>

Note: Observations = 3528; MAD_SD in parentheses.

Table 9 indicates that the median posterior estimate for within-industry CEO narcissism is -0.53 Narcissism with a standard deviation of 0.07, signifying that within
the industry, there is an expected decrease of 0.53 in SEB for a one-unit increase in CEO.

Similarly, there is an expected decrease of 0.90 with a standard deviation of 0.28 in SEB for a one-unit increase in between-industry CEO Narcissism. The median posterior estimate of the within-industry environmental hostility is 0.16 with a standard deviation of 0.26, signifying an increase in 0.16 in SEB with a one-unit increase in environmental hostility. Likewise, there is an expected increase of 2.85 in SEB with a one-unit increase in between-industry environmental hostility. The median posterior estimate of the within-industry interaction term is -0.28 with a standard deviation of 1.05, implying a decrease of 0.28 in SEB when the interaction term increases by a one-unit. Finally, the SEB decreases by 5.04 when the between-industry interaction term increases by a one-unit.

In Table 9, the within-group variance \( \sigma^2 = 1.03 \) of the moderation model is 1.03, while the between-group variance \( \tau_{00} \) is 0.08. The within-group variance indicates that within a specific industry, firms differ from each other by 1.03. Between-group variance indicates that industries in the sample differ from each other by 0.08.

The equation for the full research model (model 2) is depicted below:

Level 1 equation:

\[
SEB_{ij} = \beta_0 + \beta_1 \text{Narcissism}_{ij} + \beta_2 \text{Hostility}_{ij} + \beta_3 \text{Narcissism}_{ij} \times \text{Hostility}_{ij} + B \text{X}_{ij} + \omega_i + e_{ij}
\]
Level 2 equation:

\[ \text{SEB}_{ij} = (\gamma_{00} + \mu_{0j}) + \gamma_{10}\text{Narcissism}_{ij} + \gamma_{20}\text{Hostility}_{ij} + \gamma_{30}\text{Narcissism}_{ij} \times \text{Hostility}_{ij} + BX_{ij} \]

\[ + \omega_i + \epsilon_{ij} \]

\[ \beta_{0j} = \gamma_{00} + \mu_{0j} \]

\[ \beta_{1j} = \gamma_{10} \]

\[ \beta_{2j} = \gamma_{20} \]

\[ \beta_{3j} = \gamma_{30} \]

The level 1 equation predicts SEB at time \( i \) for industry \( j \), where \( \beta_{0j} \) is the overall level 1 intercept, adjusted for industry mean value of CEO narcissism and environmental hostility. \( \beta_{1j} \) is the within-industry effect of CEO narcissism, adjusted for an industry-level random slope; \( \beta_{2j} \) is the within-industry effect of environmental hostility, adjusted for industry-level random slope; \( \beta_{3j} \) is the within-industry interaction effect of CEO narcissism and environmental hostility, adjusted for industry-level random slope. While \( \gamma_{10} \) is the between-industry effect of CEO narcissism, \( \gamma_{20} \) is the between industry effect of environmental hostility. \( \gamma_{30} \) is the between-industry interaction effect of CEO narcissism and environmental hostility; \( X_{ij} \) is a vector of control variables with coefficient estimates \( B \). Finally, \( \omega_i \) is the year-fixed effects, and \( \epsilon_{ij} \) is the disturbance term. Similarly, the equation for the alternative model (model 1) is depicted below:

Level 1 equation:

\[ \text{SEB}_{ij} = \beta_{0j} + \beta_{1j}\text{Narcissism}_{ij} + \beta_{2j}\text{Hostility}_{ij} + BX_{ij} + \omega_i + \epsilon_{ij} \]
Level 2 equation:

\[ SEB_{ij} = (\gamma_{00} + \mu_{0j}) + \gamma_{10} \text{Narcissism}_{ij} + \gamma_{20} \text{Hostility}_{ij} + BX_{ij} + \omega_i + \epsilon_{ij} \]

\[ \beta_{0j} = \gamma_{00} + \mu_{0j} \]
\[ \beta_{1j} = \gamma_{10} \]
\[ \beta_{2j} = \gamma_{20} \]

I use the posterior distribution to construct an uncertainty/credibility interval around the estimate for SEB. The credibility interval is equivalent to the confidence interval of a frequentist approach. However, unlike a frequentist confidence interval, a credibility interval offers an intuitive and straightforward interpretation. Fig. 2 illustrates the credibility intervals for CEO narcissism (within-industry and between-industry), environmental hostility (within-industry and between-industry), and the interaction effect (within-industry and between-industry).

![Fig. 7. Credibility intervals](image-url)
In Fig. 7, “Narcissism within” represents within-industry narcissism, and “Hostility within” represents within-industry hostility. Likewise, “Narcissism between” indicates between-industry narcissism, and “Hostility between” indicates between-industry environmental hostility. Finally, “Narcissism within: Hostility within” represents the within-industry interaction term, while “Narcissism between: Hostility between” represents the between-industry interaction term.

Fig. 7 illustrates a 95% probability that the influence of CEO narcissism on SEB (within the industry) lies between -0.67 and -0.38, and effectively zero probability that CEO narcissism exerts no influence or a positive influence on SEB. Similarly, there is a 95% probability that the effect of CEO narcissism on SEB (between industry) lies between -1.44 and -0.36 and effectively zero probability that CEO narcissism has no influence or a positive influence on SEB. Additionally, there is a 95% probability that the effect of environmental hostility on SEB (within the industry) lies between -0.35 and 0.66 and a substantial probability that environmental hostility exerts no influence on SEB. Likewise, there is a 95% probability that the credibility interval for the effect of environmental hostility on SEB (between industry) lies between -1.74 and 7.62 and a substantial probability that environmental hostility does not influence SEB. Finally, there is a 95% probability that the effect of interaction term on SEB (within the industry) lies between -2.40 and 1.76, and a substantial probability that environmental hostility does not influence SEB. Between the industry, there is a 95% probability that the effect of interaction term on SEB lies between -11.99 and 2.43 and a substantial probability that environmental hostility does not influence SEB.
4.2.5 Evaluating the model

After drawing from the posterior distribution, the next step in Bayesian analysis involves assessing the model and making the changes (if necessary). A common technique to evaluate the model is comparing the proposed model with an alternative model (Gelman et al., 2020). In the proposed Bayesian model of Study 2, the 95% credibility intervals for the within and between interaction effect include zero; therefore, I fit an alternative model to verify whether to retain the interaction term or not. I generate an alternative model (model1) by dropping the interaction effects. Then, I compare the alternative model (model1) with the proposed moderation model (model2) using the leave one out cross-validation (LOOIC) of the "loo package."

LOOIC is the Bayesian equivalent of the Akaike Information Criteria (AIC) used in frequentist analyses. LOOIC estimates the amount of data lost by a model. The lower the LOOIC value, the lesser the amount of data lost, and the higher is the model’s predictive quality (Vehtari et al., 2017). The result indicates that the LOOIC value for the original model is lower (LOOIC = -22.6), implying that the original (moderation) model loses a lesser amount of data and offers better predictive performance than the alternative model (without interaction effect).

4.2.6 Visualizing the posterior distribution

The next step in Bayesian involves visualizing the posterior distribution. While "rstanarm" offers several visualizations and diagnostic tools to evaluate the posterior, Fig. 8 presents the histogram of the posterior distribution.
Fig. 8 indicates that the predictive distributions drawn from the model ($y_{rep}$) look a lot like the actual observed values of $y$, thereby implying that model has returned plausible predicted values for SEB — in the context of what SEB measures.

In Fig. 9, “Narcissism within” represents within-industry narcissism, and “Hostility within” represents within-industry hostility. Likewise, “Narcissism between” indicates between-industry narcissism, and “Hostility between” indicates between-industry environmental hostility. Finally, “Narcissism within: Hostility within” represents the within-industry interaction term, while “Narcissism between: Hostility between” represents the between-industry interaction term. Fig. 9 illustrates the histograms for each variable used in the moderation model and depicts that our variables are normally distributed.
Researchers can also create a time series plot of the posterior draws, called a trace plot, as illustrated in Fig. 10. In Fig. 10, “Narcissism within” represents within-industry narcissism, and “Hostility within” represents within-industry hostility. Likewise, “Narcissism between” indicates between-industry narcissism, and “Hostility between” indicates between-industry environmental hostility. Finally, “Narcissism within: Hostility within” represents the within industry interaction term, while “Narcissism between: Hostility between” represents the between-industry interaction term.
Trace plot exhibits the history of a parameter value across iterations of the chain. It helps to evaluate how quickly the MCMC procedure converges in distribution — how quickly the starting values of parameters are forgotten. Trace plots with rapid ups and downs variations indicate rapid convergence in the distribution, while long-term trends or drifts indicate slower convergence. The trace plot in Fig. 10 exhibits rapid ups and downs, indicating that the parameter value at any iteration is unrelated to the parameter value in later iterations.

4.3 Summary of results

This dissertation incorporates two studies: Study 1 based on primary data and Study 2 based on secondary data. The nature of data collected during Study 2 allowed
me to conduct within and between industry analyses, whereas the same was not possible for Study 1 due to lack of multilevel data. Study 1 suggests that CEO narcissism exerts a negative and significant influence ($\beta = -0.24, p < 0.05$) on SEB, while environmental hostility exerts a negative but non-significant influence ($\beta = -0.24, p > 0.1$) on SEB. Finally, the moderating effect of environmental hostility on the relationship between CEO narcissism and SEB is positive but not significant ($\beta = 0.03, p > 0.1$).

Study 2 indicates both the within and between effects of CEO narcissism on SEB are negative with the posterior median of -0.53 and 0.90, respectively. Similarly, both within and between effects of environmental hostility on SEB are positive with the posterior median of 0.16 and 2.85, respectively. Finally, the within and between moderating effects of environmental hostility on the relationship between CEO narcissism and SEB are negative with the posterior median of -0.28 and 5.04, respectively.

Results of Study 1 and Study 2 consistently suggest that CEO narcissism exerts a negative influence on SEB. Study 1 and Study 2 suggest an opposing relationship between environmental hostility and SEB. While Study 1 suggests a negative relationship, Study 2 indicates a positive one. However, the effect sizes exhibited by both studies are very small, encompassing zero in the confidence interval. Therefore, the opposing relationship between environmental hostility and SEB, as indicated by study 1 and Study 2, is not surprising. Study 1 suggests a positive but non-significant moderating effect of environmental hostility on the relationship between CEO narcissism and SEB. According to Study 2, the within industry
moderating effect of environmental hostility is negative, whereas the between industry moderating effect is positive.

Thus, the empirical analyses of the research model exhibit that CEO narcissism deters entrepreneurial behavior, whereas environmental hostility exerts a statistically insignificant influence on firm-level entrepreneurial behavior. Furthermore, environmental hostility exerts a statistically insignificant impact on the degree of association between CEO narcissism and SEB.
5.1 Summary and discussion

With the rising popularity of firm-level entrepreneurial behavior as one of the predictors of firm performance, the use of EO as a measure of firm-level entrepreneurial behavior is proliferating. Despite the burgeoning EO literature, several ontological issues persist in EO literature dimensionality of EO (Lumpkin and Dess, 1996); formative versus reflective measurement model (Covin and Wales, 2012); attitudinal versus behavioral construct (Covin and Lumpkin, 2011; Miller, 2011); and the extent to which the dimensions covary. To address these issues, Anderson et al. (2018) formulated a unidimensional construct of SEB. SEB captures the firm-level entrepreneurial behavior — the phenomenon of developing products and exploiting market opportunities — and contributes to the growth of strategic entrepreneurship research by capturing similar nomological associations as EO while being more reliable.

The Upper echelon theory facilitates the growth of strategic entrepreneurship research by providing a foundation for studying governance and managerial characteristics and their relationship with strategic outcomes. Building on the concept of “bounded rationality” (Simon, 1988; March and Simon, 1958; Cyert and March, 1963), Upper echelon theory proposes that the characteristics and personal values of CEOs and top management teams reflect in firm-level behavior (Hambrick and Mason, 1984). CEOs retain control over firms’ strategies, decisions, and policies, thereby impacting the firm-level outcomes. CEOs guide firms’ strategic directions and perform
crucial roles in determining the entrepreneurial behaviors of the firm (Simsek et al., 2010; Wales et al., 2013).

Narcissism constitutes one of the individual characteristics of executives that affects the strategic outcomes of firms. Narcissism signifies an elevated sense of self, coupled with an obsession for success and accolades (Ames et al., 2006). Narcissistic CEOs undertake bold decisions and actions, leading to changes in firm behaviors (Chatterjee and Hambrick, 2007). Therefore, this dissertation has argued that firms with narcissistic CEOs exhibit higher firm-level entrepreneurial behavior than firms led by non-narcissistic CEOs.

In addition to the characteristics of management, the industry environment plays a crucial role in explaining the entrepreneurial behaviors of firms. Therefore, this dissertation examined the moderating role of environmental hostility by hypothesizing that environmental hostility moderates the relationship between CEO narcissism and SEB; this dissertation argued that the relationship between CEO narcissism and SEB is more robust in a hostile environment than in a munificent environment.

To enhance the validity of the results and findings, I used a mixed-method design. Mixed method design involves using two or more sources of data to conduct the analysis. It allows creating a reliable and valid intervention that is scientifically designed and tested and enhances the results' credibility and validity by integrating multiple data sources. As part of the mixed design, I integrate survey data and secondary data by employing survey data in Study 1 and secondary data in Study 2.

The results indicate that Study 1 and Study 2 could not find any evidence to corroborate the hypothesis. However, in contrast to hypothesis 1, Study 1 suggested
that CEO narcissism negatively influences SEB. Study 2 also exhibited similar findings, indicating that the within-industry and between-industry effects of CEO narcissism on SEB are negative. This dissertation found contradictory evidence regarding the relationship between environmental hostility and SEB. While Study 1 suggested a negative relationship between environmental hostility and SEB, Study 2 indicated a positive relationship. However, the effect sizes indicated by both studies are very small and include zero in the confidence interval; therefore, the opposing relationship between environmental hostility and SEB as suggested by study1 and Study 2 is not surprising. Finally, both Study 1 and Study 2 indicate that the moderating effect of environmental hostility on the relationship between CEO narcissism and SEB is not significant.

The results of Study 1 and Study 2 unanimously suggest that CEO narcissism negatively influences SEB. Hence, the findings of this dissertation imply that firms with narcissistic CEOs exhibit lower entrepreneurial behavior than firms with non-narcissistic CEOs. In other words, CEO narcissism deters firm-level entrepreneurial behavior.

5.2 Implications

This dissertation offers four implications to the literature. First, the study grounds the firm-level entrepreneurship research in a theoretical paradigm by utilizing Upper echelon theory as a backbone of the study. Firm-level entrepreneurship research remains largely atheoretical, and this study introduces a theoretical foundation that helps explain the entrepreneurial phenomenon. This dissertation also
extends the applicability of Upper echelon theory. While strategic management scholarship has adopted Upper echelon theory in investigating a myriad of strategic outcome variables, it remains under-utilized in entrepreneurship research. This research identifies a new context in which Upper echelon theory helps explain the phenomenon, thereby highlighting the significance of Upper echelon theory in the growth of firm-level entrepreneurship research.

Additionally, this dissertation integrates literature on CEO narcissism with that of firm-level entrepreneurial behaviors. Past studies have identified several positive and negative firm-level outcomes of CEO narcissism, indicating that CEO narcissism is not necessarily detrimental. Under certain situations, CEO narcissism produces positive outcomes, while under others, it produces negative outcomes. This study adds to the stock of knowledge by highlighting that CEO narcissism negatively influences firm-level entrepreneurial behavior. While this dissertation hypothesized that the inherent characteristics of narcissistic CEOs push firm-level entrepreneurial behavior upward, the results indicate otherwise.

The dissertation also clarifies the role of environmental hostility as a moderator on the relationship between CEO narcissism and firm-level entrepreneurial behaviors. Relevant literature suggests either a positive relationship, negative relationship, or no relationship between hostility and firm-level entrepreneurial behaviors. The dissertation hypothesized that hostility moderates the relationship between CEO narcissism and firm-level entrepreneurial behavior positively such that the relationship is stronger when the environment is hostile. Contrary to the hypothesis, the results suggested that though environmental hostility influences firm-level entrepreneurial
behavior, environmental hostility does not influence the degree of relationship between CEO narcissism and firm-level entrepreneurial behaviors.

Finally, this research will also impact the hiring and selection procedures of CEOs. CEOs of some successful firms of the 21st century are prominent narcissists; therefore, there exists a widespread belief that firms with narcissistic CEOs perform better. However, this dissertation indicates that firms with narcissistic CEOs fall behind in entrepreneurial behavior, one of the predictors of firm performance. A multitude of factors, including firm-level entrepreneurial behavior, explain firm performance. While this dissertation measures firm-level entrepreneurial behavior, the dissertation does not measure firm performance and its other explanatory variables. It is possible that while firms with narcissistic CEOs exhibit lower entrepreneurial behavior, these firms outperform the competitors in terms of other performance predictors, eventually leading to higher overall firm performance.

Therefore, this dissertation highlights that the corporate houses and their managements cannot generalize the relationship between CEO narcissism and firm-level entrepreneurial behavior based on how CEO narcissism manifest in the success/performance of firms. While narcissistic CEOs may help elevate the firm performance, firms aspiring to enhance the firm-level entrepreneurial behavior may benefit better from non-narcissistic CEOs.

5.3 Limitations and future research

Despite the theoretical and practical implications of this dissertation, this study suffers from a few limitations. While Study 2 analyzed the within-industry and
between-industry effects, Study 1 could not carry out a similar analysis because of the lack of multilevel primary data. Future research can examine the within and between-industry effects of CEO narcissism and environmental hostility on SEB using mixed-method design. Collecting longitudinal data using surveys can be challenging, as it entails gathering the same data over an extended period. The process requires utmost discipline and vigorous work from the researcher(s). However, prior research has succeeded in gathering longitudinal data using the survey (Rindfleisch et al., 2008). Despite the challenges involved, first-hand longitudinal data enriches the quality of the study (Rindfleisch et al., 2008).

Furthermore, Study 2 relies on S&P 500 firms, and S&P 500 firms represent some of the country’s largest firms. As such, the dataset for Study 2 comprises firms that are inherently entrepreneurial than other firms; prior research indicates that firm size also determines the firm-level entrepreneurial behavior (Engelen et al., 2016). Lack of variability in the sample constraints the generalizability of Study 2’s findings. Future research can include large and small (and medium) firms in the sample to increase the generalizability of Study 2’s findings. It would also be interesting to see how the relationship among CEO narcissism, environmental hostility, and SEB manifest in the context of small and medium-sized firms. Future research can conduct separate studies for large (and medium) firms and small firms and carry out a comparative analysis. Examining the relationship among CEO narcissism, environmental hostility, and SEB in varying contexts would increase the generalizability of findings and help understand the relationship better.
While the results of Study 1 and Study 2 are consistent, suggesting the negative influence of CEO narcissism on firm-level entrepreneurial behaviors, Study 2 represents an imperfect replication of Study 1: studies are based on data from different countries. Prior research suggests that country and culture-specific factors can also influence entrepreneurial behavior (Gnyawali and Fogel, 1994). Therefore, future research can use data from similar settings (same country or at least the same region) to carry out the multi-method analysis so that the latter study can better replicate the former one. Alternatively, future research can examine whether country/culture-specific variables moderate the relationship between CEO narcissism and SEB.

While this dissertation examines the role of CEO narcissism, this study does not account for the CEO’s self-efficacy, which could be a significant variable to consider in the future. From a layman’s perspective, self-efficacy and narcissism seem like overlapping concepts, but they represent different constructs (Brookes, 2015). While self-efficacy is the belief in one’s abilities (Brookes, 2015), narcissism is an escalated self-importance and lack of sensitivity towards others. Self-efficacy is a sought-after personality characteristic, whereas narcissism represents a characteristic discouraged by society. To better isolate the influence of CEO narcissism, future studies can control for self-efficacy. Some studies suggest that self-efficacy is one of the outcomes of narcissism (Brookes, 2015). Therefore, future studies can also carry out a mediation analysis where self-efficacy mediates the relationship between CEO narcissism and firm-level entrepreneurial behaviors.
While Study 2 carries out the within and between industry analyses, it would be interesting to see how the relationship among CEO narcissism, environmental hostility, and SEB manifest within and between firms. This dissertation could not conduct within and between firm analyses because of the limited observations available for each firm. Though I gathered data from 2008 to 2018 (10 years), some firms ended up with fewer (minimum two) observations after the listwise deletion. Therefore, future research can increase the sample window so that there is enough data to carry out within and between firm analyses.

Environmental hostility is one of the dimensions of the task environment, and this dissertation indicates that the moderating effect of environmental hostility on the relationship between CEO narcissism and SEB is not significant. Future research can explore the role of other dimensions of task environment — environmental complexity and environmental dynamism (Dess and Beard, 1984). Future research can examine the moderating effect of environmental complexity and (or) environmental dynamism on the relationship between CEO narcissism and SEB.

In addition to CEO narcissism, CEOs’ personality traits such as self-esteem, core self-evaluation, and hubris could also explain firm-level entrepreneurial behavior. Self-esteem and core self-evaluation deal with positive self-regard like narcissism does. Future studies can examine the relationship between these personality traits among CEOs and firm-level entrepreneurial behavior. Similarly, Machiavellianism — manipulating others and using whatever means necessary to gain power — is another dark trait that can hurt firm performance (Palmer et al.,
It would be interesting to unpack the relationship between CEO Machiavellianism and firm-level entrepreneurial behavior. Psychology literature deals with two types of narcissism: grandiose and vulnerable narcissism (Zajenkowski and Syzmaniak, 2019). While this dissertation measures narcissism as a continuous variable ranging from low to high, further research can conceptualize narcissism as a dichotomous variable (grandiose and vulnerable) and unpack how these two categories of narcissism relate to firm-level entrepreneurial behavior. Similarly, CEOs' self-identity (revolutionary and discoverer) would be another pertinent variable that can affect firm-level entrepreneurial behavior (Zuzul and Tripsas, 2019).

5.4 Conclusion

This dissertation examines the role of CEO narcissism in explaining firm-level entrepreneurial behaviors. It also investigates whether the hypothesized relationship varies with environmental hostility. In contrast to the hypotheses, evidence indicates that CEO narcissism deters firm-level entrepreneurial behaviors, and environmental hostility does not moderate the relationship. While this research contributes to both scholarly work and practitioners, the study suffers from a few limitations. Nevertheless, it is crucial to comprehend the firm-level entrepreneurial behavior and its connection with CEOs and top management characteristics; therefore, this dissertation encourages future studies in this domain.
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VITA

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While working as a teaching assistant for about a year, she fell in love with teaching. After receiving the “Silver Jubilee scholarship” offered by Indian Embassy, Nepal, She went to Visvesvaraya Technological University, India, to pursue her master’s in business administration, specializing in human resource management.

After completing an MBA, she returned to her home country, Nepal, and started working as a faculty member at the College of Applied Business, Tribhuvan University. During her stay at College at Applied Business, she got exposed to research, which marks the beginning of her research career. To further her career in research, she joined the Ph.D. program in Entrepreneurship and Innovation in 2017 at the University of Missouri-Kansas City.

Upon completion of her degree requirements, Ms. Shah plans to carry teaching and research simultaneously so that she can contribute through the process of creating and disseminating knowledge.