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Exploring the macro conditions for national entrepreneurship: A panel data-based analysis in developing countries

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ABSTRACT

Objective: The article aims to analyse the impacts of macro factors on national entrepreneurship, providing insights for policymakers to promote entrepreneurial activities in developing countries.

Research Design & Methods: We employed the panel data analysis method and identified the robust fixed-effects model as the most appropriate for our research sample, which we obtained from the open databases of Global Entrepreneurship Monitor (GEM) and the World Bank. Given the unbalanced panel structure, the dataset comprised 37 developing countries, with 173 year-observations over the period 2003 to 2019.

Findings: Our findings indicate that economic growth, consumer price index (CPI), government expenditure on education, and Research and Development (R&D) investment positively impact national entrepreneurship of developing countries, whereas unemployment exhibits a negative impact. However, other macro factors such as Gross Domestic Product (GDP) per capita, Foreign Direct Investment (FDI) inflows, import, export, gross national expenditure, labour force quality and entrepreneurial institutions do not show a significant impact on national entrepreneurship of developing countries.

Implications & Recommendations: Governments of developing countries should prioritise national entrepreneurship by investing in education, R&D, and controlling inflation at an appropriate level. It is also crucial for these countries to enhance economic growth and address unemployment through entrepreneurship programs and labour market reforms.

Contribution & Value Added: This study contributes to the literature by enriching the resource-based view (RBV) and institutional theory on national entrepreneurship and its macro conditions, which governments in developing countries can influence to promote entrepreneurial activities at the macro level. Methodologically, our empirical study strengthens the field by employing panel data analysis on a sample of developing countries. The findings provide policymakers with a clearer perspective for planning strategies and policies to enhance positive factors and mitigate negative ones, fostering an environment conducive to entrepreneurship and sustainable economic development in developing countries.

Article type: research article

Keywords: macro conditions; entrepreneurship determinants; national entrepreneurship; aggregate entrepreneurship level; developing country

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INTRODUCTION

With its direct outcome of newly established businesses, entrepreneurship has been considered one of the most important drivers of a country's socio-economic development. Newly established firms are often more efficient and create competitive pressures for other firms, by contributing to national productivity enhancement and economic growth (Klapper *et al.*, 2006). Newly established businesses have higher job creation rates than mature firms, thereby reducing unemployment rates and increase-

ing individual incomes (Ayyagari *et al.*, 2014). Particularly in developing countries, scholars agree that entrepreneurship contributes positively to economic growth, job creation, poverty, and unemployment reduction, as well as to improvements in national and firm competitiveness (Acs & Amorós, 2008; Alvarez & Barney, 2014; Ayyagari *et al.*, 2014; Urbano & Aparicio, 2016). Therefore, clarifying the conditions for entrepreneurship at the country level constitutes an important research interest that continues to attract the attention of both researchers and policymakers.

In the literature, entrepreneurship has been extensively studied in recent decades, but research at the country level remains underexplored. Previous studies have predominantly focused on the individual level, specifically on favourite factors such as demographic and psychological characteristics, entrepreneurship skills, managerial competences, financial resources, and social relations (De Clercq & Dakhli, 2009; Lim *et al.*, 2016); as well as macro determinants, including economic, political, business environment, technological, and cultural factors, that encourage individuals to start a business (Lim *et al.*, 2016; Pathak & Muralidharan, 2016). Furthermore, as highlighted by Pfeifer *et al.* (2021) and Hamdan *et al.* (2022) in their literature reviews, there is a growing interest among researchers and policymakers in investigating and analysing the determinants of national entrepreneurship or entrepreneurship at the country level.

Addressing the research gaps mentioned above, our study focuses on the context of developing countries, where entrepreneurs face distinct challenges when initiating new business ventures. Starting a new business in developing countries often encounters more difficulties compared to developed countries due to underdeveloped or inadequately established infrastructure and institutions. These limitations restrict entrepreneurs in terms of necessary resources and result in high transaction costs when capitalising on new market opportunities. Moreover, existing studies have rarely conducted a comprehensive empirical analysis that simultaneously considers an extensive set of macro variables, specifically in developing countries, making this context both important and underrepresented in the literature. Hence, researching macro conditions to foster national entrepreneurship in developing countries is both pressing and tailored to the needs of these countries. It also contributes to global economic development (Hamdan *et al.*, 2022; Pfeifer *et al.*, 2021; Urbano *et al.*, 2019).

In the aforementioned perspective, this study focuses on analysing the macro conditions for national entrepreneurship in developing countries. The research question posed is: Which macro factors influence national entrepreneurship in developing countries and how do they do it? Our objective is to identify macro factors shaping the business environment for entrepreneurs, and analyse their impact on the national entrepreneurship in developing countries. The novelty of this research lies in its comprehensive and simultaneous examination of macro variables, using a large unbalanced panel dataset focused exclusively on developing countries. Unlike the existing research that predominantly examines entrepreneurship at the individual level, focusing on entrepreneurs and their characteristics, this study adopts a national level perspective, emphasising the economic, social, and institutional conditions that facilitate or hinder entrepreneurship in developing economies. Moreover, the study applies a robust fixed-effects model to address data heterogeneity across countries and years – an approach that enhances the reliability and validity of the findings. By applying both institutional theory and the resource-based view (RBV), this study provides a more comprehensive framework for analysing national entrepreneurship, offering insights into how macro conditions interact to shape entrepreneurial activity in developing countries. The findings of our research will provide valuable insights for public management, enabling governments of developing countries to formulate and implement targeted regulatory policies that address both favourable and constraining macro conditions to promote entrepreneurship at the national level.

The following parts of the article consist of four key sections. In the first one, we develop the theoretical framework for exploring how macro factors influence national entrepreneurship in developing countries and formulate hypotheses based on the literature review. Next, the research methodology section details the data collection and research sample, as well as the study variables and the panel data analysis method. Following this, the results and discussions section presents the empirical findings, analysing how these align with the formulated hypotheses and discussing the

impact of macro factors for understanding national entrepreneurship dynamics in developing countries. Particularly, we highlight how macro conditions influence national entrepreneurship, addressing the concern that entrepreneurship development varies significantly across developing countries. Lastly, the conclusions section summarises the main findings, research contributions, policy implications, and suggests future research directions in the national entrepreneurship area.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Framework

Concept of National Entrepreneurship

From an individual perspective, entrepreneurship is the career choice between self-employment and work as a salaried employee. Therefore, an individual can become an entrepreneur if the profits and non-monetary benefits gained from self-employment exceed the wages and additional benefits obtained from wage employment (Evans & Jovanovic, 1989; Murphy *et al.*, 1991). Hence, entrepreneurship, defined as an individual's discovery and exploitation of opportunities (Shane & Venkataraman, 2000), equates to self-employment or being a business owner.

From a macro perspective, the concept of 'national entrepreneurship' (or entrepreneurship at the country level) refers to the proportion of adults or the labour force within a country who have initiated a business and currently own new businesses (Wennekers, 2006). The nature of national entrepreneurship lies in the management and regulation of macro-level factors towards creating a favourable environment and conditions to promote the development of entrepreneurship within the country. National entrepreneurship is intricately connected with individual-level entrepreneurship and firm-level entrepreneurship, but, in general, individual-level and firm-level entrepreneurship serve as the foundation for national entrepreneurship (Hamdan *et al.*, 2022; Pfeifer *et al.*, 2021). Specifically, the percentage of new business ownership among the national labour force depends on individual career decisions within that country; conversely, these decisions are influenced by macro conditions.

National Entrepreneurship and Resource-based View (RBV)

At the firm level, the resource-based view (RBV) explains the differences in performance among companies operating in similar conditions and business environments. Accordingly, a firm's competitive advantage primarily lies in its effective utilisation of a set of valuable tangibles and/or intangible resources. Firms are differentiated by their possession of distinct resources (Barney, 1991; Grant, 1991). Resources are everything that a firm possesses, specifically tangible and intangible assets associated with the business (Wernerfelt, 1984, p. 172). They include all assets, capabilities, organisational processes, information attributes, or knowledge that the firm holds control over (Barney, 1991, p. 101). Resources which are valuable, rare, inimitable, and non-substitutable are considered as sources of sustainable competitive advantage of the firm (Barney, 1991).

At the macro level, the RBV is also significant in studying national entrepreneurship. Accordingly, the favourable economic, social, and institutional conditions of a country provide the necessary resources for its national entrepreneurship. The provision of these resources influences the supply-side of entrepreneurship, as the availability of resources determines the inputs of entrepreneurship, such as capital, human skills, technology, etc. (Sarasvathy, 2009). In other words, the establishment of new businesses requires appropriate resource conditions; a lack of resources can negatively impact the decision to start a business, resulting in a decline in the rate of new business formation and reducing national entrepreneurship subsequently. According to Alvarez and Busenitz (2001), if potential entrepreneurs have all the necessary resources to exploit a market opportunity, they do not need to organise but only to coordinate and execute. Conversely, if they lack one or more key resources, they need to organise more business activities to exploit price differentials.

By their nature, developing countries – often marked by a scarcity of essential resources – face significant challenges in fostering national entrepreneurship. These challenges stem from adverse economic and social conditions, underdevelopment, burdensome regulatory frameworks, administrative

complexities, and a range of other restrictive factors. Moreover, the extant resources within developing countries are inadequate to supplement, supplant, or mobilise additional resources needed for entrepreneurial endeavours. Consequently, this deficiency hampers the growth of entrepreneurial ventures and acts as a deterrent to the overall advancement of national entrepreneurship.

National Entrepreneurship and Institutional Theory

Institutional theory focuses on analysing the institutionalisation process, as well as the role of institutions issued by governments and provincial authorities in shaping the behaviours of individuals and organisations. By definition, institutions are models implementing rules and regulations, in which 'departures from the pattern are counteracted in a regulated fashion, by repetitively activated, socially constructed, controls – that is, by some set of rewards and sanctions' (Jepperson & Meyer, 2021, p. 39). This definition emphasises the role of state power in the form of control. Accordingly, the current institutions directly influence behaviours of individuals, organisations and society, including entrepreneurship. Institutions, including formal ones (such as policies, regulations, and government variables) and informal ones (such as attitudes, values, social norms, religion, and other factors), impose what individuals and organisations are allowed, not allowed to do or should do.

Consequently, institutions exert a significant influence on the supply of entrepreneurship and new businesses' activities by shaping the temporal, financial, and resource-related requirements associated with entrepreneurial endeavours. Entrepreneurial regulations impact the time and cost of initiating a business, while economic and social ones determine the economic and social conditions that in turn, influence the availability of essential resources for new business ventures, such as financial resources, skilled labour, and market opportunities (Castaño *et al.*, 2015; Harraf *et al.*, 2021). This means that having necessary resources, in the absence of efficient institutions to leverage them, does not suffice to create sustainable competitive advantages. In this regard, institutions are essential for entrepreneurs to efficiently exploit and utilise resources to support business entrepreneurship and contribute to the success of newly established businesses.

In developing countries, characterised by uncertainty and high risk, small and medium-sized enterprises often gain an advantage over larger corporations. Moreover, most developing countries may have underdeveloped economic and political institutions, lacking transparency (Nafziger, 2012). Consequently, the establishment of a suitable, effective, and transparent institutional environment becomes imperative to optimise resource mobilisation and utilisation, thereby fostering the development of national entrepreneurship (Lim *et al.*, 2016; Urbano *et al.*, 2019). Moreover, establishing regulations and policies (formal institutions) also serves to mitigate transactional risks and reduce associated costs, thereby incentivising and nurturing national entrepreneurship. Therefore, institutions play a central role in explaining the positive and negative conditions of national entrepreneurship, particularly individuals' decisions to start a business or not, as well as the industries favoured for entrepreneurial activity through related rules and legal procedures (Hamdan *et al.*, 2022).

Hypotheses Development

Economic Conditions for National Entrepreneurship

Economic development is also crucial for entrepreneurship in developing countries, as larger economic activities create positive economic expectations, provide financial and physical resources, and improve perceptions of opportunities, thereby encouraging individuals to engage in business activities (Acs *et al.*, 2018; Awoa Awoa *et al.*, 2022; Castaño *et al.*, 2015; Prieger *et al.*, 2016). Therefore, initiatives that promote economic activities and establish a stable macroeconomic environment stimulate national entrepreneurship in developing countries. Some scholars suggest that economic conditions, such as economic growth, GDP per capita (McMullen *et al.*, 2008), trade (Solomon *et al.*, 2021), and FDI (Hong *et al.*, 2021; Slesman *et al.*, 2021) may lead to market saturation and increased competition, potentially hindering or having negligible or negative effects on new business creation. Thus, examining the nuanced impacts of economic conditions in developing economies provides a more balanced understanding of their role in shaping national entrepreneurship.

The economic conditions within a country may exert a strong impact on the demand-centric dimension of entrepreneurship. Empirical evidence highlights that higher income is a driving force behind the increasing demand for entrepreneurship (Awoa Awoa *et al.*, 2022). It means that higher income levels can engender and distinct consumer demands, creating opportunities for business ventures with new or specialised products and consequently fostering the emergence of potential niche markets. Moreover, higher available income also contributes to capital accumulation and national reserves, providing favourable financial resources for entrepreneurship (Albert *et al.*, 2023; Tleuberdinova *et al.*, 2021). Li (2025) and Cervelló-Royo *et al.* (2024) support and affirm that there is a positive relationship between financial capital and entrepreneurship.

Moreover, moderate inflation can have a stimulative effect on entrepreneurship by increasing nominal revenues for businesses, thereby enhancing profitability and incentivising new business creation. In developing countries where access to financial markets is limited, inflation can push individuals to shift capital from stagnant savings to investment in business ventures as a means of preserving wealth (Baltar, 2015; Gillman & Kejak, 2011). As Izuchukwu (2023), Khan *et al.* (2023), and Cervelló-Royo *et al.* (2024) highlight the positive impact of inflation, we believe that a controlled level of inflation may encourage borrowing for entrepreneurial activities, as the real cost of debt decreases over time, making credit more accessible for aspiring entrepreneurs in developing countries.

Furthermore, international trade activities also positively influence national entrepreneurship. International trade, specifically exports and imports, facilitates the expansion of economic relations between countries and the rest of the world, thereby creating new business opportunities (Purkayastha *et al.*, 2021; Shane & Venkataraman, 2000). Rahman *et al.* (2023) observed that trade openness contributes significantly to the development of global entrepreneurship in Brazil, India, China, and South Africa. Both imports and exports have significant positive effects on the economic growth of countries, especially those in the developing phase. Imports of production materials, machinery, and technology enhance domestic production capacity and product quality. On the other hand, exports help in expanding consumer markets and boosting domestic production activities. Exports also increase the value of goods and services, resulting in higher revenues for businesses and export-oriented countries, providing attractive financial rewards that encourage individuals to engage in entrepreneurship. Nguyen *et al.* (2022) highlight that, in low and middle-income economies, export diversification may play a more significant role in fostering entrepreneurship compared to high-income economies.

By promoting economic growth, international trade also contributes to the creation of financial resources for entrepreneurial endeavours at the country level. Furthermore, entrepreneurs involved in export businesses have privileged access to market knowledge and foreign technology (Purkayastha *et al.*, 2021). This knowledge can help them discover untapped opportunities in the domestic market, thus driving them to undertake further entrepreneurial activities (Shane & Venkataraman, 2000).

Moreover, foreign direct investment (FDI) also contributes to increasing a developing country's income, creating conditions for improving the state budget, and thus enabling financial accumulation and net savings, which in turn provide more resources for entrepreneurship (Zhao, 2023). Moreover, FDI brings in modern scientific and high-specialisation technology, advanced management practices, and expertise, which help enhance domestic technological and managerial capabilities through learning and imitation processes (Afi *et al.*, 2022). These are crucial factors that support entrepreneurship in developing countries.

In summary, economic conditions have a strong influence on both the supply and demand sides of entrepreneurship, providing favourable conditions for mobilising and accumulating the necessary resources while opening up new business opportunities that make entrepreneurial endeavours more attractive to individuals. Therefore, developing economic conditions is a necessary task to provide sufficient inputs and opportunities for initiating new business activities. Based on these prior empirical results, we assumed the first research hypothesis:

H1: Economic conditions significantly influence the national entrepreneurship of developing countries.

Social Conditions for National Entrepreneurship

Although some studies have found contrasting results (Dheer, 2017; Solomon *et al*., 2021), scholars agree that social conditions contribute intangible resources (such as skills, knowledge, and capabilities) as well as informal institutions (such as attitudes, values, and social norms) to the national entrepreneurship in developing countries. Specifically, Li (2025) argues that individuals with greater educational capital are more likely to pursue opportunity-based entrepreneurship. Jiménez *et al.* (2015) found that different levels of education have varying effects on formal and informal entrepreneurship. Not all characteristics of entrepreneurs can be trained. Higher educational attainment also equips individuals with the knowledge and tools necessary for establishing businesses and helps young entrepreneurs identify market opportunities, thus stimulating their entrepreneurial desires. On the other hand, the knowledge and skills gained through entrepreneurship education also influence individuals' self-efficacy, which can impact their intention to start a business, leading individuals to be more inclined to engage in entrepreneurial activities (Amofah & Saladrigues, 2022; Lee & Wong, 2003).

Another measure to promote entrepreneurship is increasing social consumption of the country (McMullen *et al.*, 2008). Governments of developing countries can enhance spending on social safety nets and welfare programs, promote public investment projects, including infrastructure investments in transportation, communication, electricity, and water supply. Increasing public expenditure contributes to boosting social consumption demand, creating profit opportunities, and thus stimulating national entrepreneurship (Castaño *et al.*, 2015). The implementation of public investment emerges as a pivotal policy, not only in promoting entrepreneurship but also improving infrastructure, creating favourable conditions for attracting investment and economic development, consequently engendering the country's economic conditions. Moreover, the presence of social safety net initiatives assumes significance, offering a mechanism to mitigate potential downsides of business failures and reduce the fear of potential entrepreneurs from leaving salaried jobs, thus encouraging individuals to start their ventures.

Furthermore, investing in research and development (R&D) plays a significant and positive role for entrepreneurship by driving innovation, digitisation, and digital transformation (de Lucas Ancillo & Gavrila Gavrila, 2023). Noteworthy, R&D development can lead to important inventions and patents, fostering innovations or even revolutionary changes not only in the economy but also across multifarious domains spanning political, social, and cultural landscapes. Consequently, this imparts impetus to the ongoing advancement of developing countries. The economic and social development conditions create more resources and opportunities for entrepreneurs, encouraging them to engage in business ventures. On the other hand, strengthening national-level R&D activities can positively impact enterprise and individual-level R&D activities, driving businesses and individuals to seek innovation and improvements in their entrepreneurial and business ventures, thereby enhancing their efficiency and attractiveness, attracting more individuals and businesses to participate (Duguet, 2004).

Entrepreneurial activities also exhibit interdependencies with variables, including government investment in education, population-level educational attainment, and prevailing unemployment rates. These factors collectively influence the quality of life and resource endowment, thereby affecting the ambitions and entrepreneurial aspirations of individuals. Using data from 23 OECD countries spanning the period 1974 to 2002, Thurik *et al.* (2008) found that shifts in unemployment rates had a clear positive influence on subsequent changes in self-employment rates or start-up activity. Simultaneously, changes in self-employment rates negatively affected subsequent unemployment rates, with this latter effect proving more substantial than the former.

Thus, we can observe that social conditions strongly influence national entrepreneurship, where favourable ones support the provision of necessary resources and opportunities to foster entrepreneurial activities. Social conditions also influence the desires and entrepreneurial aspirations of individuals, galvanising their proactive engagement. Stemming from the above arguments, we proposed the second hypothesis as follows:

H2: Social conditions significantly influence the national entrepreneurship of developing countries.

Institutional Entrepreneurial Conditions for National Entrepreneurship

In addition to economic and social conditions, institutional conditions officially constrain the establishment and subsequent operation of new firms.

These impacts, although occasionally detrimental (Chambers & Munemo, 2019; Dheer, 2017), can take on a favourable trajectory, potentially supporting the seamless progression of the entrepreneurial process. By shaping the business environment through laws and supportive policies, entrepreneurial institutions are among the most extensively scrutinised determinants of national entrepreneurship (Urbano *et al.*, 2019; Valdez & Richardson, 2013; Van Stel *et al.*, 2007). Specifically, Chambers and Munemo (2019) examined the impact of entrepreneurial regulations and institutional quality on new business activity in 119 countries in the period 2001-2012. The results show that institutional conditions, such as excessive barriers to entry and/or a lack of high-quality governmental institutions, significantly reduce new business formation. The application of complex and unpredictable regulations increases the costs of starting a business. In addition to the procedural costs, new businesses may need to spend extra on legal support services to expedite the registration process (Harraf *et al.*, 2021).

On the other hand, regulations that allow officials to manage sectors by obstructing or delaying the entry of new businesses, for personal or policy reasons, can result in cumbersome regulations and delays in obtaining licenses and necessary procedures. This time-consuming process could deter many potential entrepreneurs, as opportunities may have passed by the time all regulatory procedures are completed (Pfeifer *et al.*, 2021). In their empirical study on Worldwide Governance Indicators across 126 countries, Abegaz *et al.* (2023) assert that political stability, government effectiveness, regulatory quality, rule of law, and control of corruption all have significant impacts on entrepreneurship.

According to conventional reasoning about entrepreneurship, tax policies reduce the attractiveness of starting a new business because they take away a portion of the profits. Therefore, if an individual is considering entrepreneurship and perceives high corporate taxes, they may choose to forgo entrepreneurship and seek high-paying employment instead (Djankov *et al.*, 2002; Van Stel *et al.*, 2007). Consequently, policymakers need to make potential entrepreneurs see the attractive financial rewards of starting a business. This proposition necessitates the establishment of a low tax rate regimen so that entrepreneurs can preserve a substantial proportion of their earnings, simultaneously complemented by the provision of tax incentives tailored to newly established enterprises (Keuschnigg & Nielsen, 2003).

Moreover, the government can influence national entrepreneurship through their supportive policies. Specifically, the government of developing countries can assist newly established businesses through subsidy programs, providing physical support, and offering information for new business projects (Hamdan *et al.*, 2022; Keuschnigg & Nielsen, 2003). These programs often address the input factors of entrepreneurship, such as financial resources, market information, and human resources quality. For example, market development policies can enhance the accessibility of vital financial resources required for the establishment or expansion of small-scale enterprises through financial grants and loan guarantees (Wennekers, 2006). Therefore, the government's implementation of supportive policies can create incentives to boost national entrepreneurship.

In general, the institutional entrepreneurial conditions influence national entrepreneurship by impacting various aspects such as costs, time to start a business, input factors, and the availability of necessary resources for national entrepreneurship in developing countries. Thus, we propose the third hypothesis as follows:

H3: Institutional entrepreneurial conditions significantly influence the national entrepreneurship of developing countries.

RESEARCH METHODOLOGY

Data Collection and Research Sample

We gathered and consolidated data on developing countries from 02 sources of GEM's and World Bank's open databases. The World Bank database is a widely recognised and authoritative source providing comprehensive economic and development indicators across countries since 1960. Meanwhile, GEM is

a network of primarily national teams affiliated with leading academic institutions which conduct continuous research on entrepreneurship and entrepreneurial ecosystems worldwide for over 20 years.

After collecting the data, we filtered the sample to include only developing countries, which are defined as either economies in transition that are not classified as high-income or developing economies, based on the annual *World Economic Situation and Prospects* reports by the United Nations (2003-2020). As income classifications may change over time, a country's inclusion in the sample may vary across years. For example, Poland, classified as upper-middle income until 2008, was considered a developing country in the sample and was excluded from 2009 onward after being reclassified as high income by the World Bank. Next, we excluded observations from years with missing data, primarily due to the absence of GEM data, resulting in a research sample that forms an unbalanced panel dataset, comprising 37 developing countries over the period from 2003 to 2019. The total number of observation years was 173, wherein different countries had varying observation years, yet ensuring that each country has at least one complete year of data for all variables.

Table 1. List of countries in the research sample

Countries	Observations (years)
South Africa, Colombia, Chile	> 10 years
Peru, Uruguay, Guatemala, Israel	9
Thailand	8
Türkiye, Brazil, South Korea	7
Panama, Iran	6
Egypt, Ecuador, Malaysia	5
Tunisia, Indonesia, Mexico	4
El Salvador, Costa Rica, Croatia, Vietnam, Russia	3
Hong Kong, Georgia, Serbia	2
Ghana, Poland, Philippines, United Arab Emirates, Armenia, Hungary, Belarus, India, Singapore, Pakistan	1
Total: 37 countries	173

Source: World Bank.

Research Variables

Dependent Variable

In this study, the dependent variable (Y) was total early-stage entrepreneurial activity (TEA) sourced from the Global Entrepreneurship Monitor (GEM) database. Among collected data, the most famous index is the total early-stage entrepreneurial activity (TEA) index, measured by the percentage of an economy's 18-64 population who are either a nascent entrepreneur (actively planning a new business) or owner-manager of a new business (within the first 42 months of starting). Used by Wong *et al.* (2005) and Urbano and Aparicio (2016) to analyse national entrepreneurship, TEA serves as a valuable benchmark for entrepreneurial activity, particularly as it evolves.

Independent Variables

In this study, we examined specific economic, social, and institutional macro variables to better understand the conditions shaping national entrepreneurship in developing countries. Economic factors (*e.g.*, GDP growth, GDP per capita, imports, exports, FDI, inflation) influence resource availability and market opportunities. Social factors (*e.g.*, national expenditure, education, unemployment, labour) affect human capital and entrepreneurial capabilities. Institutional factors related to business creation shape the entrepreneurial environment by either reducing or increasing barriers to entry. Analysing these variables provides a comprehensive view of how macro-level conditions enable or constrain entrepreneurial activity in developing countries. We collected the data from the World Bank's open-access database. Specifically:

Table 2. Independent variables and their measurement

Variable		Description	Measurement
Economic indicators			
X1	GDP growth	Reflects national economic development	Annual % change of GDP
X2	GDP per capita	Indicates income level and quality of life	Logarithmic value of GDP / population
X3	FDI inflows	Measures investment inflows relative to the economy's size	% of GDP
X4	Exports	Represents the value of goods and services exported by the economy	% of GDP
X5	Imports	Represents the value of goods and services imported by the economy	% of GDP
X6	Consumer price index	Shows price changes in consumer goods.	% of base year 2010
Social indicators			
X7	Gross national expenditure	Reflects domestic spending on consumption and investment.	% of GDP
X8	Government expenditure on education	Indicates public investment in education	% of GDP
X9	Research and development expenditure	Reflects spending from various sources on R&D activities	% of GDP
X10	Labour force with basic, intermediate, and advanced education	Proxy for workforce skills at different education levels	% of the total working-age population
X11	Unemployment rate	Indicates labour market health	% of labour force
Entrepreneurial institutional indicators			
X12	Cost of business start-up procedures	Reflects the cost barrier to entrepreneurship	% of GNI per capita
X13	Time required to start a business	Reflects the complexity, difficulty, and efficiency of the start-up procedures and regulations	Number of calendar days

Source: World Bank.

The Pearson correlation matrix of research variables (Table 4) indicated that several independent variables showed significant correlations with the dependent variable Y, notably X10 ($r = 0.490$, $p < 0.01$), X11 ($r = -0.390$, $p < 0.01$), and X9 ($r = -0.327$, $p < 0.01$), indicating their potential influence in the regression model. Meanwhile, most variables exhibited low or insignificant correlations with each other, suggesting minimal multicollinearity concerns in the dataset. However, three variables – X3, X4, and X5 – showed notable correlations. In particular, X3 was moderately correlated with both X4 ($r = 0.650$, $p < 0.01$) and X5 ($r = 0.702$, $p < 0.01$). More significantly, X4 and X5 exhibited a very strong correlation ($r = 0.966$, $p < 0.01$), suggesting potential multicollinearity that may affect the robustness of the regression analysis. To examine the impact of all independent variables on the dependent variable, we considered separating the highly correlated variables X4 and X5 into two distinct regression models.

Regression Method

In this research, for panel data, we applied the procedure outlined by Dougherty (2011) and Torres-Reyna (2007) to select appropriate models among the three: fixed-effects model, random-effects model, and pooled OLS model. According to Dougherty (2011), the process of selecting a regression model for panel data begins with checking whether the observations are randomly sampled from a specific country. If the observations come from a random sample, both fixed effects and random effects will be applied. Otherwise, a mixed-effects model should be used. Subsequently, we used the Lagrange multiplier (LM test) to decide if the random effects model or the pooled OLS model was appropriate for our present study (Breusch & Pagan, 1980). We used the Hausman test, also known as the Durbin-Wu-Hausman test (Hausman, 1978), to compare the fixed effects model and the random effects model. Then, we examined the presence of random effects. If random effects existed, we used the random effects model; otherwise, we applied the pooled OLS model.

Table 3. Descriptive analysis of research variables

Variable	Indicator	Unit	Obs.	Mean	Std. Dev.	Min		Max	
X1	GDP growth	Annual %	173	3.496	2.438	-3.747	Iran in 2012	11.314	Panama in 2011
X2	GDP per capita (current USD)	Logarithm value	173	3.915	0.319	3.100	Ghana in 2010	4.760	Singapore in 2014
X3	Foreign direct investment, net inflows	% of GDP	173	3.897	4.480	-0.901	Uruguay in 2016	41.532	Hong Kong in 2016
X4	Exports of goods and services	% of GDP	173	35.357	26.138	9.391	Pakistan in 2019	191.954	Singapore in 2014
X5	Imports of goods and services	% of GDP	173	36.605	23.835	11.801	Brazil in 2017	184.722	Hong Kong in 2016
X6	Consumer price index	(2010 = 100)	173	121.057	41.086	72.173	Turkey in 2006	508.339	Belarus in 2019
X7	Gross national expenditure	% of GDP	173	101.111	6.987	72.799	UAE in 2018	121.793	Serbia in 2008
X8	Government expenditure on education	% of GDP	173	4.368	1.056	1.511	UAE in 2018	6.680	Costa Rica in 2014
X9	Research and development expenditure	% of GDP	173	0.849	1.144	0.023	Guatemala in 2016	5.140	Israel in 2019
X10	Labour force with basic, intermediate and advanced education	% of labour force	173	199.869	26.004	123.870	Iran in 2013	263.280	Singapore in 2014
X11	Unemployment (national estimate)	% of labour force	173	8.189	6.321	0.250	Thailand in 2013	32.310	South Africa in 2003
X12	Cost of business start-up procedures	% of GNI per capita	173	13.034	10.993	0.200	South Africa in 2016	52.500	Guatemala in 2011
X13	Time required to start a business	Days	173	25.632	22.163	1.500	Hong Kong in 2016	100.500	Peru in 2004
Y	Total early-stage Entrepreneurial Activity – TEA	%	173	15.164	7.549	2.560	Croatia in 2003	40.270	Peru in 2004

Source: World Bank & GEM Global reports.

Table 4. Pearson correlation matrix of research variables

Variable	Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
Y	1													
X1	0.073	1												
X2	-0.182*	-0.120	1											
X3	-0.010	0.056	0.315**	1										
X4	-0.203**	0.049	0.312**	0.650**	1									
X5	-0.196**	0.096	0.206**	0.702**	0.966**	1								
X6	-0.011	-0.278**	-0.048	-0.112	-0.039	-0.054	1							
X7	0.108	0.159*	-0.463**	-0.025	-0.434**	-0.188*	-0.033	1						
X8	-0.066	-0.199**	0.244**	-0.081	-0.112	-0.146	-0.001	-0.080	1					
X9	-0.327**	-0.063	0.666**	-0.061	0.110	0.028	-0.087	-0.314**	0.334**	1				
X10	0.490**	0.119	-0.027	0.127	0.160*	0.134	-0.115	-0.103	-0.086	-0.247**	1			
X11	-0.390**	-0.171*	-0.145	-0.127	-0.276**	-0.251**	-0.097	0.131	0.278**	-0.090	-0.357**	1		
X12	0.198**	0.205**	-0.340**	-0.156*	-0.210**	-0.127	-0.190*	0.366**	-0.322**	-0.243**	0.180*	-0.266**	1	
X13	0.104	-0.234**	-0.316**	-0.261**	-0.261**	-0.298**	-0.072	-0.065	0.104	-0.170*	-0.028	0.286**	0.014	1

Note: *. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed).
Source: own study.

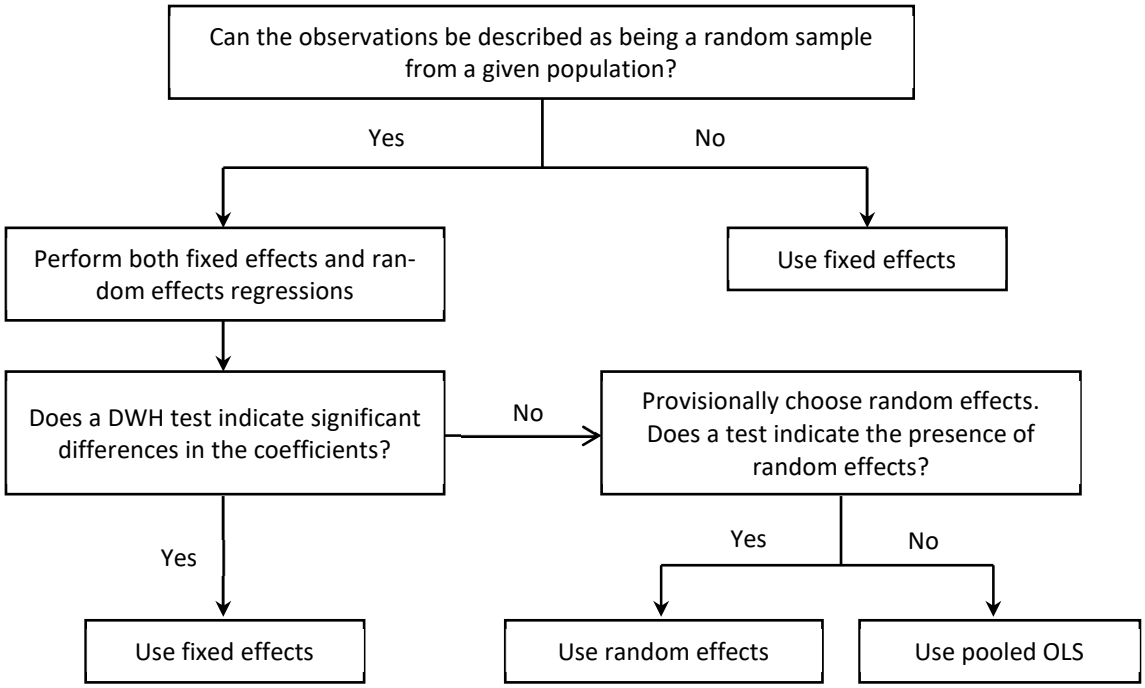

Figure 1. Process of selecting a regression model for panel data
Source: Dougherty (2011, p. 421).

Following the completion of the model selection process for panel data, the next step involved checking for multicollinearity and heteroskedasticity of regression. We applied the cutoff point of 5 suggested by Craney and Surles (2002, p. 393) and even the stricter threshold of 4 recommended by O'Brien (2007, p. 674) to ensure that the VIF value of any variable in the model did not exceed this limit, thereby preventing excessive or serious multicollinearity. Moreover, if the heteroskedasticity test results revealed the presence of these issues, we utilised a robust model to test the proposed research hypotheses (Greene, 2008).

Since the two variables X4 and X5 were strongly correlated, as detected in the correlation matrix analysis in Table 4, we conducted two separate panel data analysis processes, R1 and R2, with each of these variables, respectively, along with the other independent variables. The regression results yielded two corresponding models, R1 and R2, summarised in Table 5.

RESULTS AND DISCUSSION

According to the regression results in Table 5, the insignificant Hausman's tests (chi2(13) = 19.58; Prob>chi2 = 0.1063) support the null hypothesis by accepting the fixed-effects model at 95% confidence level in both two regression processes (with respectively chi2(12) = 28.54 & Prob>chi2 = 0.0046 for R1 and chi2(12) = 28.43 & Prob>chi2 = 0.0048 for R2). The significant LM tests refuse also the Pooled OLS model (with respectively chibar2(01) = 47.98 & Prob > chibar2 = 0.0000 for R1 and chibar2(01) = 48.05 & Prob > chibar2 = 0.0000 for R2). Finally, we identified the fixed-effects models as the appropriate ones for our study in both regression processes (Dougherty, 2011; Torres-Reyna, 2007).

Then, we examined the VIF values of the independent variables in both selected fixed-effects models. We found that the VIF values of all independent variables are less than 4, ensuring that the issue of multicollinearity can be neglected in our regression models (Craney & Surles, 2002; O'Brien, 2007). In the next step, we check the heteroskedasticity tests of the two selected fixed-effects models. These tests were both significant at a 95% confidence level (with respectively chi2 (37) = 1.40E+32 & Prob>chi2 = 0.0000 for R1 and chi2 (37) = 1.50E+32 & Prob>chi2 = 0.0000 for R2), by indicating the existence of a heteroskedasticity problem in our fixed-effects models. Therefore, we use the robust

option for correcting these fixed-effects models in both regression processes (Greene, 2008). Finally, we utilised the robust fixed-effects models to verify our research hypotheses.

Table 5. Regression results

Dependent variable: Y (National entrepreneurship) *N = 37 developing countries with 173 year-observations*						
Independent Variable	**R1: Robust Fixed-effects model**			**R2: Robust Fixed-effects model**		
	Coef.	***t***	***P > t***	***Coef.***	***t***	***P > t***
X1	0.415*	2.22	0.033	0.407*	2.21	0.034
X2	-9.994	-1.15	0.257	-9.802	-1.14	0.263
X3	0.139	0.85	0.400	0.128	0.82	0.420
X4	0.015	0.13	0.899			
X5				0.028	0.26	0.793
X6	0.042**	2.86	0.007	0.042**	2.90	0.006
X7	0.112	0.62	0.536	0.092	0.56	0.579
X8	3.473**	3.39	0.002	3.448**	3.42	0.002
X9	2.647†	1.95	0.059	2.721*	2.06	0.047
X10	-0.086	-1.44	0.159	-0.086	-1.43	0.161
X11	-0.527†	-1.99	0.054	-0.523*	-2.03	0.049
X12	-0.026	-0.17	0.864	-0.027	-0.18	0.859
X13	0.055	1.03	0.309	0.055	1.03	0.308
_cons	38.433	0.77	0.446	39.328	0.92	0.366
R^2	0.0035 (overall)			0.0063 (overall)		
VIF	All VIF < 4; Mean VIF = 2.05			All VIF < 4; Mean VIF = 1.95		
F statistics	F(12,36) = 7.00***; Prob > F = 0.000			F(12,36) = 7.21***; Prob > F = 0.000		
Correlation (corr(u_i, Xb)	-0.662			-0.672		
Hausman's test	chi2(12) = 28.54**; Prob>chi2 = 0.0046			chi2(12) = 28.43**; Prob>chi2 = 0.0048		
LM-test	chibar2(01) = 47.98***; Prob > chibar2 = 0.0000			chibar2(01) = 48.05***; Prob > chibar2 = 0.0000		
Heteroscedasticity Test	chi2 (37) = 1.40E+32***; Prob>chi2 = 0.0000			chi2 (37) = 1.50E+32***; Prob>chi2 = 0.0000		

Note: significant codes: 0.001 '***'; 0.01 '**'; 0.05 '*'; 0.1 '†'
Source: own study.

Impact of Economic Conditions on National Entrepreneurship

Regarding the impact of GDP growth (X1): Based on the results of the robust fixed-effects models in Table 5, the independent variable X1 had a significant impact on the dependent variable Y at a 95% confidence level (with Coef. = 0.415 & P = 0.033 in R1 and with Coef. = 0.407 & P = 0.034 in R2). This result indicates that GDP growth significantly and positively affects the national entrepreneurship of developing countries. Indeed, economic growth creates a positive psychology and expectation for investors and potential entrepreneurs regarding the future of the economy. Consequently, this stimulation encourages them to pursue market prospects and engage in entrepreneurial activities or expand existing businesses to take advantage of such opportunities. Notably, developing countries often experience higher economic growth rates compared to developed nations due to factors such as rapid industrialisation, urbanisation, and rising domestic consumption. This sustained economic expansion provides fertile ground for entrepreneurship by continually generating new market opportunities and demand for innovative products and services.

This finding aligns with prior research (Acs *et al.*, 2018; Ordeñana *et al*., 2024; Awoa Awoa *et al.*, 2022; Castaño *et al.*, 2015), which emphasised that economic development fosters entrepreneurship by providing financial and physical resources, improving perceptions of opportunities, and enhancing economic expectations. Higher GDP growth often translates into higher disposable incomes, which not

only increase consumer demand but also expand niche markets, creating opportunities for entrepreneurial ventures. Overall, our findings reaffirm the critical role of economic growth in stimulating national entrepreneurship by providing necessary financial resources, enhancing economic stability, and shaping positive expectations among entrepreneurs.

Regarding the impact of GDP per capital (X2)*:* According to the regression results, the independent variable X2 did not have a significant impact on the dependent variable Y – national entrepreneurship of developing countries, at a 95% confidence level (with Coef. = -9.994 & P = 0.257 in R1 and with Coef. = -9.802 & P = 0.263 in R2). This finding contrasts with previous findings suggesting that GDP per capita plays a crucial role in fostering entrepreneurship by improving economic conditions and increasing disposable income (Castaño *et al.*, 2015; Nafziger, 2012). It can be explained by the fact that many developing countries often experience high and frequent inflation rates, which lead to increased living costs despite the rise in per capita income. Consequently, there is not much financial accumulation, and it does not generate significant resources for entrepreneurship. McMullen *et al.* (2008) even found that GDP per capita has a negative impact on entrepreneurial action.

Moreover, most developing countries have partially industrialised economies and still rely heavily on agriculture. The modern business and production sectors are relatively small and are often owned by the government and private capitalists. Therefore, an increase in GDP per capita may be driven by the rising income of private capitalists, while the actual income of the majority of the population may not increase significantly or remain stagnant. This disparity indicates that even though GDP per capita may rise, only a few individuals accumulate significant financial resources. Potential entrepreneurs may not be among them, resulting in GDP per capita having an insignificant impact on financial resources for entrepreneurship.

Regarding the impact of FDI inflow (X3): the robust fixed-effects model results also show an insignificant impact of the independent variable X3 on the national entrepreneurship of developing countries at the confidence level of 95% (with Coef. = 0.139 & P = 0.400 in R1 and with Coef. = 0.128 & P = 0.420 in R2). This finding contradicts prior research by Zhao (2022) and Afi *et al.* (2022) but aligns with the finding of Hong *et al.* (2021), who suggested that FDI does not generally serve as a stimulus for entrepreneurship. Slesman *et al.* (2021) even found that FDI exert a negative impact on domestic entrepreneurship in emerging economies. The reasons for this could be that FDI firms often possess superior financial, technological, and managerial capabilities, which are often lacking in many developing countries. As a result, FDI firms have a significant competitive advantage in the domestic market, which potential entrepreneurs may perceive as a barrier and risk, discouraging them from making entrepreneurship decisions.

Furthermore, the proportion of equity ownership in FDI firms may result in unfavourable profit distribution for developing countries, meaning there may not be substantial financial resources available for accumulation and savings. Consequently, there may not be significant financial resources to support national entrepreneurship.

However, in the long term, FDI could have a positive impact on national entrepreneurship by opening niche markets, such as supporting industries for the FDI sector. It can also create opportunities for developing countries to enhance their technological and managerial capabilities, thereby increasing the competitiveness of domestic industries and businesses (Afi *et al.*, 2022). In turn, this can serve as motivation and create opportunities for individuals to engage in entrepreneurship.

Regarding the impact of export and import (X4 and X5)*:* According to the results of robust fixed-effects models, the independent variables X4 – Export and X5 – Import did not significantly impact the dependent variable Y – national entrepreneurship of developing countries (with Coef. = 0.015 & P = 0.899 in R1 for export, and with Coef. = 0.028 & P = 0.793 in R2 for import). Contrary to expectations, our findings indicate that export activities do not necessarily foster national entrepreneurship, and imports also fail to show a substantial effect in developing countries.

Previous research has often emphasised the role of exports and imports in enhancing economic growth and facilitating entrepreneurship (Purkayastha *et al.*, 2021; Shane & Venkataraman, 2000). However, our findings challenge these assumptions in the context of developing countries. One possi-

ble explanation lies in the structural challenges of export activities in developing countries. While international trade is often associated with economic growth, export-oriented businesses in these countries frequently face severe constraints, including inadequate infrastructure, logistical inefficiencies, quality control challenges, limited financial access, trade barriers, and technological gaps. As a result, even as export revenues grow, the benefits may not be evenly distributed or substantial enough to translate into increased entrepreneurial activity. This aligns with Nguyen *et al.* (2022), who argue that high export-intensive margins and diversification do not necessarily lead to entrepreneurial growth, as the complexities of entering global markets often outweigh the potential benefits.

Similarly, the insignificant impact of imports on national entrepreneurship suggests that merely increasing access to foreign goods and technology does not automatically translate into new business opportunities. While imports may provide domestic producers with access to better inputs, production efficiency, and cost advantages, these benefits are often contingent on the ability of local businesses to adapt and integrate new technologies effectively. In many developing countries, potential entrepreneurs may lack the technical expertise, financial capacity, or institutional support needed to effectively utilise imported materials and technologies for innovation and business creation. Additionally, high import penetration can intensify competition from foreign firms, making it more challenging for domestic start-ups to become established and achieve growth in local markets.

Regarding the impact of the CPI (X6): our robust fixed-effects model findings show that the variable X6 have a significant impact on national entrepreneurship of developing countries, with a 95% confidence level (with Coef. = 0.042 & P = 0.007 in R1 and with Coef. = 0.042 & P = 0.006 in R2). The CPI is used as an indicator of inflation because it reflects changes in the cost of living for the average consumer. An increase in the CPI implies rising prices of goods and services, potentially leading to inflationary pressures. Noteworthy, high inflation can lead to currency depreciation, posing fundamental challenges and prerequisites related to capital and interest rates for potential entrepreneurs. In the context of developing countries, this issue can become particularly severe, as a large portion of the population has low to moderate incomes, rendering them considerably more vulnerable to the ramifications of inflationary forces.

Interestingly, while inflation is often viewed as a macroeconomic challenge, our finding, in line with Izuchukwu (2023) and Khan *et al.* (2023), suggests that an increase in CPI can have a stimulating effect on entrepreneurial activities in developing economies. Inflation-driven price adjustments may enhance profit margins for businesses, particularly in sectors with high demand elasticity, providing incentives for new market entrants. Moreover, inflationary environments can encourage entrepreneurial investment as individuals and firms seek to hedge against currency depreciation by reallocating capital from savings to business ventures. This effect is particularly pronounced in developing countries, where limited access to financial instruments encourages individuals to seek alternative means of wealth preservation and income generation. Moreover, as wages and revenues adjust to inflation, entrepreneurs may perceive new opportunities in cost-sensitive industries, such as essential consumer goods and services.

Summarising, the regression results show that among the economic factors evaluated for their impact on national entrepreneurship in developing countries, there is a significant positive impact of GDP growth and CPI, but an insignificant one of import, export, GDP per capita, and FDI. Therefore, we can conclude that the hypothesis H1 is partially supported: only some economic factors, such as economic growth and inflation, significantly influence the national entrepreneurship of developing countries. These findings align with the RBV, which emphasises the role of economic resource availability in shaping entrepreneurial activities. We may explain the difference in the aggregate entrepreneurship rate across developing countries by variations in their economic conditions, particularly economic growth and inflation. As countries experience higher GDP growth, there is often an increase in market opportunities, consumer demand, and access to financial resources, all of which create a more favourable environment for entrepreneurship. Moreover, controlled inflation tends to encourage investment rather than savings, as it reduces the real cost of borrowing and provides entrepreneurs with greater access to credit. In contrast, countries with unstable economic growth or high inflation may face increased risks, which deter both investment and entrepreneurial activities.

Impact of Social Conditions on National Entrepreneurship

Regarding the impact of national government expenditure (X7): Based on the results of the robust fixed-effects models, the variable X7 does not have a significant influence on the dependent variable Y – national entrepreneurship within developing countries at a 95% confidence level (with Coef. = 0.112 & P = 0.536 in R1 and with Coef. = 0.092 & P = 0.579 in R2). This suggests that higher government spending does not necessarily translate into increased entrepreneurial activities. Prior research has argued that public expenditure can stimulate economic activity, improve infrastructure, and create a favourable environment for business development (Castaño *et al.*, 2015; McMullen *et al.*, 2008). However, our findings indicate that in developing countries, the impact of government expenditure on entrepreneurship is not straightforward.

One possible explanation is that government spending in these countries tends to be allocated to social welfare programmes, public sector wages, and administrative costs rather than directly supporting entrepreneurial ventures. While infrastructure investments and economic stimulus programs may benefit established businesses, they do not necessarily create new entrepreneurial opportunities. Moreover, excessive government intervention can sometimes crowd out private-sector activities. When public spending dominates key industries, private entrepreneurs may find it difficult to compete, limiting their ability to establish and expand new ventures. Moreover, inefficient public expenditure, misallocation of resources, and bureaucratic inefficiencies in developing countries further weaken the link between government spending and entrepreneurship. Another critical factor is the prevalence of corruption, which distorts the intended benefits of government expenditure (Jiménez *et al.*, 2015). High levels of corruption can divert resources away from productive investments, increase regulatory burdens, and create an uneven playing field for businesses.

Regarding the impact of government investment in education (X8): the robust fixed-effects models showed that variable X8 had a significant and positive impact on national entrepreneurship (Y) at the confidence level of 95% (with Coef. = 3.473 & P = 0.002 in R1 and with Coef. = 3.448 & P = 0.002 in R2). It means the more developing countries' governments invest in education, the higher the national entrepreneurship becomes. Our finding supports Lee and Wong (2003) and Jiménez *et al.* (2015), who identified a positive relationship between investment in education and the establishment of new businesses. This is readily comprehensible because investing in education not only elevates the collective educational attainment but also establishes the fundamental prerequisites of knowledge and consciousness essential for potential entrepreneurs.

Specifically, investing in education is beneficial for any country regardless of its developmental stage. It stands as a foundational requirement for the enhancement of human resource elements within the socioeconomic framework. In developing countries, this investment can be particularly transformative, as it addresses the gap in skills and knowledge that often limits entrepreneurial potential. Investment in education fosters transformative shifts in perceptions, enhances general knowledge, and consequently leads to constructive changes in cognitive processes and behavioural paradigms. For instance, agricultural practitioners benefit significantly from educational exposure, enabling them to adopt new technologies and increase productivity, thus improving both individual and national economic outputs. Furthermore, reinforcing education and raising educational levels within the workforce of developing countries equip them to respond effectively to the evolving demands of modern industries. This enhanced skillset contributes to higher personal earnings and economic value for businesses, which, in turn, creates a more robust resource pool for national entrepreneurship. As a result, these countries experience a conducive environment for entrepreneurship to thrive. Moreover, enhancing education and understanding also improves the ability to identify and seize new business opportunities. As a result, aspiring entrepreneurs in developing countries are more inclined to break away from traditional occupations, such as family farming, and explore new ventures, leading to increased business creation and income generation.

Regarding the impact of government investment in research and development (R&D): The regression results indicate that variable X9 has a significant impact on national entrepreneurship (Y) (with

Coef. = 2.647 & P = 0.059 in R1 and with Coef. = 2.721 & P = 0.047 in R2). This finding aligns with previous studies, such as those by Castaño *et al.* (2015) and Duguet (2004), who emphasised that R&D investment fosters national entrepreneurship. In developing countries, where resource constraints and technological gaps often limit entrepreneurial potential, government investment in R&D plays a crucial role in fostering innovation and the development of new industries. These investments enhance access to advanced technologies and help build essential infrastructure and knowledge networks.

Moreover, government-backed R&D initiatives help alleviate entry barriers faced by aspiring entrepreneurs in developing countries, such as limited access to critical resources, infrastructure challenges, and financial constraints. These initiatives provide entrepreneurs with access to technological advancements and locally adapted business models, thereby fostering innovation and new venture creation. Furthermore, R&D funding stimulates the creation of innovation ecosystems, in which collaboration between entrepreneurs, research institutions, and businesses leads to the commercialisation of new technologies and products. In turn, this strengthens national industries, attracts private investment, and enhances the overall business environment. By cultivating a conducive environment for innovation, government investment in R&D empowers and positions entrepreneurs in developing countries to leverage emerging opportunities.

Regarding the impact of the labour force with different education levels (X10): According to the results of the regression model, the variable X10 did not have a statistically significant effect on national entrepreneurship (Y) at a 95% confidence level (with Coef. = -0.086 & P = 0.159 in R1 and with Coef. = -0.086 & P = 0.161 in R2). This finding contrasts with prior studies that emphasise the positive role of labour force quality in fostering entrepreneurship (Bae *et al.*, 2014; Jiménez *et al.*, 2015). Traditionally, higher education and specialised training are believed to equip individuals with the skills necessary to innovate, adopt technology, and establish businesses. However, our finding suggests that, in the context of developing countries, these expected benefits do not necessarily translate into a substantial increase in entrepreneurial activity.

A possible explanation for the insignificant relationship between labour force quality and national entrepreneurship in developing countries lies in the persistent structural mismatches between the skills provided by education systems and the demands of the entrepreneurial ecosystem. While formal education may enhance theoretical knowledge, many graduates still face significant barriers, such as limited access to financial capital, bureaucratic challenges, and weak institutional support, which hinder their ability to start and sustain businesses (Purkayastha *et al*., 2021; Duguet, 2004). Moreover, in many developing countries, entrepreneurship is often driven by necessity rather than opportunity (Acs *et al.*, 2018). Thus, individuals may engage in entrepreneurial activities regardless of their education level. Thus, even a well-trained labour force may struggle to convert their skills into new business creation.

Regarding the impact of unemployment (X11), the regression findings show that the variable X11 significantly and negatively affected the dependent variable (Y) – national entrepreneurship (with Coef. = -0.527 & P = 0.054 in R1 and with Coef. = -0.523 & P = 0.049 in R2). This result contradicts the findings of other studies that suggested individuals might turn to entrepreneurship out of necessity when the fear of unemployment forces them into self-employment (Hessels *et al.*, 2008; Thurik *et al.*, 2008). It is readily explicable as increasing unemployment leads to a decrease in income, thereby resulting in a lack of financial resources to support entrepreneurship. In low-income countries characterised by rapidly growing populations and underdeveloped economies, high unemployment rates and a scarcity of job opportunities are prevalent. In certain impoverished countries, it is noteworthy that unemployment rates may even be lower than those in developed countries. However, the literature primarily attributes this discrepancy to the willingness of the labour force to accept precarious and low-paid work, which is less economically efficient and more vulnerable. This is often due to the absence of social security policies, subsidies, and welfare programmes within the country. Therefore, in the context of developing countries, even when unemployment rates appear low, national entrepreneurship may still be hindered.

Prolonged unemployment can also deplete human resources, as it may prevent the labour force from keeping pace with changes in the job market and technological advancements. Over time, some knowledge, skills, and experience may erode due to neglect or a lack of practice, further impeding

entrepreneurship. Moreover, for individuals facing unemployment, the struggle to make a living becomes burdensome and a source of anxiety, negatively impacting their motivation and capacity to engage in entrepreneurship. Consequently, this reduces the overall rate of newly established businesses in the country.

Summarising, our research findings regarding social conditions reveal a negative impact of unemployment, as well as positive impacts of government expenditure on education and R&D expenditure. However, we observed an insignificant impact of gross national expenditure and the labour force quality on national entrepreneurship of developing countries. Thus, we partially accepted the hypothesis H2: only some social factors (such as government expenditure on education, R&D expenditure, and unemployment) influence significantly the national entrepreneurship of developing countries. These findings align with the RBV, which emphasises the role of social resource availability in shaping entrepreneurial activities. Accordingly, differences in entrepreneurship rates across developing countries can be explained by these social conditions, where disparities in education and R&D investment, as well as labour market dynamics, play a crucial role in shaping entrepreneurial outcomes.

Impact of Institutional Entrepreneurial Conditions on National Entrepreneurship

The impact of the cost of business registration procedures (X12); according to the regression results of our research, the variable X12 had an insignificant effect on the dependent variable (Y) – national entrepreneurship at a 95% confidence level (with Coef. = -0.026 & P = 0.864 in R1 and with Coef. = -0.027 & P = 0.859 in R2). Theoretically, the cost of business registration procedures can contribute to the overall cost of entrepreneurship, thereby reducing financial resources available for new businesses. However, once an entrepreneur has accumulated sufficient necessary resources and identified significant business opportunities, such cost may no longer pose a significant financial constraint.

In the context of developing countries, while issues related to costs and finances appear crucial and significantly impact the decisions of potential entrepreneurs, the cost of business registration procedures is not excessively high compared to the expenses associated with developing a business idea and operating the business after official launch. Therefore, this cost does not considerably deter potential entrepreneurs from starting a business. Furthermore, in some cases, supportive measures and institutions from the government or relevant organisations in developing countries can mitigate the impact of business registration costs and create a more favourable entrepreneurial environment. These supportive measures may include reduced fees, streamlined registration processes, or financial incentives to encourage and facilitate entrepreneurship.

The impact of the time required to start a business (X13); according to the results of the regression model, the variable X13 did not have a significant effect on business entrepreneurship (Y) at a 95% confidence level (with Coef. = 0.055 & P = 0.309 in R1 and with Coef. = 0.055 & P = 0.308 in R2). In practice, instead of primarily fixating on this temporal aspect, potential entrepreneurs in developing countries frequently find themselves compelled to await extended durations until they accumulate adequate resources and encounter substantial business opportunities prior to embarking on entrepreneurial endeavours. On one hand, the process of starting a business varies markedly depending on factors such as industry type, business model, and company size. Certain entrepreneurial undertakings can promptly commence operations right from their nascent stages, whereas more intricate and sizable ventures necessitate preparatory work, market analysis, infrastructure development, and partnership establishment. Nevertheless, the availability of financial resources significantly influences the time required to start a business. Entrepreneurs may need to allocate time to amass requisite capital, seek investments, or foster relationships with financial institutions and banks to ensure financial stability during the nascent phases. Furthermore, the duration required for building networks and cultivating partnerships can also affect national entrepreneurship. Partnerships and relationships assume an indispensable role in generating business prospects and enlarging the customer base.

Although administrative processing times are generally not unduly protracted in many countries, in contexts where complex and burdensome regulations and procedures exist, entrepreneurs may rely on legal support services to reduce the time required for business initiation and avoid missing opportunities. Moreover, entrepreneurs may choose to operate informally while awaiting

the completion of formal procedures, thereby minimising the impact of administrative delays on their decision-making processes. Consequently, research findings suggest that the time required to start a business does not fully capture the complexity of entrepreneurship and is not a central concern for entrepreneurs in developing countries.

Summarising, we did not find significant impacts of institutional entrepreneurial conditions on national entrepreneurship in developing countries. This result is surprising, as institutions directly related to business creation are typically considered essential for fostering entrepreneurship. Therefore, we did not accept hypothesis H3. This finding contrasts with previous studies that emphasise the negative impact of high entry costs (Chambers & Munemo, 2019; Dheer, 2017), lengthy and complex registration procedures (Van Stel *et al*., 2007; Pfeifer *et al*., 2021) on entrepreneurial activity. This suggests the need for further research to understand why these factors may not have the expected impact in developing economies, possibly due to weak policy implementation, institutional inefficiencies, or, as argued by Sendra-Pons *et al.* (2022), variations in socioeconomic characteristics across countries.

Table 6. Validity of research hypotheses

Hypothesis	Variable	Finding
H1 is partially valid	GDP growth (X1)	Positive impact
	GDP per capital (X2)	Insignificant impact
	Foreign Direct Investment (X3)	Insignificant impact
	Exports (X4)	Insignificant impact
	Imports (X5)	Insignificant impact
	Consumer price index (X6)	Positive impact
H2 is partially valid	Gross national expenditure (X7)	Insignificant impact
	Government expenditure on education (X8)	Positive impact
	Research and development expenditure (X9)	Positive impact
	Labour force with basic, intermediate and advanced education (X10)	Insignificant impact
	Unemployment (X11)	Negative impact
H3 is invalid	Cost of business start-up procedures (X12)	Insignificant impact
	Time required to start a business (X13)	Insignificant impact

Source: own study.

CONCLUSIONS

Main findings and contributions: The current study has clarified the macro conditions influencing national entrepreneurship, which is considered a key driver of economic growth and development in developing countries. We found that with hypotheses H1 and H2 partially supported and hypothesis H3 unsupported, some macro factors have a positive impact, some have a negative impact, and some have no significant impact on national entrepreneurship in developing countries. Specifically, economic growth, CPI, government expenditure on education, and R&D investment positively impact national entrepreneurship of developing countries, whereas unemployment exhibits a negative impact. However, other macro factors such as GDP per capita, FDI inflows, import, export, gross national expenditure, labour force quality and entrepreneurial institutions do not show a significant impact on national entrepreneurship of developing countries.

This study has made significant contributions to the literature on national entrepreneurship by addressing an underexplored research gap. Unlike previous research that often focuses on individual-level entrepreneurship and its determinants, this study shifts the focus to macro conditions influencing national entrepreneurship from the perspectives of the RBV and institutional theory at the country level. By clarifying the macro conditions that governments in developing countries can influence to promote national entrepreneurship, the study provides new and valuable insights into the field. Methodologically, our empirical study contributes by employing panel data analysis on a sample of developing countries using data available from GEM's and the World Bank's open databases. This method enabled a comprehensive cross-country analysis that identifies the factors with positive, negative, or insignificant impacts, thus providing a deeper understanding of how each macro factor influences national entrepreneurship

in developing countries. These findings offer policymakers a clearer perspective on the impact of macro factors on entrepreneurial activity. Consequently, policymakers can formulate strategies and policies to enhance positive factors and mitigate negative ones, fostering an environment conducive to entrepreneurship and sustainable economic development in developing countries.

Policy implications: Our research findings imply interesting policy implications for national entrepreneurship in developing countries, specifically:

Firstly, the positive impact of economic development (GDP growth) on national entrepreneurship underscores the importance of fostering macroeconomic stability and growth as a foundation for entrepreneurial activity. Policymakers in developing countries should prioritise strategies that stimulate sustainable economic growth, such as promoting investment in infrastructure, innovation, and high-potential industries. Additionally, fostering a conducive environment for entrepreneurship, such as reducing barriers to entry, ensuring access to capital, and enhancing market opportunities, would further leverage the benefits of GDP growth. In practice, this may involve targeted fiscal policies, such as tax incentives or subsidies for emerging industries, that encourage business formation and innovation. Long-term growth strategies should focus on building resilient and diversified economies capable of supporting entrepreneurship even during periods of economic uncertainty.

Secondly, the positive relationship between the CPI and national entrepreneurship highlights the need for price stability in fostering entrepreneurial activity in developing countries. Inflation control policies should remain a priority, as erratic price fluctuations can undermine investor confidence and limit the purchasing power of consumers. Policymakers should focus on maintaining low and stable inflation through effective monetary policies, such as adjusting interest rates and controlling money supply growth. Additionally, price stability can enhance the predictability of business costs and revenues, enabling entrepreneurs to plan and make long-term investments with greater certainty. As such, central banks and governments should work collaboratively to ensure inflation remains within a manageable and sustainable range, thereby supporting entrepreneurial ventures in developing countries.

Thirdly, the positive impact of government expenditure on education on national entrepreneurship suggests that investment in human capital is crucial for fostering entrepreneurial capabilities. Policymakers should increase investment in education systems, with a particular emphasis on programs that equip individuals with the skills, knowledge, and an entrepreneurial mindset necessary to start and grow businesses. This could include expanding vocational training, entrepreneurship education, and access to higher education, particularly in fields relevant to emerging sectors. By improving the quality and accessibility of education, governments can ensure a skilled workforce that drives innovation and entrepreneurial development. Moreover, policies that promote lifelong learning and entrepreneurship support programs can encourage individuals to pursue entrepreneurial careers, thereby enhancing national entrepreneurship levels in developing countries.

Fourthly, recognising the positive influence of government expenditure on education on national entrepreneurship underscores the importance of investing in education as a means to foster entrepreneurial skills and innovation. Governments in developing countries should allocate resources to enhance the quality and accessibility of education, especially in fields relevant to entrepreneurship. Additionally, initiatives that promote entrepreneurship education and skill development should be encouraged and expanded.

Fifthly, addressing the negative effects of unemployment on national entrepreneurship requires a multi-faceted approach. Governments in developing countries should focus on job creation through entrepreneurship promotion programs, support for startups, and incentives for small business growth. Additionally, comprehensive labour market reforms that reduce barriers to employment can help mitigate the negative consequences of unemployment.

Research limits and perspectives: By focusing on developing countries, we may not capture the full spectrum of entrepreneurship dynamics present in the global context. Another limitation consists of the macro-level analysis, which may not provide a comprehensive understanding of the individual experiences and challenges faced by entrepreneurs within these countries. The intricacies of personal motivations, access to resources, and the impact of cultural and social factors on entrepreneurship remain beyond the scope of this study. Additionally, our data coverage was limited to a 16-

year period (2003-2019), which constrains the ability to capture long-term patterns or assess delayed effects and temporal dynamics that could provide deeper insights into how the impact of macro factors evolves. Notably, the dataset is unbalanced, as some countries have data spanning up to 10 years while others only have one year, due to differences in data availability. This limit underscores the need for future research to collect more temporally uniform and extended datasets, despite the considerable time and resource requirements involved.

Moreover, the absence of certain institutional variables, such as control of corruption, government effectiveness, regulatory quality, and the rule of law, further limits the comprehensiveness of our analysis. We also did not examine disparities between countries, as the primary aim of this study was to analyse national entrepreneurship in developing countries as a group, rather than to explore differences among countries within different economic contexts. Therefore, while our research offers valuable insights into the macroeconomic conditions shaping national entrepreneurship in developing countries, it is essential to acknowledge these limitations when interpreting our findings.

Future studies may benefit from incorporating a more extensive array of macro indicators, particularly institutional ones such as control of corruption, government effectiveness, regulatory quality, and the rule of law, to enhance the comprehensiveness of the analysis. Moreover, exploring the micro-level dynamics of entrepreneurship, such as individual motivations, access to resources, and the influence of cultural and social factors, could provide a more nuanced understanding of entrepreneurial behaviours and challenges within developing countries. This would complement the macro-level analysis and offer a more holistic perspective on the entrepreneurial phenomenon.

Moreover, future studies could examine the disparities between different countries, as this study focused on developing countries as a whole. A comparative analysis of countries with varying economic structures – such as factor-driven, efficiency-driven, and innovation-driven economies – could uncover how different macroeconomic and institutional factors influence entrepreneurship in each context. Such analysis would allow for a more detailed understanding of the specific needs and challenges faced by entrepreneurs in distinct economic environments. Further, future research could benefit from analysing sector-specific entrepreneurship to identify how macroeconomic conditions and institutional factors influence entrepreneurship across different industries. Sector-specific studies could provide valuable insights into the varied challenges and opportunities entrepreneurs face in specific fields, which might differ from the general trends observed at the national level.

Moreover, expanding the temporal scope of the analysis to include longer time horizons would allow for the examination of delayed effects and temporal dynamics, helping to understand how the impact of macroeconomic and institutional factors evolves. By addressing these aspects, future research could build upon the limitations of this study and offer more comprehensive insights into the factors influencing national entrepreneurship.

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Use of Artificial Intelligence

We acknowledge the use of ChatGPT to check the spelling and grammar of this article. The prompts used include general instructions for grammar and spell-checking. The output from these prompts was used to enhance the language of this article but did not generate any of the ideas or explanatory logic shared.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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