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Impact of Entrepreneurship on Sustainable Development in Emerging Markets under the Conditions of COVID-19

Wpływ przedsiębiorczości na zrównoważony rozwój na rynkach wschodzących podczas pandemii COVID-19

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Abstract
This paper investigates the contribution of entrepreneurship to sustainable development and economic growth in emerging markets in the period before and during the COVID-19 pandemic. Additionally, the importance of various measures implemented by entrepreneurs and governments as responses to the changing environment in the COVID-19 pandemic is examined. By employing the data for 20 emerging markets, the findings revealed that only high-growth-expectation entrepreneurship (HEA) had a significant contribution to economic growth before the pandemic, but this relationship became negative during the COVID-19 crisis. Furthermore, this research pointed out that sufficient responses to the COVID-19 pandemic could be a useful instrument to encourage the development of entrepreneurship and revive the economy in the post-COVID period in emerging markets.

Key words: COVID-19, sustainable development, economic growth, entrepreneurship, emerging markets
Słowa kluczowe: COVID-19, zrównoważony rozwój, wzrost ekonomiczny, przedsiębiorczość, rynki wschodzące

1. Introduction
Over the previous two years, the world has worked to contain the unprecedented health and economic crises brought by the COVID-19 pandemic. At the time of this paper release, the outlook for the pandemic and the path to economic recovery remains highly uncertain. In this context, the ongoing health of the economy remains a primary concern for economic policymakers. Previous research shows that entrepreneurship is one of the key drivers of economic growth and sustainable development. But bearing in mind the fact, that the COVID-19 pandemic presents a great challenge for all aspects of society, as well as for entrepreneurship, its role in sustainable development is also unclear.

We assume that the negative trends in the field of entrepreneurship have reduced its contribution to economic growth under the conditions of COVID-19. Many small businesses were closed by December 2021, especially firms in hospitality, retail, personal services, entertainment, and the arts industry, and in addition all SMEs were affected with an average 20% decrease in sales and a 16% decrease in customer base (Digitally Driven, 2021). Also, there was an increase in gender inequality in the field of entrepreneurship in the context of the COVID-19 pandemic, due to female owners of small businesses facing 35% higher losses than their male counterparts, largely explained by the fact that women disproportionately work in industries that are more severely affected by the

COVID-19 pandemic (Graeber et al., 2021). It caused a negative impact of entrepreneurship on sustainable development.

On the other hand, the emergence of digital technologies has significantly reduced the costs of entrepreneurs and offered opportunities for new business during the COVID-19 pandemic, due to the changes in people's lifestyles (Liguori & Winkler, 2020). Entrepreneurs able to create a platform-based ecosystem, have become a force of creative destruction (Acs et al., 2021). Also, rapidly evolving medical technologies and new ways of handling the COVID-19 crisis offered opportunities for entrepreneurs to start new businesses (Kuckertz et al., 2020). This led to an increase in the number of entrepreneurs. For all of these reasons, there is a general gap in the understanding of the effects of entrepreneurship on sustainable development under the conditions of COVID-19. The subject of this paper is to examine the influence of the COVID-19 pandemic on the relationship between entrepreneurship and sustainable development in emerging markets.

We choose emerging markets since there is no strong empirical evidence that the link between entrepreneurship and sustainable development is strong and statistically significant, and further empirical research is desirable. Furthermore, this group of markets is becoming a very strong competitor in the global market, thanks to their rapid development (Aizpun et al., 2019), and a global economy needs to understand drivers of their sustainable development which can revive the economy in the post-COVID-19 period. This paper supports these considerations with a statistical analysis, based on regression models on the panel data for the period 2011-2021, as well as cross sectional analysis for 2020 and 2021 in the sample of 20 emerging markets. The aim of the paper is to identify factors which can force sustainable development through entrepreneurship development under the conditions of COVID-19 in emerging markets and propose measures that macroeconomic policymakers could implement in order to revive global economy in the post-COVID-19 period.

The paper first gives an overview of literature that links entrepreneurship with sustainable development in emerging markets under the conditions of COVID-19. The next part of the paper presents methodology, the obtained results and the discussion of results and recommendations to macroeconomic policymakers. The final part of the paper presents concluding remarks.

2. Literature review and the hypotheses development

The novel coronavirus appeared at the end of 2019 in China. The virus caused the disease COVID-19 which has threatened millions of people's lives all over the world (Worldometers, 2021) and has significantly changed global society (Parnell et al., 2020). Due to the effects of the virus, many healthcare systems collapsed and the World Health Organization declared a worldwide pandemic on the 11th of March 2020. The pandemic had flow-on effects on other sectors as well. Under the conditions of COVID-19, people's lifestyles changed significantly, as well as living and working conditions (social distancing, hand washing, personal hygiene, digital forms of communication, working from home, etc. were promoted). It has had a great negative influence on the economy, particularly the tourism and hospitality industries, which are reliant on close contact between individuals as part of their business models (Belitski et al., 2021). In order to get life back on track, appropriate measures are needed to revive the economy in addition to an adequate cure for the virus. That is why economic policymakers are persistently looking for appropriate economic solutions that will enable them to get out of the crisis and encourage sustainable development.

Previous research has indicated that entrepreneurship is the key driver of sustainable development in developed countries (Valliere & Peterson, 2009; Carree & Thurik; 2010; Van Stel et al., 2018). Entrepreneurs may introduce important innovations, by entering markets with new products or production processes; enhancing knowledge of what is technically viable and what consumers prefer; introducing variations of existing products and services in the market (Van Stel et al., 2005; Williams et al., 2017). Under the conditions of COVID-19, entrepreneurs can use the possibilities offered by digital technology and adapt their businesses more easily than any other business entity to new consumer demands related to the changed lifestyle (Acs et al., 2021). The business creativity and innovations involved in agile and resilient new businesses can help entrepreneurs to find opportunities in the turmoil that the pandemic has caused globally (Zahra, 2021). Also, resulting learning process can speed up the discovery of the dominant design for product-market combinations enabling knowledge spillovers, stimulating economic growth and revitalization of the economy in the post-COVID-19 period. Bearing in mind the fact that several previous empirical studies have proven that entrepreneurship is an engine of economic growth and sustainable development, in developed countries, many of their economic policymakers have implemented measures to support the development of entrepreneurship under the condition of COVID-19.

However, the situation is much different in emerging markets. There is no strong empirical evidence that the link between entrepreneurship and sustainable development in emerging markets is strong and statistically significant (Ivanovic-Djukic et al., 2022). Most theoretical studies explain that entrepreneurship has a significant role in economic growth, but the results of empirical research are diverse. For example, studies conducted by Tang & Koveos (2004), as well as Zaki & Rashib (2016), showed a negative correlation between entrepreneurship and economic

growth in emerging markets, while research conducted by Valliere and Peterson (2009) showed that this relationship is positive, but insignificant. For that reason, there is no clear picture of the role and importance of entrepreneurship in economic growth and sustainable development in emerging markets. Bearing in mind the fact that emerging markets are becoming very serious players in the global market (especially Russia, China, India, Brazil), it is very important to analyze the drivers of their sustainable development, and predict whether entrepreneurship can be one of the instruments for economic recovery in the post-COVID-19 period.

We believe that the situation in emerging markets, as well as relationship between entrepreneurship and economic growth has changed significantly in recent years, due to the fact that income per capita in most of emerging markets has increased (the relationship between entrepreneurship and economic growth is caused by income per capita and stage of economic development, and it appears to be U-shaped) (Valliere & Peterson, 2009). Hence, the first hypothesis is:

H1. Entrepreneurship has a significantly positive impact on sustainable development in emerging markets and it can contribute to the economic recovery in the post-COVID-19 period.

The COVID-19 pandemic has become a challenge for all economic entities, including entrepreneurs. Many economies were in lockdown, with international travel restricted or banned, and many shops, restaurants, and hotels closed. It has created a huge number of problems for entrepreneurs in these areas. In addition, people were increasingly encouraged to work from home. For these reasons, many established businesses were hit hard, as orders drained away, and many new businesses were inevitably stillborn as markets evaporated (Ratten, 2020).

On the other hand, home deliveries boomed, both from online shopping and from a sharp rise in takeaway food deliveries. At the same time, new opportunities emerged with an initial and ongoing massive consumer demand for sanitizing products and protective personal equipment, followed rapidly by demand for online education and entertainment, then for online sales. According to GEM data, TEA was significantly lower in 2020 compared to 2019 in some emerging markets, such as Poland, Chile, Israel, but in some of them, such as Colombia, Panama, Egypt, TEA in 2020 was higher compared to 2019 (Bosma et al., 2020). This can be seen in Figure 1.

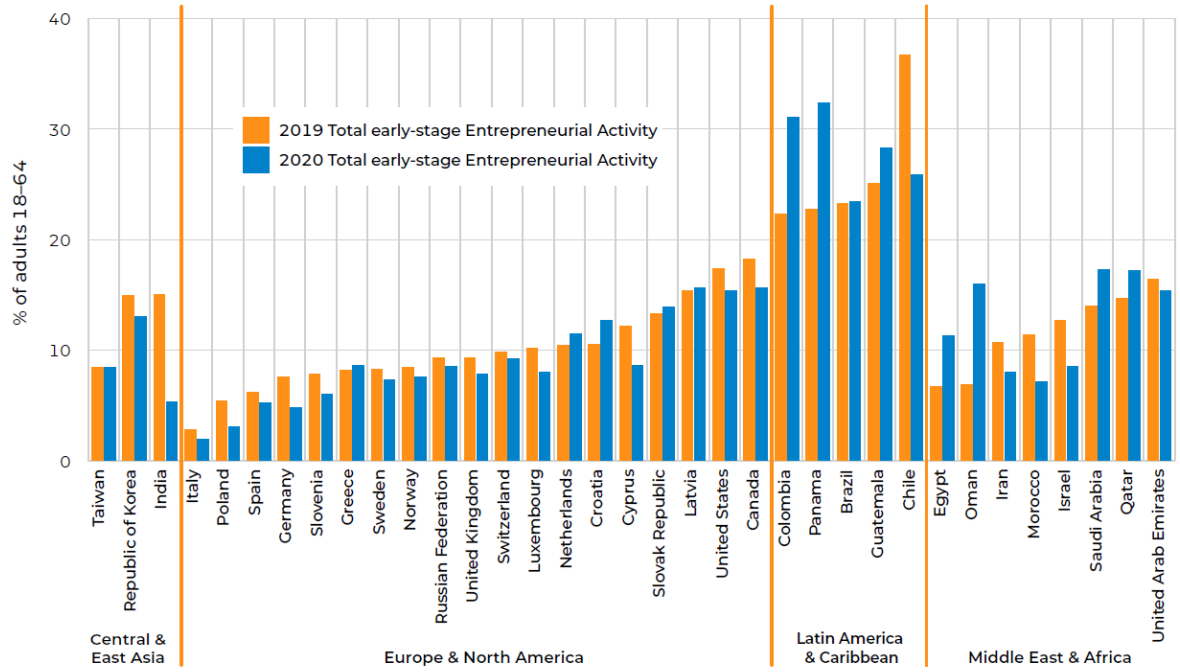


Figure 1. Levels of total early-stage entrepreneurial activity in 2019 compared to 2020 (Bosma et al., 2020, p. 42)

In 21 economies, out of the 35 examined economies, there was a fall in TEA between 2019 and 2020. While many of these falls were modest, others were much more dramatic. However, over the same period, in 14 economies there was an increase in TEA, including four economies in which TEA increased by more than a quarter. Three of them were emerging markets (Egypt, Panama, and Colombia) (Bosma et al., 2020).

At the first glance, it is uncertain what impact the COVID-19 pandemic had on entrepreneurship and how it affected the relationship between entrepreneurship and sustainable development. However, when you bear in mind the fact that many established businesses ceased to work, the situation is clearer. Also, the negative impact of the COVID-19 pandemic is confirmed by a large number of exits. There were six economies, such as: Panama, Saudi Arabia, India, Kuwait, Chile, and Poland, in which the pandemic is cited as the most important reason for exiting. The impact of COVID-19 pandemic on the establishment and stopping new business is shown in Figure 2.

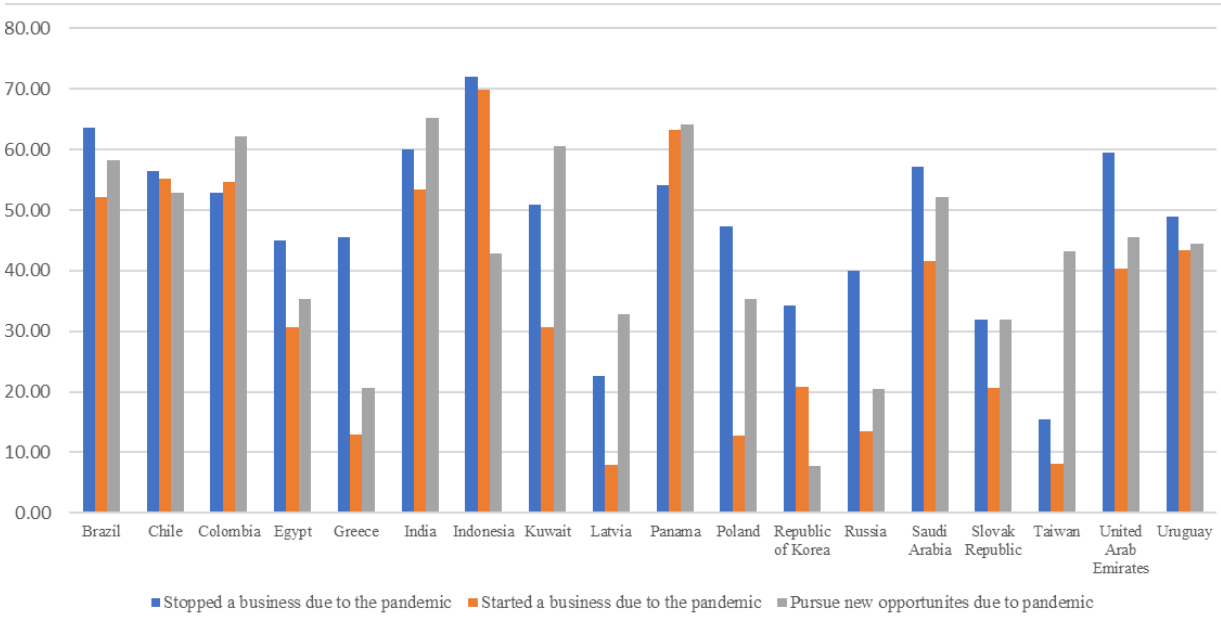


Figure 2. Attitudes and perceptions in an age of COVID-19 (Bosma et al., 2020, p. 186-189)

It is obvious that there were more entrepreneurs who stopped a business due to the pandemic than those who started a new business in most emerging markets. At the same time, there were many entrepreneurs pursuing new opportunities due to pandemic. As a result, the level of established businesses increased rapidly in some emerging markets. For example, in Qatar, it was more than doubled and, in Egypt, more than tripled. This fact blurs the picture of the impact of the pandemic on entrepreneurship. But, when we take into account TEA in 2021, it is noticeable that its level has decreased in most emerging markets compared to 2019, especially in countries with higher levels of income per capita. For that reason, our second hypothesis is:

H2. The contribution of entrepreneurship to sustainable development and economic growth is lower under the conditions of the COVID-19 than in the previous period.

Many entrepreneurs and governments worldwide responded to the changed environment in the pandemic (Bosma et al., 2020). Entrepreneurs have implemented various organizational changes in response to the COVID-19 pandemic (Hill et al., 2021). For example, most of them adopted digital technologies and developed strategic, managerial, and digital skills to increase their efficiency (Audretsch & Belitski, 2021). A very dynamic response was the transformation of business models introducing business model innovation, based on digital platforms for ordering, selling, and charging products and services (Clauss et al., 2019). Also, digital communication, as well as online communities, had a very important role in the entrepreneurial response to the COVID-19 pandemic, offering support in: resolving problems, reframing problems, reflecting on situations, refocusing thinking and efforts (Meurer et al., 2021). Many entrepreneurs have improved financial performance in the COVID-19 crisis, by focusing on working from home as an opportunity rather than an activity that leads to frustration, loneliness, and worries about the future (Banerjee & Rai, 2020; Zhang et al., 2022). Also, partnerships between small and large firms, open innovation and knowledge spillovers, measures that entrepreneurial ventures undertake to preserve liquidity seems to be very useful forms of the entrepreneurial response to the COVID-19 pandemic (Block et al., 2021).

At the same time, various support policies were developed and provided by governments in response to address the needs of entrepreneurs. The 2020 GEM report mentions that 54 national governments made emergency policy decisions and actions in order to support entrepreneurs in response to the COVID-19 pandemic (Bosma et al., 2020). For example, in the United States, the largest Paycheck Protection Program (PPP) included the provision of funds to small businesses with a volume of $650 billion during the early stages of the pandemic (Bhutta et al., 2020). In the UK, the government implemented the Coronavirus Job Retention Scheme for waged workers, which covers 80% of employee salaries up to a maximum of £2,500 per month (Yue & Cowling, 2021). German government intent to protect new businesses and start-ups included taxation support, and state-supported short-time work compensation schemes (PWC, 2020; Block et al., 2020). In lot of developed countries there have been programs providing loans to small businesses through banks, credit unions, and other financial institutions to keep small businesses open and retain employees on the payroll (Fairlie & Fossen, 2021).

Situation in emerging markets were similar as in developed countries. In China, measures were implemented in February 2020 when Chinese Central Bank unblocked extensions or renewals of loans to companies and announced a reduction in the banks' mandatory reserve ratio. The government presented a package to support the digitalization of SMEs in the context of the crisis. A wide range of policy measures was announced for SMEs at

the regional level in China, including deferred tax payments for SMEs, reduced rent costs, waived administrative fees, subsidized R&D costs for SMEs, social insurance subsidies, subsidies for training and purchasing teleworking services, and additional funding to spur SME loans (KPMG, 2020). Financial support in Russia was similar to the Chinese. State-owned banks supported small businesses by approving credit lines. These policy instruments can be broadly categorized into loan guarantees, direct lending to small businesses, grants and subsidies, and equity instruments (Liu et al., 2021). Brazilian and Indian governments provided little support to small business.

Many empirical studies, conducted in developed countries, proved that the governmental response has had positive effects on TEA. For example, a study conducted in the US found a positive relationship between loan receipt per business and number of businesses (Fairlie & Fossen, 2021). A study examining the effects of governmental policies on 42,401entrepreneurs and SMEs in UK demonstrated that government financial support may reduce the number of small businesses with negative earnings and allow extending the residual life of small businesses with negative earnings up to 194 days (Belghitar et al., 2021). The similar effects were found in Germany (Block et al., 2020).

According to GEM data, the entrepreneurial response, as well as the governmental response, was different in some emerging markets. But research examining the governmental and entrepreneurial response to the COVID-19 pandemic in emerging markets is very limited. We believe that situation in emerging markets is similar to the situation in developed countries, Also, we believe that contribution of entrepreneurship to sustainable development, as well as the success of TEA, was bigger in emerging markets whose entrepreneurs and governments responded more seriously to the COVID-19 pandemic. Therefore, the third hypothesis is:

H3. Appropriate entrepreneurial and governmental responses to the COVID-19 pandemic have a positive and significant impact on TEA and sustainable development.

According to GEM data, the entrepreneurial response to the new condition under COVID-19 was more appropriate compared to the governmental response in emerging markets. For that reason, we believe that organizational changes implemented by entrepreneurs in response to the COVID-19 pandemic had a bigger influence on TEA compared to the measures implemented by governments. Hence, the fourth hypothesis is:

H4. The contribution of the entrepreneurial response to the TEA, as well as sustainable development, was bigger compared to the contribution of the governmental response in emerging markets during the COVID-19 pandemic.

3. Data and methodology

3.1. Research context

Emerging markets can be defined as *economies transitioning from a dictatorship to a free-market-oriented-countries with increasing economic freedom, gradual integration, global marketplace, expanding middle class, improving standards of living, social stability and tolerance, as well as, increasing cooperation with multilateral institutions* (Kvint, 2009, p. 27). They include very diverse countries in different geographic areas, such as East Asia, Eastern Europe, and Latin America (Bruton et al., 2008), which have common characteristics, such as the following: low-income, rapid-growth, economic liberalization, high level of volatility, underdeveloped institutional infrastructures etc. (Peng, 2001; Aulakh & Kotabe, 2008; Yamakawa et al., 2008; Bruton et al., 2013).

These common macroeconomic characteristics have a great influence on entrepreneurship, as well as relationship between entrepreneurship and sustainable development (Bruton et al., 2008). For example, high level of volatility (pace at which prices move higher or lower), leads to an increase in economic instability that distorts the development of entrepreneurship. Also, insufficiently developed capital market and financial institutions make serious problems to entrepreneurs in acquiring capital to start and develop their business (Szirmai et al., 2011; Guegan et al., 2014). Additionally, emerging markets yet have had a problem with underdeveloped institutional infrastructures, such as legal systems and trade policies, presence of grey economy, corruption, unfair competition, non-incentive tax system, discriminatory legislation, unstable legal and political system, underdeveloped market economy mechanisms, etc. (Cuckovic & Bartlett, 2007; Bruton et al., 2008; Tracey & Phillips, 2011). Such institutional gaps and lack of resources have stimulated development of informal entrepreneurship (Yamakawa et al., 2008; Tracey & Phillips, 2011).

Thanks to a number of measures implemented, in recent years there has been an improvement in the macroeconomic environment, increase in income per capita and the development of entrepreneurship in emerging markets. They are becoming a very serious player on the global market (Lu et al., 2010). In 2021, the GDP of the emerging markets amounted to around 38.85 billion US dollars, which is approximately 41% of the total global GDP (Statista, 2022). Also, emerging markets account for 34% of global nominal GDP and 46% in PPP terms (Duttagupta & Pazarbasioglu, 2021). The World Bank predicts that emerging markets will account for half of the world's economic growth by 2025 (Lin, 2011). Given the growing importance of emerging markets, the analysis of the drivers of their economic growth and possible revitalization measures under the COVID-19 condition has become a very serious task of the researchers (Lu et al., 2010).

3.2. Sample characteristics

There is no universal consensus on exactly which countries qualify as emerging markets. For example, Morgan Stanley Capital International Emerging Market Index qualifies 25 developing countries as emerging markets including Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Kuwait, Malaysia, Mexico, Peru, Philippines, Poland, Qatar, Russia, Saudi Arabia, South Africa, Taiwan, Thailand, Turkey and United Arab Emirates (MSCI, 2021). The International Monetary Fund (IMF) classifies 20 countries as emerging markets, Standard and Poor's (S&P) classifies 25, and Russell classifies 24 countries as emerging markets, while Dow Jones classifies 25 countries as emerging markets.

We have selected 20 countries that are common to these lists. An additional reason for the inclusion of these countries in the research is the availability of data. The list of selected countries is presented in Table 1.

Table 1. Countries included in the study and GNI per capita in 2019 and 2021 (World Bank, 2022)

	GNI per capita, Atlas method (current US$)	
Country	**2019**	**2021**
Argentina	11,250	9,070
Brazil	9,270	7,850
Chile	14,990	13,470
China	10,310	10,550
Colombia	6,570	5,790
Estonia	23,250	23,170
Greece	19,650	17,930
Hungary	16,520	15,890
India	2,120	1,920
Indonesia	4,050	3,870
Latvia	17,790	17,880
Malaysia	11,260	10,570
Mexico	9,470	8,480
Peru	6,790	6,030
Poland	15,360	15,240
Russia	11,250	10,690
Slovak Republic	19,230	18,920
South Africa	6,670	6,010
Thailand	7,260	7,040
Uruguay	17,760	15,790

3.3. Research model and variables

In order to verify defined hypotheses, several regression models are applied. The first model examines the impact of total entrepreneurial activity (TEA) on sustainable development index (SDI), respectively. Other two models examine the impact of TEA and high-growth expectation entrepreneurship (HEA) on GDP growth before and during the COVID-19 crisis, respectively. All models include control variables for capital and labor (unemployment). The last three models examine the impact of entrepreneurial and governmental response on TEA under the COVID-19 condition in all emerging markets, as well as by clusters of emerging markets depending on the intensity of the response to the COVID-19 pandemic. Also, all models include control variable – National Entrepreneurship Context Index (NECI). The variables employed in the regression models are presented in Table 2.

Table 2. Variables employed in the regression models (authors' presentation)

Variable	**Variable Type**	**Model**
Sustainable development index (SDI)	Dependent	M1
GDP growth rate (r)	Dependent	M2, M3
GDP per capita (GDPpc)	Control	M1, M2, M3
Inbound FDI per capita (FDIpc)	Control	M1, M2, M3
Gross capital formation per capita (GCFpc)	Control	M1, M2, M3
Unemployment (UNE)	Control	M1, M2, M3
National Entrepreneurship Context Index (NECI)	Control	M4, M5, M6
Total early-stage entrepreneurial activity (TEA)	Predictor	M1, M2
	Dependent	M4, M5, M6
High-growth-expectation entrepreneurship (HEA)	Predictor	M3
Entrepreneurial response (ER)	Predictor	M4, M5, M6
Governmental response (GR)	Predictor	M4, M5, M6

4. Results and discussion

4.1. Results

The impact of entrepreneurship on long-term sustainable development is examined by employing the regression model M1. The sustainable development index (SDI) is chosen as a dependent variable. The SDI evaluates each country's total performance on the 17 sustainable development goals, with each goal given equal weight. The score indicates where a country stands in relation to the worst possible outcome (0) and the best outcome (100) (Sachs et al., 2021). Entrepreneurship is measured as GEM total entrepreneurial activity rate (TEA), defined as the percentage of individuals aged 18-64, who are either nascent entrepreneurs or owner-managers of a new business – younger than 42 months (Hill et al., 2021). Control variables used include the level of GDP per capita, inbound foreign direct investments per capita, gross capital formation per capita, and unemployment rate. These data are taken from the World Bank's database. All variables are used as average data for the period 2011-2020. Results are presented in Table 3.

Model 1 shows that an increase in TEA leads to the increase of sustainable development (if the TEA increases by 1%, the SDI will increase by 0.276), and this impact is statistically significant ($p<0.05$). This model explains 87.1% changes in SDI and F test confirms that it is statistically significant (18.834). The Tolerance and VIF statistics indicate that there is no problem of multicollinearity, whereas Durbin-Watson statistics show no autocorrelation in data. Based on these results we can accept the first hypothesis, i.e., entrepreneurship has positive and significant impact on sustainable development in emerging markets.

Table 3. Impact of entrepreneurship on the sustainable development (authors' calculations)

Model 1	**Coefficient**	**t**	**Sig.**	**Tolerance**	**VIF**		
Constant	54.429	20.077	0.000			**R^2**	**Adj. R^2**
GDPpc	0.001	4.559	0.000	0.298	3.354	0.871	0.824
FDIpc	-0.001	-0.931	0.367	0.721	1.387	**F test**	**Sig.**
GCFpc	0.001	1.551	0.143	0.319	3.131	18.834	0.000
UNE	-0.022	-0.233	0.819	0.877	1.141	**Durbin-Watson**	
TEA	0.276	2.624	0.020	0.801	1.249	2.303	

Dependent Variable: SDI

In order to verify the second hypothesis, we created the regression model M2. Since there is no data for the SDI for each year individually, we chose the GDP growth rate as a dependent variable, while TEA was independent variable. In order to measured impact of the COVID-19 pandemic on the relationship between entrepreneurship and economic growth, we included dummy variable for TEA during COVID-19 pandemic. Since the results showed that the impact of TEA on economic growth is not statistically significant, we examined additionally, impact of high-growth-expectation entrepreneurship – HEA (the percentage of entrepreneurs who expect to employ at least 20 people in five years from now) on GDP growth (because previous research showed that it was the form of entrepreneurship that had the largest contribution to the economic growth). Thus, the regression model 3 was created. The GDP growth rate is chosen as a dependent variable, while HEA was independent. The second dummy variable is created in order to capture the effects of the COVID-19 crisis on HEA. These regression models employ data for the period 2011-2021 for 20 emerging markets, comprising a balanced panel. The same control variables are used as in the previous model (M1). Missing values for some of the indicators are estimated based on the values of these indicators in previous years. Test results for choosing the appropriate panel regression model are presented in Table 4.

Table 4. Test results for choosing the appropriate model (authors' calculations)

Model	**F-test**	**Breusch-Pagan LM**	**Hausman**
	H_0: Pooled, H_1: FEM	*H_0: Pooled, H_1: REM*	*H_0: REM, H_1: FEM*
Model 2	3.06 (0.0001)	14.02 (0.0001)	7.54 (0.2735)
Model 3	2.75 (0.0003)	15.64 (0.0000)	2.27 (0.8932)

Note: p values in ( )

Based on the obtained results it is determined that REM is appropriate for fitting analyzed data. The results of the regression models are presented in Table 5.

According to Model 2, TEA has the positive impact on economic growth before COVID 19 crisis (if TEA increases by 1% the GDP growth rate will increase by 0.05%), but it is statistically insignificant. However, due to the COVID-19 crisis TEA has negatively influenced the economic growth. An increase in TEA by 1% leads to the

decrease of GDP growth rate by 0.4% due to the COVID-19 crisis. The model is statistically significant as confirmed by the Wald test (274.44). In this model, the individual specific error can explain 19.5% of entire composite error variance.

Table 5. The impact of entrepreneurship on economic growth (authors' calculations)

	Model 2	**Model 3**
Constant	4.76176* (4.20)	5.19076* (5.38)
GDPpc	-0.00024* (-4.67)	-0.00024* (-4.38)
FDIpc	-0.00017 (-1.57)	-0.00019 (-1.66)
GCFpc	0.00135* (4.48)	0.00122 (3.72)
UNE	-0.12449* (-2.88)	-0.18291* (-3.74)
TEA	0.05230 (1.41)	
TEAC	-0.45004* (-13.88)	
HEA		0.04958** (2.07)
HEAC		-0.25665* (-12.39)
Θ	0.45942	0.47191
P	0.19498	0.20545
Wald test	274.44*	224.49*

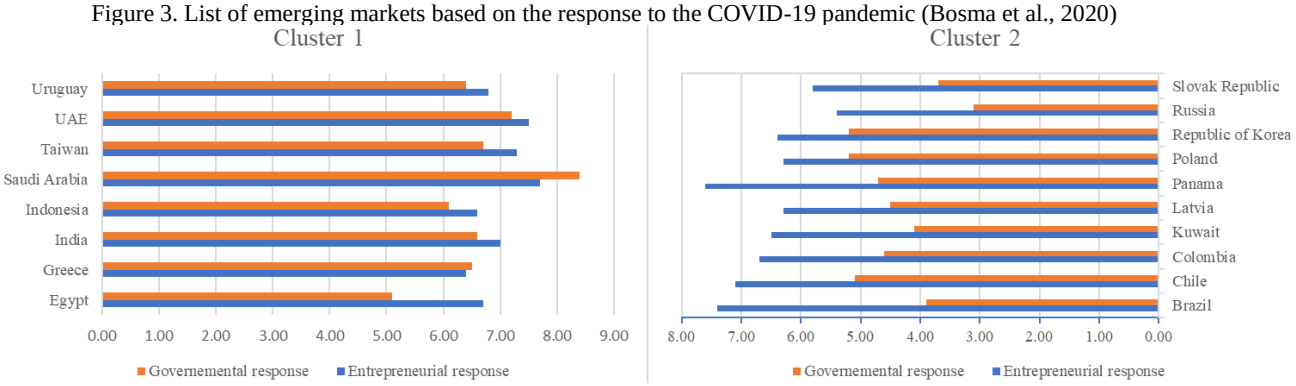
Note: z values in ( )
**, ** at 0.01 and 0.05 significance level respectively*
Dependent Variable: GDP growth rate

As regards Model 3, HEA has the positive and statistically significant impact of economic growth ($p<0.05$). If HEA increases by 1%, the GDP growth rate will increase by 0.05%. However, due to the COVID-19 crisis HEA has negatively influenced the economic growth. The model is statistically significant as confirmed by the Wald test (224.49). The individual specific error can explain 20.54% of entire composite error variance.

Three last models were created in order to verify the third and fourth hypotheses. TEA in 2021 is chosen as a dependent variable, while entrepreneurial and governmental response to the COVID-19 pandemic in 2020 were independent variables. The National Entrepreneurial Context Index (NECI) in 2020 is used as a control variable. NECI assesses the average condition of an economy's entrepreneurship environment on a national level. The NECI score for every economy is the arithmetic mean of that economy's EFC scores, therefore it is also assessed on a Likert scale from 0 to 10. A score of 5.0 is often considered as just enough. GEM reacted immediately to the epidemic by adding two additional blocks of relevant items to the NECI. These blocks of questions are intended to emphasize two main areas: first, entrepreneurs' reactions to the pandemic's impacts, and second, governments' reactions to COVID-19's implications. Entrepreneurs are incorporating innovative business models, boosting working from home, modifying their products or services, identifying new possibilities, or intensifying collaboration with other businesses, according to the new questions related to the entrepreneurial response in NECI 2020. Expert responses are then collected into an aggregate reaction, indicating if the entrepreneurial response to the COVID-19 crisis is evaluated as sufficient by the experts. The second set of new questions posed to national experts focused on governmental responses to the pandemic's consequences, including whether governments are effectively assisting businesses in adapting, preventing the loss of firms, protecting employees and consumers, and increasing the digital delivery of regulations (Bosma et al., 2020).

We divided all emerging markets into 2 clusters, based on the response to the COVID-19 pandemic. The first cluster included emerging markets whose government implemented a large number of measures to support entrepreneurs during the COVID-19 pandemic, as well as entrepreneurs themselves introduced a large number of organizational changes in the direction of adapting to the changed environment under the condition of COVID-19 (the grade of 6 or higher is viewed as the sufficient one). The second cluster includes emerging markets whose responses to the COVID-19 pandemic were not sufficient (the grade was up to 6). The list of emerging markets is shown in the Figure 3.

Figure 3. List of emerging markets based on the response to the COVID-19 pandemic (Bosma et al., 2020)



The results of the regression models are presented in Table 6.

Table 6. The impact of entrepreneurial and governmental response to the COVID-19 pandemic on TEA (authors' calculations)

	Model 4 Cluster 1	**Model 5 Cluster 2**	**Model 6 All markets**
Constant	-59.695** (-2.309)	-33.077 (-0.658)	-39.234** (-2.272)
NECI	5.525 (1.032)	-3.060 (-0.519)	-0.806 (-0.316)
ER	11.551* (3.549)	10.905 (0.663)	10.269* (3.606)
GR	-5.682 (-1.530)	-1.846 (-0.202)	-2.159 (-1.248)
R^2	0.650	0.537	0.485
Adj. R^2	0.500	0.288	0.374
F	4.329**	0.404	4.391**

Note: t values in ( )
*, ** at 0.01 and 0.05 significance level respectively
Dependent Variable: TEA

According to Model 4, ER has the positive and statistically significant impact on TEA, while the impact of GR is negative and statistically insignificant. If ER increases by 1% the TEA will increase by 11.551 (level of significance is 1%). Also, NECI has the positive impact on TEA, but its impact is insignificant. Model explains 50% changes in TEA under the condition of COVID-19. F test confirms that the model is statistically significant (4.329). On the other hand, the impact of ER on TEA is positive, and the impact of GR is negative, but both are statistically insignificant in emerging markets with insufficient response to the COVID-19. Model 5 explains 28.8% changes in TEA under the condition of COVID-19, but it is not statistically significant. Based on these results we can only partially accept the third hypothesis, as the appropriate responses of entrepreneurs to the COVID-19 pandemic have the positive and significant impact on TEA and sustainable development, while the impact of government responses is negative, but statistically insignificant.
According to Model 6, the impact of ER on TEA is positive and statistically significant, whereas the impact of GR is negative and statistically insignificant. If ER increases by 1%, TEA will increase by 10.269 (level of significance is 1%). We can accept the last hypothesis. Model 6 explains 37.4% of changes in TEA under the condition of COVID-19, and it is statistically significant.

4.2. Discussion and policy recommendations

The analysis of the data from GEM on a sample of 20 selected emerging markets confirms that entrepreneurship has the positive effect on sustainable development, as well as on economic growth in emerging markets, but this impact is significant only in case of sustainable development. This is in accordance with the result of prior studies conducted in emerging markets (Valliere & Peterson, 2009; Zaki & Rashib, 2016, Ivanovic-Djukic et al., 2022), but contrary to recent theoretical views (Ramesh, 2018), as well as to our expectations. It can be explained by the fact that the macroeconomic environment in emerging markets has not significantly changed during the last years, and the forms of unproductive entrepreneurship (informal and necessity driven entrepreneurship) are still dominant in TEA. For these reasons, TEA have the significant contribution to employment, as well as to solving social problems (as a part of sustainable development), but their contribution to the GDP growth is not significant.
The significant contribution to the GDP growth in emerging markets has only HEA. The results for relationship between HEA and the GDP growth is similar with the results of studies conducted in developed countries, but

different compared to the results obtained by prior research in emerging markets (Vallerie & Peterson, 2009). It can be explained by the fact that the number of these entrepreneurs is increasing rapidly, they are creating great added value and employing a huge number of workers, thus contributing to an increase in economic growth. This is confirmed by the large number of successful start-up ecosystems, especially in China, which is ranked among the top 10 in the world. It is desirable to implement incentive measures in the direction of HEA development. In order to overcome these weaknesses, governments can create start-up ecosystems. The start-up ecosystem encourages the creation and development of HEA thanks to different forms of support, such as mentoring, consulting services, contacts with investors, etc. Also, many high-growth-oriented entrepreneurs included in an entrepreneurial ecosystem create a pool of well-trained and like-minded entrepreneurs. It enables the exchange of knowledge and experiences and creates a culture that encourages innovation and new businesses. By linking technology, capital, and know-how within a protected and enabling environment, the process of business creation can be speeded up, while the probability of failure can be reduced.

The focus of our research was on the impact of the COVID-19 pandemic on entrepreneurship, as well as the link between entrepreneurship and economic growth in emerging markets. The results of regression analysis showed that the COVID-19 pandemic has negatively affected entrepreneurship. During the pandemic, the number of HEA has been reduced. For this reason, TEA and HEA had the negative impact on the GDP growth, which was statistically significant. In order to reorient these negative trends in a positive direction, it is necessary to implement a number of adjustment measures by entrepreneurs, as well as support measures at the state level.

According to GEM data, many entrepreneurs as well as governments responded to the COVID-19 pandemic. Our research has shown that sufficient responses of entrepreneurs to the COVID-19 pandemic have the positive and significant impact on TEA, directly, and on sustainable development, indirectly. This is in accordance with the results of prior studies conducted in developed countries (Block et al., 2020; Fairlie & Fossen, 2021; Belghitar et al., 2021). Also, our analysis has shown that implemented measures by entrepreneurs have a greater contribution to entrepreneurship development during the pandemic compared to supportive measures implemented by governments, which is in accordance with GEM report for 2020.

In order to overcome the consequences of the pandemic and further development of entrepreneurship, it is desirable to implement additional measures. For example, use of digital technology can help entrepreneurs to increasingly sell products on digital platforms, using digital tools like TikTok for marketing and relying on platforms such as Kickstarter for funding. The use of online communities support, can develop opportunities and help entrepreneurs to get assistance with problems, and find collaborators. Working together with entrepreneurs and experts from other countries, through digital social networks, can help entrepreneurs gain valuable experience, find business partners and expand the market. The use of the latest technologies of the so-called Industry 4.0 and robots can help entrepreneurs to offer radically new innovative products and business models, adapted to the changed needs of consumers in the context of the COVID-19 pandemic and improve their business. Finally, digital technology and robots can reconfigure production and service systems, which could be useful even long after the crisis is over (Meurer et al., 2021).

Working from home, as a new business practice, can help entrepreneurs save in costs, but also have a positive impact on the psychological state of their employees during the COVID-19 pandemic. A company's positive psychological state directly influences creative innovation during a crisis. Due to innovation and flexibility, they can quickly engage and implement small-scale creative innovations and thus adapt to the fast-changing circumstances arising from the COVID-19 pandemic (Kuckertz et al., 2020). Also, cooperation with other economic entities could be useful. Positive effects of the cooperation, like information and knowledge gathering (Wall & Bellamy, 2019), mobilization of bricolage (Kuckertz et al., 2020), and joint efforts (Markman et al., 2019), are visible.

5. Conclusion

The health pandemic caused by COVID-19 has dramatically changed society, and posed huge challenges for economy. Policymakers are persistently looking for appropriate economic solutions that will enable them to get out of the crisis and encourage sustainable development. Numerous previous studies show that entrepreneurship has a significant contribution to sustainable development in developed countries, which has not been proven for emerging markets. Given the fact that emerging markets have become very serious players in global markets, we have examined relationship between entrepreneurship and sustainable development before and during COVID-19 pandemic in emerging markets, in order to propose appropriate macroeconomic measures and revive economy in post COVID-19 period.

We empirically examined the impact of TEA on sustainable development and economic growth in emerging markets in period before and during COVID-19 pandemic (2011-2021). Using data for 20 emerging markets, we found that TEA has a significant contribution to sustainable development, but its contribution to the GDP growth is still not significant. The significant contribution to the GDP growth in emerging markets has only HEA, but their participation in TEA is obviously insufficient.

We also investigate the importance of various measures implemented by entrepreneurs and governments as responses to the changed environment in the pandemic COVID-19. Our research pointed out that sufficient responses

to the COVID-19 pandemic could be useful instrument in order to encouraging the development of entrepreneurship and reviving the economy in the post-COVID period in emerging markets.

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