CEOs and Firm Innovation: The Role of Political Ideology

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Abstract

Innovation plays a critical role in the adaptability and survival of firms by enabling them to effectively respond to changing market conditions and create new avenues for growth. Existing research demonstrates that CEOs have a significant influence over firms' innovation strategies. In this chapter, our objective is to examine how CEO political ideology, in terms of their position on the liberal-conservative continuum, shapes firms' innovation efforts. We draw on upper-echelons theory, which underscores the role of executives' personal orientations on their decisions, and the scholarship in political psychology that demonstrates the different values and psychological needs of liberals and conservatives. We found that CEO liberal orientation is associated with a greater number of innovations and higher innovation quality. Specifically, we observed that CEO liberalism influences innovation outcomes through increased investment in risky strategies such as R&D, capital investments and mergers and acquisitions, which are integral drivers of firms' innovation endeavors.

Keywords: CEO, Political ideology, Innovation, Risk taking

Introduction

In today's fast-paced and ever-changing business world, organizations must continually adapt and thrive in response to the dynamic environment in which they operate. Innovation has emerged as a crucial driver of organizational success and competitiveness, propelling companies to stay ahead of the curve. At the forefront of fostering innovation and enabling organizations to navigate environmental challenges are CEOs, who serve as strategic leaders. Investments in innovation is

one of the most fundamental and frequent decisions that CEOs make and have discretion over during their career (Barker & Mueller, 2002; Yang, et al., 2020). In fact, CEOs' characteristics have been found to be directly influential in the firms' innovation outcomes such as patenting and level of R&D investments (Custódio et al., 2019; Helfat & Martin, 2015).

In this chapter, we delve into the link between CEO attributes and firm innovation. Specifically, we explore the influence of a CEO's political ideology, an integral facet of their identity, on innovation. Past research has shown that CEO's ideology is an important attribute that influences a range of important strategic decision they make (Swigart et al., 2020), however, its effect on innovation is still understudied.

The political ideology of CEOs significantly influences their identity and, consequently, their conduct (Burris, 2001; Jost et al., 2009). Driven by their political ideology, CEOs frequently contribute substantial personal funds towards political causes. According to recent research (Cohen et al., 2019), approximately 89% of CEOs serving in S&P 500 companies made political donations between 2000 and 2017. Furthermore, the ideological beliefs held by CEOs motivate them to adopt public positions on social matters. This trend is exemplified by instances such as Bank of America's CEO, Brian Moynihan, and PayPal's Dan Schulman expressing strong opposition to a North Carolina law regarding bathroom usage based on birth certificates as well as Chick-fil-A's CEO, Dan Cathy, public denouncement of same-sex marriage (Chatterji & Toffel, 2018). Elon Musk is another intriguing example of a CEO who has ventured into the political sphere, offering his views on controversial topics such as the Covid-19 pandemic, the Russian war in Ukraine, and free speech issues. He has even taken specific positions on political figures, engaging in conflicts with Democrat Sen. Elizabeth Warren and endorsing Republican Florida Gov. Ron DeSantis

(Dorn, 2022). Furthermore, CEOs' political ideology significantly influence their judgment and decision-making processes (Swigart et al., 2020).

Although political ideology is an important aspect of CEOs' identity, its influence on CEO decision-making has only recently begun to receive attention in the literature. Notably, the mechanisms through which CEO political ideology influences innovation remain understudied. Our aim is to bridge this gap by demonstrating that CEO political ideology exerts influence on firm innovation, particularly through its impact on risky decision-making. In the next section, we provide a brief review of existing research on the implications of CEO political ideology for firm strategy and then explore how it influences firm innovation.

CEO Political Ideology and Firm Strategies

Political ideology encompasses individuals' beliefs regarding the ideal structure of a society and means of achieving a societal structure (Erikson & Tedin, 2003; Jost et al., 2009). Political ideology, particularly the left-right or liberal-conservative orientation, serves as a crucial factor in comprehending an individual's value system across various dimensions, such as the preference for equality versus hierarchy, openness to social change versus maintaining the status quo, and beliefs about the relative influence of individual attributes versus external factors on outcomes (Jost et al., 2003). Political ideology is thought to mirror individuals' inherent dispositional tendencies, including their approach to uncertainty, thereby exerting a substantial influence on their decision-making processes and behaviors (Hibbing et al., 2014; Jost et al., 2003; Jost et al., 2017). Findings from neuroscience research strengthen these contrasts by highlighting discernible differences in brain structures between liberals and conservatives. According to this research, conservative-oriented individuals have a brain structure associated with more sensitivity to threat and fear (a larger right amygdala), while liberal individual's brain structure is associated with greater tolerance

of uncertainty and ambiguity (a larger anterior cingulate cortex) (Kanai et al., 2011; Schreiber et al., 2013).

Moreover, political ideology is closely linked to the openness to new experience dimension of the Big Five personality traits. Liberals tend to embrace new experiences more readily, while conservatives typically show lower levels of openness to new experience (Carney et al., 2008; Gerber et al., 2011).

In light of the pivotal role played by political ideology in shaping individuals' value systems and influencing their personality, decision-making processes, and behaviors, organizational researchers have directed their attention towards investigating its impact on organizational contexts, particularly among strategic leaders. Studies in this field assume that political ideology influences strategic leaders' decision-making processes by acting as a filter through which they perceive and interpret any situation (England, 1967).

Assuming organizations as reflections of their strategic leaders (Hambrick & Mason, 1984), scholars theorized that the political ideology held by CEOs would manifest in firm outcomes. A growing body of research provides substantial evidence to support this perspective, demonstrating the impact of CEO political ideology on firm-level outcomes (Swigart et al., 2020).

Most studies have delved into the differences in values between liberals and conservatives, particularly regarding egalitarianism and social concerns. For example, the liberal orientation of CEOs can be reflected in their egalitarian view on pay structure, as supported by a study indicating that liberal CEOs tend to reduce horizontal total pay disparity within the TMT (Chin & Semadeni, 2017). Moreover, research has demonstrated that liberal CEOs exhibit a stronger commitment to corporate social responsibility (CSR) than their conservative counterparts (Chin et al., 2013; Gupta et al., 2019). Political ideology of strategic leaders can extend to their receptivity to social activism,

as evidenced by Briscoe et al., (2014) finding indicating a positive relationship between CEO liberalism and LGBT employee activism.

Additionally, several studies on the influence of political ideology are built on the assumption that conservative CEOs are more risk-averse than their liberal counterparts. For example, Elnahas and Kim (2017) found that conservative CEOs are less likely to pursue mergers and acquisitions (M&A) compared to their liberal counterparts. When conservative CEOs do engage in such actions, they tend to choose less risky options, such as acquiring public firms and avoiding cash payments and earnout clauses. In the same vein, assuming tax avoidance is a risky course of action, Christensen et al., (2015) demonstrated that companies led by conservative CEOs are more hesitant to partake in tax avoidance compared to firms led by liberal CEOs.

To summarize, the political ideology of CEOs holds significant sway within companies because it not only affects their value system but their risk preferences. Liberal CEOs tend to embrace new experiences and higher levels of risk. Conversely, conservative CEOs lean towards risk aversion. Therefore, we expect firms with liberal CEOs to engage more in risk taking and exhibit risk-taking behaviors such as investments in R&D and M&As than firms lead by conservative CEOs.

CEO political ideology and firm innovation

Innovation is about the creation, acceptance, and implementation of fresh ideas pertaining to processes, products, and technologies (Thompson, 1965). Innovation inherently carries a significant degree of risk. The outcome of innovative projects remains highly uncertain, with a considerable number of initiatives ultimately ending in failure. The unpredictable nature and high probability of failure associated with innovative endeavors have been widely acknowledged (Cummings & Knott, 2018; David et al., 2008). These risks extend beyond the firm level and can

also impact CEOs personally by raising questions about their leadership capabilities (Meindl et al., 1985).

As previously discussed, conservatives and liberals exhibit contrasting tendencies in managing uncertainty and threats, with conservatives typically displaying a higher need for predictability and security. This inclination prompts conservatives to seek greater control over events and enhanced security. Therefore, we expect firms with liberal CEOs to have higher innovation outcomes than firms with conservative CEOs.

Furthermore, we anticipate that the political ideology of CEO will impact innovation performance, particularly through their risk-taking behaviors. As mentioned earlier, a greater tolerance for uncertainty inclines liberal CEOs towards favoring investments in uncertain strategies, such as R&D and/or M&As. These bold investments are essential prerequisites for cultivating innovation within a company.

To summarize, we hypothesize that the presence of politically liberal CEOs will contribute to increased innovation performance within firms. We particularly predict that higher innovation performance in firms with liberal CEOs is achieved through engaging in more risk-taking behaviors.

Methods

Data and sample

We defined our sample as CEOs (accessed via Execucomp database) who served on high-tech firms listed on S&P1500 from 1992 to 2014. High-tech firms present a suitable sample for testing our hypothesis given the pivotal role of innovation in this sector. The swift technological changes they face and their essential need to maintain competitiveness drive these firms to prioritize innovation (Cloodt et al., 2006, Yu et al., 2019). As a result, they allocate a substantial portion of

their budget to R&D and employ a high percentage of research professionals (Bartos, 2007). We used the high-tech industry SIC-code of the National Bureau of Labor Statistics (Hecker, 1999), to identify high-tech firms. Furthermore, we chose 2014 as our endpoint because the primary source we use to measure CEO political ideology is accessible up until that year.

We excluded the CEOs for whom no donations to either Democratic and/or Republican parties between 1992 to 2014 have been found. We also considered only those firms listed in Execucomp that match with the United States Patent and Trademark Office (USPTO) database. Our final sample comprised 6,724 firm-years, encompassing 1,336 CEOs from 678 firms.

To measure innovation variables, we utilize patent data acquired from the USPTO's PatentsView database. The data used in this database is derived from USPTO bulk data files, encompassing all patents granted from 1976 up to the most recent update. To measure CEO political ideology, we rely on the recorded donations to the Democratic and Republican parties by individuals. The data regarding these contributions is obtained from Bonica's (2016) Database on Ideology, Money in Politics and Elections (DIME), which consists of over 130 million political contributions, collected from Federal Election Commission (FEC) filings, made by both organizations and individuals. Further, we collect financial data from Compustat database and CEO data from Execucomp.

Measures

Dependent variable.

Risk-taking behavior: Following the previous literature (Chen, Luo, Tang, & Tong, 2023; Connelly, Li, Shi, & Lee, 2020), we measured risk-taking behaviors as the sum of capital allocated to three highly uncertain but strategic investment decisions that are mostly are taken with the direct

involvement of the CEO, namely: R&D expenditure, capital expenditure, and capital allocated to mergers and acquisition (M&A) activities each year.

Innovation performance. We measured innovation performance as the number of patents filed by a firm with the USPTO in each year of the sample and the number of forward citations subsequently received by those patents (Custódio, et al., 2019; Galasso & Simcoe, 2011; Sunder, Sunder, & Zhang, 2017).

Independent variable.

CEO liberalism. We used individual donations to Democratic and Republican parties to measure CEO political ideology (Chin et al., 2013). Research in political science demonstrates that individual contributions to political parties are often driven by ideological considerations (Ansolabehere, deFigueiredo, & Snyder, 2003). It is widely acknowledged that individuals who hold liberal values typically show support for the Democratic Party, whereas those with conservative orientations tend to favor the Republican Party (Levendusky, 2009). When calculating this variable, we treat political ideology as a stable characteristic over time, aligning with the findings of research in political psychology indicating that individuals' political ideology tends to remain stable once they reach adulthood (Jost, 2006; Sears & Funk, 1999). Additionally, recent studies examining the political ideology of executives offer further evidence supporting the notion that their ideological orientation (and contributions) tend to exhibit consistency over time (Chin et al., 2013; Christensen et al., 2015). Following prior studies (e.g., Chin et al., 2013, Gupta et al., 2019), we measure CEO liberalism using an index of four indicators of political liberalism: 1) proportion of the number of donations to the Democratic Party to the number of donations to both parties, (2) proportion of the number of years the individual donated to the Democratic Party to the number of years he or she donated to either party, (3) proportion of the amount of donations

to the Democratic Party to the amount of donations to both parties, and (4) proportion of the number of unique recipients of the Democratic Party to the total number of unique political donation recipients of both parties. We average these indicators to compute a composite index of CEO liberalism ranging from 0 (highly conservative) to 1 (highly liberal).

Control variables.

We incorporated controls for various variables at the firm, CEO, and environmental levels. At the firm level, we accounted for *firm performance*, measured by return on assets (ROA), as previous research has demonstrated its influence on innovation (Bowen, Rostami, & Steel, 2010). We controlled for *firm size*, represented by the logarithm of the total assets, as firm size has been shown to impact innovation outcomes (Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004). We included a control for *R&D intensity*, measured by the ratio of R&D investment to total assets, to capture the level of R&D efforts that may affect innovation outcomes. Consistent with prior studies, we assigned a value of zero to firms with missing R&D expenditure in each sample-year (Sunder et al., 2017; Tang et al., 2015). Further, we controlled for the logarithm of *firm's market value*. At the CEO level, we incorporated several variables to account for the varying power and influence that CEOs possess in making business decisions, as well as their personal preferences. To capture CEO power, we controlled for *CEO tenure*, measured by the number of years since the CEO's appointment to the position and *CEO duality*, coded as 1 if the CEO also serves as the chairman of the board and 0 if not. We also controlled for *CEO age* and *CEO gender* to account for differences in risk-taking motives that may arise due to career stage and gender (Matta & Beamish, 2008). Finally, we controlled for *CEO change* to account for the possible change in a firm's innovation strategy during and after the CEO succession event. We

controlled for the effects of time and industry by including industry (three-digit SIC codes) and year dummies in the models.

Estimation method

We used a generalized structural equation model (GSEM) for estimating standard mediation analysis that calculates direct, indirect (as a product of coefficients), and total effects for each mechanism (MacKinnon, 2012), with robust standard errors. The GSEM estimates a system of equations, allowing the error terms across different equations to correlate (Shaver, 2005).

We utilize a one-year lag when testing our hypothesis (Balsmeier, Buchwald, & Stiebale, 2014; Hirshleifer et al., 2012) given that CEO preferences and other explanatory variables require a certain amount of time to manifest in the patent data (Balsmeier & Buchwald, 2015; Cummings & Knott, 2017).

Results

Table 1 provides descriptive statistics and correlations among our variables. We hypothesized that CEO liberalism is positively associated with firm innovation performance and this relationship is mediated by risk-taking behaviors. Table 2 reports the result of GSEM regressions estimating this mediation relationship and calculates the direct and indirect effect of CEO's liberalism on the number of patents and the number of citations. Two conditions must be met for mediation effects to be present (Kenny, Kashy, & Bolger, 1998). First, the independent variable must predict the mediating variables. Model 1 in Table 2 demonstrate that our data satisfy this first condition, with CEO liberalism being strongly associated with the risk-taking behaviors (Model 1, Path A in Figures 1 and 2). The second condition is that the mediating variables predict the dependent variable. We test this condition in Model 2 and Model 3. Our results show that risk-taking

behaviors is strongly associated with the number of patents (Model 2, Path B in Figure 1) and the number of forward citations (Model 3, Path B in Figure 2).

Table 1 Summary statistics and correlations

	Mean	SD	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)
(1) log(PATENTS+1)	2.236	2.027	0	9.075	1.000					
(2) log(CITES+1)	3.761	3.086	0	11.985	0.907	1.000				
(3) CEO liberalism	.465	0.288	0	1	-0.130	-0.132	1.000			
(4) Risk-taking	.3	0.429	0	6.211	-0.055	-0.027	0.061	1.000		
(5) Total assets	6.895	1.778	-1.911	12.681	0.595	0.439	-0.098	-0.238	1.000	
(6) R&D intensity	.117	0.125	0	2.453	-0.031	-0.010	0.031	0.553	-0.349	1.000
(7) ROA	-.233	39.075	-2024	1743.33	0.009	0.010	0.008	-0.233	0.044	-0.102
(8) Market value	7.182	2.064	-5.298	13.289	0.537	0.436	-0.079	-0.151	0.859	-0.230
(9) CEO age	53.935	7.818	28	96	-0.033	-0.079	-0.046	-0.029	0.080	-0.070
(10) CEO change	.103	0.304	0	1	-0.004	-0.014	-0.005	-0.021	0.032	-0.021
(11) Male CEO	.982	0.133	0	1	-0.029	-0.005	-0.033	0.009	-0.089	0.022
(12) CEO tenure	8.17	7.907	0	61	-0.081	-0.083	0.010	-0.044	-0.064	-0.013
(13) Dual CEO	.335	0.472	0	1	0.150	0.263	-0.112	-0.053	0.045	-0.043

	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(7) ROA	1.000						
(8) Market value	0.037	1.000					
(9) CEO age	0.004	0.041	1.000				
(10) CEO change	0.006	-0.009	0.130	1.000			
(11) Male CEO	-0.002	-0.075	0.027	-0.003	1.000		
(12) CEO tenure	-0.012	-0.036	0.443	0.033	0.061	1.000	
(13) Dual CEO	0.009	0.090	0.106	0.031	0.030	0.160	1.000

Table 2-GSEM estimation using a maximum likelihood estimator.

	(1) F.Risk-taking b/se	(2) F.PATENTS b/se	(3) F.CITES b/se
Risk-taking		0.1637***	0.3229***
		(0.0481)	(0.0817)
R&D intensity		2.8157***	3.3315***
		(0.2348)	(0.3489)
Total assets	-0.0624***	0.5521***	0.5766***
	(0.0069)	(0.0254)	(0.0389)
ROA	-0.0024**	-0.0000	-0.0000
	(0.0008)	(0.0002)	(0.0004)
Market value	0.0236***	0.2166***	0.3768***
	(0.0053)	(0.0199)	(0.0313)
CEO age	-0.0020*	-0.0102***	-0.0184***
	(0.0008)	(0.0028)	(0.0046)
CEO change	0.0126	-0.0098	-0.0198
	(0.0152)	(0.0603)	(0.0948)
Male CEO	0.0291	0.2344	0.5266*
	(0.0222)	(0.1484)	(0.2049)
CEO tenure	-0.0008	-0.0051+	-0.0062
	(0.0006)	(0.0026)	(0.0041)
Dual CEO	-0.0533***	0.1234**	0.1591*

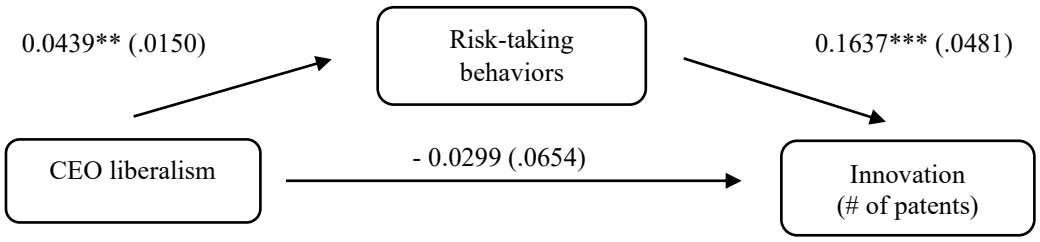
	(0.0117)	(0.0472)	(0.0803)
CEO liberalism	0.0439**	-0.0299	-0.0005
	(0.0150)	(0.0654)	(0.1051)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Log-likelihood	-	-12186.411	-14767.083
Observations	6,724	6,724	6,724
Number of firms	678	678	678

+, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1% confidence levels, respectively. Parentheses contain robust standard errors.

We find that the indirect effect of CEO liberalism (Path A × B in Figure 1) on the number of patents is 0.0072 (0.439 (Model 1) × 0.1637 (Model 2)) and statistically significant at the 5% confidence levels. Similarly. the indirect effect of CEO liberalism (Path A × B in Figure 2) on the number of forward citations is 0.0142 (0.439 (Model 1) × 0.3229 (Model 3)) and statistically significant at the 5% confidence levels. Overall, the results are consistent with our mediation hypothesis. However, the results of Model 2 and Model 3 in Table 2 do not support the presence of a direct effect of CEO liberalism on the number of patents (Model 2, Path C in Figure 1) or on the number of forward citations (Model 3, Path C in Figure 2).

This interesting result sheds light on the mechanism with which CEO political ideology influence innovation performance. Our finding demonstrates that due to their higher tendency to embrace risk, liberal CEOs exhibit a propensity to channel investments into risky strategies, including the allocation of resources to R&D endeavors, as well as engaging in mergers and acquisitions (M&A). Such risky strategies serve as pivotal catalysts, driving the innovation initiatives of firms and subsequently innovation performance such as the number of patents filed and the subsequent citations received by patents.

Figure 1- Mediation analysis of the effect of CEO liberalism on number of patents



Note: +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1% confidence levels, respectively. Parentheses contain robust standard errors. Innovation is measured as the logarithm of the number of patents. Firm and CEO controls and industry and year dummies in all regressions. Results correspond to Model 1 and Model 2 of Table 2.

Figure 2- Mediation analysis of the effect of CEO liberalism on number of forward citations

Note: +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1% confidence levels, respectively. Parentheses contain robust standard errors. Innovation is measured as the logarithm of the number of forward citations. Firm and CEO controls and industry and year dummies in all regressions. Results correspond to Model 1 and Model 3 of Table 2.

Discussion and Conclusion

This chapter has explored the relationship between CEO attributes and firm innovation. We extend this literature by specifically examining how CEO political ideology influences innovation outcomes. Drawing upon previous research demonstrating distinct attitudes towards risky behaviors between liberals and conservatives, we posited that organizations led by liberal CEOs would exhibit superior innovation performance compared to those led by conservative CEOs. We particularly hypothesized that higher innovation performance in firms with liberal CEOs is driven by their higher engagement in risk-taking behaviors including investments in R&D, capital expenditures, and M&As. Analyzing a comprehensive dataset of high-tech firms listed on

S&P1500 firms spanning the period from 1992 to 2014, our findings offered compelling evidence in support of our proposition.

Overall, our findings underscore the significance of considering CEO characteristics, including their political beliefs, when examining the driving forces of innovation and organizational adaptation. Our results yield substantial insights, particularly for boards of directors, especially during the CEO selection process. Boards of directors should assess whether the CEO's risk tolerance, innovation orientation, and overall ideology match the firm's desired strategic approach. Facilitating alignment between CEO characteristics, especially their political beliefs, and the company's strategic orientation can significantly enhance the overall capacity for organizational adaptation. Further, board need to consider that a CEO with a higher liberal orientation tends to exhibit a greater inclination to allocate capital towards riskier investments, such as R&D and M&A. While these investments inherently possess uncertainties, they also have the potential to yield impactful results, such as an increased number of innovations. This implies that boards should adjust their expectations regarding the decisions and strategies pursued by a CEO to align with the CEO's deeply held values and beliefs.

Moreover, an interesting finding in this study is that liberal-oriented CEOs not only implement strategies that boost the quantity of patents but also enhance the quality of those patents, as evidenced by a higher number of forward citations. These forward citations serve as an indicator of the patents' quality (Hall, Jaffe, & Trajtenberg, 2005). Complementing our findings, future research could delve deeper into whether CEO liberalism is also associated with a higher number of failed innovations. Another promising avenue for future research lies in investigating whether liberal and conservative CEOs differ in their approach to innovation, particularly in terms of exploration versus exploitation strategies.

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