



The gendered effects of effectuation

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ABSTRACT

Recent research has confirmed the positive role of effectuation in firm performance. We propose that bringing gender roles into the application of effectuation is important because of the alignment between gender expectations and effectual logics. Employing four samples collected with 990 entrepreneurs from emerging economies, we find that female entrepreneurs apply effectuation more effectively than male entrepreneurs, especially in countries with low gender inequality. Thus, this research suggests that investigating the adoption of effectuation through the lens of gender roles, along with gender power differences, provides an important window into understanding how female entrepreneurs can outperform male entrepreneurs.

1. Introduction

Effectuation is a control-oriented decision logic that applies a set of existing personal and social means as given, and focuses on possible effects that can be co-created with those means (Sarasvathy, 2001), where future states and the outcomes of decisions are uncertain (Sarasvathy, 2008). Effectuation starts with imagination of novel futures that can be created with the existing means (Sarasvathy & Dew, 2005). It continues with applying logic of control in assessing the complementary means one can obtain through extension of social ties, and then adjusting initial aspirations and experimenting with emerging ideas to create valuable outcomes (Read et al., 2016b).

Research on effectuation has grown dramatically over the past two decades (Karami et al., 2020), with a subset of these findings exploring gender effects (e.g. Jisr & Maamari, 2014; Yang et al., 2021). However, most of these studies did not focus on gender as the primary pursuit, but employed gender as a control variable. To our knowledge, the only study that has fully examined the role of gender is conducted by Frigotto and Valle (2018), but this study represents a pilot as it only included 20 international students. More importantly, although existing research indicates that gender matters for effectuation, conflicting results have been found. We argue that effectuation logic, which enables entrepreneurs to address pure uncertainty, goal ambiguity, and isotropy (no way

to assist which information is pertinent) (Read & Sarasvathy, 2012), works differently between genders (McRae et al., 2008). Thus, the current research addresses the following research question: Does gender matter for the relationship between effectuation and new venture performance?

To this end, we explore effectuation relative to two different gender perspectives. The first is based on gender role theory. Gender role theory recognizes that females and males differ in their societal roles and individuals are judged by their adherence to those roles (Eagly, 1987). Gender role congruity would predict that females engaged in a more stereotypically feminine process or task should see better results than males, and vice versa. Drawing upon this theory, and contrary to the conventional view of effectuation as a male/masculine pursuit (Frigotto & Valle, 2018), we contend that female entrepreneurs employ effectual logics more effectively based on gender role alignment with effectuation (i.e., effectuation being more feminine in nature), which results in better firm performance.

The second perspective is drawn from the macro environment in which the entrepreneur operates the new venture, specifically the impact of the country's gender inequality. While gender roles are social constructions of how each gender should align, gender role congruity theory does not explicitly state a power asymmetry/hierarchy of those roles or behaviors (Wood & Eagly, 2012). Each culture establishes a

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hierarchy for gender based on the assumed roles, which dictate who should have decision-making power (Zhu & Chang, 2019). Building off the above premise that the feminine aspects of effectuation align with better new venture performance when female entrepreneurs use effectual logic, a gender inequality perspective would predict that this relationship will be weakened when gender inequality is higher because a more feminine perspective will be less valued and have less influence. We propose that effectuation will be applied more effectively in countries with lower gender inequality, as the more feminine aspects of effectuation will be allowed and have more weight in the decision-making process. Further, we combine both thoughts to propose that new venture performance as it relates to effectuation will be highest for female entrepreneurs in countries with lower gender inequality. By integrating gender role congruity and national gender inequality, we are able to provide a holistic view of the impact of gender on the relationship between effectuation and new venture performance.

To explore this question, we test to see if gender moderates the relationship between effectuation and new venture performance. We provide empirical evidence for the moderating role of gender in the effectuation-new venture performance relationship with data collected from four samples in three emerging economies (Bangladesh, Vietnam, and Ghana). We focus on emerging economies because the economic center of gravity has been moving toward emerging countries, and it provides an opportunity to expand the boundary conditions of effectuation theory and deepen our understanding of the theory and its applications (Foo et al., 2020). The Global Entrepreneurship Monitor (GEM) 2020/2021 report emphasizes that female entrepreneurship is a “fundamental promoting factor of inclusive economic growth in developing economies” (Monitor, 2021). Research shows that the prevalence of female entrepreneurship is relatively higher in some developing economies than the developed counterparts (Minniti et al., 2006; Okten Hasker, 2015). However, limited research exists on female entrepreneurship in emerging economies (Welsh et al., 2018). We thus attempted to reach under-explored regions in Southeast Asia (Bangladesh and Vietnam) and West Africa (Ghana). Our data largely support our hypotheses.

By identifying the moderating role of gender, we add to important foundations for understanding the gender influence of effectuation as it relates to new venture performance and theoretically link these findings to gender role congruity theory. We also contribute to effectuation theory by capturing the impact of gender as a fundamental sociological concept in effectuation process. We further provide practical implications for female entrepreneurs, policy makers, educators, and investors. Finally, our findings provide insights on women empowerment as a way to achieve the United Nations Sustainable Development Goal (UNSDG) #5, gender equality.

2. Theoretical framework

2.1. Effectuation

Effectuation theory started with critiquing the classic division of the world into entrepreneurs versus non-entrepreneurs, and sought to understand the circumstances under which entrepreneurship does flourish (Sarvasvathy, 2008). Effectuation theory explains how decision-making logic and actions create a new future in conditions of pure uncertainty wherein there is no future to be predicted, and therefore, there is no probability assigned to any option (Sarvasvathy, 2001). Effectuation theory argues that under such conditions, entrepreneurs apply logic of control to expand their control over the unpredictable environment by extending their control over key resources. In this sense, effectuation is a resources-based view (Read et al., 2009), which shows how effectuation process enables entrepreneurs to utilize their seemingly useless means into strategically important resources via partnership.

The effectuation process is heavily based on network and networking, so that, it is both *network-dependent* and *network-driving*

phenomenon (Kerr & Coviello, 2020). That is, effectuation process starts with existing social ties (as well as personal means) to figure out *what can I do* and then actively expands the existing ties into strategic networks within which self-selected stakeholders commit their resources to a constantly evolving aspiration (Sarvasvathy, 2001). Networking and partnership therefore become a key in sense-making of the uncertainty of future and outcomes of stakeholders' decision and actions, by providing an opportunity to collectively understand the situation and assembling all required resources to transform the uncertainty into a new opportunity for the constellation of the stakeholders (Read et al., 2016a; Sarvasvathy, 2001). In this process of networking and partnership, the quality of the focal entrepreneur's personality (Who I am) plays a critical role in assembling a useful constellation of stakeholders, and building and activating trust among the stakeholders so that they willingly share their tangible and intangible resources as the main mechanism of new opportunity creation (Karami & Tang, 2021; Sarvasvathy, 2001).

2.2. Gender roles

As a socially constructed concept (Ridgeway, 2011), gender and the associated stereotypes are cultural views of a given group of people on how males and females should behave (Malmström et al., 2020). Given the cultural setting, the behavior of males and females either aligns with or goes against the cultural roles assigned to that gender. According to gender role congruity theory (Eagly & Karau, 2002), those that do adhere to gender expectations are going to be rewarded, and those that do not are punished. Extant research has demonstrated that gender congruity with a given task or activity can significantly predict positive or negative outcomes (Eagly, 1987; Eddleston & Powell, 2008; Powell, 2011; Williams & Best, 1990). One such outcome has been identified as new venture performance (Zhao & Yang, 2021). Thus, in a given cultural setting, how each gender approaches an outcome can be important.

When drilling down into the details of effectuation, certain aspects of effectuation may align more with culturally assigned feminine characteristics and activities than masculine. Femininity is more aligned with cooperation, caring and modesty (Marusic & Bratko, 1998; Powell, 2011), which is closely related to the process nature of effectuation wherein an unknown future is imagined and co-created by the stakeholders (Karami & Read, 2021; Read et al., 2016b). Co-creation requires a great deal of cooperation, resource sharing, trust, and commitment development which are conventionally assigned feminine behaviors. Whereas, masculinity is more related with competitiveness, assertiveness, and heroism (Hofstede, 2001; Mast et al., 2003). Effectuation theory clearly critiques competitiveness as the core of entrepreneurial activity and emphasizes openness to different ideas, so that self-selected stakeholders can gradually co-develop new goals (Sarvasvathy, 2001).

Gender stereotype literature would suggest that a more masculine approach would be associated with being more achievement/goals oriented, along with focused on predicting the future and seeking ambiguity rather than trying to control it (Bem, 1974; Carli, 2010; David & Brannon, 1976). Effectuation argues that under uncertainty there is no predetermined goal to be focused on, and therefore goal orientation may not help with effectuation process. Instead, effectuation is a control-oriented decision logic focused on means instead of outcomes. Means become transformed to strategically important resources within the network where stakeholders share their complementary resources and commit their resources to actualize a shared imagined future (Read et al., 2016b). Control in effectuation theory is a collective control over complementary means which enable the stakeholders to perceive a control over the situation and take actions to co-create a new future (Read et al., 2016b).

Further, effectuation calls for decision makers to mitigate risks by setting financial limits to negate losses (Dew et al., 2009) and convincing partners to provide aid early in the process (Sarvasvathy, 2001, 2008). Logic of affordable loss plays a central role in effectuation process as it

enables entrepreneurs to protect their limited means as well as encourages them to expand their network ties and build strong partnership as the main mechanism for collective sense-making of the situation and resources sharing for co-creation of new opportunities (Kerr & Coviello, 2020). These elements of effectuation align more with feminine stereotypes, as masculine characteristics, with emphasis on achievement and competition, would not reward mitigating risks or getting assistance from others (Heilman, 2012). In other words, gender roles would expect females to set boundaries and operate more communally, while males are expected to make big bets and operate in an individualistic manner. Effectuation, with a focus on the co-creative nature of entrepreneurship (Karami & Read, 2021; Sarasvathy, 2001), inherently aligns more with femininity and female roles. Appreciating the existing means and extending control over the situation through extension of network ties are the most important mechanisms emphasized in effectuation. As the core mechanisms of effectuation are aligned with female gender roles, female entrepreneurs will benefit more from effectuation, hence strengthening the impact of effectuation on new venture performance.

Hypothesis 1. *The relationship between effectuation and new venture performance is stronger for female entrepreneurs.*

2.3. Gender inequality

Given the cultural elements of gender, we argue that a broader/national institutional level perspective is necessary to enhance our understanding of the gendered effects of effectuation. Effectuation theory argues that at the macro level, sociopolitical institutions become important means for entrepreneurship (Sarasvathy, 2001). As noted by Sarasvathy (2012, p.3): “A world in which women have the opportunity to vote and work and compete is a very different world from one in which they are specifically denied it.” There is a difference between these two worlds as institutions act as means in one and as a hurdle in the other. Recent research has begun to explore the effects of regulatory, normative, and cognitive institutions on effectuation, showing how more developed institutions enhance the effectiveness of effectuation (Shirokova et al., 2021). The type of culture in a sample of entrepreneurship students also plays a role in the effectiveness of effectuation (Laskovaia et al., 2017). We build on these studies to narrow on the specific elements of institutions based on gender in the form of gender inequality.

Gender equality does not mean that women and men are the same, but that gender does not impact rights, responsibilities and opportunities (United Nations, (2021), 2021). Equality also assumes that the needs and interests of each gender is taken into consideration. Unfortunately, the term gender inequality is the more appropriate term, as to date, no nation has demonstrated absolute gender equity (Gaye et al., 2010; Gutiérrez-Martínez et al., 2021). Subsequently, gender inequality at the national level focuses on the power asymmetry between genders as it relates to reproductive, economic, and political resources (United Nations Development Programme, 2015). As the Kauffman Entrepreneurship Policy Digest (2015) shows, women are 1/3 as likely to access equity finance through venture capital and angel investors; start businesses with almost half as much capital as male entrepreneurs start with; and are less likely to access networks in search for financial resources compared to their male counterparts. It is due to this power asymmetry that we focus on gender inequality rather than other cultural variables of gender, as cultural variables would mirror gender roles. However, gender inequality allows us to evaluate power differences in formal and informal institutions.

Asymmetrical power between genders means that priorities and rewards are skewed towards males and masculine behavior, and this becomes institutionalized within a given civilization and specific context (Kenny, 2007). In the entrepreneurship context, institutionalized gender inequality diminishes the ability and priority of female entrepreneurs and feminine perspective towards work (Thébaud, 2015). With less

power, the use of more feminine thinking and/or processes will be less effective, as it would be deemed less valuable (United Nations, (2021), 2021) and lacking fit with more masculine systems (Theeuwes et al., 2021). Thus, no matter the gender of the person, in a high gender inequality environment, the use of more feminine logic, such as effectuation, should not result in superior performance. Conversely, lower gender inequality environments should be more accepting and fit better with effectuation logic, resulting in better new venture performance, no matter the gender of the individual decision-maker.

Hypothesis 2. *The relationship between effectuation and new venture performance is stronger in countries with lower gender inequality.*

Combining both theoretical logics, if alignment with gender roles and lower gender inequality do matter, women in more gender equal environments should be the most effective in utilizing effectuation, resulting in higher new venture performance than any other groupings. In other words, if gender roles align to benefit more from engaging in the feminine aspects of effectuation, and power asymmetry is not present to disadvantage those benefits, better performance should be the outcome for women in such a setting. Thus, we propose the following:

Hypothesis 3. *The relationship between effectuation and new venture performance is highest for females in countries with lower gender inequality.*

3. Methodology

3.1. Sample and procedures

We tested our hypotheses with four samples of entrepreneurs collected in three emerging countries: Ghana (2 samples), Bangladesh, and Vietnam which exhibited a similar pace of economic development and GDP in 2019 (International Monetary Fund, (2019), 2019) and represented under-explored emerging economies across two continents (Asia and Africa). In order to achieve methodological and sampling equivalence (Cumming et al., 2009), we surveyed respondents from multiple major cities and sources in each country. All firms were eight years old or younger with fewer than 50 employees, and were independently, domestically owned with no international business operation. In addition, for each sample, the entrepreneurs (i.e., founders of the current business) were asked to complete the questionnaire on effectuation and a different top executive from the same firm was asked to complete the section on performance. Non-response bias was checked for each sample and no significant difference was identified.

Data collection in Vietnam was administered in the five largest cities in Vietnam: Ho Chi Minh City, Hanoi, Haiphong, Da Nang, and Can Tho, from May to November 2019. Prior to data collection, we conducted a pilot survey with 28 entrepreneurs in order to enhance the face validity and clarity of the survey. At Time 1, 1,800 entrepreneurs in business parks and incubators were approached with a questionnaire on effectuation and control variables. The survey administrator went back in one week, and received 309 complete questionnaires. 54 questionnaires were eliminated due to missing values and suspected errors, leaving us with a final sample of 255 useable questionnaires. At Time 2, we approached the top executives of these 255 firms for information on performance. With the founders' endorsement, all 255 questionnaires were usable, representing a 31.87 % response rate. In the final sample, 35 % were manufacturing firms and 65 % were service firms. The average age of the firms was 4.7 years and the firms employed an average of 12 full-time employees.

Data collection in Bangladesh was conducted in seven large cities in Bangladesh: Dhaka, Chittagong, Rajshahi, Khulna, Gazipur, Sylhet, and Barishal, which lasted from June to December 2019. At Time 1, we contacted 500 entrepreneurs face-to-face with a questionnaire on effectuation and control variables, and received 265 responses. After discounting missing values, we obtained 262 complete responses. At Time 2, we approached top executives of these 262 firms face-to-face for

information on performance. After removing missing values, we obtained a total of 236 matched responses, representing a 47.42 % response rate. The average firm age was 9.8 years, and the average firm size was 7 employees.

Data collection in Ghana comprised two samples. For *Sample 1*, we identified 750 ventures from the Ghana Business Directory and the membership directory of the Association of Ghana Industries. Prior to data collection, we sent letters to the entrepreneurs of these ventures to explain the academic purpose of our study. Then we visited these 750 ventures and handed entrepreneurs the questionnaires for Time 1 of the survey on effectuation and control variables. After several visits and reminders, we received 303 responses. We eliminated 22 responses with missing values, and obtained 281 complete responses. At Time 2, we contacted the top executives of these 281 ventures with a questionnaire delivered in person on performance. After discarding 21 responses due to missing values, we obtained 260 matched responses for a response rate of 34.66 %. The average firm age was 4.1 years and the average firm size was 10 employees.

Entrepreneurs for *Sample 2* were identified from the Ghana Business Directory (350 firms) and Ghana Revenue Authority (450 firms). We telephoned these 800 firms to seek their participation. Then one month later, we approached all the 800 firms with a questionnaire on effectuation and control variables, and received 256 responses. Our final sample for Time 1 consisted of 249 firms after cases with missing values were removed. At Time 2, we approached the top executives of these 249 firms for measures on performance. We discarded 10 firms due to missing values, and employed 239 matched responses for final analyses, which represented 29.87 % overall response rate. The average firm age was 7.1 years and the average firm size was 9 employees. The final sample size for all four samples combined was 990.

3.2. Measures

Effectuation was measured with [Chandler et al. \(2011\)](#) scale (“1” = “strongly disagree” to “7” = “strongly agree”). Following previous literature (e.g. [Peng et al., 2020](#); [Smolka et al., 2018](#)), we calculated the average score of all four dimensions to represent overall effectuation ($\alpha = 0.83$).

New venture performance was measured with [Li and Zhang \(2007\)](#) scale by asking top managers to compare their firms’ performance to that of their competitors (“1” = “below expectation” to “7” = “exceeded expectation”).

Entrepreneurs’ gender was coded with “0” representing “male” and “1” representing “female.”

Gender inequality was pulled from the United Nation’s Gender Inequality Index (GII) ([Glick & Fiske, 2001](#); [United Nations Development Programme, 2015](#)). The GII is a form of the United Nations Human Development Index (HDI), and measures gender inequalities in three important aspects of human development—reproductive health, empowerment, and economic status. Higher GII values indicate greater disparities between females and males.

Control variables. We controlled for entrepreneurs’ age and education (“1” = “less than high school;” “2” = “high school;” “3” = “bachelor’s degree;” “4” = “master’s degree;” and “5” = “doctoral degree”). The squared term of age was also controlled because the latest meta-analysis indicated that entrepreneurs’ age is more likely to have a curvilinear effect on firm success ([Zhao et al., 2021](#)). Firm size was measured as the number of full-time employees and firm age was captured using the number of years of the firm since its incorporation. We controlled firm entrepreneurial orientation (EO) with [Covin and Slevin \(1989\)](#) three-dimensional scale. The average score for all three dimensions was calculated to represent overall EO ($\alpha = 0.85$). Environmental uncertainty was measured with the four-item scale developed by [Waldman et al. \(2001\)](#) ($\alpha = 0.83$). Finally, country was controlled for methodological equivalence.

3.3. Analysis and results

To assess the appropriateness of our measurement model, we performed a confirmatory factor analysis (CFA) with the analysis of moment structures technique with AMOS 19 (Arbuckle, 2010). The measurement model provided good fit to the data: $\chi^2/df = 1.314$; $RMSEA = 0.051$; $GFI = 0.930$; $CFI = 0.984$; $NFI = 0.937$; $IFI = 0.984$. We assessed the convergent validity of our variables by computing the average variance extracted (AVE) values for each variable. All estimates were greater than the recommended value of 0.50 ([Fornell & Larcker, 1981](#)). We then followed [Fornell and Larcker \(1981\)](#) and calculated the square root of the AVE. All of these values were greater than the values in the corresponding rows and columns, suggesting adequate discriminant validity of the constructs.

[Table 1](#) presents the descriptive statistics, and [Table 2](#) summarizes hypothesis testing results. We employed STATA 16 and conducted hierarchical multiple regression analysis to test our hypotheses. Confirming and extending the findings of the large volume of previous studies on effectuation, Model 2 in [Table 2](#) indicates that effectuation is positively associated with new venture performance ($r = 0.202$, $p < .001$). [Hypothesis 1](#) proposes that the relationship between effectuation and performance is stronger for female entrepreneurs. Model 3 in [Table 2](#) shows that the interaction between effectuation and entrepreneur gender is positively related to new venture performance ($r = 0.187$, $p < .05$), supporting H1. We employed [Aiken and West \(1991\)](#) procedure to visually illustrate the moderating effect of gender. In further support of H1, [Fig. 1](#) shows that the positive relationship between effectuation and new venture performance is stronger for female entrepreneurs than for male entrepreneurs.

[Hypothesis 2](#) predicts that gender inequality negatively impacts the relationship between effectuation and new venture performance. Model 4 indicates that the interaction between effectuation and gender inequality is negatively related to new venture performance ($r = -3.639$, $p < .001$), supporting H2. [Fig. 2](#) indicates that the effect of effectuation on new venture performance is positive for countries with lower gender inequality. Yet the effect of effectuation on new venture performance turns negative in countries with high gender inequality. These results identified significant boundary conditions for effectuation to exert the assumed positive effect on performance.

Finally, [Hypothesis 3](#) proposes that the relationship between effectuation and new venture performance is highest for female entrepreneurs in countries with lower gender inequality. Model 5 shows the three-way interaction between effectuation, gender, and inequality has a negative effect on new venture performance ($r = -2.474$, $p < .01$), providing initial evidence for H3. [Fig. 3](#) provides additional evidence that the effect of effectuation on new venture performance is the strongest for female entrepreneurs in countries with lower gender inequality index. It also illustrates that female entrepreneurs in countries with low gender inequality generate the highest performance (Slope 2).

3.4. Robustness test

Due to concern over potential endogeneity, we followed previous studies (e.g. [Haveman et al., 2017](#); [Tang et al., 2021](#)), and adopted the propensity score matching (PSM) procedure to construct a control group (i.e., higher effectuation) which was compared to the treatment group (i.e., lower effectuation). We required that the treatment and control groups be similar in terms of important characteristics including entrepreneurs’ age, education, firm age, firm size, environmental uncertainty, and entrepreneurial orientation. We used one-to-one nearest-neighbor matching without replacement and required a caliper distance of 0.25 standard deviations to determine the threshold of being selected ([Haveman et al., 2017](#)). After discarding the unmatched observations, we obtained a final sample of 784 observations. The results of PSM regression analysis remain unchanged and are presented in [Table 3](#).

Table 1
The Descriptive Statistics of Variables.

Variables	Mean	S. D.	1	2	3	4	5	6	7	8	8	10
New Venture Performance	5.331	1.030										
Entrepreneurs' Age	43.548	10.822	0.141									
Entrepreneurs' Age Squared (ln)	7.485	0.514	0.129	0.972								
Entrepreneurs' Education	2.499	1.242	−0.010	0.038	0.036							
Firm Age	6.335	3.340	0.335	0.210	0.200	0.004						
Firm Size	12.838	11.219	−0.085	0.089	0.098	0.160	0.024					
Environmental Uncertainty	5.043	0.951	0.160	−0.021	−0.025	−0.049	−0.051	−0.011				
Entrepreneurial Orientation	5.028	0.610	0.131	0.096	0.084	−0.034	0.083	−0.045	0.207			
Entrepreneurs' Gender	0.499	0.500	0.044	0.018	0.023	−0.007	0.020	0.098	0.033	−0.024		
Gender inequality	0.496	0.096	0.351	0.304	0.301	0.088	0.275	0.055	0.124	0.338	0.054	
Effectuation	4.989	0.585	0.184	0.033	0.031	−0.173	0.022	−0.064	0.215	0.241	−0.015	0.072

Note: If the absolute value of correlation is 0.064 or greater, its significance is at 0.05 level.

Table 2
Regression Results (N = 990).

Variables	New Venture Performance					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Entrepreneurs' Age	0.001 (0.011)	0.002 (0.011)	0.003 (0.011)	0.001 (0.011)	0.002 (0.011)	0.001 (0.011)
Entrepreneurs' Age Squared	0.005 (0.232)	−0.014 (0.231)	−0.026 (0.230)	0.002 (0.224)	−0.010 (0.224)	0.013 (0.224)
Entrepreneurs' Education	−0.002 (0.023)	0.012 (0.023)	0.012 (0.023)	0.026 (0.022)	0.026 (0.022)	0.026 (0.022)
Firm Age	0.020 ⁺ (0.011)	0.022* (0.011)	0.024* (0.011)	0.018 ⁺ (0.010)	0.020 ⁺ (0.010)	0.019 ⁺ (0.010)
Firm Size	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)
Environmental Uncertainty	0.204*** (0.031)	0.181*** (0.031)	0.181*** (0.031)	0.133*** (0.031)	0.133*** (0.031)	0.133*** (0.030)
Entrepreneurial Orientation	−0.109* (0.050)	−0.145** (0.050)	−0.154** (0.051)	−0.105* (0.049)	−0.114* (0.049)	−0.107* (0.049)
Entrepreneurs' Gender	0.109* (0.056)	0.111* (0.056)	0.107* (0.056)	0.074 (0.054)	0.070 (0.054)	0.080 (0.054)
Gender inequality	6.468*** (0.494)	6.349*** (0.491)	6.344*** (0.490)	6.311*** (0.477)	6.306*** (0.477)	6.386*** (0.477)
Effectuation		0.202*** (0.050)	0.205*** (0.050)	0.184*** (0.049)	0.187*** (0.049)	0.189*** (0.049)
Effectuation × Entrepreneur gender			0.187* (0.092)		0.188* (0.093)	0.173 ⁺ (0.093)
Effectuation × Gender inequality				−3.639*** (0.478)	−3.640*** (0.478)	−3.687*** (0.478)
Entrepreneur gender × Gender inequality						−0.104 (0.567)
Effectuation × Entrepreneur gender × Gender inequality						−2.474** (0.916)
Country	<i>Control</i>	<i>Control</i>	<i>Control</i>	<i>Control</i>	<i>Control</i>	<i>Control</i>
_cons	1.848 (1.324)	1.242 (1.322)	1.308 (1.321)	1.309 (1.286)	1.375 (1.284)	1.165 (1.283)
N	990	990	990	990	990	990
R ²	0.289	0.300	0.303	0.340	0.342	0.347

Note: (1) Robust standard errors in parentheses. (2) ⁺significant at the 10 % level, * significant at the 5 % level, ** significant at the 1 % level, *** significant at the 0.1 % level.

4. Discussion

This study investigates whether gender influences the effectuation and new venture performance relationship. By identifying the association of gender roles with effectuation and firm performance, we establish that the gender of the entrepreneur engaging with effectuation matters in how effectuation translates into superior firm performance. Previous studies have indicated that male entrepreneurs may have better firm performance than female entrepreneurs (Robb & Watson, 2012). These studies have conceptualized entrepreneurship as a masculine phenomenon where competitiveness, assertiveness and heroic achievement put male entrepreneurs in an advantageous position over their female counterparts (e.g. Gupta et al., 2009). Our results show that effectuation provides a pathway for female entrepreneurs to engage with their key stakeholders (Nair, 2020) and outperform male

entrepreneurs. This gender role congruity can be discussed in terms of the co-creative nature of the effectuation process (Read et al., 2016b), and the overall shift in entrepreneurship from an individualist phenomenon to a co-creative phenomenon, where everything happens in a constellation of stakeholders facilitated by the entrepreneur (Karami & Read, 2021). We argue that these facilitation and co-creative approaches are more congruent with femininity. Our findings not only add credence to the performance benefits of utilizing effectuation (Grégoire & Chérchem, 2020; Peng et al., 2020), but also how gender enhances this relationship.

To address calls from scholars to study more macro gender effects (i. e. Ahl, 2006; Hughes et al., 2012), we also explore how country-level gender inequality shapes the effect of effectuation on new venture performance. Our findings indicate that the gender inequality of the decision-maker's country greatly impacts the relationship between

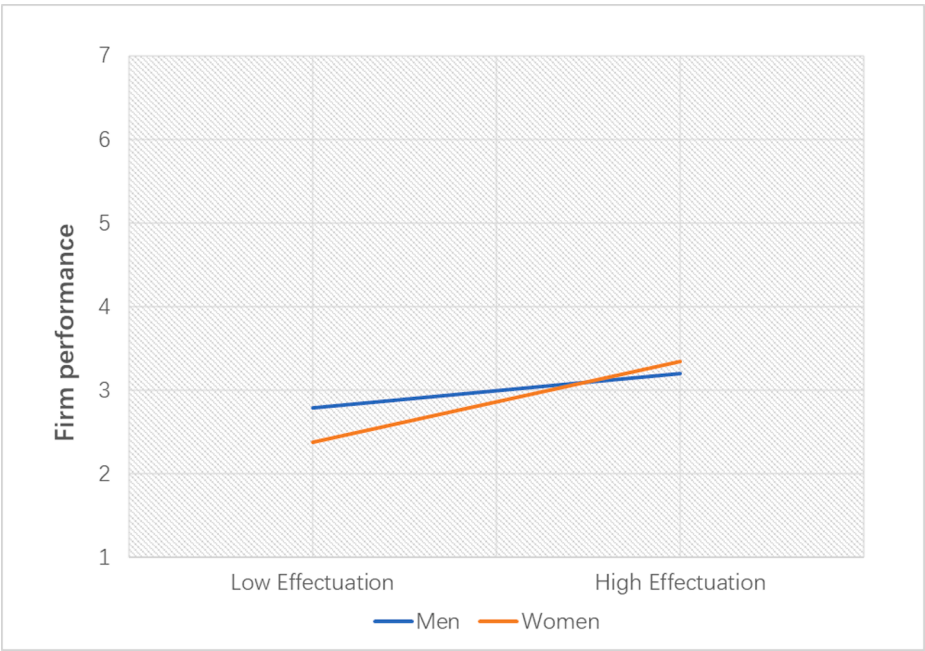


Fig. 1. The Moderating Effect of Entrepreneur Gender.

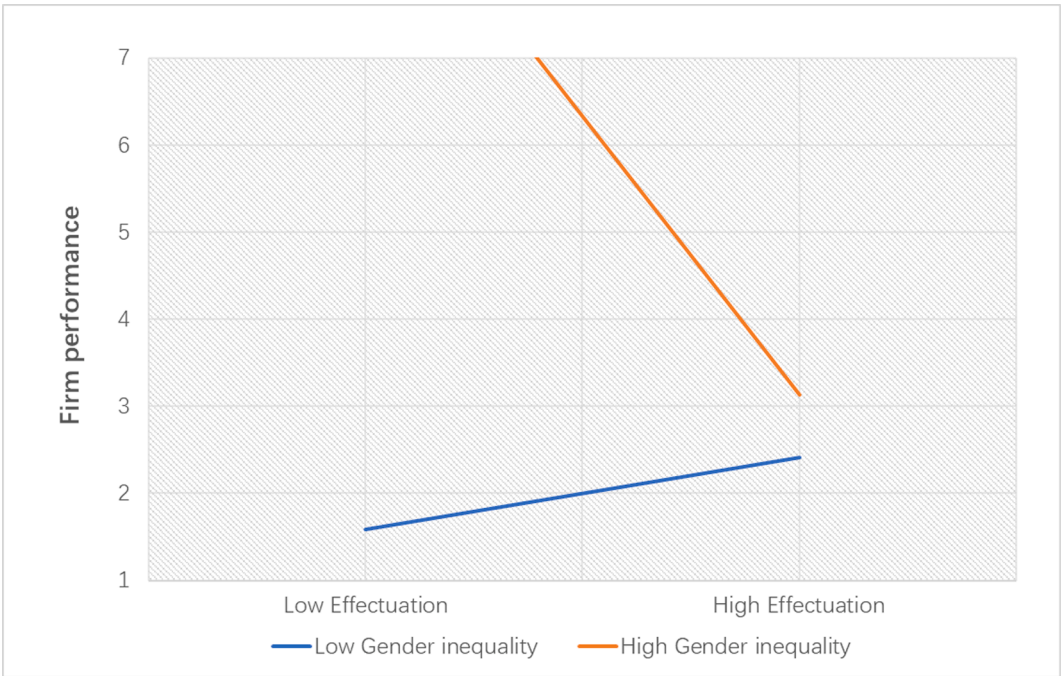


Fig. 2. The Moderating Effect of Gender Inequality.

effectuation and firm performance. These findings further indicate the gendered effects of effectuation, at the macro level. When the feminine perspective is less valued or carries less weight, as in higher gender inequality countries, effectuation will not result in better firm performance. Together, these findings show that the best firm performance comes when females in low gender inequality countries utilize effectuation. By identifying the moderating roles of entrepreneur gender and national gender inequality, we add to important foundations for understanding the gender influence of effectuation as it relates to new venture performance.

Overall, our findings suggest a strong gender component to effectuation, which needs to be taken into consideration for future effectuation

research. By bringing gender to the forefront of effectuation, research on effectuation theory may further develop by investigating the gender-based differences in entrepreneurial cognition and actions. Future research on effectuation would be better served to recognize that both individual and societal factors will impact the effectiveness of effectuation (Shirokova et al., 2021). Other societal variables may add more specificity to this relationship in an effort to further ground effectuation as a theory (Zhang et al., 2021).

4.1. Practical implications

From a practice standpoint, investors should consider evaluating an

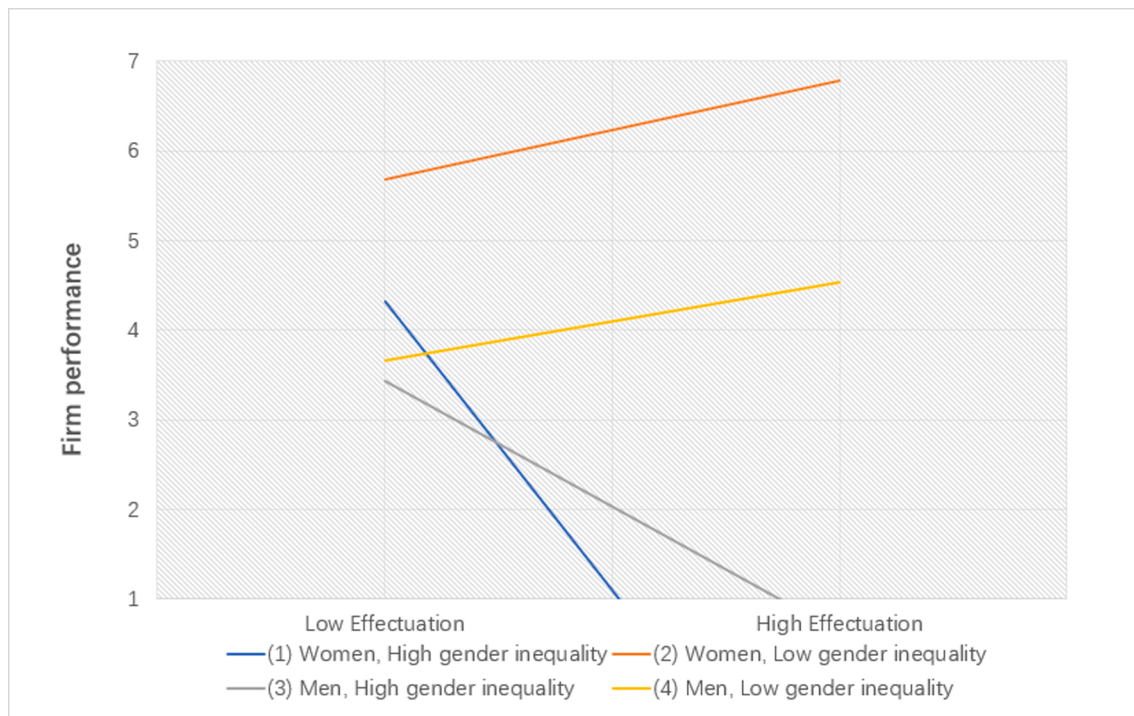


Fig. 3. Three-way Interaction.

Table 3

Regression Results with Propensity Score Matching (N = 784).

Variables	New Venture Performance					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Entrepreneurs' Age	0.001 (0.013)	0.003 (0.013)	0.004 (0.013)	0.001 (0.013)	0.002 (0.013)	0.002 (0.013)
Entrepreneurs' Age Squared	0.001 (0.280)	−0.039 (0.280)	−0.045 (0.279)	−0.001 (0.275)	−0.006 (0.275)	−0.023 (0.275)
Entrepreneurs' Education	−0.012 (0.024)	−0.003 (0.024)	−0.003 (0.024)	0.004 (0.024)	0.004 (0.024)	0.004 (0.024)
Firm Age	−0.010 (0.012)	−0.007 (0.012)	−0.004 (0.012)	−0.008 (0.012)	−0.005 (0.012)	−0.007 (0.012)
Firm Size	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.006 ⁺ (0.003)	0.006 ⁺ (0.003)	0.005 ⁺ (0.003)
Environmental Uncertainty	0.125*** (0.033)	0.113*** (0.033)	0.113*** (0.033)	0.083* (0.033)	0.083* (0.033)	0.081* (0.033)
Entrepreneurial Orientation	−0.152** (0.053)	−0.183*** (0.054)	−0.192*** (0.054)	−0.153** (0.053)	−0.162** (0.053)	−0.158** (0.053)
Entrepreneurs' Gender	0.031 (0.059)	0.036 (0.059)	0.021 (0.059)	0.019 (0.058)	0.004 (0.058)	−0.027 (0.061)
Gender inequality	4.943*** (0.535)	4.998*** (0.533)	4.955*** (0.532)	5.429*** (0.532)	5.384*** (0.531)	5.438*** (0.530)
Effectuation		0.155 ⁺ (0.055)	0.157 ⁺ (0.055)	0.196*** (0.054)	0.198*** (0.054)	0.196*** (0.054)
Effectuation × Entrepreneur gender			0.225* (0.104)		0.217* (0.103)	0.259* (0.104)
Effectuation × Gender inequality				−2.977*** (0.598)	−2.957*** (0.597)	−2.897*** (0.595)
Entrepreneur gender × Gender inequality						0.822 (0.732)
Effectuation × Entrepreneur gender × Gender inequality						−3.056*** (1.158)
Country	Control	Control	Control	Control	Control	Control
_cons	3.632* (1.592)	3.210* (1.592)	3.264* (1.588)	2.546 (1.574)	2.603 ⁺ (1.570)	2.708 ⁺ (1.569)
N	784	784	784	784	784	784
R ²	0.176	0.185	0.189	0.210	0.215	0.222

Note: (1) Robust standard errors in parentheses. (2) ⁺ significant at the 10 % level, * significant at the 5 % level, ** significant at the 1 % level, *** significant at the 0.1 % level.

entrepreneur's use of effectuation (Schmidt et al., 2018), especially if the founder is female. This may aid in the effort to correct inequalities women experience in raising financial capital (Brush et al., 2014; Geiger, 2020; Malmström et al., 2020). Effectuation logic enables female entrepreneurs to utilize their resourcefulness and focus on cooperation, collaborations, transformation of their initial means into strategic resources, and resource sharing. These entrepreneurial actions can empower these entrepreneurs to overcome institutional barriers related to financing, networking, cultural norms, and regulative voids. Effectual entrepreneurship relies on intangible resources which our study shows female entrepreneurs can build on to gain access to required tangible resources. Trust, commitment, and learning within collaborations plays the key role, and we revealed that these are more feminine qualities. Investors and other stakeholders, such as suppliers, distributors, government and many more should consider the co-creative nature of entrepreneurship and the positive impact of femininity on forming a constellation of stakeholders and on facilitating the process of new venture development and performance.

This emphasis is also in line with the United Nations' sustainable development goal #5, gender equality, which provides further insights for policy makers (United Nations, 2014, 2014). Policy makers should consider institutional arrangements which empower women entrepreneurs so that they become more self-reliant to control resources and eliminate their subordination (Crittenden et al., 2019). In addition, it has been argued that effectuation may lead to more disruptive innovations (Fisher, 2012). Thus, our proposal may aid in an organization's pursuit to be more disruptive, especially leaning into feminine aspects (Díaz-García et al., 2013) rather than the traditional masculine ideals of innovation (Pecis, 2016; Vehviläinen et al., 2010). In general, our study aligns with more recent research showing the positive aspects of embracing feminism to become a successful entrepreneur. For example, crowdfunding research shows that gender congruity allows female entrepreneurs to achieve successful crowdfunding campaigns (Cowden, Creek, et al., 2021). Thus, future work can further highlight that individuals do not need to mask who they are to be a successful entrepreneur.

To make progress on the positive effects of effectuation, this type of decision-making logic needs to be taught in the education system. It has asserted that causation is the primary decision logic taught in MBA programs and propose how effectuation should be introduced in all MBA topics, not just entrepreneurship courses (Cowden, Hiatt, et al., 2021). From the results of our study, policy makers and educators should consider adding effectual decision-making curriculum at all levels of the education system to train all, but especially women. Naturally, this adoption is more realistic and more beneficial in lower gender inequality locations.

4.2. Limitations

This study is not without limitations. We did not examine whether the observed influence of gender on the association between effectuation and new venture performance would hold for large, established firms or for top executives rather than founders of new ventures. Future research might want to confirm or replicate our findings with samples of large firms in different economies. Future studies also might want to replicate our findings in rural communities or communities with different religious affiliations.

Second, research suggests that effectuation consists of four underlying dimensions: affordable loss, pre-commitments, experimentation, and flexibility (Sarasvathy, 2001). We followed extant research (e.g. Yang et al., 2021; Zhang et al., 2021) to examine the overarching effect of effectuation on performance and how this relationship is affected by gender and national gender inequality level. Future research is warranted to engage in a more fine-grained investigation into how gender influences the effect of each of the effectuation components on performance. This can enhance our understanding why female entrepreneurs

are more effective in using effectuation and what specific gender roles align with effectuation.

Third, how individuals identify in terms of gender is not captured neatly by a dichotomous variable (Linstead & Brewis, 2004; Pecis, 2016). Further, how those individuals align with differing gender roles gets more complex (Kroska, 2007) as gender and gender roles become more fluid (Hegarty et al., 2018). Thus, future research can provide much greater detail to the gendered effect of effectuation by looking at gender as a spectrum (Gülgöz et al., 2022) and by measuring feminine and masculine tendencies in all subjects no matter their gender assignment at birth (Stets & Burke, 2000).

5. Conclusion

Although previous research has offered empirical evidence on the role of gender in the effectiveness of effectuation, results are inconsistent and the gendered effects of effectuation has not been explored systematically from a sound theoretical perspective. It is critical to draw upon gender theories to integrate the fragmented pieces together to provide robust, consistent implications for effectuation as it relates to gender. We argue that co-creative approaches to entrepreneurship are more congruent with femininity, so that female entrepreneurs openly share their perception of uncertain situations, and actively collaborate in developing and exploiting new opportunities. This process takes place in countries with less inequality where there is less power distance and women's subordination. Our findings contribute to our understanding of the importance of women empowerment in further development of female entrepreneurship as a way to address UNSDG#5.

CRedit authorship contribution statement

Birton Cowden: Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Masoud Karami:** Writing – original draft, Formal analysis, Data curation, Conceptualization. **Jintong Tang:** Writing – original draft, Data curation, Conceptualization, Visualization, Methodology. **Wenping Ye:** Software, Resources, Methodology, Formal analysis, Data curation, Writing. **Samuel Adomako:** Writing – original draft, Investigation, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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