

Sustainable development and entrepreneurship in emerging countries: Are sustainable development and entrepreneurship reciprocally reinforcing?

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Abstract

PURPOSE: Entrepreneurship seen as an engine for economic development is especially desirable for emerging countries to support rapid growth. Moreover, entrepreneurs can support social transformation in favor of more sustainable products and services. Sustainable orientation of entrepreneurship contributes to sustainable development goals and prevents environmental deprivation. However, the sustainable development agenda can also influence entrepreneurship. **METHODOLOGY:** The conducted bibliometric analysis confirmed the growing interest among scholars in the correlation of entrepreneurship to sustainability in the last years. Furthermore, panel regression (static model) was used to explore the variables on entrepreneurship influencing the sustainable development goal (SDG) index in emerging countries, and Levin, Lin and Chu (LLC), W-Stat – IPS, ADF-Fisher Chi-Square, and PP-Fisher Chi-Square tests were applied to analyze the variables stationarity. In order to examine the existence of structural breaks, the robustness was checked on single cross-section units and on the whole panel dataset. In addition, the Hausmann test was used to select between random and fixed effects, and heteroskedasticity of residues, autocorrelation of residues and dependence of residues between the panels were conducted. Data was analyzed through Eviews 13. **FINDINGS:** This paper investigates the relationship between sustainability and entrepreneurship in emerging countries. It discusses the impact of sustainable development on entrepreneurship and the influence of entrepreneurship on sustainable development. **IMPLICATIONS:** The study results can be used by governments and policymakers to plan their strategies and policies

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concerning entrepreneurship and implementation of sustainable development goals. They should promote entrepreneurial activity and control the negative environmental impact of enterprises simultaneously. ORIGINALITY AND VALUE: The research addresses the gap in the literature concerning the relationship between sustainable development and sustainable entrepreneurship. The paper examines the reciprocal relationship between sustainable development and entrepreneurship with an emphasis on emerging countries.

Keywords: *entrepreneurship, sustainability, sustainable development, sustainable entrepreneurship, emerging countries, entrepreneurs*

INTRODUCTION

Entrepreneurship is considered to be an engine for economic development and hence is especially desirable for emerging countries to support rapid growth. Entrepreneurs can facilitate social transformation in favor of products and services produced in a sustainable way. Consequently, the sustainable orientation of entrepreneurship contributes to sustainable development goals (SDGs) and avoids environmental degradation. On the other hand, the sustainable development agenda can also affect entrepreneurship. Sustainability, as the effort to balance economic, social, human, and ecological goals, takes into consideration the fact that organizations operate in a complex, interdependent environment.

The concept of sustainable development engages in improving human wellbeing over a long-term period within the sustaining ecosystems (United Nations [UN], 1972). The concept explains that human wellbeing must not be achieved at the cost of a damaged environment, which poses a question of how sustainable development could be interpreted from the point of view of smaller private enterprises (Parrish, 2010). Sustainability-driven enterprises should endure business activities while contributing to sustainable development (Atkinson, 2000).

In recent years, considerable attention has been devoted to entrepreneurship, including social, environmental, sustainable, green, and women entrepreneurship in the academic literature. Entrepreneurs are focused on solving concerns through innovative entrepreneurial activities and business ventures. Entrepreneurship is seen as a driver for economic growth through innovation, job creation, technologies, positive impact on exports and GDP/capita (Cumming, Johan, & Zhang, 2014). Especially, social entrepreneurship has attracted the attention of scholars and practitioners for its capability to contribute to solving urgent social problems and responding to grand challenges (Bacq, Geoghegan, Josefy, Stevenson, & Williams, 2020). Social enterprises strive to couple entrepreneurship with sustainable

development, offering the potential for the implementation of SDGs. Moreover, social entrepreneurship is defined differently in diverse countries, highlighting the variances in developed and developing country contexts (Starnawska, 2016; Defourny, Mihály, Nyssens, & Adam, 2021). The definitions agree that social enterprises combine business activities with social missions to serve vulnerable people (Defourny et al., 2021; Gigauri, 2022) and help society to transform instead of generating profit for its founders (Martin & Osberg, 2007). Searching innovative solutions, social entrepreneurs achieve scaled social impact (Lubberink, Blok, Van Ophem, & Omta, 2019).

Miller (1983) defined entrepreneurial orientation as “one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with ‘proactive’ innovations, beating competitors to the punch.” Entrepreneurial orientation includes proactiveness, innovation, and risk-taking, and favorably impacts firm performance (Razaei & Ortt, 2018). Entrepreneurial orientation includes “processes, practices, and decision-making activities” (Lumpkin & Dess, 1996), leading to innovations and defining the market potential of a company (Kiyabo & Isaga, 2020).

Although sustainable development encompasses social, environmental, and economic aspects to be balanced, the sustainability concept is described as maintaining “critical natural capital intact for transferal to future generations” (Reijnders, 2021), taking into account that natural resources cannot be substituted by economic resources. For example, forests can be a source of raw material for business, but simultaneously they are the only non-substitute source of oxygen and biodiversity (Singh, Murty, Gupta, & Dikshit, 2009; Geissdoerfer, Savaget, Bocken, & Hultink, 2017). Therefore, the substitutability of natural resources by human-made capital is restricted, but, on the other hand, the “substitution of manufactured capital by natural capital” is possible (Reijnders, 2021). Accordingly, a long-lasting negative impact on natural capital would occur if human-made capital substitutes natural capital, and hence, this would be unjust towards future generations due to the unfair distribution of natural resources between generations (Reijnders, 2021). In this regard, sustainable development centers on sustainability in entrepreneurship activities. Sustainable entrepreneurship pursues economic, ecological, and social goals, which are integrated into business operations. While recognizing and using business opportunities, entrepreneurs must also consider sustainability aspects, as “business as usual” is no longer acceptable (and effective) these days. Thus, sustainability in entrepreneurship means implementing entrepreneurial activities without damaging the environment.

To address the gap in the literature regarding the relationship between sustainability and entrepreneurship, the study answers the following research question (RQ):

RQ: What is the association between entrepreneurship and sustainable development in emerging countries?

The aim of the paper is to investigate the correlation between sustainable development and entrepreneurship in emerging countries. In order to achieve the research objective, relevant literature was reviewed, and a bibliometric analysis was conducted. Further, hypotheses were formulated and tested. The paper discusses the variables reflecting entrepreneurship in emerging economies and its connection with sustainable development.

This paper is divided into six sections. After the introduction, the relevant literature on entrepreneurship and sustainability in emerging countries is reviewed. The section is concluded by hypothesis formulation and bibliometric analysis. Next, data and methodology are described, followed by empirical results and a discussion of the results. The final section provides conclusions highlighting the research implications on theory and practice, including limitations and suggesting future research avenues.

LITERATURE REVIEW

Entrepreneurship and sustainable development

Sustainable development is an important concept for business and policy, reflecting the progress on pressing environmental issues such as ecosystem degradation and climate change. It is defined as the development meeting the needs of the present, but also protecting Earth's life-support system in order to assure the welfare of current and future generations (Griggs et al., 2014). As the laws of physics will not change (Foley, 2017), the solution is that society respects the boundaries of the "safe operating space" (Rockström et al., 2009; Steffen et al., 2015) and limit harmful emissions (Hummels & Argyrou, 2021). Although "sustainability is a pluralist concept" (Byrch, Milne, Morgan, & Kearins, 2015), broadly, it focuses on the triple bottom line suggesting that economic growth, flourishing society, and protecting the environment can be accomplished simultaneously (Larsen, 2008). In this sense, it unifies economic, social, and ecological concerns and proposes a new way of thinking that recognizes the world as interconnected between nature, society, and the economy (Hopwood, Mellor, & O'Brien, 2005).

Sustainable development is defined as “to meet the needs and aspirations of the present without compromising the ability to meet those needs of the future” (UN, 1987).

Regarding this, entrepreneurship represents a significant driver in the process of transformation towards sustainable products and services (Hall, Daneke, & Lenox, 2010), being seen as a universal solution for many social and environmental concerns (Brugmann & Prahalad, 2007; Arthus-Bertrand & Handy, 2003; Senge, Lichtenstein, Kaeufer, Bradbury, & Carroll, 2007; Hart & Milstein, 1999; Wheeler et al., 2005). Thus, entrepreneurship represents a way to ameliorate and improve environmental and social disruptions (Cohen & Winn, 2007; Hall & Vredenburg, 2003; Gigauri, 2022; Hart & Milstein, 1999; Hart & Christensen, 2002; Senge & Carstedt, 2001; Coase, 1974; North & Thomas, 1970; Demsetz, 1970; Pigou, 1912).

Entrepreneurship has a significant role in business, but not necessarily a productive one (Baumol, 1990), being influenced by “information asymmetry and prior knowledge,” “social networks,” “the entrepreneur’ personality traits” and/or “type of opportunity” (Ardichvili, Cardozo, & Ray, 2003). In the process of change and societal transformation, entrepreneurs are motivated by environmental degradation and supply entrepreneurial opportunities, which generates profit and improvements in social welfare (Dean & McMullen, 2007). Thus, entrepreneurship is providing institutional change and societal transformation (Santos, 2012; Stål & Bonnedahl, 2016; Salmivaara & Kibler, 2020), being very important to establish an equilibrium between the demands of the economy and the ecological support systems.

Shepherd and Patzelt (2011) highlighted that “the mechanism of inducing change” is based both on “what is sustained and what is developed.” What is to be sustained is referring to environment-friendly institutions, community-based institutions, and institutional trade-offs and what is to be developed is referring to economic benefits, and non-economic gains for others. Therefore, entrepreneurship involves the simultaneous presence of profitable opportunities and of enterprising individuals (Venkataraman, 1997), with a positive social impact on the achievement of sustainable development goals (Seelos & Mair, 2004). The efficacy of the entrepreneurial activity is significantly influenced by the nature of market impulses, known in the literature as the prisoner’s dilemma. In this context, entrepreneurs are facing disagreements between individual rewards and collective goals in order to achieve sustainable development, being compelled to environmentally degrading behavior (Pacheco, Dean, & Payne, 2010).

Entrepreneurial collaboration influences sustainability in three ways: first, for cross-actor participation within entrepreneurial processes; second, for coordinating across sustainability issues and between entrepreneurial

solutions; and third, for cross-sector cooperation between different forms of entrepreneurship, the collaborative entrepreneurship being linked with sustainable development (Schaltegger, Beckmann, & Hockerts, 2018).

Entrepreneurship positively influences economic growth and, respectively, job creation and social well-being (Audretsch & Keilbach, 2004; Audretsch, 2005; Alpkhan, Bulut, Gunday, Ulusoy, & Kilic, 2010; Acs, Audretsch, Braunerhjelm, & Carlsson, 2012; Méndez-Picazo, Galindo-Martín, & Ribeiro-Soriano, 2012; Nissan, Galindo, & Picazo, 2012; Castaño, Méndez, & Galindo, 2016; Doran, McCarthy, & O'Connor, 2018; Stoica, Roman, & Rusu, 2020; Gigauri, Panait, Apostu, & Raimi, 2022). The increased interest in environmental problems contributes to develop activities that respect the environment, being a stimulating factor for sustainable development (Méndez-Picazo, Galindo-Martín, & Castaño-Martínez, 2021; Panait, Hysa, Petrescu, & Fu, 2022). Entrepreneurship is considered an alternative to unemployment and poverty, being a panacea for development (Bogan & Darity, 2008; Apostu, Mukli, Panait, Gigauri, & Hysa, 2022), significantly contributing to achieving sustainable growth, and together with small businesses it represents the basics of economy (İyigün, 2015).

A key factor for entrepreneurship is represented by innovation, representing a continuous, systematic activity that focuses on the entire organization, including its organizational forms and methods (Sawhney, Wolcott, & Arroniz, 2006; Hamel, 2006). Innovation has an impact on the capacity of an organization to support its competitive advantages, and helps the organization provide better answers to rapid and sudden changes within the market and economy (Du, Bhattacharya, & Sen, 2011; Flammer, 2015; Wadhwa & Kotha, 2006; Miller, Fern, & Cardinal, 2007). It is based on policy tools or measures that are very important for the transition of society and the economy to sustainability (Ionescu et al., 2020). In order to achieve sustainable development, an association between entrepreneurship and innovation is necessary (Iqbal, Khan, Gill, & Abbas, 2020). The recognition of entrepreneurship as a solution to environmental degradation and social inequality led to the appearance of a new type of entrepreneurial activity, namely sustainable entrepreneurship (Muñoz & Cohen, 2018). Sustainable entrepreneurship alludes to entrepreneurial actors who can achieve economic returns by exploiting environmentally relevant market failures (Dean & McMullen, 2007).

Social enterprises are emerging as a source to solve pressing social and environmental problems through their value-based business approach and step forward to mitigate the impact of health and economic crises while contributing to economic growth and promoting social equality (Gigauri et al., 2022; Gigauri & Bogacz-Wojtanowska, 2022). Through innovative

solutions, social enterprises address sustainable development goals and create social impact while raising awareness among investors and the public (Gigauri et al., 2022).

Although new ventures are considered a solution to social and ecological challenges (Hall et al., 2010), there are differences in this respect among developed and developing countries. Sustainability damages are often found in developing economies due to their weak regulation systems and unsustainable business practices (Kshetri, 2021; Fikru, 2014). Moreover, effective mechanisms forcing sustainable activities in developed countries cannot be effective in emerging markets (Kshetri, 2017). Furthermore, technological progress enabling sustainable entrepreneurship is more developed in advanced economies but shows great promise for emerging countries (Kshetri, 2021). In addition, sustainable entrepreneurship can be attractive for developing economies only if it contributes to economic growth, which is seen as the main possibility to increase the welfare of a country (Hall et al., 2010).

Entrepreneurship in emerging countries

Emerging countries are very important in the current economic scenario, representing approximately half of both the world population and the global gross product (Casanova & Miroux, 2017). Even though, the observed growth of these countries has registered a downward trend since 2013 due to the global financial crisis that started in 2008 (Kantis, Federico, & García, 2020). Emerging economies are characterized by an increasing market orientation and an expanding economic foundation, many of these are becoming major economic forces in the world and entrepreneurship is playing a key role in this economic development (Bruton, Ahlstrom, & Obloj, 2008). In developing countries, entrepreneurship must enhance at the same time economic growth, advance environmental objectives, and improve from a social point of view. Dhahri and Omri (2018) studied entrepreneurial activity in emerging countries, highlighting a positive influence to the economic and social dimensions of sustainable development, and a negative contribution to the environmental dimension.

Entrepreneurship education is a must for sustainable development, providing the youth with the needed entrepreneurial skills in order to be self-reliant. Governments should also be included in entrepreneurial development by giving adequate attention through the requirements of a good economic environment (Arogundade, 2011; Gigauri, 2022). Lourenço, Jones, and Jayawarna (2012) examined attitudes to an entrepreneurial form of sustainability education, indicating a strong relationship between the

perception of learning benefits and the intentions of aborning entrepreneurs to achieve a profit. The first mentality is negatively associated with perceptions of benefit; instead, learning is not affected.

Emerging countries are characterized by a “youth bulge,” meaning a population dominated by young people. Thus, governments must take appropriate measures in order to make the best benefit of this young population, otherwise, the results will be a rising trend regarding unemployment (Zaki & Rashid, 2016), leading to an unemployed young population becoming entrepreneurs. Thus, the emerging economies are confronted with a high level of entrepreneurship due to less difficult entry barriers and high levels of need for entry, particularly in the informal sector (Omri, 2020).

The emerging markets are associated with high institutional uncertainty, which can be a barrier to entrepreneurship, but they also provide important opportunities for entrepreneurs (Tracey & Phillips, 2011). Kirzner (1992) considers that a free market encourages entrepreneurship from a legal, political, constitutional, and economic perspective. In emerging countries, liberalized environments lead to improved business climates (Okoroafo, 1993) and a free market representing an instrument for entrepreneurial activity (Herrera-Echeverri, Haar, & Estévez-Bretón, 2014). Entrepreneurial activities are significant in emerging economies due to an increasingly market orientation and an expanding economy, with entrepreneurship playing a key role in economic development (Ahlstrom & Bruton, 2008; Bruton et al., 2008).

Another important factor regarding entrepreneurship in emerging countries is reflected by good government (Ong, 2006), which has recently become a buzzword both for scholars and political decision-makers (Omri, 2020). Ahlstrom and Bruton (2006) highlighted that in the case of emerging economies, fundamental and comprehensive institutional transformations are encountered as their economies grow.

Thus, formal entrepreneurship is encouraged by several factors, such as good economic and political institutions, efficient regulation of the economy, and well-defined property rights and solid laws (Havrylyshyn, 2001; Kaufmann, Kraay, & Mastruzzi, 2006). Although there are numerous studies confirming governance quality which significantly influences entrepreneurship activities in emerging countries, in the case of economies in their early stages of development, the improvement of governance quality does not lead to encouraging people to register their businesses (Thai & Turkina, 2014).

Governments of emerging economies are interested in startups and young firms as they are potential engines of economic growth and structural transformation (Gries & Naudé, 2010). Although there is a high interest in this topic, there is not so much research in the literature (Acs & Amoros,

2008; Bruton et al., 2008; Kantis, 2005; Smallbone, Welter, & Ateljevic, 2014), thus policymakers are not provided with a clear evidence-based platform in order to design their policies and programs.

Due to intense global competition, rising market volatility, constantly changing consumer demand, and shortened product life cycles, companies all over the world are being affected, with disruptive innovation and disruptive innovation-based entrepreneurship becoming strategic means to achieve sustainable company growth and competitiveness (Si, Zahra, Wu, & Jeng, 2020), especially in emerging countries.

Reviewing the above entrepreneurial literature in emerging countries, it is also noteworthy that there are not only differences between developed and emerging countries, but also within developing countries in terms of their economic development, legislation, education, demographical conditions, access to finances, technological advancement, or innovativeness. Besides, attitudes towards entrepreneurship can vary, leading to entrepreneurial motivation. However, our study focuses on emerging countries, assuming they share one important similarity: developing economies.

HYPOTHESIS FORMULATION

Entrepreneurs' solutions to environmental degradation

Entrepreneurship has a vital role in solving the environmental challenges the world is facing. The traditional theory regarding the environment and welfare indicates that market failures in the economy impede entrepreneurial activities to solve environmental problems, motivating environmentally degrading entrepreneurial behaviors (Pigou, 1932; Tietenberg, 2000; Cropper & Oates, 1992; Bator, 1958). There are also authors considering entrepreneurship as a modality of solving market failure problems (Coase, 1974; Buchanan & Faith, 1981; North & Thomas, 1970, Demsetz, 1970) and, respectively, issues related to the environment (Anderson & Leal, 1997, Anderson & Leal, 2001). Regarding this, York and Venkatatraman (2010) contradicted the idea that entrepreneurs cause environmental degradation, launching solutions for this issue.

In this context, environmental entrepreneurship was born as a subset of sustainable entrepreneurship, representing the entrepreneurial action that solves environmental challenges. Thus, entrepreneurial action can lead to achieving ecological sustainability (Dean & McMullen, 2007). Despite social entrepreneurship, which tends to address mission-driven instead of profit-driven entrepreneurial endeavors (Dees, 2001; Mort, Weerawardena, & Carnegie, 2006), sustainable entrepreneurship is characterized by its

alleviation of environmental market failures through the exploitation of profitable opportunities (McMullen, 2007).

The entrepreneurs' motivations for pursuing sustainable activity

Although many discussions deal with the factors motivating entrepreneurs to undertake sustainable ventures (Schaltegger, 2002), there are only a few studies on this issue (Schlange, 2006). Walley and Taylor (2002) referred to a typology founded in entrepreneurship theory (Thompson, 1998; Post & Altmann, 1994; Giddens, 1984). Based on the external and internal influences on observed entrepreneurial behavior, four ideal types of "green entrepreneurs" are concluded. The external factors are characterized as "soft" (personal networks) as opposed to "hard" structural influences (economic structure of society). The internal factors of the entrepreneur vary between predominating economic objectives with no green orientation and a sustainability orientation. In this context, green entrepreneurs register different levels of commitment to sustainability issues and their motivation can be differentiated along distinct context variables (Schaltegger, 2002). Parrish (2010) highlighted the fact that entrepreneurs are motivated by opportunity-driven variables in order to build a profitable activity and by sustainability-driven variables with the aim to achieve profit objectives.

The external drivers are: geographical influence (Linnanen, 2002), market choice (the reason for market emergence) (Schaltegger, 2002), and structural influences (degree of enforcement of environmental standards) (Walley & Taylor, 2002). The internal factors are deduced from the entrepreneurial motivation structure: sustainable entrepreneurs following their desire to change the world, make money, or combine both (Schaltegger, 2002). The internal factors are: priority of environmental business goals (Schaltegger, 2002), orientation of entrepreneurial mindset (Walley & Taylor, 2002), and entrepreneurs' desire (Linnanen, 2002).

Sustainability orientation leads to entrepreneurial propension

In the literature we found that entrepreneurship is very important for sustainable development because entrepreneurs will follow entrepreneurial opportunities caused by market imperfections to achieve entrepreneurial rents (Kuckertz & Wagner, 2010). The entrepreneurial opportunities based on market imperfections are not always the same as those promising the highest entrepreneurial rents (Dean & McMullen, 2007).

Entrepreneurial intentions and behavior were associated with individual personality (Baum, Frese, & Baron, 2007), self-efficacy, risk-taking propensity,

or optimism (Fraser & Greene, 2006; Rauch & Frese, 2007). In the case of sustainable development, the individual's sustainability orientations are the result of the individual's interests in understanding the emergence of organizations (DiMaggio, 1988).

People concerned about environmental problems act according to their values and engage in voluntary actions (Bruyere & Rappe, 2007). In some cases, policy makers can solve market imperfections, but in other cases, they are associated with entrepreneurial opportunities (Cohen & Winn, 2007; Dean & McMullen, 2007). Thus, individuals interested in sustainability will be predisposed to accept entrepreneurial opportunities resulting from unsustainable economic behavior, as the perception of entrepreneurial opportunities depends on prior individual knowledge (Shane, 2000). Zahra, Gedajlovic, Neubaum, and Shulman (2009) consider that opportunities for sustainable entrepreneurship might not be seen as opportunities, in some cases being hard to be distinguished, sustainability orientation being ascribed to entrepreneurs as individuals rather than to businesses (Kuckertz & Wagner, 2010).

The orientation towards sustainability includes attitudes and personal traits on social responsibility and environmental protection (Sung & Park, 2018; Popescu, Hysa, & Panait, 2022). In what concerns the individual level, the orientation to sustainability is reflected by the proactive orientation toward societal and environmental issues of a business owner or manager (Diehl, Greenvoss, & Klee, 2015). In the case of business, the sustainability orientation reflects a company's philosophy of doing business in a socially and environmentally sustainable way (Roxas & Coetzer, 2012), leading to competitive advantage and superior financial performance (Claudy, Peterson, & Pagell, 2016).

According to Tran and Von Korflesch (2016), entrepreneurial behavior can be predicted using intentions. The Theory of Planned Behaviour (TPB) claims that intentions can be useful in order to predict actual behavior (Ajzen, 1991), using TPB the actual entrepreneurial behaviors (Hockerts, 2017) and human behavior (Armitage & Conner, 2013; Yuzhanin & Fisher, 2016) can be predicted.

The attitude towards sustainability and perceived entrepreneurial desirability enhances sustainability-oriented entrepreneurial intentions (Vuorio, Puumalainen, & Fellnhofer, 2018). Kuckertz and Wagner (2010) indicated a positive relationship between sustainability orientation and entrepreneurial intention. Instead, business experience negatively influences this relationship.

Based on the extant literature, the following hypotheses were formulated:

H1: Entrepreneurship significantly influences sustainable development in emerging countries.

H2: Sustainable development significantly influences entrepreneurship in emerging countries.

Bibliometric analysis on entrepreneurship in sustainable development in emerging countries

Bibliometric analysis represents a quantitative study of bibliographic material in order to provide a general picture of a research topic (Merigó & Yang, 2017). It is an integral part of research evaluation methodology, mainly within the scientific and applied fields (Ellegaard & Wallin, 2015). Norton (2010) defines bibliometrics as the measurement of texts and information. Using bibliometrics, Porter, Watts, and Anderson (2003), Porter and Watts (2005), and Pilkington (2003) identified hidden patterns by classifying information. Therefore, we used bibliometric analysis to create a comprehensive image of the literature regarding entrepreneurship in sustainable development in emerging countries. We investigated all published papers in the Web of Science database related to the association of the words: “entrepreneurship,” “sustainable development,” “emerging countries,” the result being represented by 79 articles from 2002 until 2021.

As shown in Figure 1, the number of published papers and citations illustrates a hyperbolic progression. There is a jump in the number of publications after 2012 and a rise in the number of citations after 2018. Thus, there has been a growing interest in the field in the last decade, with the main focus being on entrepreneurship for sustainable development.

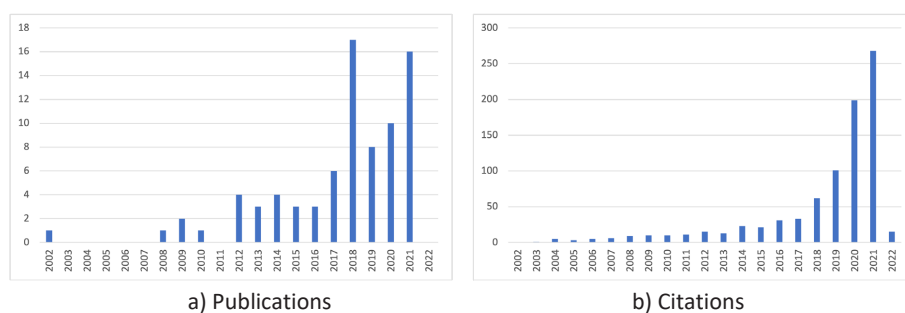


Figure 1. Dynamics on (a) publications and (b) citations in the field

Source: Authors' selection from WoS database, based on selected words, using Excel.

Analyzing a country's interest for the 'entrepreneurship in sustainable development in emerging countries' topic, the most influential countries in the field are countries in cluster 1 (Figure 2). The top five productive countries of publication are: the UK, China, USA, India, and Spain, registering the most participation in the field, with 9, 8, 8, 7, and 6 papers, respectively.

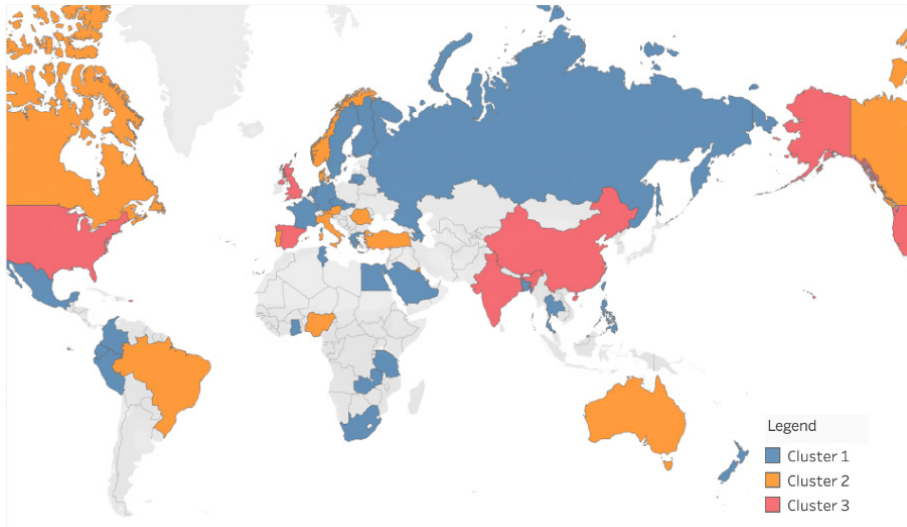


Figure 2. Country analysis

Source: Authors' selection from WoS database, based on selected words, using Tableau.

Exploring the amount of information offered by the word clouds, we tried to identify the most common words found in the scientific articles. The co-occurrence of authors' words in the publications is investigated, taking into account a frequency of at least eight times, using a correlation degree greater than 0.5 and a threshold of 0.5. The analysis has been done using the VOS programme.

In order to recognize the common words, we used cluster analysis on a keyword network, which was extracted from the papers. The results are presented in Figure 3, highlighting the words that record the highest frequencies of occurrence, which, apart from the keywords used, are: opportunity, innovation, knowledge, strategy, network, and challenge.

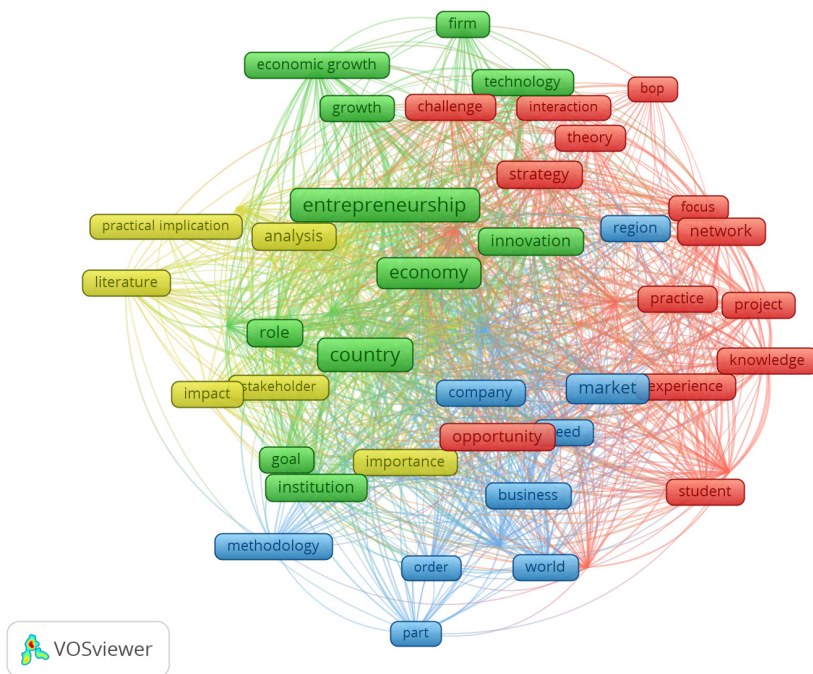


Figure 3. Most common words and word network in scientific publications' content

Source: Authors' selection from WoS database, based on selected words, using VOS program.

The combinations of words most encountered were explored by the most correlated words within the selection of articles. The empirical results (Figure 3) highlighted four significant clusters of the most common combinations in the selected 79 studies in the field. These are:

- Cluster 1: bop, challenge, education, entrepreneur, experience, focus, interaction, knowledge, network, opportunity, practice, project, relationship, society, strategy, student, theory;
- Cluster 2: country, economic growth, economy, entrepreneurship, firm, goal, government, growth, innovation, institution, perspective, role, technology;
- Cluster 3: business, company, creation, market, methodology, need, order, part, person, region, sustainable development, world;
- Cluster 4: analysis, development, economic development, factor, impact, importance, literature, practical implication, stakeholder.

As can be observed from the four clusters, the most encountered words are related to entrepreneurship and sustainable development.

DATA AND METHODOLOGY

To identify whether entrepreneurship influences sustainable development in emerging countries, we used the following variables: new business density rate, total business density rate, closed business density rate (reflecting entrepreneurship), and SDG index (representing sustainable development) for 29 countries for the period 2009–2020. The source data is represented by the World Bank database and Sustainable Development Report. A short description of the variables is presented in Table 1.

Table 1. Variables description

Variables	Variables description	Source
CBDR	The number of deregistered firms with limited liability per 1,000 working-age people (ages 15-64)	https://www.worldbank.org/en/programs/entrepreneurship/methodology
NBDR	New business density (new registrations per 1,000 people ages 15-64)	https://data.worldbank.org/indicator/IC.BUS.NDNS.ZS
TBSR	The total number of registered firms with limited liability per 1,000 working-age people (ages 15-64)	https://www.worldbank.org/en/programs/entrepreneurship/methodology
SDG	The overall score measures the total progress towards achieving all 17 SDGs	https://dashboards.sdgindex.org/rankings

For highlighting the variables on entrepreneurship influencing the SDG index in the emerging countries panel regression (static model) was used, being specified as follows:

$$Y_{it} = c + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{k=1}^K \beta_k Z_{it}^k + \sum_{l=1}^L \beta_l W_{it}^l + e_{it} \tag{1}$$

where Y, X, W, and Z are different vectors of pull and push determinants.

To test the variables’ stationarity, the study used the Levin, Lin, and Chu – LLC (Levin et al., 2002), Im, Pesaran and Shin W-Stat - IPS (Im et al., 2003), ADF-Fisher Chi-Square, and PP-Fisher Chi-Square tests. In order to investigate

the existence of structural breaks, the robustness was checked both on single cross-section units and on the whole panel dataset.

Referring to the Static Panel data model, three different methods can be detected: Common Constant, Fixed Effects, and Random Effects. The Common Constant method considers no differences among the data matrices of the cross-sectional dimension (N). In the case of the Fixed Effect Model (FE), differences between units can be accommodated from different intercept. In the case of the Random Effects Model (RE), interference variables may be interconnected between time and units (Apostu et al., 2022).

To select between random and fixed effects, the Hausmann test was used to detect the presence of statistically significant unobserved fixed effects (Hausman, 1978). Robustness checks (heteroskedasticity of residues, autocorrelation of residues and dependence of residues between the panels) was conducted by the Wooldridge autocorrelation test (Wooldridge, 2002) and Wald test (heteroskedasticity of residues), Pesaran test (dependence of residues between the panels) and Greene heteroscedasticity test (Greene, 2003) and LM test (autocorrelation of residues). We used Eviews 13 Student version to estimate the analysis models.

RESULTS

To answer the research objectives related to the determinant factor in the emerging countries related to SDG, we used a panel data equation model as follows:

$$SDG_{it} = c + \sum_{j=1}^J \beta_j NBDR_{it}^j + \sum_{k=1}^K \beta_k TBSR_{it}^k + \sum_{l=1}^L \beta_l CBDR_{it}^l + e_{it} \quad (2)$$

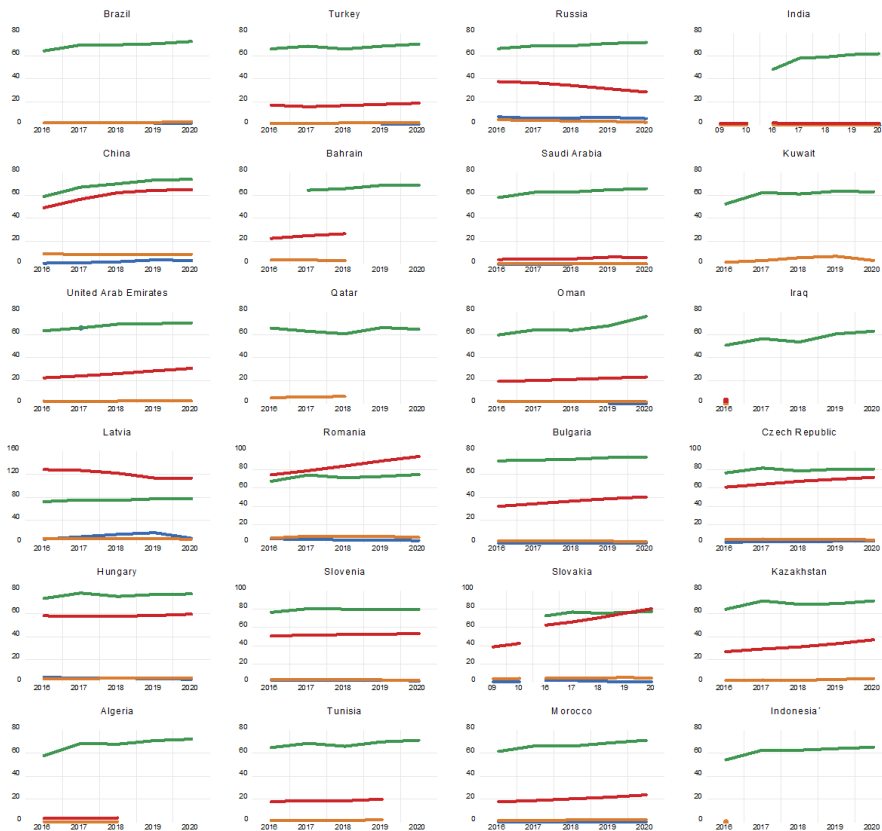
The dependent variable is represented by the SDG index. The explanatory variables included in the regression equations are: new business density rate (NBDR), total business density rate (TBSR), and closed business density rate (CBDR).

In order to examine the characteristics of the countries included in the sample, descriptive analyses of the data were conducted (Table 2). The average CBDR in the sample is 3.46%, varying from 0.02% and 66%, with a standard deviation of 8.32%. The minimum value for NBDR is 0.15%, the maximum value is 10.66%, the mean value is 4.17%, and the standard deviation is 2.79%. TBSR oscillates between 1.45% and 128.56%, with a standard deviation of 32.81% and a mean of 51.38%. The SDG index registers the lowest value of 57.20 and the highest value of 81.90. The average value for the sample is 71.79, and the standard deviation of 5.78.

Table 2. Summary statistics of dependent and explanatory variables

Variables	CBDR	NBDR	TBSR	SDG
Mean	3.457	4.169	51.375	71.789
Min.	0.015	0.1531	1.453	57.200
Max.	66.000	10.656	128.562	81.900
Std. Dev.	8.318	2.788	32.814	5.782

As we can see in Figure 4, the trends for the variables in the sample are slightly different, but in most of the cases, SDG registers an ascending trend, concluding that all countries have taken measures in order to achieve sustainable development goals.



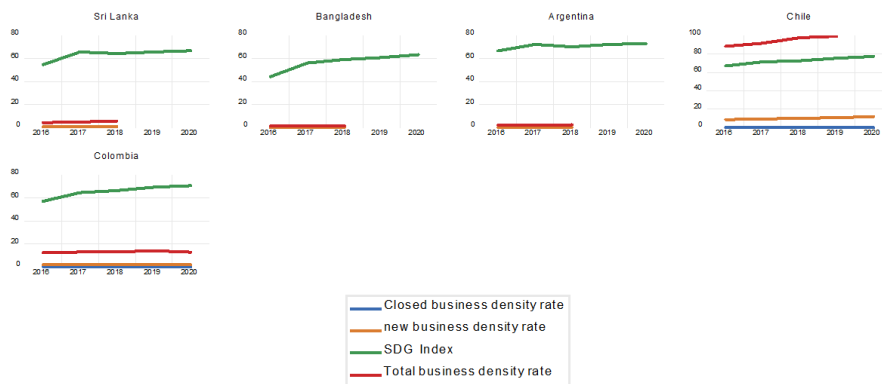


Figure 4. Trends regarding the variables in the analysis

An important step is identifying the cross-sectional dependence between variables, and for this, we performed the Pesaran cross-sectional dependence test (Table 3). The results concluded to reject the null hypothesis, thus, there is no cross-sectional dependence, i.e., the variables are not correlated to each other.

Table 3. Results from cross-sectional dependence test

Test	Statistic	Prob.
Breusch-Pagan LM	1406.887	0.0000
Pesaran LM normal	35.124	0.0000
Pesaran CD normal	35.232	0.0000

The stationarity of the variables was tested through unit root tests using the augmented Dickey–Fuller and Im, Pesaran, and Shin unit root tests. The variables CBDR and SDG are stationary at level and the variables NBDR and TBSR are stationary after the first difference for a probability of 95%, registering a value of less than 0.05 (Table 4).

In order to check causality, the Granger causality test is employed (Table 5). The result confirmed the role of CBDR on NBDR, but not vice versa. CBDR and NBDR cause TBSR, and CBDR causes SDG for the countries in the sample. This can be explained by the fact that total business density rate and closed business density rate have an influence on the sustainable development index, thus, sustainable development represents the result of density rate for enterprises and closed enterprises. Instead, sustainable development does not cause changes in entrepreneurship in the case of emerging countries.

Table 4. Unit root tests for the full sample

Variables	Levin, Lin & Chu		Im, Pesaran & Shin W-Stat		ADF-Fisher Chi-Square		PP-Fisher Chi-Square	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
CBDR	-2.682	0.004	-0.161	0.436	26.590	0.431	34.902	0.114
NBDR - level	2.553	0.995	2.637	0.996	31.545	0.881	40.926	0.518
NBDR - first difference	-15.052	0.000	-34.077	0.000	92.616	0.000	106.441	0.000
TBSR - level	5.599	1.000	3.182	0.999	35.596	0.581	54.513	0.040
TBSR - first difference	-11.789	0.000	-77.821	0.000	63.262	0.002	70.843	0.000
SDG	-19.426	0.000	-9.311	0.000	146.899	0.000	175.401	0.000

Table 5. Granger causality results among the variables

Null hypothesis	F-statistic	Prob.
NBDR does not Granger Cause CBDR	1.352	0.279
CBDR does not Granger Cause NBDR	6.449	0.006
TBSR does not Granger Cause CBDR	0.023	0.978
CBDR does not Granger Cause TBSR	9.618	0.001
SDG does not Granger Cause CBDR	0.117	0.890
CBDR does not Granger Cause SDG	2.506	0.097
TBSR does not Granger Cause NBDR	0.749	0.480
NBDR does not Granger Cause TBSR	4.310	0.021
SDG does not Granger Cause NBDR	0.938	0.400
NBDR does not Granger Cause SDG	3.025	0.060
SDG does not Granger Cause TBSR	0.244	0.785
TBSR does not Granger Cause SDG	0.739	0.485

The static results using fixed/random effect estimations are prescribed by Hausman’s specification test (Table 6), highlighting random effect estimates are appropriate due to accepting the null hypothesis of random effect applicability. The results are also confirmed by the Redundant Fixed Effects Test.

Static results (Table 7) indicated that the SDG index is significantly influenced by the total business density rate in emerging countries, with the correlation between them being negative. Instead, new business density rate and closed business density rate do not influence sustainable development in the emerging countries.

Table 6. Correlated random effects - Hausman test

Test summary	Chi-Sq. Statistics	Chi-Sq. d.f.	Prob.
Cross-section random	2.420	3	0.489

Cross-section random effects test comparisons

Variables	Fixed	Random	Var (Diff.)	Prob.
CBDR	-0.234	-0.084	0.071	0.574
D(NBDR)	-0.161	-0.290	0.077	0.641
D(TBSR)	-0.351	-0.295	0.002	0.259

Table 7. Static panel results

Variables	Coefficients	Std. Error	t-Statistic	Prob.
CBDR	-0.084	0.082	-1.022	0.311
D(NBDR)	-0.290	0.623	-4.466	0.643
D(TBSR)	-0.295***	0.110	-2.677	0.010
Intercept	72.808	1.379	52.789	0.000
R2	0.125			
F-statistic	2.579			
Prob (F-statistic)	0.063			
Applicability of model	Random effects			
No. of observations	85			

Note: *** - 1% significance level.

Also, the following assumptions were verified: heteroskedasticity of residues (Wald test); dependence of residues between the panels (Pesaran test) and autocorrelation of residues (LM test). In order to test the normality of the residuals, we used the histogram (Figure 5). According to it, it is depicted that the residuals are normally distributed because the Jarque-Bera test value is 2.267, which is found to be non-significant at the 5% level of significance.

Therefore, the analysis results indicate that entrepreneurship significantly influences sustainable development, confirming H1. Instead, sustainable development does not cause an increase in the case of variables reflecting entrepreneurship in emerging countries, invalidating H2.

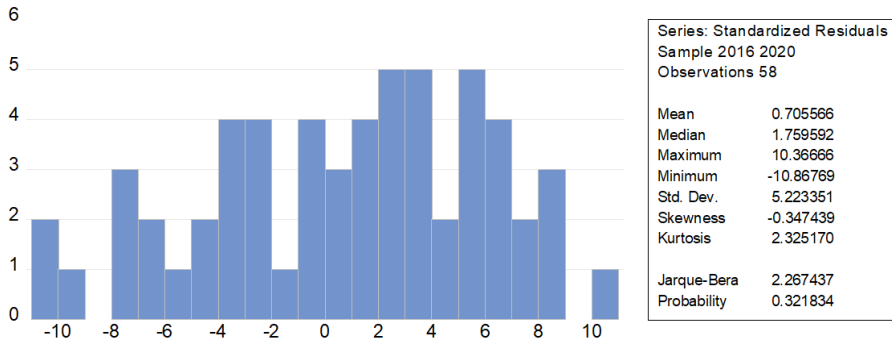


Figure 5. Characteristics of residuals based on the random-effects model

DISCUSSION

Since sustainable concerns are becoming of great significance, society anticipates that entrepreneurial practices focus on balancing sustainability and profitability (De Clercq & Voronov, 2011). Consequently, entrepreneurship must take into consideration sustainability development while striving for financial gains. Furthermore, enterprises play an important role in economic development, especially in emerging markets. Developing countries offer a dynamic environment for investment and entrepreneurial potential. Entrepreneurs are motivated to change and improve the existing situation. Accordingly, entrepreneurship, seen as an economic driver for development and transformation, requires that governments support entrepreneurial ecosystems in order to fully realize their developmental potential and facilitate economic growth (e.g., Kantis et al., 2020; Audretsch & Keilbach, 2004; Alpkam et al., 2010; Nissan et al., 2012; Stoica et al., 2020).

The results of our research suggest that entrepreneurship significantly influences sustainable development. All emerging countries in our sample have taken actions to achieve sustainable development goals. The findings are in line with previous studies emphasizing the positive impact of entrepreneurship on economic and social aspects of sustainable development (e.g., Dhahri & Omri, 2018; Hall et al., 2010). These results also confirm the contribution of entrepreneurship to sustainable development goals (Seelos & Mair, 2004). It should be noted that although the results show that entrepreneurship significantly influences sustainable development, the concept of sustainable development affects entrepreneurship as sustainability influences almost all domains of today’s society. Moreover, social and sustainable enterprises, generating social impact, are the reflection of such an influence.

In addition, sustainable development goals (SDGs) imply to enterprises to operate in harmony with the environment preventing unsustainable use of natural resources. Our research results indicate that total business density in emerging economies influences the SDG index. However, sustainable development does not lead to increases in variables reflecting entrepreneurship in emerging countries. This result indicated that, in the case of emerging countries, sustainability does not influence entrepreneurship. Our study presents the relationship between sustainable development and entrepreneurship in the short term.

Prior studies also demonstrated a negative influence of entrepreneurial activities on the environmental dimension of sustainability (e.g., Haldar, 2019; Ben Youssef, Boubake, & Omri, 2018; Dhahri & Omri, 2018). Yet, entrepreneurship positively affects sustainable development in the case of innovation and new technologies (e.g., Ben Youssef et al., 2018; Iqbal et al., 2020).

Moreover, innovation is pivotal for enterprises in developing countries to achieve multiple ends of sustainability. It is an impetus for the growth of entrepreneurship and the implementation of sustainability (e.g., Ben Youssef et al., 2018). In this regard, sustainable entrepreneurship is becoming prevalent to address environmental and market issues (Sung & Park, 2018; Muñoz & Cohen, 2018; Dean & McMullen, 2007). Our research resonates with the literature suggesting the values that bring about sustainable entrepreneurship and that entrepreneurs should have multiple goals for the *raison d'être* of their enterprises (Haldar, 2019).

Since the research results indicate that entrepreneurship significantly influences sustainable development confirming the previous findings (e.g., Sung & Park, 2018; Seelos & Mair, 2004), entrepreneurship education should concentrate on sustainability issues, teaching business and management from the lens of SDGs (Ortiz-de-Urbina-Criado, Mora-Valentín, & Nájera-Sánchez, 2022; Lourenço et al., 2012). Moreover, sustainability-focused individuals can better recognize entrepreneurial opportunities (Sung & Park, 2018; Nordin, Raval, Möller, & Mohr, 2018; Parrish, 2010; Baum et al., 2007).

CONCLUSION

This paper attempted to offer a better understanding of the links between sustainable development and entrepreneurship in emerging countries. The aim of this research was to identify the impact of sustainable development on entrepreneurship and vice versa. Research findings clearly showed that entrepreneurship considerably influences sustainable development. According

to Granger causality, closed business density rate causes new business density rate, but new business density rate does not cause closed business density rate. Closed business density rate and new business density rate cause total business density rate and closed business density rate causes sustainable development goals for the countries in the sample. These results reflect the fact that in the case of emerging countries, the density rate for enterprises and closed enterprises generate changes in sustainable development. Instead, sustainable development does not cause changes in entrepreneurship. To establish the relationship between sustainable development and entrepreneurship, panel regression was also used, the dependent variable being the sustainable development index and the independent variables: new business density rate, total business density rate, and closed business density rate. According to the Hausman test and Redundant Fixed Effects test, the model considered random effects. The results of the regression analysis indicate that the SDG index is significantly influenced by total business density rate in emerging countries, the correlation between them being negative. Instead, new business density rate and closed business density rate do not influence sustainable development in emerging countries.

This research supports the results of other studies and has implications for the theory and practice of entrepreneurship. It contributes to the existing literature by exploring the influence of entrepreneurship on sustainability in emerging economies. The results can be used by governments and policymakers to plan their strategies and policies concerning entrepreneurship and implementation of sustainable development goals. They should promote entrepreneurial activity and control the negative environmental impact of enterprises simultaneously. For about four decades, scholars have advocated sustainability-driven entrepreneurship, sustainable production, and responsible consumption (Haldar, 2019). If entrepreneurship supports sustainable development, entrepreneurial practice needs to be encouraged. In addition, the adoption of innovation and new technologies should be promoted in enterprises in order to implement sustainability.

Governments in developing countries pay attention to the potential benefit of entrepreneurship to contribute to economic and social development. To realize this strategy, entrepreneurs need a stimulating environment and support from the government. Consequently, policymakers can develop programs to encourage entrepreneurs to build their ventures. Governments can create an enabling environment for entrepreneurs by removing barriers, supporting collaboration, accessing financial resources, and reducing entry regulations and costs for entrepreneurs.

Moreover, entrepreneurial capabilities need to be developed as rapid and constant changes occur. In this regard, education programs should

provide sustainability-oriented teaching in business and management courses. Nurturing an entrepreneurial culture has a crucial role in enhancing entrepreneurial orientation with an emphasis on sustainability.

The authors are aware of the limitations of the research that emerged from the sample of countries, and the indicators used. Given that this study analyzes only the influences of entrepreneurship on sustainability and the impact of sustainable development on entrepreneurship, this relationship could include more variables that must be explored as sustainable entrepreneurship is a complex process. For this reason, this research should be extended by future studies to investigate other factors, including entrepreneurs' behavioral aspects, cultural and country contexts, entrepreneurial intention and sustainability awareness, affecting the correlation between sustainability and entrepreneurship. In addition, further studies will investigate the difference in the relationship between sustainable development and entrepreneurship in developed and emerging countries while taking into consideration the sectoral, geographical, and economic differentiation of this relationship. Another direction considers sustainable entrepreneurship. Sustainable entrepreneurship includes more components, and starting from the idea that entrepreneurship significantly influences sustainable development in the case of emerging countries, future studies will examine sustainable entrepreneurship in terms of motives and behaviors.

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Abstrakt

CEL: *Przedsiębiorczość postrzegana jako motor rozwoju gospodarczego jest szczególnie pożądana dla krajów wschodzących, aby wspierać szybki wzrost. Co więcej, przedsiębiorcy mogą wspierać transformację społeczną na rzecz bardziej zrównoważonych produktów i usług. Zrównoważona orientacja przedsiębiorczości przyczynia się do realizacji celów zrównoważonego rozwoju i zapobiega deprywacji środowiska. Program zrównoważonego rozwoju może również wpływać na przedsiębiorczość.*

METODYKA: Przeprowadzona analiza bibliometryczna potwierdziła rosnące w ostatnich latach zainteresowanie naukowców korelacją przedsiębiorczości ze zrównoważonym rozwojem. Ponadto regresja panelowa (model statyczny) została wykorzystana do zbadania zmiennych dotyczących przedsiębiorczości wpływających na wskaźnik celów zrównoważonego rozwoju (SDG) w krajach wschodzących. Ponadto wykorzystano regresję panelową (model statyczny) do zbadania zmiennych dotyczących przedsiębiorczości wpływających na wskaźnik celu zrównoważonego rozwoju (SDG) w krajach wschodzących. Ponadto do analizy stacjonarności zmiennych zastosowano testy Levina, Lin i Chu (LLC), W-Stat – IPS, ADF-Fisher Chi-Square i PP-Fisher Chi-Square. W celu zbadania występowania pęknięć konstrukcyjnych sprawdzono wytrzymałość na pojedynczych jednostkach przekroju poprzecznego oraz na całym zbiorze danych panelowych. Ponadto zastosowano test Hausmanna do wyboru między efektami losowymi i stałymi oraz przeprowadzono heteroskedastyczność reszt, autokorelację reszt i zależność reszt między panelami. Dane zostały przeanalizowane za pomocą Eviews 13. **WYNIKI:** W artykule zbadano związek między zrównoważonym rozwojem a przedsiębiorczością w krajach wschodzących. Omówiono wpływ zrównoważonego rozwoju na przedsiębiorczość oraz wpływ przedsiębiorczości na zrównoważony rozwój. **IMPLIKACJE:** Wyniki badań mogą być wykorzystane przez rządy i decydentów do planowania strategii i polityk dotyczących przedsiębiorczości i realizacji celów zrównoważonego rozwoju. Powinny one promować przedsiębiorczość i jednocześnie kontrolować negatywny wpływ przedsiębiorstw na środowisko. **ORYGINALNOŚĆ I WARTOŚĆ:** Badanie odpowiada na lukę w literaturze dotyczącej relacji między zrównoważonym rozwojem a zrównoważoną przedsiębiorczością. Artykuł analizuje wzajemny związek między zrównoważonym rozwojem a przedsiębiorczością, ze szczególnym uwzględnieniem krajów wschodzących.

Słowa kluczowe: przedsiębiorczość, zrównoważoność, zrównoważony rozwój, zrównoważona przedsiębiorczość, kraje wschodzące, przedsiębiorcy

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Conflicts of interest

The authors declare no conflict of interest.

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