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WORLDWIDE INNOVATION: PANEL DATA ANALYSIS ON THE IMPACT OF THE GEM'S BUSINESS ENVIRONMENTAL FACTORS

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Extended Abstract

Abstract

Innovation policy is a significant component of sustainable development. The successful increase in innovation needs to study what are the business environment factors that determine innovation activity. Such goal will be reached using the panel data methods applied to data provided by the Global Entrepreneurship Monitor (GEM). This study concludes that worldwide factors as financing, government support, lower taxes and bureaucracy, entrepreneurship education in primary and secondary levels and the country's economy openness present an important positive impact on innovation. The results are different if the analysis is made by level of income. None of the factors showed statistical evidence for low-income countries. Financing, basic school training and education, R&D transfer, and cultural and social norms have a positive impact on innovation in lower-middle-income countries. Financing, governmental support, reduced taxes and bureaucracy, and basic school training and education influence innovation activity in upper-middle-income economies. In high-income economies, present similar results.

Keywords: Innovation, Global Entrepreneurship Monitor (GEM), business environment factors, economies' income levels, panel data methods.

1 Introduction

Nowadays, the current phase of economic development cannot be interpreted without the contribution of innovation. According to seminal work of Drucker, innovation was considered as an idea converted into a business in order to create a value that would raise both the economic cost as well as the satisfaction of the customers. However, trends and demand are changing rapidly, requiring new ideas as well as new solutions for emerging problems. Hence, during the last years, business organizations evaluate innovation activity as a significant component of sustainable growing and development. Regarding the literature on the scientific area, innovation is assumed to be important not only for creating wealth in a narrow field of increased prosperity, but also enables humanity of creating something that was never done before. Several authors believe that innovation policy is capable of finding new solutions in response to problems, challenges or opportunities that arise in the social and/or economic fields. Furthermore, innovation, together with entrepreneurship, compose a root of economic growth, where the last can be responsible for wealth creation and redistribution and employment. At the same time, they stimulate a substantial increase of value for the customers. Successful innovation depends on the combination of capabilities, including access to financing, understanding market needs, recruiting high-skilled employees. Primarily, a key to successful implementation of the innovation is to reveal what are the main business environment factors that affect innovation activity in companies.

2 Literature Review

In order to obtain a more comprehensive overview of innovation in the business field, it is significant to determine which business environmental factors affect innovation activity.
Regarding Katila and Shane (2005), the following environmental factors deemed to have an effect on the innovation activity: (i) degree of competition, (ii) availability of financial resources, (iii) manufacturing intensity of the production process, and (iv) size of the market. Law, Lee, & Singh (2018) point out the importance of the financing issue in supporting innovating – an efficient financial allocation facilitates R&D. Brown and Ulijn (2004), took into account the factors that influence organizations. These factors are related to a country specificity such as its; (i) financial system and corporate governance, (ii) legal and regulatory frameworks, (iii) level of education and skills, (iv) degree of personal mobility, (v) labour relations, and (vi) dominant management practices. Howell (2016) supported the idea of financing innovation in arguing that investments in intangible assets like R&D are quite vulnerable to financing as there is usually a strong need for purchasing high-tech equipment.

The role of government policies and support should not be underestimated while considering innovation. Discussing more obstacles of innovation there is a need to mention that high level of taxes may reduce firms' innovation as it decreases firms' internal cash flows, which assumed to be a major source of innovation financing (Howell, 2016). Relying on the literature review made by Francis and Bessant (2005) it is worth to mention that the relationships between innovation and bureaucracy are assumed to be negative. According to Baldwin and Gellatly (2003), that took into consideration, the growing small and medium-sized enterprises survey with the purpose of completing a more robust and profound report about the strategies and characteristics of SMEs. Small and medium-sized companies acknowledge the importance of government programmes which include training, industrial support and procurement. Finally, based on the innovation system capability investment framework, secondary level education was mentioned as one of the considerable components of it (Howard Partners, 2008).

3 Research Methodologies

Having in attention the abovementioned, the objective of the study is to reveal the business environment factors which influence the innovation activity in business in economies all over the world during a certain period of time. Innovation is not measured directly by the Global Entrepreneurship Monitor (GEM), however, a proxy variable will be used. The percentage of the companies involved in total early-stage entrepreneurial activity (TEA) which consider that their product or service is new to at least some customers and that few/no businesses offer the same product. In addition, it is significant to research in which degree each factor has an impact on innovation. It is believed that the identification and measurement of the business environment influencing factors for the innovation activity will help to detect, examine and discuss sources of problems and incentives which retard or boost, respectively, the innovation activity. During the research, it will be identified and quantified which business environment factors have a stronger influence on the innovation activity of new companies. By applying, simultaneously, space and time dimensions the research work will try to establish and measure possible causal relations between the business environment variables and the innovation activity of the companies.

The secondary data is applied on entrepreneurship and innovation on new created companies and the evaluation of the business environment by experts of the Global Entrepreneurship Monitor (GEM) regarding factors that may have a strong impact on the innovation activity in the scope of a business. GEM is a platform with a primary data, which has many benefits due to the public use availability, annual release of the global report on the entrepreneurial activity as well as the unique organizational structure of the projects, which includes the national experts in participating countries, who systematically provide the assessments of national entrepreneurship conditions and political characteristics.

The research will include all countries around the world in which public available and comparable data do exist. As time dimension the study will operate with the observation data on innovation activity of the companies from the period of time from 2011 to 2017. It is worth mentioning that for previous years, data indicators of innovation activity in the companies were not available in the GEM database, even if other indicators are available.

The current research work is deemed to bring some contribution as well as increase value of the GEM-based publications regarding the topic of innovation activity as, according to Bergmann, Mueller, and Schrettle (2014), there is a lack of GEM-based works covering the topic of innovation. The variable that will be explained, present the percentage of the companies involved in total early-stage entrepreneurial activity (TEA) which consider that their product or service is new to at least some customers and that few/no businesses offer the same product – this will be used as a proxy for innovation in the present work. The variables that will be used to explain the innovation activity in the companies are the ones that, according to experts, define the business environment of economies. These variables are the following: financing for entrepreneurs, governmental support and policies, taxes and bureaucracy, governmental programs, basic school entrepreneurial education and training, post-school entrepreneurial education and training, R&D transfer, commercial and professional infrastructure, internal market dynamics, internal market openness, physical and services infrastructure, cultural and social norms. The environment framework condition are measured in a 5 points Likert scale where 1 represents the lowest classification and 5 the highest classification.

Achieving the objective of this research work implies that a statistical descriptive and an econometric (inferential) analysis is carried out. With the help of descriptive statistics, it will be possible to execute the outlook of the overall performance of companies, among countries around the world and over time, which are engaged in innovation activity. Regarding inferential statistics, a panel data methodology will be applied, to explain why companies innovate over time around the world regarding a set of explanatory factors According to Longhi and Nandi (2015), panel data allows to take into consideration the individual unobserved heterogeneity. In the particular case of this research work, panel data gives the possibility to examine the differences between the economies in analysis, over time. It is possible to apply such econometric techniques as fixed effects (FE) and random effects (RE) (which choice will rely on the Hausman test), even in case of repeated observations for the same individual, since longitudinal data analysis, as the panel data methods, enables to study dynamics as well as to measure changes (Park, 2011). These differences are indicated as individual-specific heterogeneity or time specific heterogeneity and they will be represented by the fixed parameters, thus the models are believed to have fixed effect (Biørn, 2016).

In order to achieve more detailed analysis, there were created the division by the income level, which is based on the World Bank classification. The income level classification includes low income, lower middle income, upper middle income and high-income levels.

4 Discussion and Results

Current work examines 100 countries in a period of time of 7 years that comprises almost the second decade of the XXI century (more precisely the years of 2011 to 2017, as mentioned above). Such big number of countries can only be considered since the GEM database uses a common methodology to collect the data among countries and over time. Such common methodology allows to make international comparisons and apply longitudinal econometric research methods as the panel data methods.

Overall (this is, considering all the countries in analysis during the 7 years of study), in average, 25,7% of all 433 observations worldwide indicated that companies involved in early-stage entrepreneurial activities (TEA) indicate that their product or service is new to at least some customers and few or no businesses (at all) offer the same product. The standard deviation of innovation activity within a period of time is bigger than across countries. However, the standard deviation between observation reaches a relative value of around 40% of the average value (10,38% out of 25,7%), which indicates that a big variability can be observed for the 433 observations.

Regarding the results for the between and within observations, the variability of innovation among countries is bigger than the variability verified for each economy over time (the standard deviation (9,27%) between the groups of economies is bigger than the standard deviation (5,16%) within each economy over time). Moreover, the range between minimum and maximum values among groups of countries is much bigger than the range between these values within the economies over time. This indicates the importance of undertake an analysis that may divide countries in homogenous groups, like the division of countries by level of income.

When talking in account the factors that determine business environment, results provide evidence that the indicators related to physical and services infrastructure and the internal market dynamics present the highest overall assessment average values. The indicators that present the lowest overall assessment average values are the indicators related with the basic school entrepreneurial education and training (2,02%), the R&D transfer (2,35%) and the taxes and bureaucracy (2,40%). It is also important to notice that the average overall expert's assessment is for most indicators below 3 point values – only the 2 indicators abovementioned indicators with a higher assessment present an average overall assessment higher than 3 point values. However, the average hides the existence of big differences in the expert's assessment. Overall there are economies, in specific years, with a very low assessment. For instance, the indicator that measures the basic school entrepreneurial education and training reaches the minimum of 1,15 points and never reaches a value higher than 3,43 points. At the same time, the indicator that measures the cultural and social norms presents, according with the experts, an overall minimum of 1,64 points and a maximum assessment of 4,40 points. The indicators that measures the taxes and bureaucracy presents a behaviour similar to the cultural and social norms.

Also for these indicators, it is clear that the differences among groups is bigger than the differences among economies over time. Again, it shows the importance of making a division of economies in groups more homogeneous to understand better how the business environment indicators.

5 Conclusions

Generally speaking, it has to be noted that, while investigating the subject of innovation activity it is vital to observe the environment, which consist of business influencing factors, and which determines innovation. In other words, a particular attention should be paid to drivers and barriers of innovation activity. Consequently, this enables to identify the key impacts for innovation activity in the companies, and later respectively, strengthen or reduce them. Studying factors which form the area of influence on innovation activity gives a knowledge, which could be applied for enhancing innovation activity in organizations in general as well as in business companies. Regarding the studied topic of the innovation activity, current research greatly contributes to the scientific literature. Furthermore, based on the scarcity of the works dedicated to the investigation of factors that influence innovation, especially the ones that are based upon using GEM secondary database (Bergmann, Mueller, & Schrettle, 2014), a current research is considered to be valuable scientific work.

On the general analysis of innovation activity, it should be mentioned that, in average, about 26% of companies worldwide, involved in early-stage entrepreneurial activities (TEA) indicate that their product or service is new to at least some customers and few or no businesses (at all) offer the same product. Results also showed the noticeable variance of values indicating innovation activity – with a minimum value of about 1% and a maximum one of almost 59%. Regarding factors that determine business environment in general, findings present that the indicators related to physical and services infrastructure and the internal market dynamics showed the highest degree of influence, and the indicators related with the basic school entrepreneurial education and training, the R&D transfer and taxes and bureaucracy evidence the lowest degree of impact.

When considering the analysis by the division of countries by income level, it should be noted that companies operating in countries with higher levels of income tend to innovate more. According to the results, despite on the largest amount of observations, none of the factors presents evidence to explain innovation activity in low-income level countries. Perhaps, this occur because of top-priority willing of the survival of the company, which leads to the neglect of the SMEs in implementing any innovation (Lima & da Silva Müller, 2017). For the economies with a lower middle income level, the indicators related with financing, basic school training and education, R&D transfer, and cultural and social norms have a positive influence on innovation activity, which signify the importance of creation improvements and facilitation of the access of basic entrepreneurial education as well as transformation of social and cultural norms of the society, into the ones which encourage innovating. For the economies with an upper middle level of income indicators related with financing, governmental support and policies, taxes and bureaucracy, and basic school training and education indicated a positive correlation with innovation activity. Although, indicators related with market dynamics and physical services and infrastructure were found to decrease innovation. Hence, to grow the innovation, the physical infrastructure utilities in the countries with upper middle level should be financially affordable. For the counties with the high-income level indicators related with taxes and bureaucracy, commercial and professional infrastructure and market openness are deemed to enhance innovation activity. Whereas, the indicator related with market dynamics shapes the development of innovation activity negatively. Therefore, to increase innovation activity in high-income level countries, all the entrance barriers have to be erased.

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