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Entrepreneurial ecosystem of Luxembourg: Empirical insights into barriers and stimuli based on GEI data

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ABSTRACT

Objective: The research objective of this article is to evaluate Luxembourg's entrepreneurship position and performance, and compare its entrepreneurship profile with other countries, and then to investigate the main bottleneck that holds back Luxembourg's growth in terms of entrepreneurship.

Research Design & Methods: The Global Entrepreneurship Index (GEI) approach was employed in this research. This methodology focuses on institutional and individual dimensions of entrepreneurship that are linked to efficiency. Furthermore, we used a unique feature of the GEI, the Penalty for Bottleneck (PFB) methodology, to infer which entrepreneurial elements should be tackled and how much effort is needed to alleviate the bottleneck of the Luxembourg entrepreneurial profile.

Findings: The study results show no improvement in Luxembourg's profile in terms of entrepreneurship from 2014 to 2016, although it has a very high GDP per capita than those with GEI higher than it. The "start-up skills" were the main bottleneck in terms of entrepreneurship performance, which lowers the overall GEI score of Luxembourg. Therefore, the start-up skills should be improved 100% to become 0.23 in order to enhance Luxembourg's GEI score by 10 points; consequently, the new overall GEI becomes 68.3.

Implications & Recommendations: To increase and develop entrepreneurship programs in Luxembourg, the responsible authorities in Luxembourg must adapt entrepreneurship programs that target various groups of society, especially with many immigrants. It should also facilitate access to entrepreneurial and support programs to enable aspiring entrepreneurs to create their businesses. Luxembourg should also focus on refugees by strengthening the entrepreneurial programs available to them and cooperating with NGOs to overcome obstacles such as the language barrier.

Contribution & Value Added: This paper highlights Luxembourg's vulnerable performance using a new approach that combines single and institutional variables in a unique model. Additionally, what sets this research apart is the use of PFB, which is also used to uncover the components of entrepreneurship that need to be addressed.

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INTRODUCTION

Luxembourg is a tiny country with 2500 square kilometres located between Belgium, France, and Germany. Immigrants make up 45.28% (248.900) of the 549.700 total populations in Luxembourg. In 2013, the number of cross-border workers was approximately 159,600 (41.1%) of the total employment in Luxembourg, where the majority of these workers came from France, Belgium, and Germany (Schinzel, 2016). Recently, Luxembourg has made several transitional measures in developing the economy to include the mining and steel industries. Moreover, Luxembourg is considered the fifth largest financial

market in Europe and the 20 largest financial markets globally. Furthermore, Luxembourg's economic transition included attracting international companies to become the headquarters for major companies, especially in the information technology field, such as Amazon, PayPal, and Google (Carr, 2018).

The research objective of this article is to evaluate Luxembourg's entrepreneurship position and performance, and compare its entrepreneurship profile with other countries, and then to investigate the main bottleneck that holds back Luxembourg's growth in terms of entrepreneurship. The Global Entrepreneurship Index (GEI) methodology is used in this paper, which examines and evaluates the nation's overall business performance and measures the level in the country (ecosystem). This approach is extraordinary because it combines quality-related institutional and individual elements that enable the performance to be calculated on an individual and institutional level in a single model (Szerb & Trumbull, 2018). The comparison of the studied country with other countries has been done through utilizing this approach. Further, with this method, the strengths and weaknesses of country performance could be distinguished and identified (Lubbadeh, 2019; Ubrežiová *et al.*, 2008). The results show that Luxembourg has a significant hold on individual characteristics of entrepreneurship. Finally, the bottleneck methodology PFB, a unique feature of the GEI, is used to simulate a situation in which a nation can improve its performance by allocating more enterprise resources to the weakest link in the model. In order to increase its performance, the simulation implies that Luxembourg should concentrate on start-up skills. We have thus been able to offer the country's enterprise performance a comprehensive, multi-level view. Besides, policy recommendations can help intensify the company's performance by targeting the system's most vulnerable link.

The rest of this paper is organized as follows: the following section reviews the literature that takes Luxembourg's entrepreneurship into account. The section after it delves into the material and method used in this study has been explained. The following section analyses the Luxembourg entrepreneurial profile based on the GEI method, compares its profile with other countries, and makes a simulation to leverage its GEI scour relying on the FBP technique. The conclusions, limitations, implications, and recommendations for future research are presented in the final section.

LITERATURE REVIEW

The prevailing belief is that entrepreneurship is the primary driver of a country's economic development. Therefore, it reduces the unemployment rate, endorses economic growth, and boosts technological innovation (Audretsch, 2012). However, the Entrepreneurship outcomes become more accurate and effective if it is measured and defined correctly (Ács *et al*., 2014). Entrepreneurship, frequently understood as the process of creating new enterprises (Reynolds *et al*., 2005) is considered an essential contribution to innovation and technological growth, driving productivity and economic growth in the end (Braunerhjelm *et al*., 2009). In addition, successful entrepreneurs promote knowledge transmission and create new jobs.

As recently as a decade ago, Grand-Duchy has focused on supporting start-ups, the need for diversification of the economy, and the public sector's support in Luxembourg and the private. This, in turn, affects the start-ups' ecosystem positively and aids the entrepreneurs in initiating their own business (Gancarczyk, 2019). One of the main reasons for developing the ecosystem of entrepreneurship and innovation in Luxembourg is the national policy on capacity building and guiding the economy towards knowledge-based industries. This committee made several recommendations include: ease of access to information, creating and facilitating channels of communication with migrants to promote initiatives, improve communication between different groups and adapt programs of initiatives and entrepreneurship for these groups (OECD/European Union, 2017). The percentage of immigrants in Luxembourg is relatively high, constituting 45% of the population (Schinzel, 2016). Migrants are an essential economic and socio-economic phenomenon. Migrant entrepreneurs are described as people who have come and started their own business in the immigration country. This phenomenon occurs in most developed nations, attracting representatives of poverty-stricken nations. Start-up is one of the forms that allow migrant workers to overcome barriers in the host country's labour market (Maj & Kubiciel-Lodzińska, 2020).

Entrepreneurs face many difficulties because of the National Centre for Business Administration policies in Luxembourg, which focuses on technology-based businesses. Therefore, some laws do not support entrepreneurs in obtaining the necessary funding to set up their businesses. The youth self-employment rate has been increased as far as a decade ago. However, the other groups remain under the E.U. self-employment average. However, the gap between genders is still exited in terms of self-employment; nevertheless, the percentage of self-employment women grew from 5.7 % in 2008 to 8.0% in 2017. Unemployment increased in Luxembourg after the global financial crisis in 2008, but it peaked at 6.7 % in 2015 and then fell to almost 5.5 % in 2017 for both genders. However, the unemployment rate remains lower than that of the EU in general, which is 7.8 % in 2017. The unemployment rate among the youth considers high relative to the other E.U. countries. The peak value was 22.6% in 2014; the following year dropped to 18.9%. However, Luxembourg's youth unemployment rate was one and half times the unemployment rate related to the national average (OECD/European Union, 2017).

RESEARCH METHODOLOGY

The article is based on the data of the Global Entrepreneurship Monitor (GEM) for the years 2012-2016. Most of the entrepreneurial activity information used in various international comparative research in economics (macro and micro level) is provided by The Global Entrepreneurship Monitor (Głodowska, 2019). In turn, the countries level of growth can be classified based on the statistical analysis- e.g., linear regression analysis- of the provided data, for example, GDP per capita, which explains more than 60% of country entrepreneurship growth (Liñán & Fernandez-Serrano, 2014). GDP per capita plays a crucial role in boosting establishing businesses, where demand for products and opportunities is directly proportional to the income (Fritsch & Schroeter, 2011). Transition economies depend profoundly on the information provided by GEI at both levels, institutional and individual. Therefore, in order to succeed in transition the economies and emerging new business, a set of actions required to be changed, including changes in the attitudes, abilities, and aspirations for both individuals and institutional level (Cieślik & van Stel, 2014). Entrepreneurs usually gain a sense of respect from society because of their ability to create new business, supply a new product, or develop new technology (Thornton *et al*., 2011).

The Global Entrepreneurship Index (GEI) has been developed as an indicator to identify and measure the entrepreneurship standardization and the entrepreneurship ecosystem level in the studied country. GEI consists of three sub-indexes attitudes, abilities, and aspirations. These sub-indexes divided into fourteen components, called pillars (Table 1). The fourteen pillars have been identified due to their importunacy during measuring and strengthening the entrepreneurial ecosystems. These pillars were used to determine the quality of the entrepreneurship ecosystem or the entrepreneurial ecosystem (EE.) in a particular country through both individual and institutional variables. The data collected based on these variables is used in the sub-indexes calculation. Therefore, the overall GEI mark is calculated based on the sub-indexes scores (Ács, Szerb, Lafuente, & LIoyed, 2018).

RESULTS AND DISCUSSION

Luxembourg's Entrepreneurial Performance Based on GEI

This section describes Luxembourg's entrepreneurship relatively to other transition countries (Table 2), which presents overall GEI values for 95 countries, including Luxembourg. The countries sorted based on GEI value while the United States ranked first with GEI 82.5 and GDP per capita 51.884, and Burkina Faso came in the last of the list with GEI 12.5 and GDP per Capita 1.560. Countries have been divided into three divisions (group 1 consists of the lowest developed countries, group 2 consists of the medium developed countries, and group 3 consists of the highest developed countries) (Szerb & Trumbull, 2018). It is clear that Luxembourg has the second-highest GDP per capita; however, Luxembourg comes in rank 19 in terms of GEI score. Although it is prevalent higher GDP per capita increases start-up rates, which is one of entrepreneurship measurement factors (Pinillos & Reyes, 2011)

Table 1. The GEI Structure of the entrepreneurial ecosystem of a given economy

Global Entrepreneurship Index	Sub-indexes	Pillars	Variables (ind. / inst.)
	Attitudes Sub-index	Opportunity Perception	Opportunity Recognition
			Freedom
		Startup Skills	Skill Perception
			Education
		Risk Acceptance	Risk Perception
			Country Risk
		Networking	Know Entrepreneur
			Agglomeration
		Cultural Support	Carrier Status
			Corruption
	Abilities Sub-index	Opportunity Startup	Opportunity Motivation
			Governance
		Technology Absorption	Technology Level
			Technology Absorption
		Human Capital	Educational Level
			Labor Market
		Competition	Competitors
			Competitiveness
	Aspiration Sub-index	Product Innovation	New Product
			Techtransfer
		Process Innovation	New Technology
			Science
		High Growth	Gazelle
			Finance and Strategy
		Internationalization	Export
			Economic Complexity
		Risk Capital	Informal Investment
			Depth of Capital Market

Source: Ács *et al*., (2013, p. 217).

The Global Entrepreneurship Monitor (GEM) has developed the Total early-stage Entrepreneurial Activity (TEA) rate. TEA concerns measuring the proportion of the population that runs a new individual business (age less than three and a half years). Where the percentage of the population in Luxembourg based on the TEA rate was somewhat higher than the E.U. average, where it was 8.8%, while the average of the European Union was 6.7% during the period 2013-2017, according to reports for the period 2013-2017, the lack of available job opportunities is one of the reasons why people in Luxembourg go to entrepreneurship.

Table 3 demonstrates Luxembourg's overall entrepreneurial profile based on institutional and individual components, the fourteen pillars in general, and the three main sub-indexes (Attitudes, Abilities, Aspirations). We notice that Luxembourg is among the worst counties (worst 25%) in only four variables belongs to "Entrepreneurial Attitudes," two of them in the individual variables. Namely (Risk Perception, Career Status), the rest within the institutional variables, namely education and "start-up skills," is the only pillar within the (worst 25%). Only five variables labelled with yellow- are within the (worst 50%) and nine variables above the average (light blue). It clears that the majority of Luxembourg variables are located within the best 25% of countries.

Table 2. Luxembourg in position global entrepreneurship index rank of the country's 2012-2016 average

Rank	Country	GDP	GEI	DEV	Rank	Country	GDP	GEI	DEV
1	United States	51,884	82.5	3	49	Uruguay	19,491	34.1	2
2	Switzerland	56,395	78.9	3	50	Barbados	15,355	34.0	2
3	Canada	42,838	78.3	3	51	South Africa	12,385	33.4	2
4	Australia	43,881	74.9	3	52	Croatia	20,529	32.3	2
5	Sweden	44,576	74.7	3	53	Costa Rica	14,135	31.5	2
6	Denmark	44,709	73.7	3	54	Lebanon	13,031	31.0	2
7	United Kingdom	37,840	72.2	3	55	Kazakhstan	23,509	30.0	1
8	Ireland	52,558	70.3	3	56	Belize	7,941	29.8	2
9	Netherlands	45,951	69.2	3	57	Namibia	9,113	29.4	2
10	Finland	39,355	68.1	3	58	Macedonia	12,310	29.1	2
11	Hong Kong	54,279	67.3	3	59	Morocco	7,276	28.2	2
12	France	37,575	65.2	3	60	Thailand	15,000	27.7	2
13	Austria	44,210	65.2	3	61	Peru	11,552	27.4	2
14	Germany	43,402	64.2	3	62	Mexico	16,520	26.6	2
15	Belgium	41,216	63.3	3	63	Bulgaria	17,355	26.5	2
16	Taiwan	37,832	63.0	3	64	Panama	19,824	26.4	2
17	Israel	31,676	61.1	3	65	India	5,578	26.3	1
18	Chile	22,160	59.0	2	66	Georgia	9,008	25.3	2
19	Luxembourg	94,277	58.5	3	67	Trinidad & Tobago	31,592	25.3	2
20	Norway	63,173	58.2	3	68	Russia	24,732	24.7	2
21	Estonia	26,772	56.0	3	69	Egypt	10,079	24.2	2
22	Qatar	119,538	55.4	3	70	Philippines	6,589	23.9	1
23	Korea	33,372	53.6	3	71	Argentina	19,017	23.8	2
24	Slovenia	28,592	52.9	3	72	Iran	16,184	22.5	2
25	Singapore	78,294	52.1	3	73	Ghana	3,720	22.5	1
26	Japan	36,946	49.4	3	74	Algeria	13,207	22.2	1
27	Cyprus	31,196	48.0	3	75	Vietnam	5,386	22.2	1
28	Portugal	26,208	47.0	3	76	Nigeria	5,409	22.0	1
29	Poland	24,484	46.9	2	77	Jamaica	8,090	21.7	2
30	Lithuania	25,150	46.4	2	78	Bolivia	6,325	21.4	1
31	Spain	31,691	45.6	3	79	Indonesia	10,195	21.1	2
32	Turkey	21,871	45.0	2	80	El Salvador	7,743	20.7	2
33	Puerto Rico	33,844	44.6	3	81	Bosnia and Herzegovina	10,224	20.7	2
34	United Arab Emirates	67,133	44.6	3	82	Ecuador	10,630	20.5	2
35	Slovakia	27,489	42.8	3	83	Brazil	14,922	20.4	2
36	Latvia	22,298	42.3	2	84	Zambia	3,543	20.3	1
37	Czech Republic	28,380	40.4	3	85	Senegal	2,297	19.7	1
38	Saudi Arabia	50,458	40.2	2	86	Guatemala	7,203	18.4	2
39	Hungary	23,946	39.4	2	87	Suriname	15,371	17.9	2
40	Tunisia	10,577	38.8	2	88	Pakistan	4,367	17.5	1
41	Colombia	12,592	38.3	2	89	Libya		17.2	1
42	Italy	34,452	38.1	3	90	Malawi	1,051	16.6	1
43	Jordan	8,390	36.5	2	91	Ethiopia	1,231	15.5	1
44	China	12,765	35.9	2	92	Cameroon	740	15.3	1
45	Greece	24,092	35.9	3	93	Uganda	1,646	13.9	1
46	Malaysia	24,132	35.5	2	94	Angola	6,148	13.8	1
47	Romania	19,376	35.0	2	95	Burkina Faso	1,560	12.5	1
48	Botswana	15,271	34.3	1					

Source: own elaboration based on GEI data 2012-2016 averages.

Table 3. Luxembourg entrepreneurship profile at the variable level and sub-indexes (based on 2014-2016 averages)

PILLARS			INSTITUTIONAL VARIABLES		INDIVIDUAL VARIABLES	
Entrepreneurial Attitudes	Opportunity Perception	0.77	Freedom	0.83	Opportunity Recognition	0.68
	Start-up skills	0.15	Education	0.34	Skill Perception	0.47
	Risk Acceptance	0.56	Country Risk	1.00	Risk Perception	0.34
	Networking	0.77	Connectivity	0.94	Know Entrepreneurs	0.54
	Cultural Support	0.66	Corruption	0.91	Career Status	0.35
	Entrepreneurial Attitudes	**48.3**				
Entrepreneur-ial Abilities	Opportunity Startup	1.00	Governance	0.99	Opportunity Motivation	0.90
	Technology Absorption	0.96	Technology Absorption	0.90	Technology Level	0.95
	Human Capital	0.56	Labour Market	0.52	Educational Level	0.86
	Competition	0.91	Competitiveness and Regulation	0.80	Competitors	1.00
	Entrepreneurial Abilities	**64.9**				
Entrepreneurial Aspirations	Product Innovation	1.00	Technology Transfer	0.87	New Product	0.94
	Process Innovation	0.62	Science	0.67	New Technology	0.74
	High Growth	0.54	Finance and strategy	0.88	Gazelle	0.51
	Internationalization	1.00	Economic complexity	0.93	Export	1.00
	Risk Capital	0.90	Depth of Capital Market	0.57	Informal Investment	1.00
	Entrepreneurial Aspirations	**62.4**				
GEI		**58.5**	**Institutional**	**0.80**	**Individual**	**0.73**

Note: Dark blue: best 25%, Light blue: best 50%, yellow: worst 50%, Red: worst 25%
Source: own elaboration based on GEI data 2012-2016 averages.

Figure 1 shows the fourteen-pillars data for Luxembourg for 2014 to 2016; we observe that the shapes of the three charts are almost identical, and the values for most of each of the fourteen pillars during this period are almost equal. Start-up skills remained the bottleneck with the lowest value equal to approximately 0.13. The value of "High growth" and "human capital" comes in second and third place with a value of less than 0.60 for high growth and approximately 0.60 for human capital. The trend of technology absorption shows a significant fall in the value from 1.00 in 2014 to 0.80 in 2015, then increased slightly in 2016. However, some pillars such as internationalization, opportunity start-up, and product innovation maintained stability within the same period with a value of almost 1.00. Moreover, there is a slight fluctuation in the value of networking and opportunity perception.

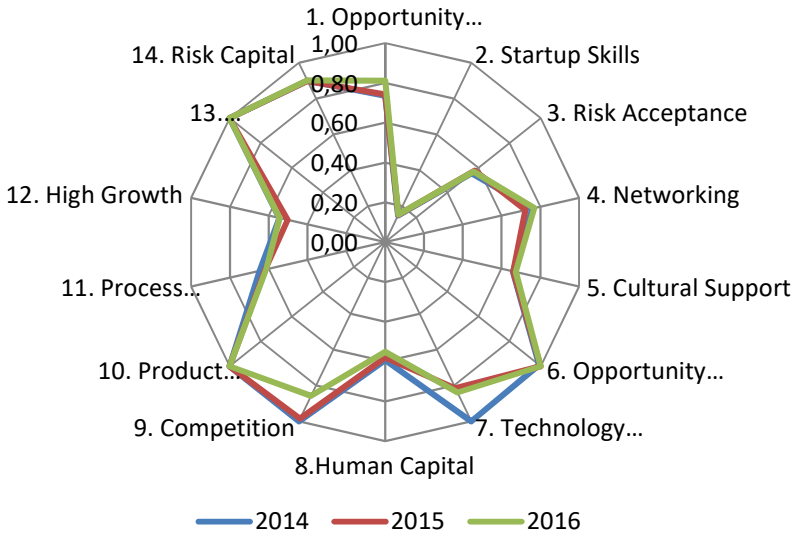

Figure 1. The time series comparison of Luxembourg's pillar values for the period 2014-2016
Source: own elaboration based on GEI data 2012-2016 averages.

Comparing Luxembourg's Entrepreneurial Performance to Belgium and Estonia

To investigate Luxembourg's GEI position, Figure 2 compares the value of the fourteen pillars over the years 2012-2016 for Luxembourg with one transition economy – Estonia and non-transition economy – Belgium (a neighbouring country). These two countries have been chosen for many reasons, including both countries located in the European continent; therefore, they encounter the same circumstances that Luxembourg faced. Moreover, the Luxembourg GDP per capita greater than both countries. However, Belgium's GEI value average of 63.1 is higher than Luxembourg, while Estonia has a GEI value of 56 and is considered the highest GEI value out of the transition countries (see Table 2).

Estonia is considered one of the most prosperous countries in entrepreneurship; although it was severely affected by the global financial crisis 2008, it achieved rapid growth, which reached almost 8 %in 2011 (Szerb & Trumbull, 2018). This development was achieved through Estonia's policy for 2014-2020, which focused on supporting high-growth start-ups and SMEs. This policy aimed to increase the Estonian economy's growth potential by digitalizing the economy and increasing productivity. But on the other hand, Belgium focused on youth leadership through many initiatives, the most recent of which was the 2016 National Reform Program. These programs aim to sustain business and grow it beyond its initial market goals. There were also state-level initiatives in Belgium, such as the Brussels Program to Support Youth Entrepreneurship and Wallonia Support, which focused on school and university students' entrepreneurship (OECD/EU, 2017).

Again, it is clear that "start-up skills" are the main drawback of Luxembourg entrepreneurship growth. The three countries almost had the same values of "high growth" level. The Graph shows that Belgium's fourteen pillars almost had equal values around Belgium's overall score, while in Luxembourg's case, there is a big gap between most of the fourteen pillars values to the high GDP per capita in Luxembourg.

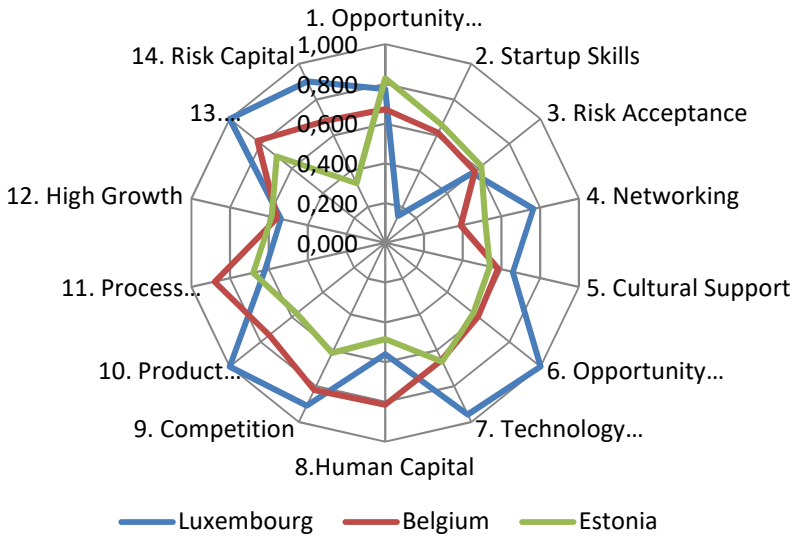

Figure 2. The comparison of Luxembourg, Belgium, and Estonia's pillar values
Source: own elaboration based on GEI data 2012-2016 averages.

The GEI's analysis results contribute to improving entrepreneurship in the country of interest by clarifying the vulnerability elements in the ecosystem, reducing the differences between the components and promoting the weaker part, and so on until reaching the optimal results term of entrepreneurship. The Penalty of Bottleneck method was developed to identify factors that lead to a decline in the overall GEI level in a particular country. Therefore, the impact of reducing the bottleneck factors will help to know the ability of this country to improve its performance (Ács *et al.*, 2014).

A Simulation for Improving Entrepreneurship in Luxembourg

Regarding PFB (Penalty for Bottleneck) analysis, Table 4 highlights only the bottleneck feature that constrains Luxembourg's performance. Emphasizing the previous section's mentioned section, the

Table 4. The bottleneck pillar

Pillar	Required Increase in Pillar	Percentage of the total new effort
Opportunity Perception	0.00	0%
Start-up Skills	0.13	100%
Risk Acceptance	0.00	0%
Networking	0.00	0%
Cultural Support	0.00	0%
Opportunity Startup	0.00	0%
Technology Absorption	0.00	0%
Human Capital	0.00	0%
Competition	0.00	0%
Product Innovation	0.00	0%
Process Innovation	0.00	0%
High Growth	0.00	0%
Internationalisation	0.00	0%
Risk Capital	0.00	0%

Source: own elaboration based on GEI data 2012-2016 averages.

Table 5. The new overall GEI and pillars values based on PFB method calculation

Target GEI Change	0.10

Pillar	Required Increase in Pillar	Percentage of the total new effort
Opportunity Perception	0.00	0%
Start-up Skills	0.23	100%
Risk Acceptance	0.00	0%
Networking	0.00	0%
Cultural Support	0.00	0%
Opportunity Startup	0.00	0%
Technology Absorption	0.00	0%
Human Capital	0.00	0%
Competition	0.00	0%
Product Innovation	0.00	0%
Process Innovation	0.00	0%
High Growth	0.00	0%
Internationalization	0.00	0%
Risk Capital	0.00	0%
Number of pillars Changed	1	should be >5 for 'balance.'

Indices	New Score	Change	% Of Total New Effort
ATT	0.587	0.10	100%
ACT	0.746	0.10	0%
ASP	0.715	0.09	0%
GEI	**0.683**	**0.10**	**100%**

Total Change	0.23
Total Change for 'dumb' policy	2.14

Source: own elaboration based on GEI data 2012-2016 averages.

critical bottleneck in Luxembourg's entrepreneurship advancement is the Start-up Skills. To increase Luxembourg's overall GEI points by ten; based on The PFB method calculation Table 5, the most remarkable improvement can be achieved by alleviating the startup skills pillar 100% to become 0.23 instead of 0.13. In turn, the entrepreneurship attitude sub-indexes average becomes 58.7. Therefore, the overall GEI becomes 68.3 instead of 58.3, with an increase of 10 points. Consequently, Luxembourg ranks 10 higher than Belgium, which is located in rank 15 with GEI 63.3.

CONCLUSIONS

The main goal of this paper was to look into Luxembourg's entrepreneurial development and make some suggestions for improving the country's entrepreneurial results. We examined the country's development at the institutional and individual levels using the GEI methodology. Besides, the PFB approach was employed to make policy recommendations by highlighting the system's worst-performing pillar.

We have used a novel GEI, the PFB methodology, in which Luxembourg can increase its average GEI by ten points by targeting the weakest pillars. Only one bottleneck, start-up skills in Luxembourg, are in the business attitudes sub-index, based on the PFB analysis. This calls for 100% of the entire effort (business policy resources) to be directed in the start-up pillar to improve Luxembourg's GEI rankings by ten.

People in Luxembourg lack the skills to start a business. Studies indicate that more than three women in Luxembourg lack the skill to start a business, and this percentage is higher than the average rate in the E.U. At the same time, half of the men lack this skill, which is almost the same average in the European Union. While a third of the youth believed that they had the skills necessary to succeed in starting a new business, which is also less than the average of the E.U., according to the survey, fear constitutes an obstacle to establishing businesses for half of the population in Luxembourg, especially among young people, who reached 52.2%. To increase and develop entrepreneurship programs in Luxembourg, the responsible authorities in Luxembourg must adapt entrepreneurship programs that target various groups of society, especially with many immigrants. It should also facilitate access to entrepreneurial and support programs to enable aspiring entrepreneurs to create their businesses. Luxembourg should also focus on refugees by strengthening the entrepreneurial programs available to them and cooperating with NGOs to overcome obstacles such as the language barrier.

The GEI data used during the analysis are limited to the period 2012-2016. Therefore, further investigation must cover a more extended or more current period than the one used in the study. The scarcity of studies on entrepreneurship in Luxembourg is also one of the limitations of this study. Moreover, only Belgium and Estonia, and only at the pillar level, were comparable to the profile of Luxembourg. More comparison should therefore be made at all levels with different countries in Europe. GEI is also a good indicator for start-up companies to use.

In spite of its limited content, the paper helps to portray the entrepreneurial profile of Luxembourg through a unique index combining individual and institutional quality variables in one model. We contribute to the identification by the sub-index, pillars, and level of the variables of the weak aspect of the business profile of Luxembourg. The analysis in particular shows empirical evidence that there is a lack of population entrepreneurship as a reason for the modest performance. We have also used the PFB approach to highlight the bottlenecks in the country and offer approximate proposals on how much Luxembourg is trying to improve its bottleneck.

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Conflict of Interest

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