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***Abstract**: The importance and the long term added value of innovation are vital to the success and maturing of each region, country and union. The purpose of this paper is to present several topics related to innovation and to asses the differences, if any, between different European regions as regards their innovation output. It is worth stating the obvious: not all innovation is equally important and not all translates into economic and social wellbeing. Even so, a constant flow of research output is vital for the general socio-economic enhancement. The overall efforts are concentrated in the following areas: renewable energy, education, fin-tech, bio-tech and security. How can regions tap and increase their innovative and creative output are elements that shall be dealt with through this paper.*

Key words: innovation; regional development; knowledge; open source.

JEL classification: O00; O30; O31.

1. Current regional state of affairs

According to a study proposed by the European commission in 2016, just by allocating a 3 percent sum of the total European Union GDP towards research programs would potentially lead to the creation of around 3.7 million jobs by 2020; this in turn would lead to the advent of the so called Innovation Union. According to the 2016 Innobarometer, in all member states, not considering Lithuania, companies “are more likely to say their innovations represent between 1 and 25% in their 2015 turnover” (European Commission, 2016). Even so, given uneven development across European regions and migration trends, no matter if funds shall be allocated towards Eastern parts of Europe, a high percentage of the aforementioned jobs would be located in already economically sound regions. As regards the European Union (EU), one key goal is to have member states pledge 3 percent of their Gross Domestic Product (GDP) towards Research and development. According to a 2016 study by Eurostat, the total spending on research activities as part of GDP was of 2.337 percent; Romania ranks amongst the lowest (second last) with a total research spending of 0.48 percent of GDP (Eurostat, 2016). In the same time, Romania ranks 50th at world level as regards its country score for innovation as per 2018 Global Innovation Index. What is more, this study proves that innovation is not influenced by the population size of a country. Not only this, but the aforementioned study arrives at the following conclusion: major regional imbalances as regards innovation and research activities will persist (Cornell University, INSEAD, and WIPO, 2018). Romania should thus not be affected, innovation wise, by the massive migration of its population in recent years. It would be interesting to develop a way in which to approximate the potential innovative outputs per a particular number of individuals (an innovation output scoreboard per 1000 individuals) so as to find out in rough numbers: innovation potential for a country given the current population together with its geographic distribution and how much a country

has to lose, innovation wise, with each 1000 individuals that decide to leave the country. Such a model or system will shed some light as to which groups are accountable for the general innovation-wellbeing of a particular region. This would be a direct continuation of the diffusion of innovation theory developed in 1962 by E.M. Rogers (2003). But, if it does not benefit someone, does innovation still matter? Thus, the dissemination capacity of any given form of innovation is essential, not only for firm survival or national growth, but for future innovation development. The Oxford Handbook of Innovation proposes that any given innovation system be divided into regional, sector-based and ultimately, national (Fagerberg, et al., 2005) (cadar and Badulescu, 2015). As regards this way of disseminating of innovation, the actual way that it is being done can be divided into two: top down or vice versa. It would be tempting for regions to await aid coming from central government, in order to promote, increase or develop innovation, but as research shows, a bottom-top approach would be more suitable for a sustainable regional development, and will evidently lead to increased competition, together with added layers of innovation output.

Even though the innovative output has increased on average by 5.8 percent since 2010, the greatest decreases as regards the innovative footprint are found in Romania and Cyprus, thus making these two countries as the most modest innovators. Unsurprisingly, the strongest performers are the northern and western countries (European Commission, 2018), this of course given their economic performance and political stability. Albeit some companies might find it counterintuitive, it is of the utmost importance not to substantially reduce funding headed towards innovation in times of economic downturn; this idea holds water especially given the research conducted by Archibugi et al. (2013). In the current economic climate, a combination of hauling or pulling of needs and innovation and research push are a must in any society.

2. Research review

Even though it has been embraced to a certain extent by western companies, using the collective minds of individuals and using an open source model in order to at least tap a company's innovative potential is an endeavor not yet adopted by eastern companies. Another aspect that must be taken into consideration is the following: should intellectual property rights allow replication/duplication of the original idea? Forms of "open source" partnership between companies, through the embrace of "co-working" spaces, regional hubs, and collective wisdom/knowledge are ever more so growing in the eastern part of Europe (Schiavone, 2009); in recent years, it has sped up, but it still has a long way to go if it wants to catch to its western European counterpart. Ideas promoted by Chesbrough and Vanhaverbeke, that universities should play a key part in promoting open forms of innovation and collaboration (Chesbrough & Vanhaverbeke, 2011) are ever more so necessary in today's society. Such networks (hubs, co-working spaces) are vital for the creation of smart cities, for the captivating and engaging of creative types of individuals. The creation of technology or research parks represents the timely application and logical continuation of their ideas.

As mentioned previously, the creation of different types of networks is essential when enhancing innovation capabilities. Several such types exist, but most widespread are the types proposed by Tidd, Bessant and Pavitt; according to them 7 types of innovation networks exist, namely: "new process development consortium, sectoral forum, new technology development consortium, emerging standards, supply chain learning, and cluster and topic network" (Tidd, et al., 2005). The names of the types are irrelevant, but as pointed out by Tidd, Bessant and Pavitt, what matters is the

potential of such forms of organizing innovation activities through which all aspects of the business and human life are positively affected.

Before going, it is important to ask the following question: can two contradictory systems complete one another and coexist? There is an abundance of evidence of companies that resourcefully manage to combine the notions of creative destruction and accumulation (Schumpeter, 1911). I am not referring only to start-ups, but rather, to fully developed companies. Thus, appropriate sources of financing are of great importance. European financed subsidies, research grants, the stock market, or loans are methods tested time and time again. Even so, improvements can be made. Open source or collaborative investments from the general population are a viable alternative. In the same time, the creation of nation wide sovereign wealth funds across member states is also a viable alternative (Anthopoulos, et al., 2016). Not only do such studies point out to the transparency of such systems, but also to their overall increased performance (increased yield as compared to other investment types). Equally important to financing, and as demonstrated by many prodigious economists, is the proper application of specialization to the concept of innovation. Time has proven the idea proposed by Adam Smith that specialization will contribute greatly to the increase of output (Cannan, 2000); this elegant idea can and should evidently apply to innovation and research. Only by an in-depth knowledge of a particular subject, can its limitations be overthrown and advancements to be made.

Innovation has many facets or dimensions. There are of course countries that score well on all innovation related dimensions, namely “human resources, attractive research systems, innovation friendly environment, finance and support, firm investments, innovators, linkages, intellectual assets, employment and sales impacts” (European Commission, 2018). As previously mentioned, finance sources coming from western companies and directed towards eastern regions are a way through which costs can be lowered and innovation fostered at higher pace. Of course, this is not the only way through which the innovation score of countries can increase. I do consider that a “one hat fits all” type of approach should not be deployed. Given various differences (geography, population, culture, economy, education, politics, etc.) between countries and between different regions of countries, one important assignment faced by regulators (such as the EU) would be the creation of specialized commissions tasked with the future development of these regions. In this particular instance, nations will have to give up some of their own national authority, but in my opinion, this will be a small price to be paid.

3. Conclusion

As has been mentioned throughout the paper, in terms of innovation, countries from the European Union are different in terms of innovation output, research and financial capabilities. It has been shown that general population size of these countries does not represent a critical factor for their creative and innovative footprint. Innovation development should be a focal point for all economic actors, be them private or public. Investing in innovation is only one side of the coin. Adaption to market conditions, hence adaption and velocity of adaption to external innovation represent the other side of the same coin. Creating a knowledge based sustainable economy should be the ultimate venture, the promotion and creation of research parks is vital for developing a knowledge based economy. Not only that, but it has been proven that the sharing of knowledge benefits all. Innovation does have trickle-down possibilities, meaning that if innovation is adopted in a particular region, it will have a spillover effect on neighboring

regions. I firmly believe that innovation and creativity do not just happen, but rather, that they can be managed as a process and thus, be improved.

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