

ENTREPRENEURSHIP PERFORMANCE OF VIETNAM

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Abstract

The study aims to measure entrepreneurship performance of Vietnam in comparison to Asian countries by applying the Global Entrepreneurship Development Index (GEDI) and then employed the Penalty for Bottleneck (PFB) methodology to allocate priority policies for the improvement of entrepreneurship performance in Vietnam. Specifically, the GEDI consisting of three sub-indices: Entrepreneurial Attitudes, Entrepreneurial Abilities and Entrepreneurial Aspiration, which are divided into 14 pillars and further subdivided into 28 variables, is used to identify the best and worst performing variables of the GEDI in Vietnam in comparison to Asian countries. Then the PFB methodology provides a more realistic analysis, aiming to discover bottle-neck factors, which are poorly performing system components before suggesting recommendations to achieve the greatest improvement of entrepreneurship performance in Vietnam. The results indicate that ten bottlenecks of 14 pillars are poorly performing with very low scores in Vietnam, in which the top priority policy is given for five pillars, including Risk acceptance, Opportunity perception, Internationalization, Technology absorption and Process innovation.

Keywords: bottleneck, entrepreneurship performance, the Global Entrepreneurship Development Index, the Penalty for Bottleneck

1. INTRODUCTION

Entrepreneurship has formally accepted in Vietnam since the 1990s and known as the simple view such as business activities, individual or firm levels, thus traditional approach is usually used by researchers and policy-makers when analyzing Vietnam's entrepreneurship (VCCI, 2014). However, entrepreneurship is the complex view basing

on the multidimensional measure in a country (Iversen et al., 2008). When discussing entrepreneurship in countries, recent studies follow National Systems of Entrepreneurship introduced by Acs et al. (2014), which are fundamentally resource allocation systems and driven by both the individual and country-specific institutional characteristics in evaluating the entrepreneurship performance of a country.

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The main purpose of this paper is to measure entrepreneurship performance of Vietnam in comparison to Asian countries by applying the Global Entrepreneurship Development Index (GEDI) and then allocate priority policies for the improvement of its entrepreneurship performance by employing the Penalty for Bottleneck (PFB) methodology. More specifically, the study evaluates Vietnam's entrepreneurship performance through its overall GEDI ranking and scores, and then measures Vietnam's entrepreneurship performance at the pillar and variable levels to identify the best and the worst performing variables of the GEDI. Furthermore, in order to enhance system performance, the PFB methodology is applied to discover bottleneck factors, which are the poorly performing system components before suggesting priority policies to achieve the greatest improvement of entrepreneurship performance in Vietnam.

2. DATA AND RESEARCH METHODOLOGY

The data in this study is collected from various sources, including the World Development Indicators of the World Bank, the GEM report, the Global Competitiveness Index of World Economic Forum, the Doing Business Index of the World Bank and the GEDI in the period 2011 - 2017 in the entrepreneurship projects of Ács, Autio and Szeb. Furthermore, based on the scores from these surveys and the GEDI in the Ács, Autio and Szeb's entrepreneurship projects, the authors use the average and statistical methods to calculate the data for the study's purposes.

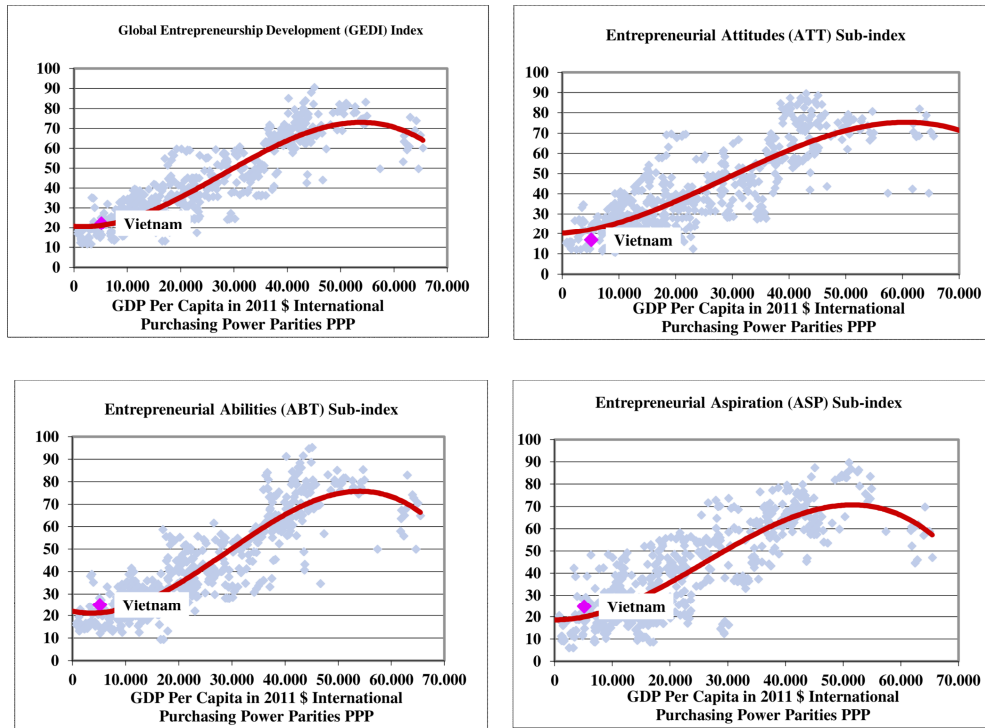
3. ANALYZING VIETNAM'S ENTREPRENEURIAL PERFORMANCE IN COMPARISON TO ASIAN COUNTRIES

3.1. Vietnam's overall entrepreneurial position: The GEDI scores and rankings

Policymakers are interested in identifying the most important issues affecting entrepreneurship performance in a country. The GEDI can be used to identify the best and the worst components of the GEDI of a country before suggesting policy priorities for this country.

The first part of this paper is to determine the overall entrepreneurial performance by analyzing Vietnam's entrepreneurial position through its rankings in the GEDI and three GEDI sub-indices. The relationship between the Global Entrepreneurship Development Index (GEDI) values and the economic development, as measured by GDP per capita is shown through the figures bellows, in which the relationship between the GEDI and GDP per capita follows a S shape. High income country tends to have better entrepreneurship ecosystem and vice versa with a correlation of 0.8057. The S-shaped curve shows the productive entrepreneurship at different stage of development. It measured the quality of entrepreneurial performance which is positively related to GDP per capita. It shows the effectiveness in explaining long term economic growth but failed to analyze short term growth perspective (Ács et al., 2015).

The Vietnam's overall GEDI score of 0.222 places it slightly above the development, which is presented by trend-line in Figure 1. This result means that Vietnam's overall entrepreneurial performance is a little higher than would be



Source: The Global Entrepreneurship Development Index (GEDI) project of Ács, Autio and Szeb

Figure 1. The relative position of Vietnam at the GEDI and three sub-index levels, 2011-2017

estimated given its GDP level. It also proved that developed economic is enough to facilitate entrepreneurship. Indeed, Vietnam’s scores for Entrepreneurial Abilities (ABT) sub-index (do you have proper skills, the abilities to work on entrepreneurship) and Entrepreneurial Aspiration (ASP) (do you want to start-up and build a giant company) sub-indices are 0.249 and 0.248, slight higher than the trend-line or the development, while Vietnam’s score for Entrepreneurial Attitudes (ATT) (how a nation thinks about entrepreneurship) sub-index is below the development. Out of three sub-indexes, ATT is the worst sub-index in Vietnam. This situation also indicates that Vietnam have ideas of start-up, aims at setting up a giant company as well as have enough skills and sufficient knowledge

to handle the business. People still doubt about entrepreneurship and its effectiveness, thus affecting the supportive environment for entrepreneurship growing.

With regards to the GEDI ranking, Vietnam’s overall GEDI rank is in the 72nd place out of 93rd participating nations. Because Vietnam is a developing country situated Southeast Asia, this study choose ASEAN developing country group that are emerging or transitional economies with similar cultural, economic and social characteristics, ASIA developing country group that have similar entrepreneurial features in the GEDI, and advance country group in Asia (Taiwan, Singapore, Korea, Japan) that provide comparative insights into advanced stages of development to compare entrepreneurial performance.

As compared to four countries in ASEAN developing country group (Malaysia, Thailand, Indonesia and Philippines), three ASEAN developing countries have higher GEDI scores and only Indonesia has a lower score than Vietnam. Indeed, Malaysia is the highest ranking in ASEAN developing country group with the GEDI score is 0.365, while the GEDI score of Vietnam is only 0.222.

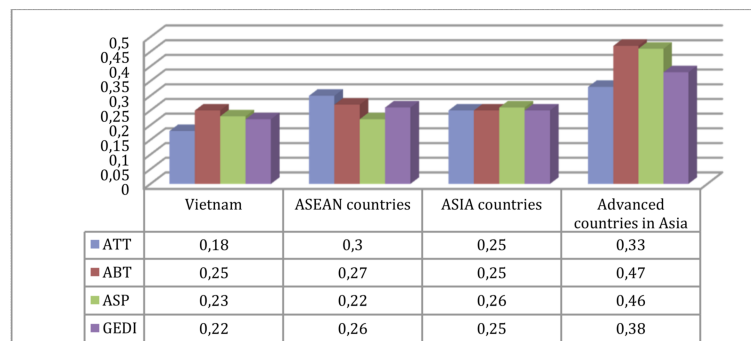
Within the Asia country group (the Central Asia, the South Asia, the East Asia and ASEAN developing country groups, including China, Kazakhstan, India, Pakistan, Bangladesh, Malaysia, Thailand, Indonesia and Philippines), Vietnam's GEDI score is lower than most GEDI scores of developing countries in Asia. It is only slightly better than Indonesia and much higher than two countries with very low economic growth: Pakistan and Bangladesh. The low GEDI score of Vietnam as compared to other countries in ASEAN and ASIA developing country groups indicates the worst entrepreneurial performance of Vietnam.

In addition to the overall GEDI score, the study examines Vietnam's entrepreneurial performance by comparing the average scores of the three sub-indices between

Vietnam, ASEAN developing country group, ASIA developing country group and advanced country group in Asia, as well as the normalized scores of its components.

Regarding the individual country, the overall GEDI score of Vietnam (0.22) is worse than the average scores of ASEAN developing countries and Asia developing countries (0.26 and 0.25 respectively). Out of three GEDI sub-indices, Vietnam's ATT is the worst sub-index in Vietnam with the lowest score (0.18), followed by the ASP sub-index. The lowest ATT score is because of Vietnam's past small and poor income economy level, leading to low perceived opportunities and capabilities of Vietnamese people to start a business and a big fear of business failure (VCCI, 2014).

Comparing the three sub-indices of Vietnam with the three sub-indices of ASEAN and ASIA developing countries, the ATT score of Vietnam (0.18) is also the lowest and much lower than this average scores of ASEAN and ASIA developing country groups (0.30 and 0.25 respectively). However, although the Vietnam's ASP score (0.23) is the second lowest in its three sub-indices, it is slight higher than the average score of ASEAN developing country group (0.22) (Figure 2).



Source: Author's calculation from the Global Entrepreneurship and Development Index (GEDI)

Figure 2. A comparison of GEDI sub-indices between Vietnam and three country groups, 2011-2017

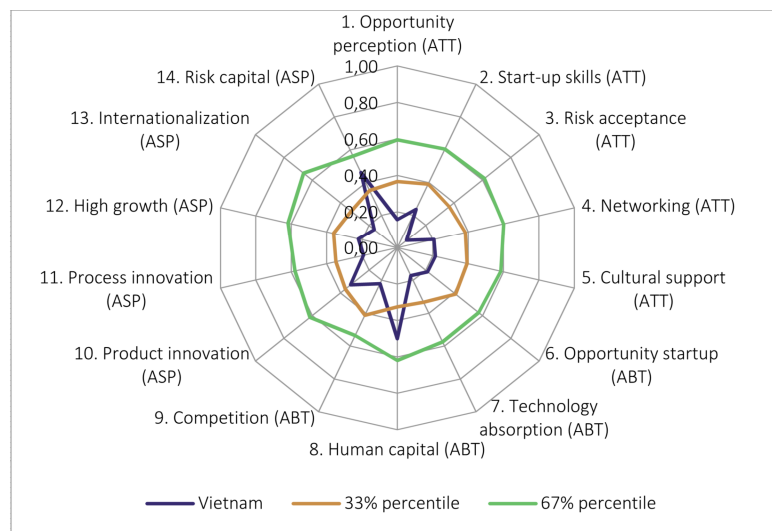
3.2. Vietnam’s entrepreneurial performance at the pillar and variable levels

To have more detailed and deeper understanding of Vietnam’s entrepreneurship performance, the study continues to analyze the relative position of Vietnam at the pillar level of the GEDI and compare the scores of Vietnam’s pillars (which is shown in blue) to that of 93 participating countries in the top one-third (67% percentile) (which is shown in green) and bottom one-third (33% percentile) (which is shown in red).

All scores of Vietnam’s pillar are below the scores of countries’ pillar in the top third.

Also, most of Vietnam’s pillar scores are below the scores of countries’ pillar in the bottom one-third, except for two pillars: Human capital from the ABT sub-index and Risk capital from the ASP sub-index. For the remaining twelve pillars, Vietnam ranks in the bottom one-third, in which the five pillars having the lowest scores are: Risk acceptance, Technology absorption, Competition, Process innovation, and Internationalization.

Taken alone and based on the data in Figure 3, Vietnam’s strongest and weakest pillars for each sub-index are shown in Figure 4.



Source: Author’s calculation from the Global Entrepreneurship and Development Index

Figure 3. The relative position of Vietnam in the pillar level, 2011 – 2017

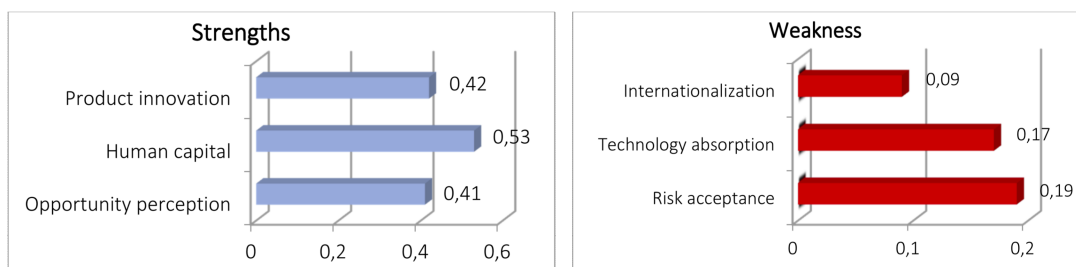
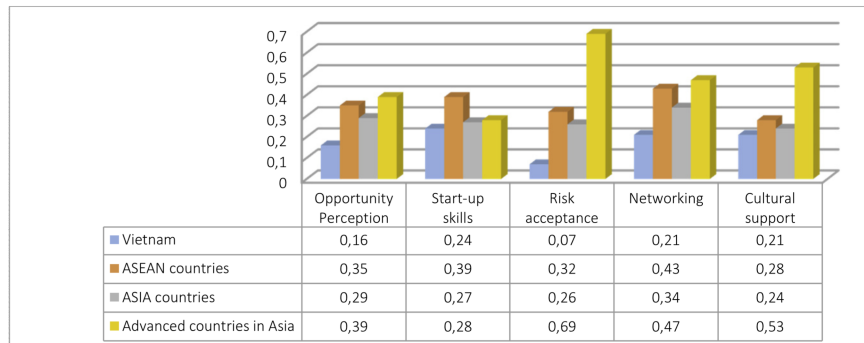


Figure 4. The strongest and the weakest pillars for each GEDI sub-index in Vietnam

The strongest pillar for the ATT sub-index in Vietnam is Opportunity perception (with the score is 0.41), while its weakest pillar is Risk acceptance (0.19). For the ABT sub-index, the strongest pillar is Human capital (0.53), while its weakest pillar is Technology absorption (0.17). In regards to the ASP sub-index, the strongest pillar of Vietnam is Product innovation (0.42), but its weakest pillar is Internationalization (0.09).

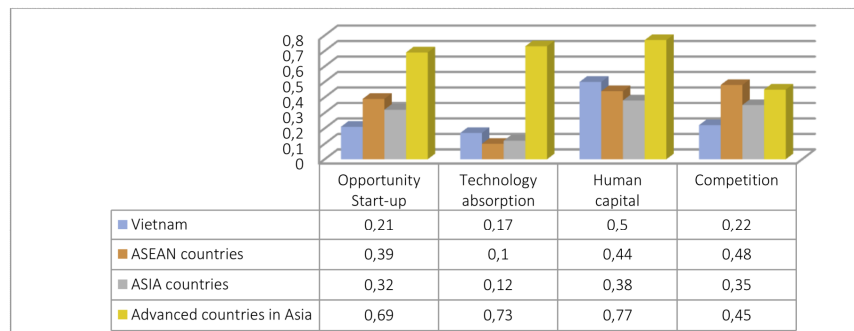
Comparing the Vietnam’s pillar values for each entrepreneurial sub-index with the average pillar scores of three country groups will provide cross-country comparisons at the pillar level. Figure 5, Figure 6 and Figure 7 demonstrate these comparison results.

Figure 5 indicates that Advanced countries in Asia score the highest on all five pillars of the ATT sub-index. Moreover, it is not surprising that Opportunity perception and Risk acceptance pillars are extremely weak in Vietnam and Asian countries because these pillars are influenced by the Socialist past. Specifically, these countries have experienced a long history of stated-controlled economic activity. Private businesses were restricted or even prohibited for decades. Indeed, these countries were the closed and small economies in the past and starts transforming to a market driven economy, thus it is not easy for the adult-age population to accept the risks as well as



Source: Author’s calculation from the Global Entrepreneurship and Development Index

Figure 5. A comparison of the ATT’ pillars among Vietnam and three country groups



Source: Author’s calculation from the Global Entrepreneurship and Development Index

Figure 6. A comparison of ABT’ pillars among Vietnam and three country groups

perceive good opportunities to start a new business and the fear of business failure still existed in the economy (Anh & Sullivan, 2016).

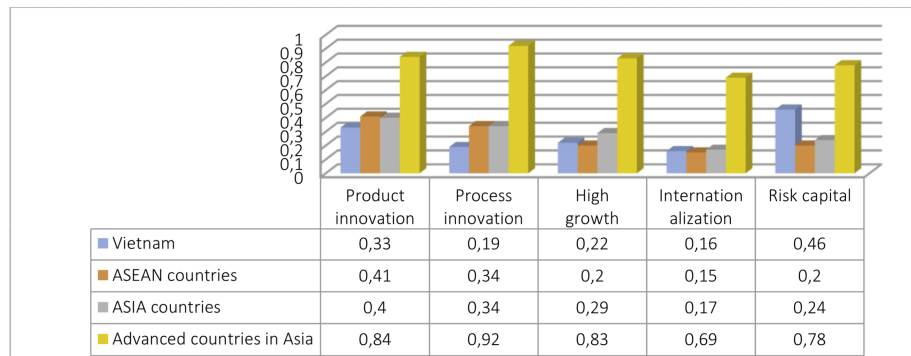
By contrast, although the scores of Start-up skills pillar in Vietnam and Asia countries are lower than the scores in two other country groups, it is the best pillar with the highest scores in five ATT' pillars. The high score of Start-up skills pillar in Vietnam and Asia countries is because these countries have a remarkable economic development in recent times and focused largely on enhancing the competitiveness of existing enterprises and new business startups. More importantly, the values of Start-up skills pillar of Vietnam and ASEAN countries are the highest resulting from the achievements of education system in these countries in training entrepreneurial knowledge and skills for business start-up and business operation in the school and the university. Similarly, Networking received its reality high scores in Vietnam, in ASEAN and Asia developing country groups due to the high value of the Knowent variable, indicating that a higher proportion of individuals in the population in Vietnam and two country groups know at least one entrepreneur. Indeed, the rapid development of the internet in Vietnam and these groups in recent decades helps entrepreneurs enhance the ability to access the social networking (Stephanie & Rafael, 2016).

Besides, Vietnam and Asia developing countries differs the most for Cultural support, which is the second highest pillar in Vietnam, but is the lowest pillar in Asia developing countries as compared to other pillars. The reasons of high score of Cultural support pillar in Vietnam are probably that entrepreneurs are highly appreciated in term of status and career

choice and the effect of corruption on perceived status and entrepreneurial aspirations of entrepreneurs is not much (VCCI, 2014).

Figure 6 presents the comparative position of Vietnam for four pillars of the ABT sub-index. As mentioned above, out of three sub-indices, the ABT is relatively the strongest GEDI sub-index in Vietnam. In fact, Vietnam performs better than ASEAN and Asia country groups for two out of four pillars: Technology absorption and Human capital. The higher score of Technology absorption in Vietnam is as a result of the improved ability of Vietnam enterprises to absorb new technology (Hoi et al., 2016). A noteworthy finding is that Vietnam outperforms for Human capital. The Human capital' pillar score of Vietnam is the highest and higher than the average scores of ASEAN developing country group and of Asia developing country group, but is less than the average score of Advanced country group in Asia by 27%. The explanation of this finding is that due to the large investment in education, the rate of Vietnamese business owners had post-secondary education increases rapidly (VCCI, 2014).

In contrast, the score of Competition pillar of Vietnam is far below the average scores of three country groups, which is due to a large influence of the dominance of several business groups in the Vietnam market and the market uniqueness of start-ups referred as creative destructive process is weak. Similarly, the value of Opportunity start-up pillar is low for Vietnam as compared with other pillars in the ABT sub-index of Vietnam as well as to three country groups. The low score of Vietnam's Opportunity start-up pillar is due to the low percentage of individuals who pursue



Source: Author's calculation from the Global Entrepreneurship and Development Index

Figure 7. A comparison of the ASP' pillars among Vietnam and three country groups

opportunity-driven start-ups that resulted from the burden of existing regulatory on business, which hinder this pursuit. Indeed, most of Vietnamese entrepreneurs do not prepare much for starting their business and do not have superior skills to generate more value in doing business, thus the prevalence of opportunity start-ups is low (Huan & Tuan, 2014).

Figure 7 shows that the score of Process innovation pillar in Vietnam is the lowest and far below the average values of that pillar in three country groups. This pillar value is only 0.19 in Vietnam less than the average value of ASEAN and Asia developing country groups by 0.15 and Advanced country group in Asia by 0.73. The lowest level of Process innovation is due to the low level of Research and Development (R&D), without systematic research activity and the limited use of new technologies of new firms in Vietnam in recent times (Enrico & Hien, 2013).

Furthermore, Vietnam, ASEAN developing countries, and Asia developing countries perform worse on Internationalization and High growth pillars with the lowest pillar scores as compared to the Advanced country group in Asia. However, the differences of High growth and

Internationalization pillar's scores among Vietnam, ASEAN developing country group and Asia developing country group are not significant. The weakness of Internationalization pillar is mainly resulted from the fact that almost enterprises in Vietnam and Asia countries are small and medium firms with a weak competitiveness. Therefore, these economic activities such as exporting and trading by smaller sized firms and new firms in these countries are reality below the international average and its growth is low. Indeed, the weakness of High growth pillar in Vietnam is explained by the low ability of Vietnamese enterprises to pursue distinctive strategies, including differentiated positioning and innovative methods of production and the delivery of goods and services (Pempel, 2005).

On the other hand, Vietnam performs the best on Risk capital (with the pillar score is 0.46) and Product innovation pillar (0.33). This finding also emphasizes that these two pillars are one of the critical factors for the Vietnam's economic development. In particular, the value of Risk capital for Vietnam is 0.46 much higher than the average values for ASEAN developing country group and Asia developing country group (0.20 and 0.24 respectively), but is

lower than the average value for the Advanced country group in Asia (0.78). The high level of Risk capital pillar for Vietnam is resulted from the larger informal investment in start-ups that is measured by the liquidity of debt and credit markets and the development of stock market in Vietnam in this period. Regarding Product innovation pillar, although Vietnam score wells on this pillar in its ASP sub-index, the value of Product innovation pillar for Vietnam is the lowest as compared to three country groups, meaning that the level of new product development in Vietnam is lower than other country groups. More specifically, in the beginning period of the market economy, it is easy for enterprises to receive profits from introducing existing products into its domestic markets. However, in order to maintain the competitiveness in the next period of the economic transition, Vietnam needs to encourage enterprises to further innovate and develop more new products in the market. Nonetheless, private sector R&D investment, the presence of high quality research institutions, the quality of technology transfer, and the protection of intellectual property are limited in Vietnam, thus this country cannot encourage the innovation of enterprises to add value to its products (Swierczek & Ha, 2003).

As mentioned above, the fourteen pillars can be further subdivided into 28 variables. Each pillar is formed from an institutional and an individual variable. Deeper research on the basic variable is necessary for analyzing Vietnam's entrepreneurial performance.

Table 1 presents the relative position of Vietnam at the variable level, in which Vietnam's scores belong to the upper 33, the middle 33 and the bottom 33 percent of participating countries, which are shown by

green, yellow and red colored groups, respectively. The last row in bold shows the GEDI level and its institutional and individual variable scores.

The overall score of the individual variable is 0.57, which places Vietnam in the middle one-third of the GEDI countries, is better than the overall level of the institutional variable (0.37). This result also indicates that the individual environment of Vietnam is relatively well developed for entrepreneurial development as opposed to the institutional environment. As can be seen in Table 1, most of the individual variables have high scores. Six individual variables, which receive a score of over 0.65: Opportunity recognition (0.90), Know entrepreneurs (0.79), New tech (0.79), Career status (0.71), Educational level (0.71) and Skill perception (0.67) play a key role in contributing to Vietnam's entrepreneurial performance. The highest score of Know entrepreneurs variable is explained by a better knowledge and understanding of Vietnamese entrepreneurs on entrepreneurship. The high score of New tech variable is as a result of an increase in using new technologies in business of entrepreneurs. Indeed, the high scores of Education level and Career status variables are resulted from the development of education system in providing a good preparation for start-up in the population (VCCI, 2014). By contrast, there also exist five individual variables with a low score of below 0.5: Gazelle, Technology level, Export, Competitors and Risk perception, which place Vietnam in the lowest one-third of the GEDI countries being considered.

On the other hand, the scores of Vietnam's institutional variables are very low. Only the Labor market variable is green colored, showing it belongs to the top level (33% of

Table 1. The relative position of Vietnam at the variable level, 2011 - 2017

	Pillars	Institutional variables	Individual variables			
Entrepreneurial Attitudes	Opportunity Perception	0.16	Freedom and Property	0.20	Opportunity Recognition	0.67
	Start-up skills	0.24	Education	0.36	Skill Perception	0.67
	Risk Acceptance	0.07	Business Risk	0.18	Risk Perception	0.27
	Networking	0.21	Connectivity	0.21	Know Entrepreneurs	0.90
	Cultural Support	0.21	Corruption	0.35	Career Status	0.71
	Entrepreneurial Attitudes	16.9				
Entrepreneurial Abilities	Opportunity Startup	0.21	Tax and government	0.36	Opportunity Motivation	0.55
	Technology Absorption	0.17	Tech Absorption	0.27	Technology Level	0.40
	Human Capital	0.50	Labor Market	0.57	Educational Level	0.71
	Competition	0.22	Competitiveness and Regulation	0.47	Competitors	0.32
	Entrepreneurial Abilities	24.9				
Entrepreneurial Aspirations	Product Innovation	0.33	Technology Transfer	0.46	New Product	0.63
	Process Innovation	0.19	Science	0.34	New Tech	0.79
	High Growth	0.22	Finance and strategy	0.45	Gazelle	0.42
	Internationalization	0.16	Economic complexity	0.32	Export	0.38
	Risk Capital	0.46	Depth of Capital Market	0.66	Informal Investment	0.61
	Entrepreneurial Aspirations	24.8				
GEDI	22.2	Institutional	0.37	Individual	0.57	

Source: Author's calculation from the Global Entrepreneurship and Development Index

the GEDI countries). This is not surprising because, in recent times, Vietnam has an abundance of young population and cheap labor, which has become the competitive advantage in attracting business start-ups (Stephanie & Rafael, 2016). Nine institutional variables: Freedom and property, Education, Business risk, Connectivity, Corruption, Tax and government, Tech absorption, Science and Economic complexity are coded red, showing that the scores of these variables are in the lowest one-third of GEDI countries, of which, five out of nine institutional variables with the lowest scores are from the ATT sub-index. More specifically, out of the nine worst institutional variables, Business risk has the lowest performing score (0.18), followed by Freedom and property and Connectivity with the performing scores are 0.20 and 0.21, respectively, and then Tech absorption with the score of 0.27.

Table 2 shows the four worst pillars and the corresponding influenced individual and institutional variables of Vietnam, which is collected from Table 1. More specifically, the lowest level of Risk acceptance in Vietnam is caused by the low levels of the institutional variable, Business risk and of individual variable, Risk perception. In other words, the lowest level of the Risk acceptance pillar can be explained by the low quality of the business environment in Vietnam and the Vietnamese's fear of failure that prevent them from starting a business (VCCI, 2014). The second lowest score of the Internationalization pillar is affected by the low levels of Economic complexity, represented by the Vietnam's high position in the Economic Complexity Index relative to its low GDP per capita and the limited exporting and trading activities in Vietnam's economy (Anh et al., 2015). The worst performance of the Technology absorption

Table 2. The four worst pillars and the corresponding institutional and individual variables of Vietnam

	Pillars		Institutional variables		Individual variables	
Entrepreneurial Attitudes	Opportunity Perception	0.16	Freedom and Property	0.20	Opportunity Recognition	0.67
	Risk Acceptance	0.07	Business Risk	0.18	Risk Perception	0.27
Entrepreneurial Abilities	Technology Absorption	0.17	Tech Absorption	0.27	Technology Level	0.40
Entrepreneurial Aspirations	Internationalization	0.16	Economic complexity	0.32	Export	0.38

pillar is because of the limitation of Vietnam firms in new technology absorption (Dabić et al., 2012). Vietnam enterprises mainly rely on low-medium technologies and only two percent of Vietnam's enterprises have high technology (VCCI, 2014) (which is shown by the Technology level variable). And the low score of the Opportunity perception pillar is mainly explained by the low level of the Freedom and property variable or the low efficiency of Vietnam's government in the regulatory process and the limitation of Vietnamese enterprises in accessing capital and resources in the economy (Hai, 2015).

4. THE PENALTY FOR BOTTLENECK METHODOLOGY

The GEDI methodology is considered a better policy tool (but not an optimal tool) to identify the weakness inhibiting entrepreneurship development in a country, but it can provide little guidance for policy design. The uniqueness is that this methodology provides a comprehensive analysis of individual and institutional aspects of entrepreneurship derived from the perspective of the system. It helps contextualize the national level entrepreneurial process, thus making it consistent with the study of country-specific features. Indeed, this methodology identifies

bottleneck factors, which constitute the weakest link among the pillars and constrain system performance, thereby helping set tangible goals for policies and support initiatives designed to improve the bottleneck identified. In practice, in the GEDI methodology, the higher pillar values are adjusted to the weakest performing pillar value of the particular sub-index, thus eliminating full, one-to-one substitutability across pillars. However, this methodology does not guide how to measure exactly the penalty; therefore, the solution is not optimal and only provides a better solution (Szerb et al., 2012).

Because of the limitations of the GEDI methodology, and because all pillars are formed as interactions between individual and institutional aspects, the PFB methodology is considered to be the policy application of the GEDI methodology, which provides a more realistic analysis of overall entrepreneurial performance of a country, contributing to more insightful policy development and cross country comparison (Szerb et al., 2012).

According to Acs et al. (2014), bottleneck is defined as the weakest link or the binding constrain in the national entrepreneurial performance. In other words, within a given set of normalized pillars, a bottleneck is a factor with the lowest value. From the policy perspective, the PFB methodology focuses

on the weakest pillar, which is the starting point where policy is generated to achieve the greatest enhancement of the system. The principle of this methodology is that the pillar scores should be adjusted, thereby achieving this concept of balance. After equalizing the scores of all pillars, the value of each pillar is “penalized” by linking it to the value of the weakest performing indicator (that is called the bottleneck) in a given nation. If the bottleneck is improved, the overall GEDI will be enhanced significantly.

The PFB methodology also implies that a stable and efficient configuration will be reached if all pillars are the same level. Based on the approach proposed by Tarabusi and Palazzi (2004) that if the difference between the particular pillar and the corresponding pillar is larger, there requires a higher compensation for the loss in one pillar. Acs et al. (2014) create the penalty function reflecting compensation for the loss of one pillar with an improvement in another pillar. The penalty function is written as follows:

$$h_{(i,j)} = \min_{y(i,j)} + (1 - e^{-y(i,j) - \min_{y(i,j)}})$$

Where:

$h_{(i,j)}$ is the modified, post-penalty score of pillar j in country i .

$y_{(i,j)}$ is the normalized score of pillar j in country i .

$\min_{y(i,j)}$ is the lowest score of $y_{(i,j)}$ for country i .

$i = 1, 2, \dots n =$ the number of countries.

$j = 1, 2, \dots m =$ the number of index components.

In the above function, by adding one minus the base of the natural logarithm of the negative difference between a particular pillar’s value and the lowest normalized value of any pillar in country i , we can identify the modified, post-penalty score of a pillar in a country. Therefore, improving the value of the weakest pillar will bring a greater impact on the GEDI than improving the stronger pillar’s value.

The PFB methodology now is applied for Vietnam. The first step of the PFB methodology is that we add 0.1 units to improve bottleneck pillars. We assume that the cost of reaching the 0.1 unit improvement is the same for all pillars. Table 3 represents:

(1) original normalized or averaged pillar

Table 3. Sensitivity of the GEDI index to bottleneck factors

GEDI index pillars	(1)	(2)	(3)	(4)
Opportunity Perception	0.16	0.156	0.16	0.163
Start-up skills	0.24	0.226	0.24	0.24
Risk Acceptance	0.07	0.070	0.17	0.163
Networking	0.21	0.201	0.21	0.21
Cultural Support	0.21	0.201	0.21	0.21
Opportunity Startup	0.21	0.201	0.21	0.21
Technology Absorption	0.17	0.165	0.17	0.17
Human Capital	0.50	0.419	0.5	0.5
Competition	0.22	0.209	0.22	0.22
Product Innovation	0.33	0.299	0.33	0.33
Process Innovation	0.19	0.183	0.19	0.19
High Growth	0.22	0.209	0.22	0.22
Internationalization	0.16	0.156	0.16	0.163
Risk Capital	0.46	0.393	0.46	0.46
GEDI index score		22.06	23.81	23.83
Percentage improvement			7.9%	8.0%

Source: Author’s calculation

scores, (2) PFB adjusted pillar scores, (3) the impact of a 0.1 unit improvement in the bottleneck pillar value, (4) and optimal solution obtained when the 0.1 unit increase is divided amongst three weakest pillars. Based on the results of this table, we can recognize the percentage improvement relative to the PFB adjusted index value without bottleneck alleviation.

Vietnam's pillar values range from an extremely low level of Risk acceptance (0.07) to a medium value of Human capital (0.50). As can be seen in Table 3, out of fourteen variables, there are ten bottlenecks in Vietnam.

If we increase the weakest pillar value (Risk acceptance) for Vietnam by 0.1 units, new bottlenecks, Opportunity perception and Internationalization emerges (see shift from column 2 to column 3). This generates an improvement of 1.75 index points in the Vietnam's overall GEDI index score from 22.06 to 23.81 (corresponding to a percentage increase of 7.9%). Because all pillars perform relatively worst in Vietnam, and Vietnam's performance profile is imbalanced, thus this improvement produces a relatively big improvement in the overall GEDI index value for Vietnam. Indeed, to produce an optimal outcome or obtain the greatest increase in the index value for the same effort, the 0.1 pillar improvement effort is divided amongst Risk acceptance (0.07), Opportunity perception (0.16) and Internationalization (0.16). An optimal distribution of policy effort produces a further raise in the Vietnam's GEDI score of 0.02 to 23.83 units. In the percentage, this optimization produces an additional improvement of only 0.1% from 7.9% to 8.0% (see column 3 and column 4).

5. POLICY PRIORITIES FOR ENHANCING ENTREPRENEURSHIP PERFORMANCE IN VIETNAM

Beside the PFB methodology for the improvement of the system performance through increasing the Vietnam's overall GEDI score, the study also tries to identify policy priorities for the improvement of entrepreneurship performance in Vietnam.

The GEDI pillars with normalized scores of less than 0.20 are considered as top policy priorities. For Vietnam, five pillars are classified as top policy priorities: Risk acceptance, Opportunity perception, Internationalization, Technology absorption and Process innovation. These five pillars are the weakest pillars and four variables, including one individual variable Risk perception and three institutional variables: Technology absorption, Business risk and Freedom and property are the weakest variables out of 28 variables, indicating that more effort is necessary to improve these values in Vietnam.

In the case of Internationalization, in order to improve this pillar, we should focus on Economic complexity and Export in Vietnam. As for Risk acceptance pillar, the individual variable Risk perception has a higher value than the corresponding institutional variable Business risk. Thus, the policy priorities for improving Risk acceptance should concentrate on Business risk, for instance, Vietnam should improve the quality of the business environment by delivering the reliable corporate financial information, providing fair and efficient creditor protection, and encouraging intercompany transactions. Similarly, for Opportunity perception pillar, the individual variable Opportunity recognition has a higher value than the corresponding

Table 4. Policy priorities for the fourteen GEDI pillars of Vietnam, its individual and institutional variables

Pillars	Pillar values	Institutional values	Individual values	Policy priority
Risk acceptance	0.07	0.18	0.27	Top priority
Opportunity perception	0.16	0.20	0.67	
Internationalization	0.16	0.32	0.38	
Technology absorption	0.17	0.27	0.40	
Process innovation	0.19	0.34	0.79	
Net working	0.21	0.21	0.90	Medium priority
Cultural support	0.21	0.35	0.71	
Opportunity start-up	0.21	0.36	0.55	
High growth	0.22	0.45	0.42	
Competition	0.22	0.47	0.32	Low priority
Start-up skills	0.24	0.36	0.67	
Product innovation	0.33	0.46	0.63	
Risk capital	0.46	0.66	0.61	No
Human capital	0.50	0.57	0.71	priority

Source: Author's creation

institutional variable Freedom and property. Therefore, the best solution to improve Opportunity perception is to raise its institutional variable, for instance, Vietnam has to increase the efficiency of government in the regulatory process as well as encourage the freedom and owners in business. Regarding Technology absorption pillar, the best way to improve this pillar depends largely on its institutional variable, Technology absorption, for instance, companies in Vietnam need to absorb new technology. As for Process innovation pillar, Vietnam should concern on the institutional variable, Science, to increase this pillar value.

The medium priority is set up for the GEDI's pillars have a normalized value of from 0.20 to 0.22. For Vietnam, five pillars: Networking, Cultural support, Opportunity start-up, High growth, and Competition belong to this priority. Networking, Cultural support and Opportunity start-up are Vietnam's pillars which the institutional variable values are worse than the individual variable values. It means that Networking can be improved by increasing Connectivity. Cultural support can be improved by reducing Corruption. In order to improve

Opportunity start-up pillar, Vietnam should focus on Tax and government, for instance, the Vietnam government needs to reduce taxes as well as lessen its bureaucracy, and should encourage the predictability and consistency of regulations and taxation. Unlike these three pillars, for Competition pillar, the individual variable Competitors have a lower value than the corresponding institutional variable, Competitiveness and regulation. Therefore, the policy for improving Competition should focus on Competitors. In the case of High growth pillar, both individual and institutional variables should be improved together to increase the pillar scores.

The low priority group consists of pillars with normalized scores between 0.23 and 0.35. Improving these pillars' performances only slightly influence on the GEDI values.

The final group consists of two GEDI pillars with a normalized score of more than 0.35: Risk capital and Human capital. In this case, we do not suggest any further actions to improve these two pillars because allocating resources to increase the value of weaker pillars may lead to greater imbalances and only receive slightly higher entrepreneurial performance.

6. CONCLUSION

The research analyzes the Vietnam's entrepreneurship performance based on the GEDI and its sub-indices at the pillar and variable levels in comparison to Asia countries, and then utilizes the PFB methodology to achieve the highest improvement of the GEDI score for Vietnam as well as identify policy priorities for this improvement of entrepreneurship performance. More specifically, this study paid more attention to the GEDI approach to analyze Vietnam's entrepreneurial performance in comparison to three country groups: ASEAN developing countries, Asia developing countries, and Advanced countries in Asia. The Vietnam's overall GEDI is not good with a low value of 0.22. As compared to Asia developing countries, the Vietnam's GEDI score is only slightly better than the GEDI value of Indonesia and much higher than Pakistan and Bangladesh.

With regards to the fourteen GEDI sub-indices, Vietnam received the lowest value for the ATT and the highest value for the ABT. The main weaknesses at the sub-index level in Vietnam are Opportunity perception, Risk acceptance for the ATT, Competition for the ABT and Process innovation, Internationalization, and High growth for the ASP.

The GEDI is particular useful in dealing with the bottleneck problems of low performing pillars and focusing on the bottleneck that constitutes the weakest link amongst the pillars. However, this approach does not show how to measure the penalty exactly. Thus, there exists a problem relating to an imperfect substitutability amongst constituent components of a system, and then the efficiency of system is hold back by the weakest performing factor. The PFB is

then applied to identify potential areas of relative weakness and investigate how components of entrepreneurship interact before suggesting entrepreneurship policies. The PFB methodology indicates that an increase in the weakest pillar's score (Risk acceptance) produces a large improvement in the overall GEDI score for Vietnam. Indeed, in order to have an optimal outcome of the GEDI for Vietnam, a country has to improve the three weakest pillars: Risk acceptance, Opportunity perception and Internationalization.

When suggesting priority policies for the improvement of entrepreneurship performance, the PFB methodology is considered as a useful and optimal tool for choosing priority policies. Top policy priorities for Vietnam are given for the five GEDI's weakest pillars: Risk acceptance, Opportunity perception, Internationalization, Technology absorption and Process innovation that requires more effort to improve these pillar's values. More specifically, to improve Risk acceptance pillar, Vietnam should focus on Business risk variable, or Vietnam needs to improve the business environment by delivering the reliable corporate financial information, providing fair and efficient creditor protection, and encouraging intercompany transactions. As for Opportunity perception pillar, Vietnam can enhance opportunity perception for business startups by increasing the efficiency of government in the regulatory process as well as encouraging the freedom (that is measured through the ability to start, operate, and close a business) and the ownership in business. Furthermore, Vietnam should conduct programs to disseminate knowledge and skills for business start-up for people having entrepreneurial intentions, especially for the

young people. Regarding Internationalization, Vietnam must concentrate on internationalization by increasing its economic complexity and export capacity. Indeed, improving Technology absorption pillar is implemented by promoting the use of new technologies in business in Vietnam. Finally, promoting the application of science and technology in business is necessary way to increase Process innovation pillar in Vietnam.

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ПРЕДУЗЕТНИЧКЕ ПЕРФОРМАНСЕ ВИЈЕТНАМА

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Извод

Циљ студије је да измери предузетничке перформансе Вијетнама у поређењу са азијским земљама применом Глобалног Индекса Развоја Предузетништва (ГЕДИ), а потом применом методологије Пенала за уска грла (ПФБ), за додељивање приоритетних политика за побољшање предузетничког учинка у Вијетнаму. Тачније, ГЕДИ који се састоји од три под-индекса: Предузетнички ставови, Предузетничке способности и Предузетничка тежња, који су подељени у 14 стубова и даље подељени у 28 променљивих, користи се за идентификацију варијабли ГЕДИ са најбољим и најгорим перформансама у Вијетнаму у поређењу са осталим азијским земљама. Потом, методологија ПФБ пружа реалистичнију анализу, с циљем откривања фактора уског грла, односно идентификацију системских компоненти са лошим перформансама, пре него што предложи препоруке за постизање највећег побољшања предузетничког учинка у Вијетнаму. Резултати указују на то да постоје десет уских грла код 14 стубова, који имају лоше показатеље са врло ниским резултатима у Вијетнаму. При чему је политика приоритета дата за пет стубова, укључујући прихватање ризика, перцепцију прилика, интернационализацију, апсорпцију технологије и иновације процеса.

Кључне речи: уско грло, предузетнички учинак, Глобални Индекс Развоја Предузетништва, Пенали за уско грло

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