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# How Women CEOs' Financial Knowledge and Firm Homophily Affect Venture Performance

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# How Women CEOs' Financial Knowledge and Firm Homophily Affect Venture Performance


## ABSTRACT

We examine the impact of female-led venture firms' knowledge of alternative forms of financial capital and its effect on their financial performance as compared to male-led ventures. We contend that women chief executive officers (CEOs) leading such ventures faced unique historical and stereotypical challenges that impeded their financial knowledge and subsequent firm performance. We utilize liberal and social feminism frameworks, complemented with homophily theory to illustrate how female CEOs can overcome these challenges by increasing the percentage of women in the ownership structure of female-led venture firms.



## Key Words

CEO Gender; Female-led Ventures; Financial Funding Knowledge; Venture Performance

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## 1. INTRODUCTION

Many scholars who examine female-led ventures have found that in almost all instances, their financial performance lags significantly behind that of their male counterparts (Lee & Marvel, 2014; Hmieleski, Carr, & Baron, 2015; Robb, 2013). In this study, we seek to challenge and unpack the female underperformance hypothesis by illustrating that the problem is not only with the women entrepreneurs themselves, but rather, lies upstream in terms of (a) financial knowledge of chief executive officers (CEOs) and (b) systemic societal bias that has disadvantaged women for centuries and continues to do so today. We examine whether women CEOs have less knowledge about the various financing instruments available in the marketplace than do their male counterparts. Moreover, we rely on the tenets of liberal feminism which looks at systemic inequality that women have faced over time and explains that these disadvantages have created material structural disadvantages for women today which prevent women from obtaining their full potential (Marlow, Henry, & Carter, 2009). This theoretical grounding provides a basis for understanding how structural gender inequality can influence women's careers, resulting in lower financial knowledge among female-run ventures compared to their male-run counterparts.

The number of female-led ventures has increased 114% over the past 20 years to now total 13 million firms in the United States (U.S.) alone (WBENC.com). Based on this growth, they currently account for over 45% of all firms in the U.S, with no abatement in sight (see Inc.com). According to the Women's Business Enterprise National Council (WBENC), which is

the leading third-party certifier of female-led ventures in the U.S., in order to receive certification from WBENC, a firm must be a for-profit business located in the United States; be 51% owned by a woman, or a group of women who, except for an inheritance, contributed a proportional amount of capital to acquire ownership; must be governed by a board controlled by a woman or a group of women; the top executive officer responsible for daily operations must be a woman with technical expertise (experience) in the firm's primary business activity; and the women owners must be U.S. citizens or legal residents.

Many reasons are given for this brisk uptick in women entering into entrepreneurship. These include, but are not limited to, women looking for opportunities to escape the glass ceiling in Corporate America (Bosse & Taylor, 2012), women having freedom of career choice that had not existed decades ago (Kabeer, 2000), and women being encouraged by friends, family, and colleagues to venture out on their own and start a new business (Carr, Chen, & Jhabvala, 1996). Although we have witnessed significant increases in women-led firms being established, their performance metrics measured by either financials and/or by their number of full-time employees lags significantly behind those of their male counterparts (Robb, 2013; U.S. Census, 2015). To further illustrate this disparity, a recent study conducted in 2019 by the financial services company, American Express, found that women-led ventures produce $1.9 trillion in revenue a year. While seemingly impressive, this only accounts for 4.3% of total private sector annual revenue. Furthermore, women business enterprises account for less than 3% of the total employment in the U.S. due to those firms' traditionally having the owner as its only employee (American Express, 2020).

In an effort to understand why these disparities exist as well as to develop potential policy mechanisms to eliminate them (Carter, Mwaura, Ram, Trehan, & Jones, 2015), most scholars

have focused on discrimination that occurs in male-dominated industries and cultures (Shaheed, 1990; Shinnar, Giacomin, & Janssen, 2012), low self-efficacy among females – leading to feelings of ineptness in creating and scaling an entrepreneurial enterprise (Rehman & Roomi, 2012; Wilson, Kickul, & Marlino, 2007; Gupta, Batra, & Gupta, 2020), female founders' small and dense social networks (Goodwin, Stevens, & Brenner, 2006: Bullough, Guelich, Manolova, & Schjoedt, 2021), limited business education and prior industry experience (Constantinidis, Cornet, & Asandei, 2006), and limited access to financial capital (Orser, Riding, & Manley, 2006). Some scholars state that women entrepreneurs may define success in non-monetary forms such as personal fulfillment and helping others through social contributions, which may not necessarily equate to financial gains (Hailemariam & Kroon, 2014; Clark-Muntean & Ozkazanc-Pan, 2015). Indeed, research on women entrepreneurs in Sub-Saharan Africa found that small firms run by women are more likely to accept late payments and have unwitnessed oral contracts with customers compared to men (Uzuegbunam & Uzuegbunam, 2012).

Our research takes a novel theoretical approach by integrating liberal feminism, social feminism, and homophily theory (Kalmar & Sternberg, 1988). We first utilize the liberal feminist framework to assess female CEO led firms' knowledge of business funding sources as compared to their male CEO counterparts. Most scholars examining female entrepreneurship posit that female founders have less access to capital (Marlow & Patton, 2005; Robb, 2013), but little research has focused on their knowledge of different funding sources they could seek to start and scale their businesses. In this paper, we consider firm funding knowledge to consist of private equity, venture capital, angel financing, mezzanine financing, and debt financing. We specifically focus on these financial instruments because they are the most often used by entrepreneurs attempting to garner funding for their businesses. The first four of these are more

knowledge specific, and in many cases, more sophisticated than general business administration education that is typically taught at colleges and universities, which tends to focus on sales, marketing, human resources, and overall business strategy. As Ahlstrom (2018) found, women are significantly underrepresented in both economics and finance majors in colleges and universities across the United States. Our paper will be one of few to examine how firm CEO gender relates to financial knowledge (Caliyurt, 2011).

Furthermore, we seek to understand if funding knowledge mediates the relationship between firm CEO gender and financial performance. Unlike previous literature that has focused on women enterprises access to the various forms of financial capital and its impact on firm performance (Orser, Riding, and Manley (2006), we close a research gap in our investigation by examining knowledge of the various forms of financial capital as a mediating factor in their financial performance. Expressly, we posit that knowledge about the various forms of capital available serves as a mediator between CEO gender and firm performance. We propose that a lack of knowledge by female-led firms may be one reason why only 25% of them seek any type of start-up or growth financing. Furthermore, we also suggest that this may be why, on average, female-led ventures that do seek funding only apply for $77,000 in financing as compared to their male counterparts' requests of $109,600 (see fundera.com). This nearly $33,000 difference is quite relevant, especially since research by Orser, Riding, and Manley (2006), Becker-Blease and Sohl (2007) and DeBruin and Flint-Hartle (2005) found that female-led and male-led firms are approved by banks, angel investors, and venture capital financiers at about the same level. This means that female-CEOs may be inadvertently limiting their firms' chances of success by not obtaining crucial funds when they seek financing. The literature is clear that most entrepreneurial firms fail due to a lack of financial capital, and this reality is more pronounced

with female-led ventures, thus speaking to the importance of our examination (Alsos, Isaksen, & Ljunggren, 2006).

Subsequently, we introduce social feminism and homophily theories to determine if increasing the percentage of women ownership in female-led ventures can help these businesses overcome their limited financial funding knowledge to improve firm performance. Based on these theories, we propose that the higher percentage of women in ownership positively moderates the relationship between female CEO-led firms and financing knowledge. This prediction is unique and contrary to what was found by Goodwin, Stevens, and Brenner (2006), who suggested that having more men in the founding teams of female-led firms will assist them in overcoming their funding inexperience and enhance their likelihood of success in obtaining financing and competing in male-dominated fields of business.

Next, we incorporate suggestions by Jennings and Brush (2013) and utilize liberal and social feminism, and homophily theories to take our analyses a step further to provide additional insight. We predict that there is a moderated mediation effect such that the indirect effect of CEO gender on venture performance via knowledge of funding sources will be less negative for female CEOs when the percentage of women ownership in the ownership team is high. This proposes that female-led ventures with more females in their ownership structure can enhance their financial knowledge as well as improve firm performance. In sum, we illustrate that utilizing the tenets of liberal feminism can help identify detrimental systemic barriers for female CEO-led ventures. Furthermore, we introduce how the collaborative principles of social feminism and homophily can assist them with overcoming barriers to success.

The rest of the paper proceeds as follows. First, feminism and homophily theories are discussed to develop hypotheses. Next, we describe the data and methods used for testing the

hypotheses. Finally, the paper concludes with the findings, theoretical and managerial implications, and potential limitations of the study along with recommendations for future research.

## 2. THEORETICAL FRAMEWORKS AND HYPOTHESES DEVELOPMENT

As stated previously, we take an integrative approach to answer the call of Fischer et al.'s (1993, p.151) seminal article, in which they state the following:

> The lack of integrative frameworks for understanding the nature and implications of issues related to sex, gender, and entrepreneurship has been a major obstacle. Two perspectives that help to organize and interpret past research, and highlight avenues for future research, are liberal feminism and social feminism.

In our study, we utilize both of the aforementioned frameworks and then extend their theoretical contribution by incorporating homophily theory to provide additional insight into when having a greater percentage of women in ownership in female-led ventures results in a female CEO having more knowledge of the various forms of financing and, in turn, improves firm performance.

### 2.1 Using Feminist Theory to Explain Systemic Disadvantages Faced by Women

At present, there is no consensus on how the numerous forms of feminist thought should be labeled and categorized. However, there is some agreement among scholars that liberal feminism and social feminism are two important and distinct classifications of feminist thought (Jaggar, 1983). Many feminist scholars consider the concept of liberal feminism as part of the early phase of feminist thought and believe it to be derived from liberal political philosophy beginning in the late 1800's and early 1900's (Ferguson, 1999). During its infancy, liberal feminism focused on women's suffrage, women gaining individual liberties to displace male-imposed control systems on their bodies, the ability to obtain education, equality in society, and

the ability to partake in the pursuit of happiness. As time evolved, its baseline underpinnings expanded to encompass the concepts of rationality and self-interest, as these two concepts are truly valuable assets to all human beings. Therefore, every human being has the same potential, if given the same access to opportunities (Calás, Smircich, & Bourne, 2009). Liberal feminism posits that the observed differences in achievements between men and women are predicated on the fact that women have not reached their full potential only because they have been deprived of such fundamental opportunities as education and equal access (Marlow, Carter, & Henry, 2009). Examples of such inequality are apparent today. For instance, a 2018 report by McKinsey found that although men and women in finance started their careers on equal footing, only 19% of C-suite positions are held by women (Chandler, 2020). Moreover, women hold only 9% of senior positions in venture capital and 6% of senior positions in private equity (Chandler, 2020).

Liberal feminism scholars have posited that physical differences between men and women are not nearly as relevant as having clear conceptions about their rationality, self-efficacy, and self-interests (Rottenberg, 2014). Liberal feminists go further and posit that as women gain access to similar education and social and business opportunities, women and men will actualize their potential rationality equally and, therefore, perceived psychological differences will be reduced or may totally disappear (Lewis, 2006; Robb & Watson, 2012). However, liberal feminism scholars promulgate that before this can occur, many structural forms of bias and discrimination–legal, financial, employment, and educational, for example—will need to be addressed. They argue that if these structural and systemic issues are not addressed, they will continue to perpetuate false narratives about the ineffectualness of women (Fischer et al., 1993). We believe that although many strides have been made to "level the playing field" for women entrepreneurs, the literature is clear that much work still needs to be done.

Following from liberal feminism, there are structural reasons why women as a whole may know less about financing than men as a whole. For example, women traditionally faced systemic discrimination in obtaining credit (e.g., financial loans and credit cards) until 1974. Forty-six years ago, a woman applying for a credit card could be asked if she was married and whether she planned to have children, and many financial institutions required women who were single, divorced, or widowed to have a man cosign with them for a credit card (Eveleth, 2014). When they did get credit cards, some banks discounted the wages of women by as much as 50% when determining what credit limit, they would be given (Eveleth, 2014). It was not until 1974 that the Equal Credit Opportunity Act was passed, making it illegal to discriminate on the basis of sex, race, religion, and national origin in credit applications (Eveleth, 2014). A person's experience with credit is important both to build up one's credit history (i.e., credit score) to secure greater amounts of future credit and because it increases one's familiarity with ways of financing purchases and projects.

Moreover, women were excluded from graduate business education until about 50 to 60 years ago. For example, Harvard Business School, typically progressive and pioneering, did not admit women into its Master of Business Administration program until 1963 (Forbes, 2013). If women did not enroll in graduate business schools in larger numbers until the 1970s, this means that the earliest women pioneers with graduate degrees in finance would have reached senior-level positions in organizations within the past 20-25 years, and they did so with virtually no women role models ahead of them. Although the New York Stock Exchange was founded in 1792, it remained an all-male institution for 175 years until 1967 when Muriel Siebert became the first woman to become a member of the New York Stock Exchange. For the next 10 years, Siebert would remain the only woman, along with 1,365 men on the stock exchange (Alexander,

2020). Only recently have women in their 20s and 30s had both access to education and the reassurance of seeing senior-level women trailblazers who created a path for them in leadership positions in finance. Therefore, systemic disadvantages for at least a few hundred years can help explain why, on average, women report knowing less about financing than men.

Furthermore, a McKinsey & Company (2021) study examining the demographics of the financial services industry demonstrates that there is a "leaky pipeline" from entry level positions to the top positions in the financial services industry and women have a long way to go to achieve parity with men (McKinsey & Company, 2021). While women represent 51% of employees in the entry-level positions of the financial services industry, they shrink to 38% of senior managers, 30% of vice presidents, 28% of senior vice presidents, and 27% of C-Suite executives. White men occupy 64% of C-Suite positions in financial services companies (McKinsey & Company, 2021). This divide is very clear in the banking industry, where women occupy over half of the entry-level positions, but many of them are concentrated in lower positions such as bank tellers. When one examines the C-Suite of the banking industry, once again, White men occupy a majority of those positions. Moreover, this divide with women at the bottom and men at the top is even more exaggerated in the asset management sector of financial services, where white men occupy a large majority of C-Suite positions (McKinsey & Company, 2021). In sum, while women represent roughly half of the employees in the financial services industry, they are concentrated in lower-level positions which earn less and would have less access to knowledge of sophisticated financial instruments that could be used to start one's own company in the future. This divide that we see in the financial services industry is consistent with the tenets of liberal feminist theory which would propose that the systemic inequality women have faced for centuries has created structural disadvantages for them that preclude them from

being able to achieve their full potential and parity with men in the financial services industry, among others (Marlow et al., 2009).

Many scholars who examine female-led ventures have found that their financial performance lags behind that of their male counterparts (Lee & Marvel, 2014; Hmieleski, Carr, & Baron, 2015; Robb, 2013). One of the major reasons they posit for this disparity is that women lack access to both traditional and alternative forms of capital sources, and furthermore, when they do secure funds, they tend to be significantly less than those of male entrepreneurs (Brush, Carter, Gatewood, Greene, & Hart, 2002). Scholars who study female-led enterprises have also often found a negative relationship between their access to capital and firm performance (Coleman, 2004). In this same vein, Xie and Lv, (2018) found that having a lack of resources negatively impacts female entrepreneurs' ability to innovate, which may relegate them to providing more commoditized goods and services.

However, minimal research has examined the level of knowledge female CEOs have of the various forms of financial capital that are available to them in the marketplace. Understanding this phenomenon may uncover why female-led ventures seem to have limited access to capital. We believe it may be because female CEOs may not know and/or understand all the forms of capital that are available to them, therefore limiting their choices and potential to receive the most advantageous form of funding to start and scale their businesses.

As DeBruin and Flint-Hartle (2005) and Becker-Blease and Sohl (2007) found, there are not many female-led ventures soliciting private equity, venture capital, or angel funding. In fact, only 2.2% of the $130 billion awarded in venture capital funding in 2018 went to women-led startups (Hinchliffe, 2019). In other words, in 2018, "all female founders put together received $10 billion less in funding than one e-cigarette company, Juul" (Hinchliffe, 2019). This makes it

difficult to examine how these firms would perform compared to those of their male counterparts as well as against other female-led ventures who use traditional bank financing or various bootstrapping finance methods like personal savings, credit cards, and loans from family and friends. This lack of opportunity and experience with various funding sources also implies less funding knowledge for women CEOs. Based on previous research and our assessment of the liberal feminism theoretical framework, we posit:

**Hypothesis 1**: *CEO gender will be negatively related to funding knowledge such that female CEOs will report lower funding knowledge than male CEOs.*

### 2.2 Funding Knowledge as a Mediator of the CEO Gender – Firm Performance Relationship

Furthermore, we postulate that the knowledge of various forms of financing will be a key underlying variable that mediates the relationship between the firm leaders' gender and firm performance. Our prediction that women's limited funding knowledge will mediate the relationship between CEO gender and venture performance is predicated on the fact that without female-led ventures having a thorough knowledge of the financial tools to fund and grow their businesses, they will underperform compared to their male-led firm counterparts, who will likely have more knowledge about the various types of funding sources.

Entrepreneurship research has shown that women begin their businesses with less financial capital compared to men, and they also rely on personal rather than external funding for their businesses (Coleman & Robb, 2009). Furthermore, female-owned businesses are less likely to be profitable and they are more likely to close (Fairlie & Robb, 2009). In a decomposition analysis of the total variance predicting business closure, Fairlie and Robb (2009) found that startup capital explained 44.7% of the variance, while prior work experience in a similar business

predicted 20.6% of the variance, education predicted 16.4% of the variance, and prior work experience in management predicted 12.8% of the variance in business closure. Moreover, in a sample of new businesses from Norway, Alsos et al. (2006) found that women obtained significantly fewer financial capital resources to start their new businesses, which was then associated with less business growth compared to the businesses of their male counterparts. In sum, the literature has established a link between women-led ventures and business failure/poor performance as well as a link between limited financial capital and business performance. We build upon this literature by proposing that limited funding knowledge is an important mechanism which explains the lower performance of women-led businesses compared to male-led businesses. We posit the following hypothesis.

**Hypothesis 2**: *Funding knowledge will mediate the relationship between CEO gender and venture performance.*

### 2.3 The Moderating Effect of Founding Team Gender Composition

To provide a more holistic perspective, we now bring to bear social feminism and homophily theories to provide potential insights as to how ventures led by female CEOs can overcome their lack of knowledge of funding sources to help them potentially improve firm performance. The goal of this section is to describe how having more women in the ownership corps is not about accumulating small amounts of knowledge, but about empowering the acquisition, application, and distribution of finance knowledge among women CEO-led ventures.

First, we will introduce the concept of social feminism. In contrast to liberal feminism, social feminism holds that there are fundamental differences between men and women beyond physiology (Ahl, 2006). It is considered part of the second phase of feminism, gaining traction in the late 1960's and early 1970's. Social feminism originated from social learning theory.

Although social feminists believe there are differences between males and females, they believe they both contribute equally to society (Calás & Smircich, 1989). As the theory moved into the new millennium, it began to narrow its focus on how knowledge is gendered and, more specifically, how female knowledge is suppressed and/or denigrated. Scholars strongly assert that females need to support each other by leaning into what makes them different to help them overcome barriers in a patriarchal society (Ahl & Marlow, 2012).

Extending social feminism into our research paradigm, we propose that there are differences between women and men in how they lead organizations and obtain knowledge (Moore, Moore, & Moore, 2011). In this study, we leverage the concept of homophily to explain the benefits of how women tend to be more communal, relational, and communicative by nature (Heilman, 2001) and how these traits can be incorporated to improve firm performance. Specifically, we examine how increasing the percentage of women in venture ownership will facilitate greater information sharing and expand their knowledge base, which will enable them to overcome systemic prejudices that permeate most male-dominated capitalist societies (Eagly & Johannesen-Schmidt, 2001; Ibarra, 1993: Santos & Neumeyer, 2021). The theory of homophily is based on the principle that "contact between similar people occurs at a higher rate than among dissimilar people" (McPherson, Smith-Lovin, & Cook, 2001, p. 416). Furthermore, homophily describes network connections based on major socio-demographic dimensions such as ethnicity, sex, or age. Previous research has illustrated that entrepreneurial founding teams are primarily comprised of people who know each other and have substantial levels of shared values and goals, but even more frequently than not, share similar demographic attributes (Martinez & Aldrich, 2011; Louch, 2000).

In this research scheme, we expand this logic to posit that through homophily, venture firms will increase the number of women in their ownership structure, and more information will be shared. This will lead to greater knowledge of financing within the venture firm, which in turn will improve firm performance. Even though it could be stated that increasing the number of women in the ownership structure may not address their knowledge gap about financing, we propose that collectively they can assemble enough knowledge to overcome their individual deficiencies (Moore et al., 2011). Said differently, homophily can result in a higher level of trust, shared understanding, and information sharing to the benefit of the entire organization (Ruef, Aldrich, & Carter, 2003).

Furthermore, when men and women are both present in the entrepreneurial team, this primes implicit knowledge of gender roles that suggest entrepreneurship is a traditionally masculine domain (Ahl, 2006). According to Wilson and colleagues (2007) women reported lower entrepreneurial self-efficacy compared to men. Specifically, women felt less confident pursuing entrepreneurship and also indicated lower intentions to pursue entrepreneurship compared to men, and this was true in samples of both middle/high school students as well as adults in Master of Business Administration programs (Wilson et al., 2007). Because women lack confidence in their entrepreneurial ability compared to men, on average, it may be easier for them to fall into stereotypically supportive roles than men when both genders are present, and stereotypes are primed (Bullough et al., 2021). In addition to the aforementioned structural bias women have faced in finance over the years, research shows that there is implicit bias whereby 72% of the population automatically and subconsciously associates men with science and women with humanities. Similarly, 76% of the population subconsciously associates men with careers and women with family and supportive roles (Nosek et al. 2007). Therefore, when the

entrepreneurial team includes both men and women, stereotypes may be primed into action, increasing the probability that men handle finances.

When there are no men, women will do the financing for themselves and either solicit women who understand financing to be on the ownership team or develop their skills over time. In fact, research shows that entrepreneurship education makes an enormous difference in women's entrepreneurial self-efficacy. Wilson and colleagues (2007) found that women without entrepreneurial education reported significantly lower levels of entrepreneurial self-efficacy compared to men. However, with entrepreneurship education, women reported levels of entrepreneurial self-efficacy that were just as high (if not higher) than those of their male peers. Therefore, although finance and entrepreneurial expertise are less prevalent among women than men, there is evidence that education levels the playing field. This explains why finance expertise among women is rare and highly valued among executives. In fact, the Forte Foundation keeps a list of women they deem to be "board ready" which refers to executive women who would be willing and able to serve on boards of directors for organizations. One of the criteria for being on this Forte Foundation list is that women must be financially literate (Forte, 2020). We predict that as the percentage of women ownership increases in a business, the negative association between women CEOs and lower funding knowledge should be mitigated as homophily effects in predominantly women leadership teams reduces the likelihood of gender stereotypes being primed (Nosek et al. 2007) and increases women's confidence in their own capabilities (Wilson et al., 2007). Women who are drawn to starting their own businesses should be motivated to learn about financing and assist a female CEO who might lack funding knowledge, especially if they are not confined to traditional gender role stereotypes that would

be salient in the presence of men on the founding team. Based on the aforementioned, we propose the following hypotheses:

**Hypothesis 3a**: *The percentage of women ownership will moderate the relationship between CEO gender and funding knowledge such that the negative (positive) relationship for a female CEO (male CEO) is weakened (strengthened) when the founding team has a high (low) percentage of women owners compared to a low (high) percentage of women owners.*

**Hypothesis 3b**: *There will be a moderated mediation effect such that the indirect effect of CEO gender on venture performance via funding knowledge will be less negative (more positive) for a female (male) CEO when the percentage of women ownership in the founding team is high (low) compared to when the percentage of women owners in the founding team is low (high).*

Please reference our conceptual model in Figure 1.

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INSERT FIGURE 1 ABOUT HERE
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## 3. METHODS

### 3.1 Research Setting and Respondents

The data for these analyses were extracted from a *National Access to Capital Survey* coordinated by the National Minority Supplier Development Council (NMSDC), Bank of America, Merrill Lynch (BAML) and the National Association of Investment Companies (NAIC). The survey was conducted with 264 entrepreneurs holding the chief executive officer (CEO) position across the U.S. in 2015 to determine what they deemed as key barriers to garnering access to financial capital (see NMSDC.org). An integral component and asset of this study is that it encompasses information on both male and female CEO led firms, which provides greater richness as opposed to only having data on female CEO led firms (Fischer et al., 1993).

Although the majority of the businesses were in professional services, there was representation across numerous industry sectors in the sample (see Appendix).

### 3.2 Data and Methods

**Independent Variable**. CEO gender was a dummy variable where 0 = male and 1 = female.

**Dependent Variables**. Funding knowledge was measured using a 5-item 4-point Likert type scale (1 = no knowledge, 2 = little knowledge, 3 = knowledgeable, 4 = very knowledgeable) with a coefficient alpha of .917. The five items were prefaced with the following question: "How knowledgeable are you about the following sources of funds for financing your business?" Then, each of the five financing options were presented: Equity, Venture Capital, Angel Investors, Mezzanine Financing, Debt Financing.

Venture performance was measured as the average gross sales revenue for years 2009 to 2013 using the following 10 categories where 10 is the highest sales. 1 = No revenue; 2 = Less than $100,000; 3 = $100,000 - $250,000; 4 = $250,000 - $500,000; 5 = $500,000 - $1 million; 6 = $1 million - $5 million; 7 = $5 million - $25 million; 8 = $25 million - $75 million; 9 = $75 million - $150 million; 10 = More than $150 million.

**Moderator Variable**. Percentage of Women Ownership was captured using the following categories where a higher number reflects a greater percentage of women in ownership. 1 = 0% to 50%; 2 = 51% to 74%; 3 = 75% to 99%; 4 = 100%.

**Control Variables**. Several control variables were included because of their association with venture performance. Industries differ in their sales (Dess & Beard, 1984) so *Industry type* was measured with a dummy variable where 0 = service; 1 = other. *CEO Experience* influences performance (Li & Patel, 2019) so it was measured using the following categories where a higher

value reflects more years of experience: 1 = 1 – 3 years; 2 = 4 – 6 years; 3 = 7 – 10 years; 4 = 10+ years. *Firm Size* is associated with performance outcomes (Winn, 1977; Ha-Brookshire, 2009) and was measured as the number of employees within the following categories where a high value reflects a larger size. 1 = None; 2 = 1 to 5; 3 = 6 to 19; 4 = 20 to 99; 5 = 100 to 499; 6 = 500+. *Outside ownership* has an impact on performance as well (Brunninge & Nordqvist, 2004; Hu & Izumida, 2008) so we measured it as 0 = I do not have investors; 1 = 1 to 5 percent; 2 = 5 to 10 percent; 3 = 10 to 20 percent; 4 = 20 to 50 percent; 5 = 50 percent or more where a higher number reflects more outside ownership.

## 4. RESULTS

Descriptive statistics and standard correlations among all study variables are depicted in Table 1.

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INSERT TABLE 1 ABOUT HERE

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Hierarchical regression analyses were utilized to test the main effect and moderation hypotheses shown in Table 2. The control variables were entered in step one to examine effects on firm funding knowledge (Model 1). The independent variable, CEO gender, was entered in step two (Model 2) to see if a main effect exists on firm funding knowledge. Model 3 adds the moderator to the aforementioned models. Model 4 shows the effects of the interaction between CEO gender and Percentage of Women Ownership predicting firm funding knowledge. Model 5 shows the relationship that funding knowledge has on venture performance above and beyond the control variables, which is necessary prior to a full test of moderated mediation. Bootstrapped confidence intervals were used along with the index of the indirect effects of CEO gender on

sales productivity through the mediator to determine if mediation effects exist at different levels of the moderator (Hayes, 2012).

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INSERT TABLE 2 ABOUT HERE
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Hypothesis 1 proposed that CEO gender will be related to funding knowledge such that female CEOs will report lower knowledge of funding sources than male CEOs. Hypothesis 1 was supported (b = -.234, $p < .05$), because the coefficient for CEO Gender in Model 2 of Table 2 is negative and statistically significant.

Hypothesis 2 predicted that funding knowledge would mediate the relationship between CEO gender and venture performance. We conducted a test of mediation using the Hayes PROCESS Macro number 4 with 10,000 bootstrapped iterations (Hayes, 2012). As predicted, we found that male CEOs show higher firm performance than women partially due to higher knowledge of funding sources. Women CEOs report less funding knowledge than men CEOs (b = .23, $p = .027$), and funding knowledge is positively and significantly related to venture performance (b = .249, $p = .001$). The indirect effect of CEO gender on venture performance through funding knowledge is b = -.08, with a standard error of .046 and a 95% confidence interval of (-.19, -.01). The confidence interval does not include zero, and Hypothesis 2 is supported.

Hypothesis 3a predicted that percentage of women ownership will moderate the relationship between CEO gender and firm funding knowledge such that the negative (positive) relationship for a female CEO (male CEO) is weakened (strengthened) when the founding team has a high (low) percentage of women owners compared to a low (high) percentage of women owners. Model 3 in Table 2 shows a significant interaction effect (beta = .304, $p < .05$) lending

support for Hypothesis 3a. Figure 2 clearly shows that male CEOs report greater funding knowledge when they have a larger proportion of ownership by men rather than women. Importantly, the negative relationship between CEO gender and funding knowledge is apparent only when there is low women ownership among the founding team (simple slope -.2.48, $p$ = .014). That negative relationship is attenuated and becomes slightly positive, although not significantly different from zero (simple slope 1.139, $p$ = .257), when there is high women ownership among the founding team.

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INSERT FIGURE 2 ABOUT HERE
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Hypothesis 3b proposed a moderated mediation effect such that the indirect effect of CEO gender on venture performance via funding knowledge will be less negative (more positive) for a female (male) CEO when the percentage of women ownership in the founding team is high (low) compared to when the percentage of women owners in the founding team is low (high). Table 3 reveals that female CEOs show low performance because of less funding knowledge only when their ownership is majority men, running Model 7 of the PROCESS macro with a 95% confidence interval based on 10,000 bootstrapped iterations (Effect = -.562; Standard error = .235; lower level of the confidence interval = -1.03; upper level of the confidence interval = -.098). Interestingly and as predicted, we observed no negative performance effects for women CEOs when their ownership was predominantly women. Therefore, Hypothesis 3b is supported.

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INSERT TABLE 3 ABOUT HERE
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## 5. POST HOC ROBUSTNESS ANALYSIS

We conducted a post hoc robustness analysis given that endogeneity might have biased our findings. There are three major concerns for endogeneity: omitted variable bias, sample selection bias, and simultaneity. We first assess the extent of endogeneity due to omitted variable bias. We use the Stata's konfound command to estimate the threshold for invalidating our inferences (Frank, 2001). To invalidate the inference of women CEO on firm funding knowledge, 33.09% (97) of cases would have to be replaced with cases for which there is an effect of zero. To invalidate the moderating effect of women owned firm, 24.17% (64) of cases would have to be replaced with cases for which there is an effect of zero. To invalidate the effect of knowledge on venture performance, 50.9% (134) of cases would have to be replaced with the cases for which there is an effect of zero. For all three inferences, estimated effects are much larger than the threshold of omitted variable bias, suggesting that there is no major concern for endogeneity due to omitted variable bias.

Another endogeneity concern is sample selection bias in that our sample may not be representative of the population. Since we only included ventures with the CEO as the respondent, we need to check for potential sample selection bias. To address selection bias, we used Heckman's (1979) selection model by identifying variables that predict selection. For our study, we chose firm regions (where the venture operates) and S-corporate firm structure as the variables to predict first-stage selection. Conceptually, firm regions may affect whether venture CEOs will respond to the survey, since regional culture may affect the likelihood of CEOs to participate in our survey. Furthermore, because S-corporation structure tends to have a limited number of owners, CEOs might be more active in operations. Model 1 of Table 4 presents our first-stage Heckman selection model predicting whether the respondent is the venture CEO. As

expected, firm regions and S-corporate structure do predict sample selection. We then calculated inverse Mills ratio (or non-selection hazard) and included it to run our second-stage model to correct for sample selection bias. Models 2 of Table 4 presents results support Hypothesis 1 (b = -0.717, $p < 0.05$). The mediation tests using Hayes Process Macro also supports our mediation prediction (Hypothesis 2): women CEOs report less funding knowledge than men CEOs (b = -0.233, $p = 0.027$), and funding knowledge is positively related to venture performance (b = 0.346, $p < 0.01$). The indirect effect of women CEO on venture performance through funding knowledge is -0.081 with a 95% confidence interval of (-0.18, -0.004). Table 5 summarized the results of moderated mediation effect after adjusting for sample selection, which is consistent with the results of Table 3. Overall, our Heckman two stage selection model provides additional support for our hypotheses.

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INSERT TABLES 4 TO 6 ABOUT HERE
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The final concern for endogeneity is simultaneity: our predictor (women CEO) may jointly determine outcome variables (e.g., firm funding knowledge, and venture performance). The best solution for this is to conduct experimental designs to randomly assign women CEOs. However, it is impossible to randomly assign women CEOs for ventures. An alternative solution for this is to adopt propensity score matching to proxy experimental design using observational data (Li, 2013; Rosenbaum & Rubin, 1983). Propensity score matching can balance covariates between treated and control groups such that there is no difference between these groups. After propensity score matching, there are 123 observations left. We checked for imbalance between treated and control groups and found that there is no concern of imbalance between ventures with women CEOs ventures with men CEOs (see Figure 3).

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INSERT FIGURE 3 ABOUT HERE
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Using the matched sample, we reran our regressions to test hypotheses. Models 4 and 5 of Table 4 report our additional analyses using the matched sample, which provide support for Hypotheses 1 (b = -0.832, $p < 0.05$). The mediation tests using the Hayes Process Macro provides some support for mediation prediction (Hypothesis 2): women CEOs report less funding knowledge than men CEOs (b = -0.217, $p < 0.05$), and funding knowledge is positively related to venture performance (b = 0.376, $p < 0.05$). The indirect effect of women CEO on venture performance through funding knowledge is -0.082 with a 95% confidence interval of (-0.26, 0.046). Table 6 summarizes results supporting moderated mediation using the Hayes Process Macro. Overall, our additional analyses using propensity score matching produce results that are consistent with our predictions.

## 6. DISCUSSION

The present study advances our knowledge of entrepreneurship by revealing funding knowledge as a mediating mechanism in the relationship between female-led firms and venture financial performance. It is through a lack of funding knowledge that women CEO led businesses' lower performance compared to those of their male CEO led counterparts can be explained. Moreover, the present findings reveal a moderating effect of the proportion of women ownership among the business such that the fewer women owners there are, the more likely it is that women CEOs report lower funding knowledge compared to their male CEO counterparts. Furthermore, our results reveal that homophily is also predictive among male CEOs in that they perform highest under male ownership.

### 6.1 Theoretical Implications

The findings both support and expand liberal feminist theory which maintains that differences in achievement between men and women are a result of systemic bias and the denial of equal access for women (Carter et al., 2009). We extend liberal feminist theory to the area of entrepreneurship to examine women CEO led businesses compared to men CEO led businesses. Overall, our results are supportive of liberal feminist theory because women in our sample self-report knowing less about funding than men. This is consistent with the notion that finance has been a male-dominated industry since the beginning and women have only recently begun to achieve leadership roles within the last couple of decades (Chandler, 2020). Our study demonstrates that liberal feminist theory is helpful in explaining the disparities between male and female entrepreneurs. Moreover, liberal feminist theory can be extended to consider that increasing the number of women on the leadership team also decreases the disadvantages that women CEOs experience relative to men CEOs when it comes to venture performance.

Our findings also suggest that liberal feminist theory should be complemented with social feminist and homophily theories to account for the finding that there is safety and power in numbers. This extends prior research by showing that as the proportion of the disadvantaged group increases, the group becomes more powerful and confident in exerting its views (Kanter, 1977). This means that entrepreneurial teams experience similar demographic dynamics as other types of teams whereby team members who belong to lower-status groups can find support when others on the team are similar to them (Riordan & Shore, 1997).

Moreover, the present study answers calls to think about entrepreneurship in new ways. For example, Ahl (2006) describes that one problematic practice is that a majority of people think that entrepreneurship is male gendered and thinking about entrepreneurship leads to

masculine connotations. Our study shows that this does not have to be the case. It appears that when there are sufficient women in the ownership team, it is possible for a female CEO to develop enough proficiency among the team that their performance does not differ substantially from male CEO led firms. This phenomenon echoes the findings of Wilson and colleagues (2007) who found that entrepreneurial self-efficacy among women can be improved when they obtain entrepreneurship education. The findings also indicate that women CEO's confidence in their own knowledge and ability to finance their firms appears to decrease when they work with more male owners relative to men CEO's confidence that work with male owners.

### 6.2 Practical Implications

Research has shown time and time again that women experience disadvantages when running their businesses (Fairlie & Robb, 2009). Results show that the area of new venture financing may be added to the many spaces where women experience inequality compared to men, as the recent #MeToo Movement has highlighted in society at large. However, our study shows that women's performance disadvantages can be mitigated when their ownership teams have a higher percentage of women. Many decades ago, manufacturing environments in the United States were predominantly seen as men's work, not women's work. This was post-Industrial Revolution and pre-World War II before many men were called into military duty. During the height of World War II, the image of Rosie the Riveter, which became popular starting in 1942, was based on a photo taken of a woman named Naomi Parker while she was working in a machine shop in Alameda, California (Pruitt, 2020). Just as machine shops and manufacturing environments have traditionally been considered as masculine domains, finance and entrepreneurship have also traditionally been seen as masculine domains (Ahl, 2016). Just as Rosie the Riveter inspired a generation of women to join the workforce and fill roles men had

vacated, it appears that having other women role models in particular occupations increases women's ability to perform, although it does not seem to increase their confidence in their knowledge.

However, the glass ceiling for women in entrepreneurship persists. According to Bosse and Taylor (2012), there is a second glass ceiling that impedes women entrepreneurs in addition to the traditional glass ceiling which limits women's ability to rise through the ranks of organizations at very high levels. In a multi-country study of 14,000 firms, Murayev, Talavera, and Schafer (2009) found that women-led businesses are 5% less likely to be approved for bank loans compared to men-led businesses, and when they do get loans, they pay half a percentage point more interest on average. Efrat (2010) found that women-led businesses were overrepresented in bankruptcies in the United States and concluded that the problem is due to lower human capital, lower earnings, lower capitalization, smaller businesses, less access to capital, and a stronger reliance on high-cost financing sources. This is not a US-centric phenomenon either, as a World Bank report from 2010 found that women throughout the world start their businesses with less capital than men, they report more obstacles that prevent them from accessing formal credit than men, they pay more for overdraft facilities than men, and they are less likely to receive loans from banks compared to businesses that are managed by men (World Bank, 2010).

Given this information, what are some steps that organizations and governments can take to reduce disparities between men and women entrepreneurs? Establishing programs that help women-led businesses learn about the various types and sources of monetary capital along with providing pathways for them to obtain the necessary finances to scale their businesses seems to be a good place to start. Recently, the National Association of Investment Companies (NAIC), a

Washington D.C.-based trade association and the largest network of private equity firms and hedge funds, in coordination with the Minority Business Development Association (MBDA), a U.S. government agency whose sole purpose is to educate and facilitate entrepreneurship for ethnically diverse and women-led firms, created the Growth Equity Funds Initiative. A major purpose of the initiative is to provide customized business finance education to women entrepreneurs to help them gain a more in-depth knowledge of the various types of financing that are available in the marketplace. After receiving the training, women entrepreneurs can make informed decisions as to which type will be most beneficial for their firm. Furthermore, after female entrepreneurs have participated in the program, the NAIC then provides access to financing through one of its funding apparatuses to the respective female-led venture, thereby improving their viability, reducing their likelihood of default, while also creating greater wealth in their communities (see NAICPE.com).

Providing organizations that increase networking opportunities for women and visibility for women-led companies could also be helpful, especially as it pertains to enhancing their reputations as competent entrepreneurs (Xie & Lv, 2018). For example, the venture capital industry has been referred to as "a referral-reliant industry" which creates barriers for women (Bosse & Taylor, 2012). Moreover, major industry and trade conferences that feature entrepreneurs should also consider the diversity of their speakers because that also sends a signal about who the respected leaders are and who can be successful in those fields. If there are no women role models in entrepreneurship, this can further the stereotype that entrepreneurship is a man's domain (Ahl, 2006).

Moreover, it is important to state that the systemic disadvantages women face due to stereotypes are not just in the field of entrepreneurship, but in society at large. Previously we

cited research finding that the overwhelming majority of people in the population subconsciously associate men with science and careers much more heavily than they do women (Nosek et al., 2007). These biases and the resulting stereotypes that people hold about men and women can greatly disadvantage women throughout their careers because it creates expectations about what men and women can do and what they should be doing at both home and work (Ridgeway, 2011). For example, a study by Nosek et al. (2009) found an association between levels of gender-science implicit bias in a country and girls' scientific achievement in that same country. Approximately 70% of the over 500,000 participants who took the IAT across 34 different countries showed a bias connecting men with science more strongly than women. When Nosek and colleagues looked at the data by country level, results showed that country implicit bias linking men to science predicted national sex differences in math and science achievement between boys and girls (Nosek et al., 2009). The authors also collected participants' self-reported explicit (i.e., blatant and conscious) stereotypes about sex and science; these scores of conscious stereotypes did not provide any added predictive power to explain the achievement gap beyond the predictive power of country implicit bias. Thus, Nosek et al. conclude that implicit biases and the sex differences in scientific participation are reinforced and drive the persisting gender gap in achievement between men and women in science (Nosek et al., 2009).

Thankfully, one research article did find that illustrating counter-stereotypical examples by having prominent women entrepreneurs featured can help start breaking down people's biases and mental imagery when they hear the word "entrepreneur" (Dasgupta & Asgari, 2004). In addition, seeing women role models will also improve confidence in women's perceived ability to succeed as entrepreneurs. A study from the Institute of Leadership and Management (2011) of 3000 managers reported that women have lower confidence than men which encourages them to

be more cautious. Having more women exemplars could boost women's self-confidence and allow them to think about their work as an opportunity to excel rather than an effort to avoid failure. Two organizations that can provide significant and meaningful networking opportunities for women entrepreneurs are the National Association of Women Business Owners (NAWBO) and the Women's Business Enterprise National Council (WBENC). Through these two organizations' regional and national conferences, women entrepreneurs of various industries and venture size can exchange learnings and expand their social networks. Furthermore, they also have an opportunity to participate in symposiums led by preeminent women entrepreneurs, which can build confidence and the belief that success is possible.

## 7. LIMITATIONS AND FUTURE RESEARCH

One limitation of this study is that the data are self-reported by the entrepreneurs in the survey. Ideally, we would have had objective measures of funding knowledge and firm performance. Future research may replicate our findings using objective measures. A meta-analysis of leadership skill (Paustian-Underdahl et al., 2014) reports that women under-estimate their leadership skill while men overestimate their leadership skill. When using self-reported leadership performance, women rated themselves significantly lower than men rated themselves. However, when using other-reported leadership performance from peers, subordinates, supervisors, and trained observers, women were rated as significantly more effective leaders than men (Paustian-Underdahl et al., 2014). It is possible that this under-confidence effect may explain why women CEOs report lower funding knowledge. It is also possible that this over-confidence may explain why men CEOs rate their funding knowledge to be higher (and the more men on the founding team, the more the knowledge they believe they have). Future research may unpack this finding.

A second limitation of our study is that we cannot make strong causal claims due to potential endogeneity concerns. We have tentatively addressed endogeneity concerns due to omitted variable bias and sample selection bias. However, since our study is not based on an experimental design, we cannot completely rule out these factors that may impact our causal inferences. Although we use propensity score matching to mimic experimental designs, it is extremely useful for future scholars to consider an experiment to better address endogeneity concerns so that one can assess causal effects and validate our findings. Said differently, while we have worked diligently to establish our theoretical framework with sound logic coupled with rigorous and thorough statistical analyses, we encourage readers to interpret our results with caution. As Gelman and Imbens (2013) and King, Goldfarb, and Simcoe (2021) found there can be a multitude of different pathways to assemble, assess, process, and interpret data and that authors and readers should remain open to considering different assumptions and outcomes predicated on this reality.

Another limitation is that we do not know the nature of the relationship between the men and women on the mixed-sex ownership entrepreneurship teams. This is important, because particularly among spousal teams, women (especially women with small children) may abdicate responsibility for financial matters if they are following the stereotypical gender role as caregiver while encouraging their husbands to satisfy the prescribed gender role as the primary breadwinner (Bianchi et al., 2006). Although this mentality may seem old-fashioned to some, it has even been demonstrated among Millennials. In 2015, 38% of women in the United States made more money than their husbands, but the feedback from the culture is that men should be earning more. If that is not the case, even Millennial women have reported feeling guilty while Millennial men feel emasculated (Bloom, 2017). Further, some findings show that if women out-

earn their husbands by even $5,000 a year, the chance of divorce increases (Bloom, 2017). Therefore, the nature of the relationship between the people on the entrepreneurial ownership team should be considered in future research.

An additional limitation of our study is that we use sex differences as a proxy for the socially constructed gender construct. Although qualitative research would be most ideal, we recommend that future survey research similar to ours goes a step further by asking specific questions about gender experiences (Westbrook & Saperstein, 2015) so they can offer greater confidence that they captured gender differences among CEOs. With such enhanced measurement improvements, we would expect to find an even stronger relationship between CEO gender differences and outcomes than what we found here.

Finally, future research should consider the intersectionality that plays out in CEOs lived experiences because the interplay of gender and race has implications for their workplace behaviors and interpersonal relations (Rosette, de Leon, Koval, & Harrison, 2018). For example, Ponce de Leon and Rosette (2022) found that black women's experience and how they are perceived by others differs from that of black men and white women. Although our study did not provide a significant number of white women to make such comparisons, it was not surprising to see that black men had more funding knowledge than black women as that was consistent with our predictions. It would have been interesting to see if black women acquire more funding knowledge than both black men and white men given their racial status. Thus, we believe intersectionality might shed further light on CEO differences in funding knowledge. However, we also recommend those employing an intersectionality framework also compare the experiences of men to each other across racial groups as that has not been examined in the literature. Our sample did show that Black men enjoy funding knowledge advantages over

Hispanic men, and it would be interesting to conduct qualitative research through an intersectionality perspective to gain further understanding as to when and why this could occur. Interestingly, we did not find evidence of the model minority effect where Asians are advantaged with funding knowledge over other minority groups, but it would also be informative to further examine those assumptions through an intersectionality lens (Yip, Cheah, Kiang, & Hall, 2021).

## 8. CONCLUSION

Entrepreneurship and small business ownership are two of the greatest drivers of wealth and job creation in the U.S. Women-led enterprises now represent nearly 50% of all firms in the U.S., and this reality is becoming a global phenomenon (VanderBrug, 2013). Studies by the NAIC show that funds invested in underserved markets consistently generate returns that outperform the market. However, there has been only marginal progress in the venture capital and private equity markets to develop programs and funds that focus capital on addressing underserved markets. As Hinchliffe (2019) found, women entrepreneurs are significantly undercapitalized when compared to their male counterparts and comprise less than 2.5% of investments made by venture or private equity firms. Their findings illustrate the need to improve education and access to alternative forms of capital for women entrepreneurs is more than a social responsibility issue; it is an economic imperative.

The national survey of entrepreneurs and small businesses uncovers two novel pieces of information that may improve the current situation. First, female CEO led firms do not report the same level of financial knowledge as male CEO led firms, which diminishes their likelihood to use alternative forms of capital such as private equity and venture capital as opposed to utilizing their personal savings, credit cards, and traditional bank loans. Results show that this lack of knowledge negatively impacts their financial performance. We posit that providing women

CEOs with targeted education about alternative forms of financing may increase the amounts of money they seek as well as provide them with greater insight as to which form(s) of capital will best address their start-up and future growth needs. Moreover, findings show that having more women in ownership in women CEO-led firms is a key driver to overcoming this shortcoming, leading to improved firm performance. This finding should serve as an impetus for women to consider having more females in their ownership structure as they form their ventures, especially if they are considering a female CEO. Meanwhile, male CEO-led businesses report more knowledge of funding sources, and the higher the male ownership there is in the business, the more knowledge they report.

## 9. DECLARATIONS

### Funding

The authors received no funding support for this research.

### Conflicts of interest/Competing interests

The authors have no conflicts/competing interests.

### Availability of data and material

Data can be made available upon request.

### Code availability

Not applicable.

### Ethics approval

Not applicable. The authors used secondary data for this research project.

### Consent to participate

Not applicable.

### Consent for publication

Not applicable.

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**TABLE 1** Descriptive statistics and correlations

| Variable | *M* | *SD* | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|---|---|
| 1. Industry | .71 | .45 | | | | | | | |
| 2. Experience | 3.05 | 1.16 | .108+ | | | | | | |
| 3. Firm size | 2.88 | 1.14 | .160** | .445** | | | | | |
| 4. Investor | .33 | 1.01 | .003 | -.041 | .093 | | | | |
| 5. CEO gender | .33 | .47 | -.023 | .010 | -.090 | -.099 | | | |
| 6. Percentage of women ownership | 1.77 | 1.18 | -.021 | -.038 | -.169** | -.128* | .778** | | |
| 7. Funding knowledge | 2.09 | .83 | .006 | -.127* | .125* | .211** | -.167** | .159** | |
| 8. Venture performance | 4.48 | 2.23 | .151* | .652** | .708** | .030 | -.071 | .152* | .130* |

*Notes:* $N = 264$; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

**TABLE 2** Regression results

| Variables | DV = Funding knowledge | | | | DV = Venture Performance |
|---|---|---|---|---|---|
| | *Model 1* | *Model 2* | *Model 3* | *Model 4* | *Model 5* |
| Constant | 2.081 ** | 2.182 ** | 2.209 ** | 1.993 ** | 1.956 ** |
| | (.175) | (.179) | (.202) | (.182) | (.353) |
| Industry | -.009 | -.020 | -.017 | -.025 | .430 * |
| | (.109) | (.109) | (.109) | (.108) | (.178) |
| Experience | -.151 ** | -.146 ** | -.146 ** | -.153 ** | .864 ** |
| | (.048) | (.048) | (.048) | (.048) | (.079) |
| Firm size | .147 ** | .137 ** | .135 ** | .139 ** | .963 ** |
| | (.049) | (.049) | (.049) | (.049) | (.081) |
| Investor | .152 ** | .143 ** | .142 ** | .144 ** | -.069 |
| | (.050) | (.049) | (.050) | (.049) | (.082) |
| CEO gender | | -.234* | -.197 | -.202 | |
| | | (.105) | (.167) | (.166) | |
| Percentage of women ownership (PWO) | | | -.019 | -.120 + | |
| | | | (.067) | (.081) | |
| CEO gender × PWO | | | | .304 * | |
| | | | | (.139) | |
| Funding knowledge | | | | | .352 ** |
| | | | | | (.101) |
| R-squared | .090 | .107 | .108 | .124 | .667 |
| R-squared change | .090 | .017 | .000 | .016 | |
| F Change | 6.433** | 4.919 * | .082 | 4.740 * | F statistic = 103.233 |

*Notes: N* = 264; Values in parentheses are standard errors. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

**TABLE 3** Indirect effect of CEO gender on venture performance via funding knowledge at low and high % of women ownership

| Moderator | Effect | Boot SE[a] | LLCI[b] | ULCI[c] |
|---|---|---|---|---|
| Low % women owned firm | -.562 | .235 | -1.03 | -.098 |
| High % women owned firm | .158 | .232 | -.299 | .615 |

*Notes*: $N = 264$.

[a] bootstrapped standard errors based on 10,000 bootstrapped iterations

[b] lower level of the confidence interval

[c] upper level of the confidence interval

**TABLE 4:** Heckman Selection Model and Propensity Score Matching

| | Heckman Selection Model | | | Matching | |
|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| | Selection | Knowledge | Performance | Knowledge | Performance |
| *Firm region* | -0.246+ | | | | |
| | (0.143) | | | | |
| *S-corporation* | 0.237+ | | | | |
| | (0.144) | | | | |
| Industry | 0.156 | -0.015 | 0.193 | 0.068 | 0.224 |
| | (0.201) | (0.156) | (0.257) | (0.203) | (0.347) |
| Experience | 0.022 | -0.148** | 0.831** | -0.025 | 0.707** |
| | (0.057) | (0.048) | (0.081) | (0.072) | (0.128) |
| Firm size | 0.053 | 0.135** | 0.983** | -0.012 | 1.014** |
| | (0.060) | (0.050) | (0.082) | (0.074) | (0.123) |
| Investor | -0.052 | 0.141** | -0.049 | 0.091 | -0.016 |
| | (0.056) | (0.049) | (0.082) | (0.093) | (0.166) |
| CEO gender | 0.172 | -0.717* | | -0.832* | |
| | (0.367) | (0.300) | | (0.379) | |
| Percentage of women ownership (PWO) | 0.091 | -0.218+ | | -0.274* | |
| | (0.156) | (0.114) | | (0.137) | |
| CEO gender x PWO | -0.073 | 0.295* | | 0.319* | |
| | (0.183) | (0.140) | | (0.157) | |
| Funding knowledge | | | 0.361** | | 0.375* |
| | | | (0.101) | | (0.163) |
| *Inverse Mills ratio* | | 0.357 | -2.209* | | |
| | | (0.562) | (0.918) | | |
| Constant | -0.146 | 2.188** | -0.175 | 2.667** | -1.427** |
| | (0.272) | (0.441) | (0.702) | (0.411) | (0.519) |
| R-Squared | | 0.125 | 0.667 | 0.17 | 0.619 |
| N | | 264 | 264 | 123 | 123 |

*Notes:* Values in parentheses are standard errors. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

**TABLE 5:** Indirect effect of CEO gender on venture performance (Adjusted for sample selection)

| Moderator | Effect | Boot SE [a] | LLCI [b] | ULCI [c] |
|---|---|---|---|---|
| Low % women owned firm | -0.422 | 0.199 | -0.814 | -0.03 |
| High % women owned firm | 0.462 | 0.351 | -0.229 | 1.153 |

*Notes: N* = 264.

[a] bootstrapped standard errors based on 10,000 bootstrapped iterations

[b] lower level of the confidence interval

[c] upper level of the confidence interval

**TABLE 6:** Indirect effect of CEO gender on venture performance (matched sample)

| Moderator | Effect | Boot SE [a] | LLCI [b] | ULCI [c] |
|---|---|---|---|---|
| Low % women owned firm | -0.513 | 0.257 | -1.022 | -0.003 |
| High % women owned firm | 0.445 | 0.359 | -0.267 | 1.157 |

*Notes: N* = 123.

[a] bootstrapped standard errors based on 10,000 bootstrapped iterations

[b] lower level of the confidence interval

[c] upper level of the confidence interval

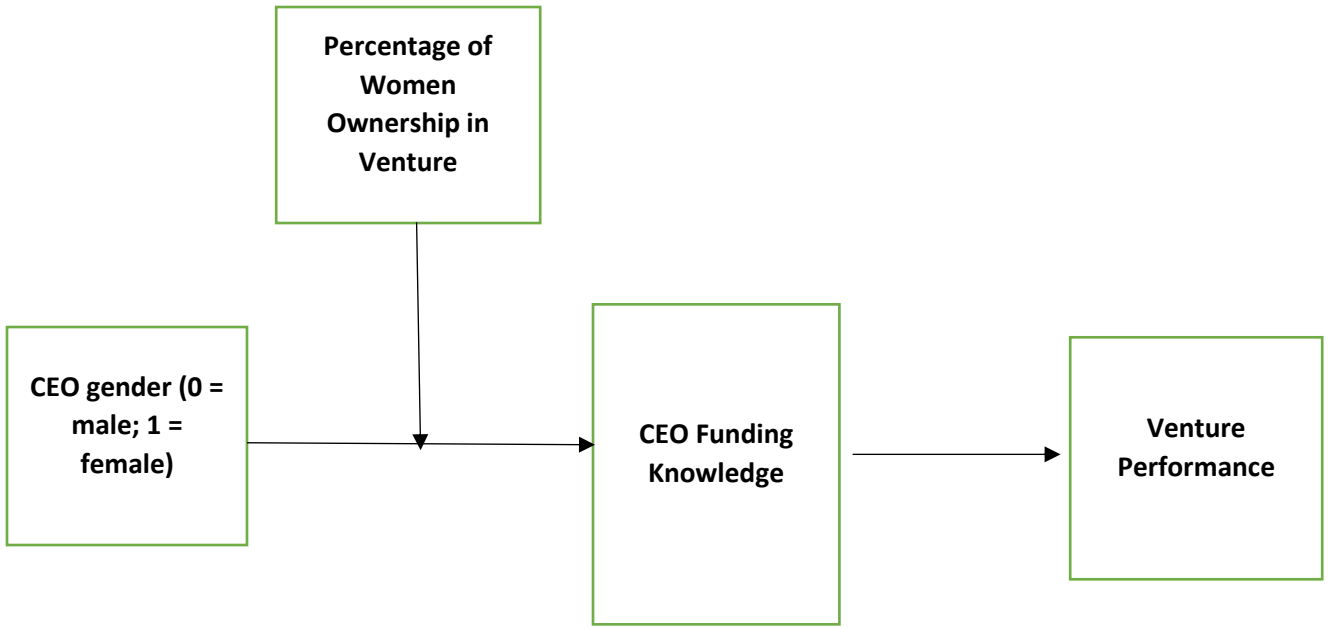


**FIGURE 1** Theoretical model

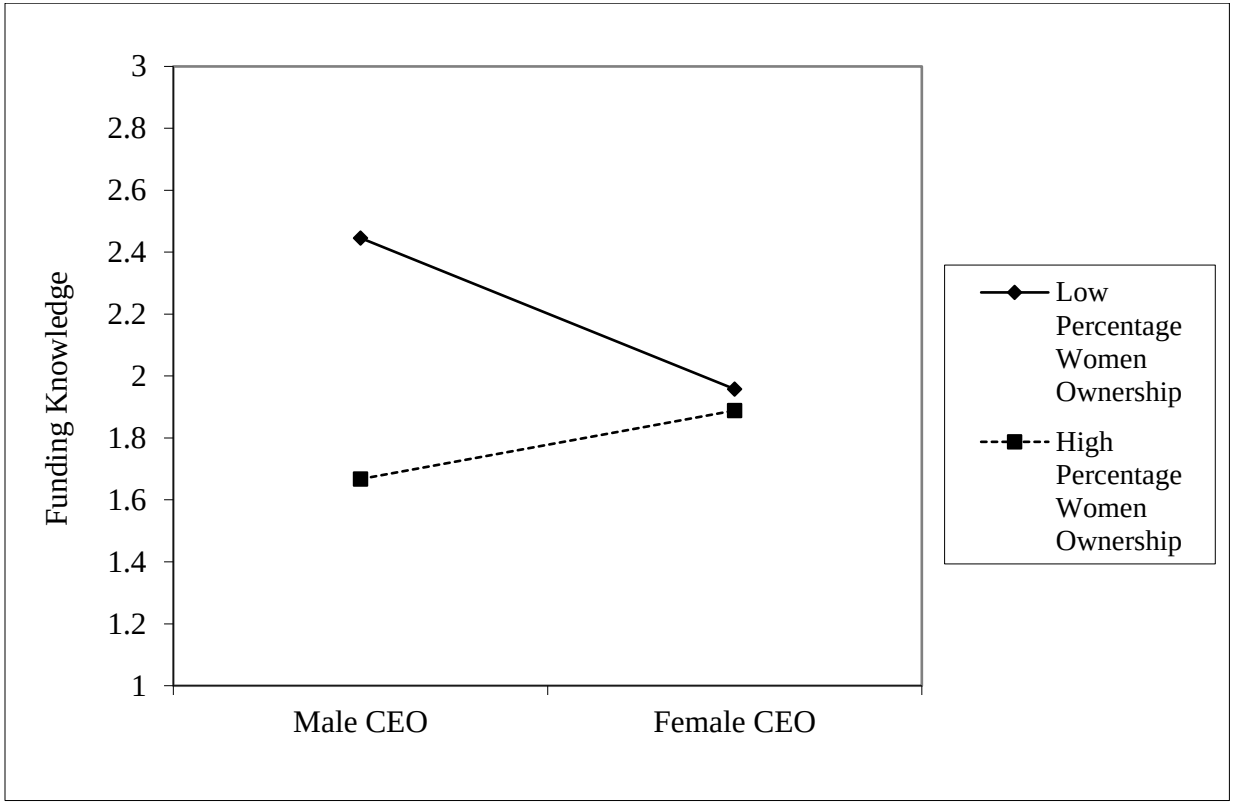


**FIGURE 2** Moderating role of women ownership on CEO gender to funding knowledge relationship

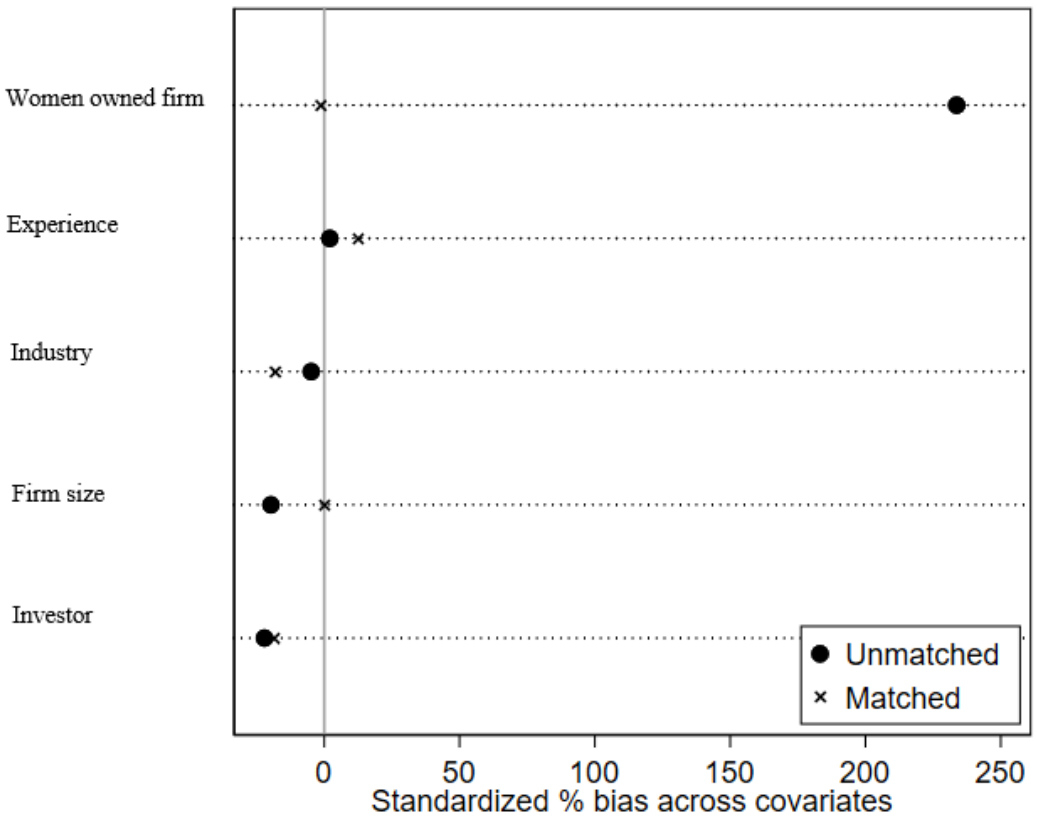


**FIGURE 3** Balancing check for propensity score matching

*Notes*: After matching, there is no difference between firms with women CEOs and firms with men CEOs on all covariates.

**APPENDIX**

Firms by Industry

| Industry Type | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Chemicals | 2 | .8 | .8 | .8 |
| Insurance | 2 | .8 | .8 | 1.5 |
| Fabricated Products | 3 | 1.1 | 1.1 | 2.7 |
| Professional | 7 | 2.7 | 2.7 | 5.3 |
| Printing & Publishing | 4 | 1.5 | 1.5 | 6.8 |
| Engineering | 4 | 1.5 | 1.5 | 8.3 |
| Health Care | 6 | 2.3 | 2.3 | 10.6 |
| Software | 6 | 2.3 | 2.3 | 12.9 |
| Retail | 7 | 2.7 | 2.7 | 15.5 |
| Transportation | 5 | 1.9 | 1.9 | 17.4 |
| Real Estate | 6 | 2.3 | 2.3 | 19.7 |
| Finance | 6 | 2.3 | 2.3 | 22.0 |
| Distribution | 20 | 7.6 | 7.6 | 29.5 |
| Construction | 33 | 12.5 | 12.5 | 42.0 |
| Manufacturing | 30 | 11.4 | 11.4 | 53.4 |
| Technology (goods or services) | 34 | 12.9 | 12.9 | 66.3 |
| Other | 13 | 4.9 | 4.9 | 71.2 |
| Professional Services | 76 | 28.8 | 28.8 | 100.0 |
| Total | 264 | 100.0 | 100.0 | |