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Economic Growth through the Lenses of Education, Entrepreneurship, and Innovation

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Abstract: Economic growth is a major goal pursued by public authorities but can be achieved with the involvement of several categories of stakeholders given the complexity of the phenomenon and the many influencing factors. In this research paper, the authors analyze specific current issues that are representative as influencers of economic growth. This study brings into focus the importance of education, particularly tertiary education, entrepreneurship skills, and innovation capacities of businesses. The objectives are (1) to find out if tertiary education leads to economic growth; (2) to examine if innovation is one of the promotors of economic growth; and (3) to discuss the impact of the dynamic of businesses (enterprise birth) on economic growth. The methodology used in this research is panel regression (static model) for a sample consisting of 30 European countries for the period 2003–2020. The main findings are associated with a positive influence of tertiary education on economic growth, whereas the two other variables, that of entrepreneurship and innovation, are found to be insignificant for this time period.

Keywords: economic growth; education; entrepreneurship; innovation

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1. Introduction

There are many studies that have focused their research on finding the reasons for the factors pushing economic growth (Vasile et al. 2007; Enache et al. 2013; Yusuf and Nabeshima 2007; Klofsten et al. 2019; Hysa et al. 2020; Morina et al. 2020; Xu et al. 2020; Anghelache et al. 2021; Ur Rehman and Hysa 2021; Panait et al. 2022). One of the channels addressing economic growth is the education level. Intuitively, we can say that because of education, the living standard increases. This is related to the capability to function and the development of society (Hysa 2014). The higher the amount of skilled labor force, the higher the productivity, and the higher the technological advancements. The second intuition behind this positive relation is the idea that the higher the education level is, the higher the wage level, implying high spending. This can be seen as increased demand, pushing the supply side, thus there is a generation in the market.

Throughout time, European countries have placed a heavy emphasis on education. Strengthening education results in a more skillful and knowledgeable population, which in turn puts these acquired skills and information to use in the market (Ndou et al. 2019; Secundo et al. 2019; Ndou 2021). The results of many studies throughout the years align with the fact that education has a positive influence on the overall improvement of the economy (Vasile et al. 2007; Blessinger and Cozza 2016; Blessinger et al. 2019). Naturally,

the type, level, and place where the education is received affect the overall capital gain in a person's library of skills and knowledge, and this starts with the primary education, which, according to Hanushek and Woessmann (2010), is emphasized as an important influencer in the overall construction education system as the very basis and fundamentals of the same system. Primary education functions as a solid, strong foundation, while secondary, tertiary, and education beyond continue to further the assimilation of knowledge and skills in individuals. Cognitive skills value quality over quantity of education, which is stated by Hanushek and Woessmann (2010), "when quality of education is introduced as a variable, quantity becomes nearly insignificant". Thus, receiving quality education and starting at an early stage with strong foundations proved to be the most useful in creating skilled and knowledgeable individuals.

Furthermore, in addition to primary and secondary education, several researchers such as Chatterji (1998), Pillay (2011), and Hanushek (2016) have investigated the contribution of tertiary education to economic growth, as a fundamental study level that supports the skilled labor force. Again, however, the results of these works are still conflicting with each other and do not properly identify a sole relation type. In addition to education, innovation and entrepreneurial incentives are seen as important factor to economic growth (Hysa and Mansi 2020; Cozza and Blessinger 2017). Hence, based on the above-mentioned debates, this study aimed to identify if some selected factors such as education level, innovation, and entrepreneurship are determinants in the economic growth of European countries. The main data employed in our model were retrieved from Eurostat and World Intellectual Property Organization for the time period 2003–2020. The paper used descriptive statistics and panel regression analysis to address the following research questions:

RQ1. As the literature supports, does education lead to economic growth while considering European countries?

RQ2. Is innovation one of the promotors of economic growth in the case of the European countries?

RQ3. What is the impact of the dynamic of businesses (enterprise birth) on economic growth?

These research questions are crucial to be investigated given that governments often have to make investment choices and target concrete determinants that foster economic growth. Good choices would help to create the appropriate frameworks to get through development and growth by implementing the right policies.

Furthermore, this study contributes to the literature on the contribution of educational level, innovation aspects in the economy, and the business dynamics to enter markets to push economic growth in European countries. What this study implies and intends to emphasize is a comprehensive understanding of economic growth though the integration of (1) tertiary education, as a main contributor to the skilled labor force, with (2) the innovation capacities, and (3) entrepreneurial incentives that assist in enterprises birth. Lastly, this paper is organized as follows: the first section represents an introduction of the issues, the second offers an overview of the main findings of the literature in terms of economic growth in relation to other determinants mentioned above, the third part of the paper presents the data and methodology applied to verify the research hypotheses, the fourth section describes the results of the empirical analysis, and the last two sections give some important insights in form of discussions and conclusions.

2. Literature Review

While previous studies have largely focused on the impact of primary and secondary education on economic growth, Chatterji (1998) includes tertiary education and finds an important role of this variable in economic growth. Furthermore, Pillay (2011) states that "tertiary education is a major driver of economic competitiveness, especially in the knowledge-driven global economy". Contrary to that, Hanushek (2016) performs an empirical analysis, finding that adding more years of schooling, when not having an increase in cognitive skills, does not have a significant impact on economic growth. Meanwhile, Benos

and Zotou (2014) took the discussion to another level. In their research, they reviewed a total of 57 studies that measured the impact of education on economic growth. The result of their work was again ambiguous, and not homogenous across countries. These divergences were mainly driven because of differences in the type of data used. In recent years, more and more studies have focused on the impact that universities have on promoting the principles of sustainable development both through the transmission of knowledge and the formation of specific competencies among students and through the power of example, by initiating various CSR programs that seek to protect the environment, the development of local communities, and the fight against corruption (Matei 2013; Panait et al. 2016; Blessinger et al. 2018; Sengupta et al. 2020; Gigauri et al. 2021).

Highly educated individuals possess skills and display attitudes that have various positive effects on the labor force. The first and most significant contribution of these individuals is their higher predisposition to involvement in entrepreneurship (Chaganti and Greene 2002). The latter has a direct positive effect on economic welfare and growth. However, a classic debate is the debate about whether the entrepreneur is born, equipped with talent and emotional intelligence that endorses empathy, social skills driving to problem solving, smartly getting though proper networking, or whether the entrepreneur is formed. Some studies argue that the entrepreneur is born, and they support their opinions based on some examples of people that could build their successful business involving new ideas (Purwatiningsih et al. 2018). Some other studies support the idea that entrepreneurs can be taught and formed through education and training (Garavan and Barra 1994).

Entrepreneurs, especially educated entrepreneurs, contribute in a few critical ways. They introduce the spilling of knowledge directly or indirectly, that is introducing innovative ideas and improvements to current practices in the market. This way they indirectly inspire change and an increase in the overall knowledge of individuals working with or for them. This also proves to be a very effective way of stimulating competition and rivalry (Wong et al. 2005). By introducing new and improved ideas to the market, the new investors force the existing ones to make respective changes in order to maintain their current place in the market. Consequently, this brings another major influence of entrepreneurship in the economy: the introduction of new technology and innovation (Avram and Hysa 2022; Baumol and Strom 2007). Technology is created to facilitate different aspects of life; however, in an economy, it can either directly improve the speed and accuracy of production or take over some more laborious and time-consuming duties. This allows the individuals previously engaged with these tasks to invest and engage with different sectors of the economy.

In addition to the improvement of current instances, entrepreneurs are more likely to recognize new potential takes on investment risks (Baumol and Strom 2007; Berhani and Hysa 2014). These investments can result in more innovative services offered and most importantly more employment opportunities. The individuals employed under these successful investments are more likely to expand the range of their knowledge and skillset, which in turn increases the number of qualified and prepared individuals in the market. Another important point to consider is the types of entrepreneurship. The types of entrepreneurs depend on the level of education. Jiménez et al. (2015) observed in their study that secondary and tertiary education have a positive effect on the increase of formal entrepreneurship. Tertiary education in particular had a negative effect on informal entrepreneurship, while secondary education did not have such an effect (Jiménez et al. 2015). A formal type of entrepreneurship is overall more reliable for the workers and the customers since it includes businesses that are regulated by the law and are registered legally. Thus, a higher level of education produces individuals who are more compliant with the regulations and are more prepared to understand and successfully navigate the more complicated legal and financial aspects of a business.

Likewise, further studies were looking at the relationship between entrepreneurs and innovation. According to Hysa and Mansi (2020), entrepreneurs only are not sufficient enough to achieve a large-scaled innovation, being defined as the collection of four di-

mensions, namely (1) entrepreneurial capacities; (2) productive opportunities; (3) small-i innovation; and (4) organizational structure. Comparing developing and developed countries, developing countries highlight the existence of entrepreneurial capacities and small-i innovations, but again, being insufficient to make big-I innovations happen. Moreover, in the study by Audretsch et al. (2006), they argued that innovation is not considered the sole factor, but it has a critical role to play economically. Both knowledge creation and competition are important as the useful accelerators of economic growth (Audretsch et al. 2006). Thus, as emphasized in the study by Alfaro et al. (2019), it is important to understand how the combination of innovation and enterprises tasks are to be implemented.

Having gone through all the above discussions, we constructed an integrated framework that demonstrates the synergy of factors affecting economic growth. This framework is shown in Figure 1.

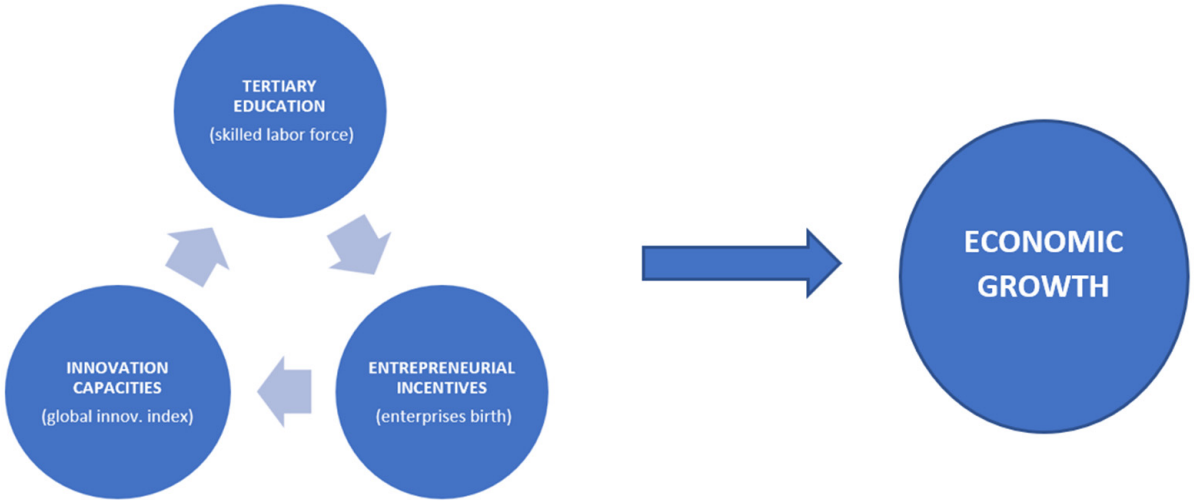

Figure 1. Integrated framework of economic growth. Source: Adapted by authors.

3. Data and Methodology

The main objective of our research is to identify if economic growth is influenced by education level, innovation, and entrepreneurship in European countries. Thus, we constructed our research considering four indicators: economic growth, births of enterprise, Global Innovation Index, and tertiary educational attainment. Our sample consists of 30 European countries due to data availability for the period 2003–2020. The countries included in the analysis are Switzerland, Sweden, the UK, Netherlands, Finland, Denmark, Germany, France, Austria, Ireland, Norway, Estonia, Belgium, Luxembourg, Czech Republic, Malta, Cyprus, Italy, Spain, Portugal, Slovenia, Hungary, Bulgaria, Slovakia, Latvia, Lithuania, Poland, Turkey, Croatia, and Romania. The data were provided by Eurostat, the variables' descriptions are presented in Table 1.

To highlight the variables influencing economic growth in terms of education, innovations, and entrepreneurship in the European countries, a panel regression (static model) was used.

For this, the following specification representing the static nature of model (Saini and Singhania 2018) can be used:

$$EG_{it} = c + \sum_{j=1}^{J} \beta_i X_{it}^{j} + \sum_{k=1}^{K} \beta_k Y_{it}^{k} + \sum_{l=1}^{L} \beta_l Z_{it}^{l} + e_{it} \quad (1)$$

$$e_{it} = v_i + u_{it} \quad (2)$$

where X, Y, and Z are different vectors of pull and push determinants. Economic growth (EG) is the dependent variable.

Table 1. Description of the variables and source of data.

Variable	Description	Source of Data
Births of enterprise	Net business population growth percentage, except activities of holding companies.	http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do (accessed on 12 March 2022)
Economic growth	The ratio of real GDP to the average population. GDP is considered at market prices, chain linked volumes (2010).	https://ec.europa.eu/eurostat/web/products-datasets/-/sdg_08_10 (accessed on 12 March 2022)
Global Innovation Index	The innovation ecosystem performance of economies. It comprises around 80 indicators, including measures on the political environment, education, infrastructure, and knowledge creation of each economy.	https://www.wipo.int/global_innovation_index/en/ (accessed on 12 March 2022)
Tertiary educational attainment	The share of the population aged 25–34 who have successfully completed tertiary studies (e.g., university, higher technical institution, etc.).	http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sdg_04_20&lang=en (accessed on 12 March 2022)

In order to test the variables' stationarity, we 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. According to the panel unit root test, all variables except Global Innovation Index rejected the null hypothesis of the common unit root. The Global Innovation Index became stationary after the first difference.

In our analysis, we considered four unit root tests: IMP, LLC, ADF, and Phillips–Perron test (PP). To select between random and fixed effects, the Hausmann test was used (Hausman 1978). To check the robustness, we used the Wooldridge autocorrelation test (Wooldridge 2002), Wald test (heteroskedasticity of residues), Pesaran test (dependence of residues between the panels), Greene heteroscedasticity test (Greene 2003), and LM test (autocorrelation of residues).

We used Eviews 13 Student version to estimate the analysis models.

4. Results

To answer the research objective related to the determinant factors influencing economic growth in the European countries, we used the panel data equation model as follows:

$$EGI_{it} = \beta_{it} + \beta_1 BE_{it} + \beta_2 GI_{it} + \beta_3 TEI_{it} + \varepsilon_{it} \quad (3)$$

The dependent variable is represented by economic growth (EG). The explanatory variables included in the regression equations are births of enterprise (BE), Global Innovation Index (GI), and tertiary educational attainment (TE). In order to examine the characteristics of the countries included in the sample, descriptive analyses of the data were conducted (Table 2). The average births of enterprise in the sample is 3.12%, varying from −7.41% to 36.2%, with a standard deviation 6.24%. The economic growth registers a medium value of 28,093.14 Euros, ranging between 5390 Euros and 85,030.14 Euros, the standard deviation being 18,951.34 Euros. The Global Innovation Index registers an average of 50.07 with standard deviation of 7.95, the minimum value is 34.90 and maximum value is 68.40. The tertiary educational attainment presents values between 21.50% and 60.30%, the average 40.06%, and standard deviation of 8.64%. All the variables are normally distributed.

Table 2. Summary statistics.

	Births of Enterprise	Economic Growth	Global Innovation Index	Tertiary Educational Attainment
Mean	3.12	28,093.14	50.07	40.06
Maximum	36.20	85,030.00	68.40	60.30
Minimum	−7.41	5390.00	34.90	21.50
Std. Deviation	6.24	18,951.34	7.95	8.64
Skewness	3.22	1.20	0.25	−0.07
Kurtosis	15.03	3.96	2.13	2.17
Jarque–Bera	1583.94	56.49	8.48	6.10
Prob.	0.00	0.00	0.01	0.05

Source: authors.

According to Table 3, a high correlation is not reported among variables, having eliminated the assumption of multicollinearity. Birth enterprise is inversely correlated with economic growth, tertiary attainment, and global innovation. Global innovation establishes a direct correlation with economic growth and tertiary attainment.

Table 3. Correlation matrix.

	Births of Enterprise	Economic Growth	Global Innovation Index	Tertiary Educational Attainment
Births of enterprise	1	−0.20 **	−0.32 ***	−0.09
Economic growth	−0.20 **	1	0.75 ***	0.55 ***
Global Innovation Index	−0.32 ***	0.75 ***	1	0.48 ***
Tertiary educational attainment	−0.09	0.55 ***	0.48 ***	1

***—1% level of confidence, **—5% level of confidence. Source: authors.

The stationarity of the variables was tested through unit root tests using the augmented Dickey–Fuller and Im, Pesaran, and Shin unit root tests. All variables, except Global Innovation Index, were stationary at level, and Global Innovation Index became stationary after the first difference (Table 4).

Table 4. Unit root tests for the full sample.

Variables	Levin, Lin, and Chu		Im, Pesaran, and Shin W-Stat		ADF-Fisher Chi-Square		PP-Fisher Chi-Square	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
Births of enterprise	−3.98	0.00	0.15	0.56	66.80	0.08	163.89	0.00
Economic growth	−6.21	0.00	0.53	0.70	44.39	0.93	58.27	0.54
Global Innovation Index—level	2.60	0.99	2.44	0.99	40.23	0.98	61.42	0.43
Global Innovation Index—First difference	−9.98	0.00	−3.93	0.00	121.94	0.00	218.49	0.00
Tertiary educational attainment	−1.95	0.03	−1.90	0.97	57.27	0.58	129.84	0.00

Source: authors.

Using the Hausman specification test (Table 5), the results indicated the fixed effect estimates are appropriate due to rejecting the null hypothesis of random effect applicability.

Table 5. Correlated random effects—Hausman test and cross-section random effects test comparisons.

Test Summary	**Chi-Sq. Statistics**	**Chi-Sq. d.f.**		**Prob.**
Cross-section random	7.44	3		0.06
Variables		Fixed	Random	Var (Diff.)	Prob.
Tertiary educational attainment		383.62	393.92	16.46	0.01
D(Global Innovation Index)		9.35	12.12	1.29	0.01
Births of enterprise		8.83	6.12	1.61	0.03

Source: authors.

For deciding between fixed and random effects, aside from the Hausman test, we also used the redundant fixed effects test (Table 6).

Table 6. Redundant fixed effects tests.

Redundant Fixed Effects Test			
Test Cross-Section Fixed Effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	1768.12	29.143	0.000
Cross-section Chi-Square	1035.74	29	0.000

From Table 6, the null hypothesis was rejected, the difference between the two estimators was high, so the alternative hypothesis that we would choose the fixed-effect model was accepted. Taking into account the two tests, we used the model with fixed effects for our analysis.

Table 7 presents the static results, indicating the factors influencing economic growth in the case of European countries. Tertiary educational attainment and birth of enterprise led to economic growth, but innovation was not statistically significant. Tertiary attainment was positively associated with economic growth, thus an increase on tertiary attainment by 1% led to an increase in economic growth of 1233.04 Euros. Birth of enterprise was negatively associated with economic growth, thus an increase on birth of enterprise by 1% led to a decrease on economic growth of 481.37 Euros.

Table 7. Static panel results.

Variables	**Coefficients**	**Std. Error**	**t-Statistic**	**Prob.**
Tertiary educational attainment	1233.043	138.757	8.887	0.000
D(Global Innovation Index)	189.343	893.948	0.212	0.833
Births of enterprise	−481.365	184.611	−2.607	0.010
Intercept	−19,910.76	5848.13	−3.40	0.001
R^2	0.3548			
F-statistic	30.596			
Prob (F-statistic)	0.000			
Applicability of model	Fixed effects			
No. of observations	176			

The hypotheses regarding errors were statistically satisfied. The distribution of errors was normal and the errors were homoscedastic. To test the residual for the serial correlation

with the variables, we used the Arrelano–Bond test (Arellano and Bond 1991), the result indicating to accept the non-autocorrelation.

The results presented in this paper indicate that in the case of the static model, tertiary educational attainment and birth of enterprise significantly influence economic growth. An increase in tertiary attainment generates an increase in economic growth, the link being a direct one, and an increase in birth of enterprise generates a decrease in economic growth, the link being inverse.

The findings are similar to those in the literature (Gyimah-Brempong 2011; Tsai et al. 2010; Nowak and Dahal 2016; Babatunde and Adefabi 2005; Hanushek 2013; Permani 2009), according to which educational level significantly influences economic growth. School attainment rates are adopted to approximate human capital accumulation, stimulating economic growth (Iamsiraroj 2016).

Education sustains economic growth based on three paradigms: (1) human capital theory; (2) catch-up models; (3) the interactions between education and technological innovation and change (Wolff 2000). The catch-up reflects the diffusion of technical knowledge from leading economies to the more backward ones (Gerschenkron 1952).

According to Reynolds et al. (1999) and Audretsch and Fritsch (1996), the relationship between enterprises and economic growth is inverse, especially in the case of Germany during the 1980s. There are also some studies according to which the relationship is positive: increasing the number of entrepreneurs leads to increasing economic growth (Wong et al. 2005). Holtz-Eakin and Kao (2003) concluded that entrepreneurship has a significant influence on productivity growth, at least for the United States.

5. Discussion

Economic growth is measured by the gross domestic product (GDP) and GDP per capita of a country. Economic development is characterized by less unemployment, a percentage of the population above the poverty line, and human development and wellbeing. Not only large companies but also enterprises are considerably contributed to by GDP, thus suggesting that governments should devote attention to creating an entrepreneurship-friendly environment, stimulating education and innovativeness.

The impact of entrepreneurial activities through newly founded firms on economic growth is widely recognized. Entrepreneurs facilitate economic development through labor, technologies, and capital. Numerous studies confirmed entrepreneurship as the main driver of economic growth and argue its contribution to employment opportunities (e.g., Naudé 2010; Chavis et al. 2011; Marcotte 2013; Fairlee and Chatterji 2013; Fritsch 2013; Hodges et al. 2015; Karimi et al. 2017). Entrepreneurs setting up new firms positively influence economic growth, when there are fewer legal, institutional, or cultural barriers. Cumming et al. (2014) empirically analyzed a sample of all countries available between the years 2004 and 2011 from three datasets from the World Bank, OECD, and Compendia, and concluded that entrepreneurship has a considerably positive impact on GDP per capita, exports per GDP, and patents per population, and has a negative effect on unemployment. It is noteworthy that these conclusions are not supported only by the OECD data, the reason for which could be the incomplete data in contrast to the World Bank's accurate dataset (Cumming et al. 2014).

Another important point to consider is the impact of innovation on economic development. An empirical study in CEE countries—Poland, Czech Republic, and Hungary—demonstrated long-term economic growth through innovation (Pece et al. 2015). Innovation leads to increased productivity which in turn enables the production of more goods and services resulting in economic growth. Innovative technologies serve the same mission to increase productivity which also induces wage growth. A study of 19 European countries from 1989 to 2014 asserted the long-run reciprocal correlation between innovation and per capita economic growth (Maradana et al. 2017). Economic growth induces innovation and innovation leads to per capita economic growth. Innovation contributes to economic growth through competitiveness, trade, financial systems, infrastructure development, and

employment, which ultimately leads to improved quality of life and economic development (Maradana et al. 2017; Thurik 2009).

However, these study results differ from those described in the previous studies that confirm the significance of innovation for economic growth. This gap could have resulted from the time period, country context, and data available. In fact, many countries consider innovation as an important factor for economic growth and introduce supportive programs aiming at stimulating innovation in the countries. Li et al. (2018) underline the role of government in improving the innovation level of educational institutions by providing research funding (Li et al. 2018).

Moreover, the study results have not confirmed the statistically significant influence on economic growth for innovativeness and birth of enterprise in contrast to the previous studies highlighted in the literature, which can be explained by several reasons. First, the variable birth of enterprise can have no statistically significant effect on economic growth because a majority of newly established enterprises cannot survive due to their vulnerability. Moreover, the reason that innovativeness has less statistical significance for economic growth according to our study results could lie in the dataset by the Global Innovation Index. There could be missing data for some indicators for some EU countries in the selected time period. In addition, the indicators and measurements used by the Global Innovation Index could have limitations. The entrepreneurial process is cyclical—enterprises are born and disappear from the market. Thus, birth of enterprise might not be directly linked to economic growth but contributes to a country's development. Moreover, the effect of entrepreneurship and innovation on economic growth varies based on the development of a country. People in developed countries are less entrepreneurial compared to the number of entrepreneurs and self-employed people in developing countries. Consequently, more enterprises are set up in developing economies while citizens of developed countries prefer to work for big companies (Chang 2010). Furthermore, the reason for an individual to establish an enterprise (necessity or opportunity) impacts entrepreneurial outcomes (Rusu and Roman 2017; Stoica et al. 2020). Intention to become an entrepreneur emerges mostly from necessity and therefore, necessity-driven entrepreneurship has a negative correlation to economic growth in EU countries (Szabo and Herman 2012; Stoica et al. 2020). Thus, more empirical studies in this direction are needed, which will take into account other variables as well. Bosma et al. (2018) note that restaurants and retail stores also do not show a significant effect on economic growth, but they confirm the contribution of entrepreneurial activities to economic growth. The correlation between GDP per capita and enterprises introducing product or process innovations is averagely positive as there are significant differences among EU countries (Szabo and Herman 2012). This relationship is stronger in north-western Europe than in central, eastern, and southern European countries (Szabo and Herman 2012).

It is noteworthy that industries that grow are employing highly educated people. Skilled workers contribute to company success. Moreover, new enterprises foster employment, especially in regions. Universities have the ability to develop entrepreneurial skills of students by special programs which give participants motivation to start new enterprises (Cooper and Lucas 2007). Leadership style is positively associated to entrapreneurial behavior of universities (Stefani and Blessinger 2017; Farrukh et al. 2019). The curriculum, course content, pedagogical technics, theory, and practice can affect students' beliefs, attitudes, and intentions towards entrepreneurship, and therefore, can develop entrepreneurial skills, competences, and confidence necessary for entrepreneurial activities (Cooper and Lucas 2007; Sengupta and Blessinger 2019). In this regard, the significance of a multidisciplinary environment in entrepreneurial programs is also highlighted (Fiore et al. 2019). In addition, business incubators created by researchers help entrepreneurs and start-ups to generate and evaluate business ideas, set up teams and receive suitable training, establish an enterprise, and operate independently (Finardi 2013). Thus, educational institutions can deliberately inspire entrepreneurship intention and in this way stimulate economic growth.

Audretsch (2014) suggests that the role of universities is broad in an entrepreneurial society where organizations are established to encourage entrepreneurial activities and hence, drive economic growth. In the context of an entrepreneurial society, knowledge-based entrepreneurship is a driving engine for providing employment and ensuring economic growth (Guerrero and Urbano 2012). Investments in knowledge lead to commercialization of innovation as well as technology transfer from the university to for- and non-profit organizations producing economic growth (Audretsch 2014).

Furthermore, universities not only encourage students to launch enterprises but also build necessary skills to grow companies with innovativeness (Lewrick et al. 2010). The further development of a start-up is of paramount importance for a company to survive and consequently, entrepreneurship education must also encompass this topic (Lewrick et al. 2010). Educational programs impact on graduates' decision to start their own business while entrepreneurial behavior has an influence economic growth (Lewrick et al. 2010). Consequently, entrepreneurial university models strive to become change agents for economic and social development (Klofsten et al. 2019). For example, in the Netherlands, universities try to improve the entrepreneurial behavior of students so that they start new enterprises (Harkema and Schout 2008).

Personality traits of students also play an important role in education. As shown by the work of Qazi et al. (2020), personality traits are positively connected with entrepreneurial intention. It resonates with the study conducted by Räty et al. (2019) emphasizing the perception of innovative and competitive abilities, which are connected with entrepreneurial intention. By the same token, students' entrepreneurial intention depends on several factors and can be, for instance, determined by entrepreneurial education, the need for achievement, and locus of control (Vodă and Florea 2019). In general, education, both formal and informal, contributes to economic and social development as educational systems can improve the business and innovative potential of a country (Xu et al. 2020; Tvaronavičienė et al. 2018; Yusuf and Nabeshima 2007). Thus, education leads to economic growth. Moreover, universities should teach creativity for innovation, entrepreneurship, and encourage graduates to set up their firms since newly established companies contribute to economic and social development. Educational institutions can contribute to the development through teaching and research of entrepreneurship, innovation, and business with special courses and educational programs devoted specifically to developing necessary abilities among students.

6. Conclusions

This paper analyzed the relations between education, innovation, birth of enterprise, and economic growth. It explored that tertiary education positively correlates to economic growth while innovation and enterprise birth have less statistically significant effects. A contribution of this paper is to demonstrate how birth of enterprise, innovation, and education level impact economic growth in EU countries.

European universities are in a complex process of metamorphosis, their role is not only changing in society but also improving substantially. Universities are not only trainers of specialists in various fields but are also creators of regional and even national/international partnerships and networks that bring together companies, NGOs, and associations based on scientific relationships. In this way, the innovation activity is not only supported, but is nurtured, and the partnerships create synergies between the participating stakeholders. The involvement of students in research activity creates the premises for their professional development but also benefits for economic agents who thus rely on the energy specific to the young generation. In addition to the didactic and research function, the new entrepreneurial function of the universities supports the students in acquiring competencies that will allow them to set up start-ups and small companies through which to implement their innovative ideas.

The activity of the universities is more and more important considering the extension of the functions they have in the society. The increasing complexity of the university's activity

and the existence of more and more sophisticated ecosystems have generated the gradual transition from the double helix model to the quintuple helix. The university–industry–government–public–environment interactions are a reality currently, and public policies in the field of education are being reconfigured taking into account the contribution that universities can have on different categories of stakeholders. In addition, the importance of education for the process of economic growth generates the growing interest of public authorities in the proper financing of this sector.

This study contributes to the literature by emphasizing that different variables affect the economic growth of a country and education is of significant importance in this regard. It also enhances theory by finding innovation and birth of enterprise as having a less significant influence on economic growth and highlighting the need for evaluating other variables such as individual country differences and the level of economic development. Government policies should focus on education strategies that support teaching and research as well as encouraging citizens to graduate from tertiary education. In addition, newly established enterprises need more support to survive and begin contributing to economic growth.

The authors are aware of the limitations of their research, generated by the choice of the sample of countries, the indicators used, and the selected analysis period. This gap can be explained by differences among the economic development of analyzed EU countries.

Further study can generate more findings to the nexus between education level, entrepreneurship intention, birth of enterprise, innovation, and economic growth in different country contexts. One direction is to identify the innovative and entrepreneurial potential of universities in the former communist countries of central and eastern Europe. The closed nature of communist economies has led to a lack of promotion of entrepreneurship.

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