

# The Impact of Globalization, Demographic, and Economic Development Variables on Entrepreneurship Using the Pooled Mean Group (PMG) Approach (Case Study: Selected Developing Asian Countries)



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**Abstract:** Entrepreneurship is regarded as a symbol of effort and success in business affairs, and entrepreneurs are the pioneers of commercial achievement in society. Today, entrepreneurship has emerged as a profession and, like other professions, must be developed and nurtured through specific educational and academic programs based on behavioral and empirical studies. Given the importance of entrepreneurship in the development process of today's world—an era marked by the expansion of international trade and economic globalization—the necessity of addressing entrepreneurship-related issues, especially from an economic perspective, is increasingly recognized. Therefore, the objective of this study is to examine the impact of globalization variables—including export diversification and foreign direct investment (FDI); demographic variables—including labor force and urbanization; and economic development variables—including industrialization and human development—on entrepreneurship in selected developing Asian countries (i.e., those with relatively high Human Development Index) over the period 2006–2023, using the Pooled Mean Group (PMG) approach. The estimation results revealed that the effects of export diversification, foreign direct investment, active population, urbanization, industrialization, and human capital on entrepreneurship in the selected developing Asian countries are positive and statistically significant in both the short and long term. Moreover, the error correction term coefficient in this model was estimated at  $-0.62$  and is statistically significant, indicating the speed of adjustment toward long-run equilibrium. This coefficient suggests that export diversification, foreign direct investment, the active population, urbanization, industrialization, and human capital eliminate 62% of the disequilibria in the model in each period to restore long-run equilibrium. Given that the error correction term is negative and significant, it can be concluded that there exists at least one long-run causal relationship among the variables in the model.

**Keywords:** Globalization variables, Demographic variables, Economic development variables, Pooled Mean Group (PMG) approach, Developing Asian countries.

## 1. Introduction

Entrepreneurship is a concept that has been studied from various perspectives, and it is widely accepted that entrepreneurship serves as a driving force behind economic development in both developed and developing countries. The three primary reasons nations emphasize entrepreneurship are wealth creation, technological advancement, and productive employment [1, 2]. In large and advanced countries, the significance of entrepreneurship goes beyond job creation; the core importance lies in the emergence and growth of small-scale economic activities that have played a substantial role in generating cutting-edge technologies and, consequently, accumulating a significant share of global wealth and income [3, 4].

Despite the increasing importance of entrepreneurship and its growing role in the global economy, comprehensive studies on the subject remain limited. In today's environment, economic conditions and demographic structures more than ever compel countries to identify progressive avenues in the economic domain. Accordingly, the need for appropriate models and strategies for training, educating, and efficiently utilizing an active and entrepreneurial workforce has become more urgent. The points outlined in the problem statement underscore the critical importance of entrepreneurship in contemporary societies [5-7]. Given that academic research has not sufficiently focused on entrepreneurship and its economic determinants, it appears necessary to investigate this domain further.

Numerous factors influence the level of entrepreneurship, among which globalization, demographic, and economic development variables can play a significant role. These variables help establish a connection with entrepreneurship by generating spillovers and facilitating the transfer of technology to countries [8].

A comprehensive review of the literature reveals an intricate web of relationships between entrepreneurship and factors such as human capital, financial development, globalization, industrial infrastructure, demographic shifts, and institutional quality across diverse national contexts. For instance, Arbabiyaan and Zamani (2023) found that the interaction between financial development and human capital influences entrepreneurship differently across innovation-driven and resource-based economies, with the former exhibiting a stronger role for human capital under low financial development, and the latter showing complementarity between financial development and human capital [9]. Shahabadi et al. (2023) demonstrated that urbanization and demographic structure significantly and positively affect entrepreneurship in both developing and developed countries, with stronger coefficients in the latter group, alongside other factors like governance, education, and financial development [8]. Ghorbani (2023) emphasized the strategic role of human capital in fostering entrepreneurial spirit in Iran's competitive environment, underscoring the need to harness human knowledge, skills, and creativity to drive sustainable economic growth [10]. Bagherzadeh and Sabet (2022) confirmed the positive and significant influence of human capital on both social and commercial entrepreneurship in Tehran's Welfare Organization, further disaggregating public and private dimensions of human capital [3]. Mousavi Naqabi and Anousheh (2021) highlighted the catalytic role of industrial infrastructure, reporting that over 43,000 small and medium-sized enterprises (SMEs) benefited from the establishment of over 800 industrial zones in Iran, thereby facilitating employment and entrepreneurship [11]. Similarly, Kakayi et al. (2021) found that components of human capital such as employee capabilities, satisfaction, and retention significantly enhance corporate entrepreneurship [12]. Seyed Noorani and Mohammadpour (2018) revealed that foreign direct investment (FDI) positively impacts employment in OECD countries but negatively affects it in developing nations [13]. Dorali and Davari (2018) posited that the transition to a knowledge-based economy underscores the supremacy of human capital over physical assets in fostering entrepreneurship and innovation [14]. Naderi Nasab and Soheili (2016) found that FDI, institutional quality, and economic freedom (e.g., tax freedom and government non-intervention) significantly impact entrepreneurship, with legal quality and rule

of law being positive, and government effectiveness showing a negative effect [15]. Rastgar and Shabani (2016) further reinforced the mediating role of export entrepreneurship in linking internal and external factors with export performance [16]. Sattari-Far et al. (2014) linked rural-urban migration and urbanization to increased informal employment in Iran, reflecting the spatial-economic consequences of demographic transitions [17]. Tayebi and Fakhri (2010) emphasized the positive impact of globalization and international trade on entrepreneurship in OECD countries, largely due to technology spillovers and trade-induced knowledge diffusion [18]. Nguyen et al. (2022), in contrast, reported a negative impact of export diversification on national entrepreneurship in high and middle-income countries [19]. Dutta and Meierrieks (2021) found that financial development significantly promotes entrepreneurship when supported by robust political and economic institutions [20]. Sutter et al. (2019) showed that entrepreneurship reduces poverty intensity through increased trade and exports [21]. Adebayo and Alhaiti (2019) found that entrepreneurial competencies and supportive government policies positively influence the export performance of Nigerian SMEs [22]. Ajayi (2016) confirmed the positive effect of entrepreneurial orientation on the export performance of Nigeria's agricultural sector [23]. Finally, Monteiro et al. (2017) showed that entrepreneurial orientation enhances export performance in Portugal through increased access to financial, informational, and relational resources and dynamic capabilities [24]. Collectively, this literature establishes a multidimensional framework where entrepreneurship is not only driven by individual-level traits but is also conditioned by macroeconomic, infrastructural, institutional, and globalization-related variables, each playing distinct roles depending on national context and developmental stage.

Therefore, this study seeks to examine the significance of globalization, demographic, and economic development variables on entrepreneurship in selected developing Asian countries. In line with this objective, the central research question is: How do globalization, demographic, and economic development variables influence the entrepreneurship process at the firm level and subsequently at the macro level? Consequently, this study aims to answer this question using econometric models across selected developing countries.

## 2. Methodology

The statistical population of this study consists of selected developing Asian countries, specifically those with a relatively high Human Development Index (HDI), defined as HDI scores above 0.60. The list of these countries is presented in Table 1. The reason for selecting this group of countries lies in the significance of the Human Development Index as one of the critical indicators of a nation's economic development. An improvement in this index can lead to increased labor productivity, entrepreneurship, and employment. Therefore, developing Asian countries with relatively high HDI can serve as a suitable model for other nations.

**Table 1. List of Developing Asian Countries with Relatively High Human Development Index**

| Country      | HDI  |
|--------------|------|
| Saudi Arabia | 0.85 |
| Bahrain      | 0.85 |
| Qatar        | 0.84 |
| Brunei       | 0.83 |
| Kazakhstan   | 0.82 |
| Turkey       | 0.82 |
| Malaysia     | 0.81 |
| Georgia      | 0.81 |
| Oman         | 0.81 |
| Kuwait       | 0.80 |

|              |      |
|--------------|------|
| Iran         | 0.78 |
| Sri Lanka    | 0.78 |
| Thailand     | 0.77 |
| Armenia      | 0.77 |
| China        | 0.76 |
| Azerbaijan   | 0.75 |
| Maldives     | 0.74 |
| Lebanon      | 0.74 |
| Mongolia     | 0.73 |
| Jordan       | 0.72 |
| Indonesia    | 0.71 |
| Turkmenistan | 0.71 |
| Philippines  | 0.71 |
| Vietnam      | 0.70 |
| Kyrgyzstan   | 0.69 |
| Iraq         | 0.67 |
| Tajikistan   | 0.66 |
| Bhutan       | 0.65 |
| India        | 0.64 |
| Bangladesh   | 0.63 |

In this study, entrepreneurship is defined, based on the study by Fueletnsaz et al. (2019), as a function of economic development variables, demographic variables, and globalization variables. This functional relationship is expressed as follows:

(1)

$Ent = f(\text{Economic Development Variables, Population Variables, Globalization Variables})$

The economic development variables used in this study include: industrialization and human capital. The demographic variables include: active labor force and urbanization. The globalization variables include: export diversification and foreign direct investment (FDI). Thus, the entrepreneurship function can be explicitly written as:

(2)

$Ent = f(\text{Ind, HC, Work\_pop, Urban, FDI, Exd})$

In this function:

**Ent** refers to entrepreneurship, for which the data is derived from new business registrations reported by the World Bank and the Global Competitiveness Reports of the World Economic Forum.

**Ind** denotes industrialization, represented by the industry's value-added as a percentage of GDP, based on data from the World Bank and the International Monetary Fund.

**HC** refers to human capital, proxied by secondary and middle school enrollment rates, obtained from the World Bank.

**Wop** is the active labor force, for which data is sourced from the World Bank.

**Urb** represents urban population, with data taken from the World Bank.

**FDI** stands for foreign direct investment, with data sourced from the World Bank.

**Exd** refers to export diversification. The export diversification index is a measure of specialization or diversification, ranging between 0 and 1. Values close to 1 indicate high reliance on a few export products (i.e., high specialization), while values close to 0 indicate greater diversification. In this study, due to data limitations for some

countries, the export concentration index is used instead. This index is calculated as the sum of the squared shares of different commodity groups in a country's total exports. It is a normalized index ranging from 0 to 1, where values closer to 0 indicate a more diversified export structure and values closer to 1 indicate high concentration. The necessary data for calculating the export concentration index was obtained from the World Bank.

The model used to analyze the effects of globalization, demographic, and economic development variables on entrepreneurship in selected developing Asian countries—within the three categories of economic development variables, demographic variables, and globalization variables—uses the Pooled Mean Group (PMG) estimator. Based on Fueletnsaz et al. (2019), the model is specified as follows:

(3)

$$\Delta LENT_{it} = \alpha_{1it} + \beta_{1it} \Delta LIN_{it-k} + \beta_{2it} \Delta HC_{it-k} + \beta_{3it} \Delta WOP_{it-k} + \beta_{4it} \Delta LURB_{it-k} + \beta_{5it} \Delta LFDI_{it-k} + \beta_{6it} \Delta LEXD_{it-k} + \lambda_{1it} ECT_{it-k} + u_{LBLE_{it}}$$

In this model,  $\Delta$  represents the first-difference of the variables.  $k$  denotes the optimal lag length of the system. The parameters  $\pi_i$  represent short-run coefficients. The error correction term is denoted as ECT. In essence, the error correction coefficient indicates the speed of adjustment toward the long-run equilibrium. That is, it shows the percentage of disequilibrium corrected in each period by the variables to restore long-run equilibrium.  $u$  is the vector of disturbance error terms. All variables, except human capital, are log-transformed.

### 3. Findings and Results

One of the fundamental assumptions in econometric methods used for panel data is the cross-sectional independence of error terms. If cross-sectional dependence exists, it can cause bias in test results. To examine cross-sectional independence, the Pesaran cross-sectional dependence (CD) test is used. The null hypothesis of this test states that the error terms are not correlated and that no cross-sectional dependence exists.

**Table 2. Pesaran Cross-sectional Dependence Test**

| Dependent Variable | Test Statistic | Probability |
|--------------------|----------------|-------------|
| LENT               | 7.20           | 0.00        |

As indicated in the above table, the null hypothesis of no cross-sectional dependence is rejected because the probability value is less than 0.05. Hence, the model exhibits cross-sectional dependence, and conducting unit root tests without accounting for this dependence would lead to incorrect results.

Before estimating the model, the stationarity of variables must be verified, as non-stationary variables may lead to spurious regression results. A panel time series is considered stationary when its mean and variance are constant over time. In this study, the Augmented Dickey-Fuller (ADF) test is used. The test results are presented in Table 3.

**Table 3. Unit Root Test Results**

| Stationarity Level        | ADF Statistic (p-value) | Variables |
|---------------------------|-------------------------|-----------|
| Stationary at level       | -6.45 (0.00)            | L(ENT)    |
| Stationary at level       | -4.39 (0.00)            | L(EXD)    |
| Non-stationary at level   | -0.54 (0.12)            | L(FDI)    |
| Stationary at first diff. | -10.76 (0.00)           | DL(FDI)   |
| Non-stationary at level   | -0.78 (0.56)            | L(WOP)    |
| Stationary at first diff. | -9.65 (0.00)            | DL(WOP)   |

|                     |              |        |
|---------------------|--------------|--------|
| Stationary at level | -8.45 (0.00) | L(URB) |
| Stationary at level | -7.34 (0.00) | L(IND) |
| Stationary at level | -5.76 (0.00) | HC     |

According to the results of the Augmented Dickey-Fuller test, foreign direct investment (FDI) and active population (WOP) are non-stationary at level but become stationary after first differencing. The other variables (entrepreneurship, export diversification, urbanization, industrialization, and human capital) are stationary at level. Therefore, since some variables are non-stationary at level and become stationary after first differencing, a cointegration test is required to avoid spurious regression.

As previously mentioned, due to the non-stationarity of some variables at level and their stationarity at first difference, the use of cointegration tests is essential to avoid spurious regression. In this study, the Pedroni cointegration test is employed. The null hypothesis of this test indicates no cointegration, whereas the alternative hypothesis suggests the presence of cointegration among model variables. The results are presented in the following table.

**Table 4. Pedroni Cointegration Test**

| Statistic Type      | Test Statistic | Probability |
|---------------------|----------------|-------------|
| Group ADF-Statistic | -7.56          | 0.00        |

According to the Pedroni method, since the group ADF test statistic has a probability value less than 0.05, the null hypothesis is rejected. Consequently, cointegration among the variables is confirmed, indicating the existence of a long-term relationship among the model variables, and there is no issue of spurious regression in the estimated models. Thus, it can be concluded that at least one long-run causal relationship exists among the variables.

Dynamic panel data models can be estimated using various methods, such as fixed effects, random effects, or generalized method of moments (GMM). In these methods, only the intercept varies across cross-sections, and the estimated coefficients may result in misleading outcomes.

To address these limitations, Pesaran et al. (1999) proposed the Pooled Mean Group (PMG) estimator, or Autoregressive Distributed Lag (ARDL) model for panel data, which allows for analyzing convergence and correcting disequilibrium. The term "pooled mean group" refers to the combination of pooling and averaging processes. This estimator is based on the maximum likelihood method and the ARDL approach.

PMG imposes a restriction that long-run parameters are the same across all panel members, while short-run parameters (adjustment speeds), intercepts, and error variances are allowed to differ. In contrast, the Mean Group (MG) estimator estimates separate regressions for each group and then calculates the average of the coefficients across groups to be used as the panel-wide estimate. Thus, a clear distinction must be made between the MG and PMG estimators.

To determine which estimator is more appropriate, the Hausman test or likelihood ratio test can be used. In this study, the Hausman test is applied. The PMG estimator assumes homogeneous long-run coefficients across panels. This assumption may not be valid; if the long-run coefficients are heterogeneous, PMG becomes inconsistent. However, if the true parameters are indeed homogeneous, PMG is more efficient. Failure to reject the null hypothesis in the Hausman test implies that the PMG estimator is more efficient than the MG estimator.

To ensure whether the PMG estimator is appropriate given the number of cross-sections and the time period under study, the Hausman test must first be conducted. If the chi-square probability in the Hausman test is greater



than 0.05, it indicates the consistency and efficiency of the PMG model. Therefore, the results of the Hausman test are presented in Table 5.

**Table 5. Hausman Test**

| Test         | Chi-square | Probability |
|--------------|------------|-------------|
| Hausman Test | 1.98       | 0.85        |

According to the Hausman test results, since the chi-square probability is greater than 0.05, the PMG estimation method in this study is consistent and efficient.

**Table 6. PMG Estimation Results**

| Variable  | Coefficient | t-statistic | Probability |
|-----------|-------------|-------------|-------------|
| COINTEQ01 | -0.62       | -4.67       | 0.00        |
| D(LEXD)   | 3.49        | 8.73        | 0.00        |
| D(LFDI)   | 2.42        | 6.56        | 0.00        |
| D(LWOP)   | 4.10        | 8.98        | 0.00        |
| D(LURB)   | 4.57        | 9.11        | 0.00        |
| D(LIND)   | 3.27        | 8.04        | 0.00        |
| D(HC)     | 4.51        | 9.12        | 0.00        |

According to Table 6, the error correction term coefficient in this model is -0.62 and statistically significant, indicating the speed of adjustment toward long-run equilibrium. This coefficient shows that export diversification, foreign direct investment, active population, urbanization, industrialization, and human capital resolve 62% of the disequilibrium in the model during each period to reach long-term equilibrium. Since the error correction term is negative and significant, it can be concluded that there is at least one long-run causal relationship among the model variables. Specifically, there is long-term causality from export diversification, foreign direct investment, active population, urbanization, industrialization, and human capital to entrepreneurship in the selected developing countries.

The effect of export diversification on entrepreneurship in the selected developing countries is positive and significant. When foreign demand for export products exists, it leads to an expansion in export production capacity. This expansion necessitates the use of more productive labor and efficient resources. Furthermore, export diversification fosters competitiveness in manufacturing firms, which, in turn, leads to innovation, the acquisition of advanced skills, and the emergence of new firms and business activities. As the influence of export diversification grows, consumer demand for a variety of products increases, thereby stimulating entrepreneurship in the country.

The effect of foreign direct investment on entrepreneurship in the selected developing countries is also positive and significant. FDI brings benefits through the transfer of necessary knowledge and skills to host countries. The result of this process is improved productivity and the efficient reallocation of resources from unproductive to productive sectors, ultimately enhancing entrepreneurship and employment in the host country.

The effect of the active population on entrepreneurship is likewise positive and significant. The capital of a country is not limited to financial resources; arguably, the most crucial form of capital is the knowledge, skills, and creativity embodied in the workforce. Experience has shown that human capabilities are the most critical factor in societal and organizational development. The importance of the workforce in organizational advancement has led researchers to devote significant time to studies on human resource management and training. These studies have concluded that implementing policies to train the labor force can enhance employee performance and, by extension,

organizational and national performance. Moreover, workforce training is one of the most vital tools for national development and can accelerate socio-economic progress and the provision of effective services.

The effect of urbanization on entrepreneurship in the selected developing countries is positive and significant. The doctrine of unbalanced growth has played a critical role in recent decades in creating and expanding regional disparities in developing countries, contributing to increased migration and urbanization. On one hand, the qualifications of many migrants—such as education, skills, and capital—are insufficient for formal employment. On the other hand, urban industrial centers in developing countries lack the capacity to absorb this influx and provide adequate employment. As a result, many migrants join the informal workforce or engage in service sectors as small-scale or home-based entrepreneurs. Consequently, due to the insufficient industrial employment capacity in cities, this large population either joins the service sector, engages in informal economic activities for subsistence, or becomes self-employed entrepreneurs.

The effect of industrialization on entrepreneurship in the selected developing countries is also positive and significant. The rapid quantitative and qualitative growth of industries in today's world necessitates the planning and organization of industrial sectors. Industrial zones lead to increased awareness, production, development coordination, labor utilization, and entrepreneurship. In developing countries, industrialization depends on economic inputs and must follow a natural path of development. The rapid growth of industry reduces poverty and unemployment while promoting entrepreneurship.

The effect of human capital on entrepreneurship in the selected developing countries is positive and significant. Human capital is the primary source of entrepreneurial absorptive capacity and influences the success of newly established organizations. Therefore, human capital affects not only the extent but also the quality of entrepreneurship. It acts as an effective catalyst for entrepreneurs to overcome institutional constraints. Entrepreneurs with higher human capital are more likely to identify connections between seemingly unrelated events and turn them into business opportunities—even in underdeveloped institutional environments. Human capital requires investing in people to increase their productivity. Because this investment aims for future returns, it is referred to as human capital investment.

In panel data studies, violations of classical assumptions can lead to biased and inefficient estimations. In the PMG method, the EVIEWS software provides the Jarque-Bera normality test for residuals. The results are presented in Table 7.

**Table 7. Diagnostic Tests of PMG Estimation**

| Dependent Variable | Jarque-Bera Statistic | Probability |
|--------------------|-----------------------|-------------|
| LENT               | 0.53                  | 0.78        |

As shown in Table 7, since the probability values in all tests exceed 0.05, the null hypothesis of normality is not rejected. Thus, the error terms in the model are normally distributed.

#### 4. Discussion and Conclusion

The primary objective of this study was to investigate the impact of globalization, demographic, and economic development variables on entrepreneurship in selected developing Asian countries using the Pooled Mean Group (PMG) approach. The findings revealed the following:

The error correction term coefficient in the model is  $-0.62$  and statistically significant, indicating a high speed of adjustment toward long-run equilibrium. This coefficient implies that export diversification, foreign direct



investment (FDI), active population, urbanization, industrialization, and human capital eliminate 62% of the disequilibria in the model during each period to achieve long-run equilibrium. Since the error correction term is both negative and statistically significant, it can be concluded that there is at least one long-term causal relationship among the variables in the model. Specifically, there exists long-term causality from export diversification, FDI, active labor force, urbanization, industrialization, and human capital toward entrepreneurship in the selected developing countries.

The effect of export diversification on entrepreneurship in the selected developing countries is positive and significant.

The effect of foreign direct investment on entrepreneurship in the selected developing countries is positive and significant.

The effect of the active population on entrepreneurship in the selected developing countries is positive and significant.

The effect of urbanization on entrepreneurship in the selected developing countries is positive and significant.

The effect of industrialization on entrepreneurship in the selected developing countries is positive and significant.

The effect of human capital on entrepreneurship in the selected developing countries is positive and significant.

When comparing the results of this study with prior literature, it is evident that:

In accordance with the studies by Bagherzadeh and Sabet (2022), Dorali and Davari (2018), and Kakayi et al. (2021), the effect of human capital on entrepreneurship is confirmed to be positive [3, 12, 14]. Regarding the influence of foreign direct investment, the current results align with those of Naderi Nasab and Soheili (2016) [15]. The findings on urbanization are also in agreement with Shahabadi et al. (2023), who demonstrated a positive impact of urbanization on entrepreneurship [8]. In terms of the effect of the active population, the results align with the study by Ghorbani (2023) [10].

- Given the positive impact of export diversification on entrepreneurship in selected developing countries, it is recommended that these countries prioritize effective non-oil export development policies at the forefront of their economic programs and seriously consider a comprehensive shift toward non-oil exports.

- Since FDI has a positive effect on entrepreneurship in the selected countries, it is advised that governments in these nations facilitate the entry of risk-taking foreign investors. Doing so not only increases the volume of foreign investments but also helps these countries gain experience in correctly managing such investments, ultimately reducing the challenges associated with this sector.

- Because both the active population and human capital positively influence entrepreneurship, it is recommended that countries manage their human resources efficiently. By attracting specialists, training employees, and effectively deploying and retaining the workforce, they should strive to make entrepreneurship a process aligned with achieving national economic goals.

- Given the positive effect of industrialization on entrepreneurship in these countries, it is advised that efforts be made to activate and expand the industrial sector. Industrial sector development may also stimulate growth in the service sector.

## Authors' Contributions

Authors equally contributed to this article.

## Ethical Considerations

All procedures performed in this study were under the ethical standards.

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## Conflict of Interest

The authors report no conflict of interest.

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