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## Article

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## Drivers of female entrepreneurship in Asian economies: a panel data analysis

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### ABSTRACT

The number of women venturing into small-scale businesses has increased with the increasing popularity of entrepreneurship. Though it has recently been acknowledged that entrepreneurship is a 'gendered phenomenon', entrepreneurship research over previous few decades has mostly concentrated on the traits and psychology of entrepreneurs. Furthermore, although researchers and policymakers have recently documented the role of females in the field of entrepreneurship, their contributions are yet to be recognized. Hence, we aim to explicitly analyze the scenario of female entrepreneurship, recognizing variations between men and women in the context of entrepreneurial endeavors. The literature investigating the factors that drive their success or hinders their growth is still in a nascent stage. Hence, there is a need to explore and understand the determinants of entrepreneurship particularly the female entrepreneurship. Given this backdrop, this study aims to identify the most significant factors that influence female entrepreneurs' behavior while entering entrepreneurship. We analyzed data from the Global Entrepreneurship Monitor (GEM) database from 2001 to 2020 using panel data analysis to address the research problem. Our empirical study shows that in all the selected Asian economies, more women enter entrepreneurship because of the opportunities it offers rather than necessity. In conclusion, we provide several suggestions for encouraging female entrepreneurship that can substantially contribute to the growth of the Asian economies under study.

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## Introduction

The current business world has seen a surge in the prevalence of female entrepreneurs with new firms because of their growing entrepreneurial intentions (Hechavarria et al., 2019; Meyer, 2018; Wiklund et al., 2019). The role of female entrepreneurship has been acknowledged worldwide, owing to its contribution to economic growth (Hechavarria et al., 2019; Rubio-Bañón & Esteban-Lloret, 2016). Although women's engagement in the workplace has increased significantly in recent decades, various innovative policy methods to promote them have emerged lately, particularly during the Covid-19 pandemic (Martínez-Rodríguez et al., 2022). The pandemic has changed the way people work, enabling a balance between work and family life, particularly for female entrepreneurs worldwide (Martínez-Rodríguez et al., 2022). Thus, understanding several aspects of female entrepreneurship before devising policy measures is necessary. Although research has been conducted to understand the phenomenon of female entrepreneurship, most of the focus has already been on developed economies (Gupta et al., 2009; Martínez-Rodríguez et al., 2022). However, in emerging and undeveloped countries, females are more inclined towards entrepreneurship than males (Arafat & Saleem, 2017; Estrin & Mickiewicz, 2011; Julia et al., 2020) but their participation is yet to be acknowledged (Liguori et al., 2024). Moreover, with regard to developing Asian economies, there are still relatively few studies on female entrepreneurship.

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Given this backdrop, this study aims to determine the most relevant factors that drive female towards entrepreneurship, particularly in Asian economies, to suggest measures to support it. This study contributes to the literature in three ways. First, the study provides insights into females' incentives and obstacles when venturing into business, which is imperative for policy formulation. Second, the study employs an international country-level panel data approach that includes a more extensive set of economies for an extended period (i.e. 15 economies and 20 years), which broadens the scope of the study and allows us to understand both the individual and international-level factors of female entrepreneurship. Finally, the study is conducted in Asian emerging economies, where the literature is inadequate, thereby offering insights into several institutional and socio-economic factors influencing female entrepreneurship specific to Asian emerging economies.

The remainder of the paper is structured as follows: Section 'Theory and hypotheses' presents a review of the existing literature to understand the motivating factors of female entrepreneurship, followed by hypothesis development. The next section describes the variables and empirical methodology employed. The analysis and results are discussed in the following sections. The study concludes by offering implications and lays down limitations and directions for future research.

## Theory and hypotheses

This study drives its theoretical framework by integrating the prominent theories in the entrepreneurship literature; namely the Theory of Planned Behavior (TPB) and the Douglas North's Theory of Institutions. The integration of the TPB and North's Theory of Institutions provides a holistic understanding of entrepreneurial behavior by considering both individual-level factors (attitudes, subjective norms, perceived behavioral control) and contextual factors (formal and informal institutions). This framework acknowledges the dynamic interplay between individual intentions and environmental constraints, highlighting the importance of both internal motivations and external influences in shaping entrepreneurial decisions and actions.

Åstebro and Tåg (2017) recognized the increasing importance of entrepreneurship in contemporary society, which has become the main priority of all economies owing to its favorable outcome on wealth (Ullah et al., 2024; Doran et al., 2016; Sugheir et al., 2013; Thurik et al., 2008). The outcomes of favorable state policies enhance innovation and increase productivity and competition (Audretsch & Keilbach, 2004; Cuervo et al., 2007; Pradhan et al., 2020). Additionally, entrepreneurial activity lessens income disparity and encourages social equality, thus contributing to constant economic growth. Gender biases are significant because recent research shows distinctions between men and women in entrepreneurship (Bin Shmailan, 2016). At the beginning of the 20th century, the contribution of female entrepreneurs was largely disregarded (Humbert et al., 2010) however, as academics began to recognize that 'entrepreneurship is a gendered phenomenon', female entrepreneurship began to gain attention among scholars and researchers (Jennings & Brush, 2013). Considering the dramatic surge in female entrepreneurial initiatives in recent years, it is crucial to research the impact of gender on entrepreneurial behavior (Liguori et al., 2024). Although governments have established several policies to boost female participation in entrepreneurial activities (Waseem, 2018), their entrepreneurial potential has recently begun to manifest lately (Malach Pines et al., 2010). The favorable impact of budding female entrepreneurship on countries' economic conditions has attracted the attention of policymakers and academics in both developed and developing countries (Rubio-Bañón & Esteban-Lloret, 2016; Wiklund et al., 2019). Specifically, it can be a practical solution for poverty reduction in underdeveloped countries (Doran et al., 2018; Sarfaraz et al., 2014). Fortunately, females are being imparted education and strengthened politically and economically (McGowan et al., 2012), which has increased worldwide in recent years (Weiler & Bernasek, 2001).

Apart from many other motivations, opportunities and necessities are the two primary drivers that encourage a person to become an entrepreneur (Block & Wagner, 2011; Arafat et al., 2020). The Global Entrepreneurship Monitor, a key platform for entrepreneurial activity worldwide, also distinguishes entrepreneurial activity drivers into opportunity-based and necessity-based factors.

On the one hand, the perception of existing opportunities drives opportunity-driven entrepreneurs to start their business (Peña et al., 2020) and the desire to expand revenues (Carter et al., 2016) attain

prestige, status and supremacy (Carsrud & Brännback, 2011) acts as economic motivations for them. In addition, several non-economic motives, such as the need for liberation and attainment or the ambition to develop their enterprise, be their own boss, and innovate new products and ideas, drive them towards entrepreneurship (Carter et al., 2016; Tyszka et al., 2011). Opportunity-driven entrepreneurs significantly affect overall economic growth (Urbano et al., 2020) because they have capacities comparable to those of large enterprises with huge capacities (Block & Wagner, 2011; Fairlie & Fossen, 2020) and higher growth expectations (Poschke, 2013). On the other hand, necessity-based entrepreneurs start their businesses because of the acute need for revenue and no other alternative (Peña et al., 2020). Necessity-driven entrepreneurs do not significantly affect economic growth, as they work in areas with minimal access to capital, technology, and other resources, which inhibits their potential to innovate and produce employment.

Likewise, the distinction between male and female entrepreneurship is also crucial, and equally important is their entrepreneurial attitude towards necessity- or opportunity-based entrepreneurship (Liguori et al., 2024). Shapero and Sokol (2009) first recognized the motivations pertaining to the necessity and opportunity for female entrepreneurship. The distinction is crucial to understand the reasons for starting a firm by females to devise effective policies to benefit from women's participation in entrepreneurial activities (Crecente et al., 2022; Liguori et al., 2024; Waseem, 2018). However, some empirical studies have produced evidence on the association between female entrepreneurship and its necessity/opportunity drivers, but this is often quite ambiguous.

Some studies state that women choose to set up their firms because they have no opportunities or other options, for several reasons. For instance, Baughn et al. (2006) and Noguera et al. (2015) defined factors such as family conciliation, labor market inequalities, and segregation of women in the labor market as major factors that push females to become entrepreneurs. Further, Maniyalath and Narendran (2016) consider necessity-based entrepreneurship as a substitute for traditional wage employment, while Noguera et al. (2015) observe the unpleasant working conditions that affect their decision to start their own firm. However, others argue that the likelihood of women being in business is driven by opportunities. For instance, Goby and Erogul (2011) and Ramadani et al. (2015) defined factors such as the urge for independence and autonomy, lack of prospects in current jobs, and low personal growth as major drivers of female entrepreneurship. Jennings and Brush (2013) and McGowan et al. (2012) reported that women consider flexibility in childcare commitments essential to becoming entrepreneurs.

Thus, previous studies suggest that necessity and opportunity are the two primary drivers of entrepreneurship among females which leads to the development of the following hypothesis:

H<sub>1</sub>: Females are more likely to be driven by necessity rather than opportunity when entering entrepreneurship.

### ***Explanatory socio-economic factors***

Entrepreneurs work in an environment with several socioeconomic and cultural factors that impact their enterprises. It is necessary to define these factors and understand how they affect entrepreneurship, particularly female entrepreneurship. Individual aspects such as perceived capabilities, institutional and financial factors such as financial and government policy support, tax burden, and bureaucratic implications are considered instrumental in studying entrepreneurial behavior (Martínez-Rodríguez et al., 2022). While these factors may also affect male entrepreneurship, this study considers only the impacts of these factors on female entrepreneurship.

### ***Perceived capabilities***

Entrepreneurial knowledge and skills are prerequisites for the successful development of an enterprise. Perceptions, abilities, knowledge, and skills are detrimental to entrepreneurship success (Álvarez et al., 2012; Hsu et al., 2019). Thus, it is necessary that an individual perceives himself or herself to be efficient, possessing the necessary skills and knowledge to become a successful entrepreneur. The literature on female entrepreneurship recognizes the association between perceived capabilities and entrepreneurial

initiatives. Their self-assessment of their skills and knowledge determines their business endeavors, and a lack of confidence inhibits their growth (Carter et al., 2016). Women entrepreneurs perceive themselves as incompetent, particularly in a conventional, men-dominant working environment. Consequently, they begin to reduce their entrepreneurial propensity. Likewise, many studies show that males are more confident and perceive themselves entrepreneurially capable.

### ***Institutional and financial factors***

Access to capital is essential to entrepreneurs, although it is also a complex problem to tackle (Hwang et al., 2019). It is essential to enable smooth and easy access to capital, as it significantly affects the income, economic growth, and advancement of female entrepreneurs as well (Halabisky, 2018). Even though women progressed over time to gain access to finance, recent research has revealed that gender prejudices prohibit them from receiving equal funding (Abebe & Kegne, 2023; Bigelow et al., 2014; Bin Shmailan, 2016; Liguori et al., 2024). Researchers have also opined that females face more challenges in securing loans, receive lower loan amounts, and are charged higher interest rates (Hwang et al., 2019; Verheul & Thurik, 2001; Wu & Chua, 2012). In general, without considering gender prejudices, entrepreneurs associated with small businesses generally face more difficulty obtaining bank loans and availing other credit and advanced schemes (Block & Wagner, 2011; Poschke, 2013). Furthermore, (Coleman, 2000) said that they rely primarily on short-term bank financing, and monetary limitations can be a big concern.

### ***The economy's level of development***

To indicate the economy's level of development and trace the feedback effect of entrepreneurial activities on the economic development of a country, Gross Domestic Product (GDP) is considered an indicator (Martínez-Rodríguez et al., 2022) therefore, it has been used as an independent economic variable in this study. National income level is considered a significant factor that determines whether females are motivated by necessity or opportunity in these economies (Terjesen & Amorós, 2010). The early stage of economic development can be primarily marked by necessity-driven entrepreneurship (Koster & Rai, 2008), while the prevalence of opportunity-driven entrepreneurship can be attributed to higher levels of economic development (Amorós et al., 2019; Fairlie & Fossen, 2020). The entrepreneurs who started to emerge as necessity-driven switch to opportunity-driven entrepreneurs with the development of economies as it leads to poverty reduction coupled with enhanced living standards (Acs, 2023). Economies with a high GDP that have robust institutional support and easy access to workforce and capital will offer more opportunities for female entrepreneurship. Therefore, women in economies with higher GDP levels are opportunity-driven entrepreneurs, as they admire bigger achievement targets, more independence levels at the workplace, self-efficacy, and self-reliance (Lerner & Malach-Pines, 2011; Waseem, 2018).

Therefore, from a review of the aforementioned explanatory factors, it can be said that these factors also influence entrepreneurial activities. This leads us to formulate the second hypothesis:

H<sub>2</sub>: The influence of explanatory socioeconomic factors varies with the economy's level of development.

## **Methodology**

### ***Data and methods***

This study utilized the Global Entrepreneurship Monitor (GEM) database and the World bank database. The GEM is an acclaimed entrepreneurship research organization founded by Babson College and London Business School in 1998 (Reynolds et al., 2005). It has been used extensively in recent entrepreneurship studies (Arafat et al., 2020; Boudreaux et al., 2019; Crecente et al., 2022; Martínez-Rodríguez et al., 2022; Schmutzler et al., 2019; Thai & Turkina, 2014). The reports and records collected by the GEM are considered benchmarks because they are based on robust surveys of the active population and experts from local and national institutions (Reynolds et al., 2005). Therefore, this study relies on data collected through

the Adult Population Survey (APS) and National Experts Survey (NES) by the Global Entrepreneurship Monitor (GEM) and adopts a panel data approach, taking a sample of 15 Asian economies for the time duration 2001–2020. [Table 1](#) provides the details regarding the variables used in study.

The study considered three aspects of entrepreneurship: Total early-stage entrepreneurship activity (TEA) as the dependent variable and, Female Opportunity-Driven entrepreneurship activity (FOTEA) and Female Necessity-Driven entrepreneurship activity (FNTEA) as independent variable for the proposed models. The other variables are considered as proxy to represent the socio-economic factors, institutional factors and the country's level of development. The sample is divided according to the economies' level of development as measured by their GDP values in absolute terms as shown in [Table 2](#). The economies are divided on the basis of average of the GDP for the whole group and is classified into higher-development economies in which GDP values are above the average of the selected group and lower-development economies in which the GDP values are below the average of the selected group. This division has been done to present the accurate and precise results so as to arrive at contextual understanding of the phenomenon of female entrepreneurship in these regions.

### Equation estimation

[Equation \(1\)](#) is devised to determine the dominant motivating factor for female entrepreneurship in selected Asian economies (i.e. necessity vs. opportunity), and [Equation \(2\)](#) is devised to identify the most influential explanatory socioeconomic variables for female entrepreneurship.

$$TEA_{it} = \alpha + \beta_1 FNTEA + \beta_2 FOTEA + \varepsilon_{it} \quad (1)$$

$$FOTEA_{it} = \alpha + \beta_1 FIN + \beta_2 CAP + \beta_3 POL + \beta_4 TAXB + \varepsilon_{it} \quad (2)$$

### Conceptual model

The analysis procedure is shown in [Figure 1](#). Six models are developed to test the hypotheses at all levels of economic development. Models 1, 2, and 3 consider the relative importance of female entrepreneurship (necessity vs. opportunity) for the different levels of economic development, considering a separate model for the different levels of development.

Models 4, 5, and 6 consider the impact of socioeconomic explanatory variables on the dependent variable (FOTEA), considering a separate model for the different levels of development ([Figure 2](#)).

**Table 1.** Description of the variables.

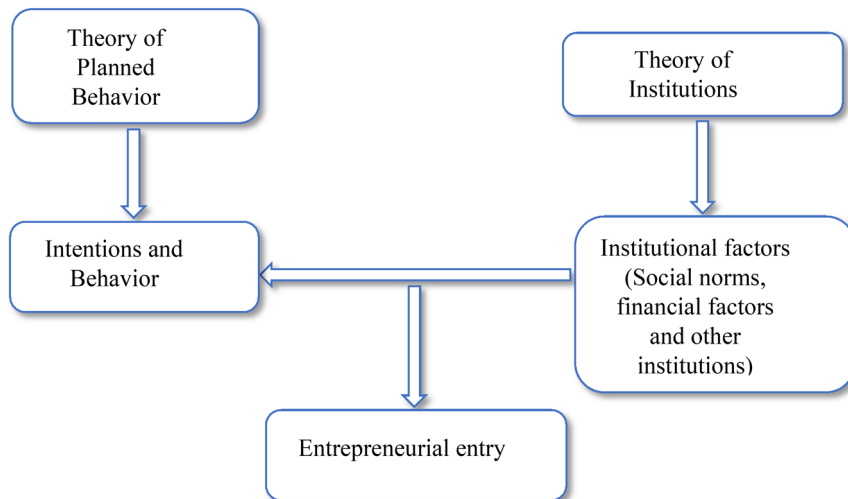
Variables used	Concept	Proxy	Source	Justification from literature
Economies' level of development	Gross domestic product at absolute values (US\$ current prices)	GDP	World Bank	Martínez-Rodríguez et al. (2022)
Institutional and financial factors	Financing for entrepreneurs	FIN	NES-GEM	Crecente et al. (2022)
	Taxes and bureaucracy	TAXB	NES-GEM	Martínez-Rodríguez et al. (2022)
Entrepreneurship	Government support and policies	POL	NES-GEM	Crecente et al. (2022)
	Total early-stage entrepreneurial activity (%)	TEA	APS-GEM	Crecente et al. (2022) and Martínez-Rodríguez et al. (2022)
	Female opportunity-driven early-stage entrepreneurial activity (%)	FOTEA	APS-GEM	Martínez-Rodríguez et al. (2022)
	Female necessity-driven total early-stage entrepreneurial activity (%)	FNTEA	APS-GEM	Martínez-Rodríguez et al. (2022)
Perceived capabilities	Perceived capabilities	CAP	APS-GEM	Arafat et al. (2020) and Martínez-Rodríguez et al. (2022)

Source: Author's representation from Martínez-Rodríguez et al. (2022).

**Table 2.** Economies' classification considered for the study.

Selected Asian economies	China Japan India South Korea Indonesia Saudi Arabia Taiwan Thailand United Arab Emirates Israel Singapore Malaysia Iran Qatar Turkey
Above GDP level economies (above the average GDP of the group, 2020)	China Japan India South Korea Indonesia Saudi Arabia
Lower GDP level economies (below the average GDP of the group, 2020)	Taiwan Thailand United Arab Emirates Israel Singapore Malaysia Iran Qatar Turkey

Source: The Author's representation from Martínez-Rodríguez et al. (2022).

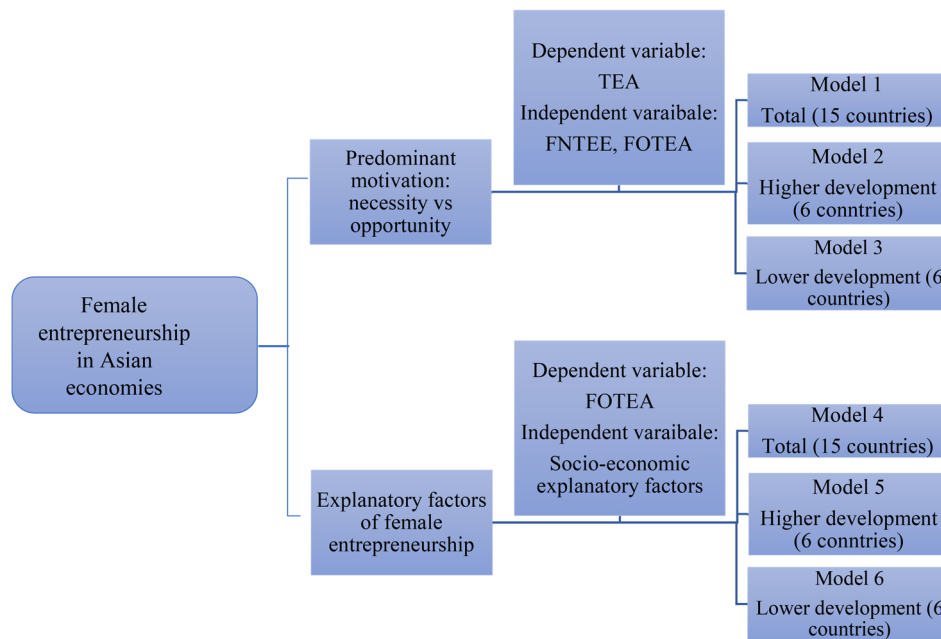
**Figure 1.** Theoretical framework for the study.

## Results and findings

This study employs panel data regression analysis to test the proposed hypothesis. The results are presented in [Tables 3](#) and [4](#), respectively.

First, to determine the predominant entrepreneurial motivation that better explains total entrepreneurial activity (TEA) depending on the level of development, an empirical economic model of total entrepreneurial activity (TEA) was proposed.

The results in [Table 3](#) show that the independent variable 'FOTEA' has a larger value of the standardized beta coefficient, i.e. 8.236, which explains the dependent variable 'TEA' to a larger extent than the



**Figure 2.** Conceptual model for the study.

**Table 3.** Results of necessity vs. opportunity based female entrepreneurship.

	M1 ( $\beta$ )	M2 ( $\beta$ )	M3 ( $\beta$ )
Dependent variable: TEA			
FNTEA	0.201	0.244	0.290
FOTE A	8.236*	5.120*	8.532*
R-squared	0.4359	0.5935	0.5749
Estimation (Hausman Test)	FE	FE	FE
N	15	6	9

\*Variables with the substantial effect on dependent variable.

**Table 4.** Results of exploratory models of socio-economic variables.

	M4 ( $\beta$ )	M5 ( $\beta$ )	M6 ( $\beta$ )
Dependent variable: FOTE A			
FIN	0.115	0.0906	0.057
CAP	0.002	0.000	0.003
POL	0.039	0.040	0.017
TAXB	-0.056	-0.050	-0.439
R-squared	0.758	0.815	0.764
Estimation (Hausman Test)	FE*	FE*	FE*
N	15	6	9

\*Variables with the substantial effect on dependent variable.

other independent variable 'FNTEA' in all the group of economies. Hence, it can be inferred from the results that there is a prevalence of opportunity-driven entrepreneurship among females in all the selected Asian economies.

Next, to explore other factors that influence the behavior of female entrepreneurs, an exploratory model of the behavior of female entrepreneurship was proposed.

Table 4 posit the results of the exploratory model. First, Taxation and Bureaucracy (TAXB) show a negative effect on 'FOTE A' for all the groups of economies under study. Second, the results suggest that Financial Factors (FIN) had a significant influence, influencing opportunity behavior to a greater extent. Third, Perceived Capabilities (CAP) had a negligible positive influence on the behavior of FOTE A in all the economies under study. It is observed that FOTE A behavior is affected by similar socio-economic variables in all 15 Asian economies under study; however, they differ in influencing the behavior of female entrepreneurs depending on the economy's level of development (GDP).

**Table 5** summarizes the results of the empirical analyses. The socioeconomic variables that influence female entrepreneurship are presented in the table. The variables marked with an asterisk (\*) have a higher standardized beta coefficient ( $\beta$ ), explaining the dependent variable to a greater extent, and therefore, considered instrumental to efficient policy measures. The study draws the following findings from the panel data analysis for the empirical models (M1 to M6): Models M1, M2, and M3 confirm that females enter entrepreneurship in pursuit of opportunity instead of necessity in all economies under study, therefore do not support the hypothesis  $H_1$ . Additionally, empirical models M3, M4, and M5 confirms that FOTEA behavior is affected by similar socio-economic variables in all 15 Asian economies under study; however, they differ in influencing the behavior of female entrepreneurs depending on the economy's level of development (GDP), therefore supports the hypothesis  $H_2$ .

## Discussion, conclusions and implications

In recent years, female entrepreneurs have become essential contributors to economic growth, attracting the attention of researchers and policymakers (Bin Shmailan, 2016; Brush et al., 2020). This study explores and examines the behavior of female entrepreneurial activity considering its two drivers (necessity and opportunity) in the context of 15 Asian economies. The preliminary analysis regressed the two aspects of female entrepreneurship (FNTEA and FOTEA) on total entrepreneurial activity (FTEA). The value of standardized beta coefficients ( $\beta$ ) obtained implies that the opportunity-based behavior of female entrepreneurship (FOTEA) explains total entrepreneurial activity (TEA) to a greater extent in all three groups of economies under study. These findings reject hypothesis  $H_1$  that women enter entrepreneurship because of necessity rather than opportunity. The findings differ from many studies that focused on developed economies. Martínez-Rodríguez et al., 2022 in their study concluded that in the economies of European region, women enter into necessity-driven entrepreneurship rather in pursuit of opportunity. However, the findings of our study are in line with the study of Crecente et al. (2022). According to a study by Crecente et al. (2022), in countries with Latin influence, although females exhibit a lower opportunity component, their participation in entrepreneurship is higher whereas in Asian and African countries, women have a lower presence, but their impact on entrepreneurship, particularly driven by opportunities, is more significant. The reason of the women being mostly driven by opportunity in these regions might be attributed to the fact that the significant factors that explain their opportunity behavior to a greater extent is 'Financing for entrepreneurs'. It is logical that when there exist adequate means of financing that ensure adequate management of any uncertain business risk, a person sees opportunity to enter entrepreneurship. The secondary analysis reveals the influence of other socioeconomic factors that determine opportunity-based entrepreneurship in selected Asian economies for all levels of economic development. It is found that the influence of all socioeconomic factors differs with the level of development of the economies; hence, the other hypothesis  $H_2$  that significant differences exist in the influence of socioeconomic factors is accepted. The findings of our study are consistent with the notion that entrepreneurial environment differs with the change in the GDP levels of economies and impacts entrepreneurship differently (Amorós et al., 2019; Chowdhury et al., 2019).

The findings suggest the following implications for promoting female entrepreneurship in selected Asian economies: Tax and bureaucratic rules impede opportunity-based female entrepreneurship at all levels of development. Therefore, in line with the findings, tax and bureaucratic regulations should be streamlined. A simple and straightforward tax system, coupled with lower tax rates, would improve the corporate environment for opportunity-driven female entrepreneurs.

**Table 5.** Result summary of empirical analysis.

Dependent variables TEA, FOTEA	All countries	Explanatory Factors Higher GDP level economies	Lower GDP level economies
FNTEA	0.201	0.244	0.290
FOTEA	8.236*	5.120*	8.532*
FIN	0.115*	0.090*	0.057*
CAP	0.002	0.000	0.003
POL	0.039*	0.040*	0.017
TAXB	-0.056*	-0.050*	-0.439*

\*Variables with the substantial effect on dependent variable.

Perceived capabilities had a negligible influence on opportunity-based behavior among female entrepreneurs at all levels of development; thus, public policies should focus on improving female entrepreneurial education and awareness by offering training and development courses. It would be beneficial to enhance the perception of opportunities among female entrepreneurs in the region.

Financing for entrepreneurs significantly affects opportunity-based female entrepreneurship at all levels of development; therefore, it is instrumental in policy implications. Cheaper lending rates, with fewer formalities, receive dual benefits. Firstly, the existing female entrepreneurial activity will grow up as 'Financing for entrepreneurs' is reported as a significant driver of female entrepreneurship in the study. Second, prospective female entrepreneurs would see an opportunity and would be motivated to enter entrepreneurship, promoting female entrepreneurship in the region.

In this exploratory research, our aim has been to enhance understanding regarding the factors that drive women's entrepreneurship within the context of Asian economies. Our initial findings carry significance for the fields of gender studies and entrepreneurial research. Additionally, this study holds potential relevance for governmental, educational, and social institutions involved in formulating policies, programs, or initiatives aimed at fostering and backing women's entrepreneurship. Recognizing the pivotal role of women's entrepreneurship, in the societal and economic advancement of developing nations, we recommend policymakers in Asian economies to actively promote and incentivize female entrepreneurship, particularly those oriented towards opportunities recognition. Through these recommendations, we aspire to contribute valuable insights into the dynamics of female entrepreneurs in Asian economies, thereby enriching our understanding of the nuances associated with the establishment of new ventures in this region.

### Limitations and direction for future research

There are certain limitations to this empirical investigation. In particular, the data are not homogenous because of the lack of statistical information. When an analysis is conducted for multiple economies for many years, the results to depict true picture, requires accurate and homogenized data free of statistical gaps, as the case in this study. Moreover, the number of variables measuring female entrepreneurship and its different explanatory variables is limited in representing the whole picture of female entrepreneurship, particularly in Asian economies. Some relevant variables could not be included in the study because of the lack of data on these economies. Hence, given the limitations of this study, future studies may strive to overcome them through more robust methods by employing homogenized data from multiple extensive datasets. Additionally, the study relies on secondary data which causes potential biases as the data collected for the purposes may be different from the objectives of this study. To address this limitation, future research could benefit from adopting a mixed-methods approach that combines secondary data analysis with primary data collection methods such as surveys and interviews. This comprehensive strategy would enhance the study's robustness by triangulating findings from diverse sources and methods. By integrating both data types, future studies can mitigate the inherent limitations of relying solely on secondary data, fostering a more nuanced and comprehensive understanding of the research topic.

### Author contributions

**Firoz Alam:** Conceptualization, Validation, and Writing-review and editing. **Amaan Ullah:** Conceptualization, Writing-original draft, Data curation, Software, and Writing-review and editing. **Nawab Ali Khan:** Conceptualization, Validation, and Writing-review and editing. **Mohd Saeem Khan:** Conceptualization, and Writing-review and editing. **Mohd Yasir Arafat:** Conceptualization, Validation, and Writing-review and editing. **Imran Saleem:** Writing-review and editing.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Data availability statement

The data that support the findings of this study are derived from the Global Entrepreneurship Monitor (GEM) database and the World Bank's World Development Indicators (WDI) available at the GEM Global Entrepreneurship Monitor ([gemconsortium.org](http://gemconsortium.org)) and World Development Indicators | DataBank ([worldbank.org](http://worldbank.org)).

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