

Entrepreneurship and Socio-Economic Development in Cross-Countries Analysis

Olga Obraztsova and Alexander Chepurenko

State University – Higher School of Economics (HSE) Moscow, Russia

Abstract

The paper stresses the importance of the nature of entrepreneurial activity ('productive', 'unproductive', 'destructive') to explore real dependence between entrepreneurship and economic development. For this reason, however, the economic development should be viewed in terms other than GDP. The entrepreneurial activity in different countries according to the APS dataset of the Global Entrepreneurship Monitor (GEM) for 2006-2008, on one side, and on the UNDP human development index (HDI), on the other are used to show the significance of entrepreneurial activity for economic development. The HDI modified to measure human capital at different stages of becoming entrepreneurial (HDIE) is introduced as a composite indicator with three components measuring: well-being, skills and social motivation of entrepreneurs. HDIE is revealed to be appropriate for international comparison of human capital development in a bilateral and multilateral context, and among the countries. The possibility to calculate the strength of relationship between the HDIE, as the independent variable, and various dependent variables being micro-level indicators of the political, economic, demographic, social, cultural, health and physical environment is argued.

1. Introduction

Since Schumpeter, there is a consensus about mainstream Economists that entrepreneurship is 'responsible' for economic and social growth. As regards the measurement of the latter, for a good portion of the 20th century there was an implicit assumption that economic growth results in growing Gross Domestic Products (GDP). However, under transition to post-modern, or 'affluent' society, it becomes clear that real economic and social progress should be measured in other indicators than GDP data. The variables could express, among others, a sustainable livelihood, the ability to live a long and healthy life and to have access to decent education. An economy that tries to remain competitive amidst globalization must draw on everyone's talents. So, the GDP's relevance is now under debate as an indicator of entrepreneurship 'benefits' for advanced societies.

We assume that the GDP is less appropriate for cross-countries analysis of entrepreneurship development because it implies (1) a measurement of different types of societies using the same criteria, (2) relevance of the factor which may result from different roots.

To avoid this, for instance the GEM seeks to compare / differentiate countries with different GDP levels and its impact on early entrepreneurship dynamic while dividing all participating countries in three groups with different types of socioeconomic development:

Factor-Driven Economies - Angola, Bolivia, Bosnia and Herzegovina*, Colombia*, Ecuador*, Egypt, India, Iran*

Efficiency-Driven Economies - Argentina, Brazil, Chile, Croatia**, Dominican Republic, Hungary**, Jamaica, Latvia, Macedonia, Mexico, Peru, Romania, Russia, Serbia, South Africa, Turkey, Uruguay

Innovation-Driven economies - Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Republic of Korea, Netherlands, Norway, Slovenia, Spain, United Kingdom, United States

* Transition country: from factor-driven to efficiency-driven

** Transition country: from efficiency-driven to innovation-driven (Bosma, N., e.a., 2008).

This classification follows to the 2008 Global Competitiveness Report¹ and is relevant to differentiate countries in relation to the type of current economic development. However, even this clustering can hardly be sufficient to differentiate countries: there are some examples where the distances in GDP per capita between societies belonging to the same group are bigger than between countries belonging to a different group. Moreover, countries with comparable GDP per capita seem to belong to different kinds of socioeconomic development.

It looks like GDP is a good indicator to compare the economic well-being of countries with more or less equal socioeconomic models of development. But it seems to be less adequate to measure the economic state of very different types of societies.

That is why problems occur if we try to reveal the correlation between entrepreneurship and economic development arguing in GDP. For instance, Russia which belongs to the group of efficiency driven economies shows in 2006-2009 quite similar rates of adults engaged into entrepreneurial activity like for instance Belgium, France or Germany. And vice versa: countries, belonging to innovation-driven economies, may have different levels of entrepreneurial activity of population.

Taking into consideration a totally different structure of driving forces of economic development, the role of entrepreneurship in the latter may become irrelevant, for instance, in societies with a dominant role of rent from natural resources. Moreover, the amount of GDP per capita in these countries may hardly imply a comparable level of entrepreneurship development like in innovation – i.e., human factor - driven economies.

We should refer to William Baumol's distinction between productive, unproductive and even destructive entrepreneurship. His basic hypothesis was that, while the total supply of entrepreneurs varies among societies, the productive contribution of the society's entrepreneurial activities varies much more because of their allocation between productive activities, such as innovation, and largely unproductive activities, such as rent seeking or organized crime. This allocation is heavily influenced by the relative payoffs society offers to such activities (GEM calls it entrepreneurial framework conditions). This implies according to Baumol that policy may influence the allocation of entrepreneurship more effectively than it can influence its supply. His evidence from ancient Rome, early China, and the Middle Ages and Renaissance in Europe testify the hypotheses. It seems, however, that modern world could easily deliver even more drastically examples of unproductive entrepreneurship – i.e. “rent-seeking, often via activities such as litigation and takeovers, and tax evasion and avoidance effort” (Baumol, W., 915).

¹ <http://www.weforum.org/documents/gcr0809/index.html>

It may occur when the civil society is weak, and especially under such circumstances when any society possesses important natural resources and plays an important role on international natural resource markets. A relatively high level of GDP may have in such societies much less effect on entrepreneurship development than one might assume taking ‘perfect’ market economies with comparable level of GDP per capita, and/or may become favorable for mainly ‘unproductive’ entrepreneurship – with small portion of added and high portion of redistributed value.

Moreover, such a framework conditions may have stronger or weaker or no significant impact on the entrepreneurship development at any level of GDP per capita. So, economies with significant share of natural resources in domestic product but small amount of population may function under a paternalist welfare state policy at a very high level of GDP per capita and very weak incentives to become entrepreneurial. Otherwise, countries with high export quote of natural resources but big population may have autocratic political regimes excluding big groups of population from rent benefiting; enabling bureaucrats to become ruling group it leads to growing administrative barriers preventing bottom-up entrepreneurship development. In any case, the level of GDP is irrelevant to understand the level of entrepreneurial activity. And vice versa: entrepreneurial activity in such societies is rather a marginal issue, with small or absent impact on the GDP formation. Also the main reasons to start-up well known in established market economies – like self-efficacy, need for achievement etc. - may have less relevance to understand the motivation of people trying to establish a new venture in such societies.

Meanwhile, the human development approach in explaining entrepreneurship focus not on the income but on people themselves as actors of both entrepreneurship *and* economic development. Low level of human capital development is, on the one hand, a resulting indicator of quality of human life and wellbeing of society, on the other hand, it is a predictor of entrepreneurial activity – in the sense that a certain level of it is crucial to be creative, to explore opportunity for a new venture and to obtain necessary skills to be successful.

The importance of analyzing entrepreneurship in such a context has recently been emphasized in the entrepreneurship literature (Davidsson, P.). A lot of studies examine the effects of the entrepreneurs’ achievements, freedoms, capabilities, education, family structure, occupational background, career history, innovativeness, motivation and so on (Boswell, J.; Bates, T., 1985, 1990; Preisdörfer, P., and T. Voss; Cooper, A.C., et al.; Dahl, M., and T. Reichstein). But all the indicators vary very much between individuals, and between countries as a whole.

In the presented paper we will try, first, to draw up a system of variables measuring human development of entrepreneurship, second, to show various dimensions of human capital correlation with entrepreneurial activity, and finally to construct a human capital based complex indicator of the entrepreneurial potential development of a society.

As this aggregate indicator is chiefly based on statistical principles related to the United Nations Development Program (UNDP) Human Development Index (HDI) methodology (see Halis Akder A., Jahan S., Report of the World Commission...), we have named it Human Development Index in Entrepreneurship (HDIE). In this paper the UNDP HDI Methodology is modified to take account of specific entrepreneurial potential features to apply the HDIE for cross-national comparison of human capital development. The HDIE may be used to calculate the strength of relationship between the HDIE, as the independent variable, and various dependent variables - micro-level indicators of political, economic, demographic, social, cultural, health and physical environment.

2. A System of Indicators Measuring Human Capital Development in Entrepreneurship

Human development in entrepreneurship is about the realization of human potential. It is about what people can do and become - their capabilities - and about the freedom they have in their lives.

An adequate measurement of human capital development in entrepreneurship is possible on the basis of an aggregate composite statistic (named HDIE), including three most important dimensions of progress: (1) sustainable 'wellbeing' of entrepreneurs, (2) good 'health' and long life of enterprises, (3) sufficient education and skills of entrepreneurs.

2.1. Sustainable entrepreneurship

The UNDP has created and developed some composite human development indices apart from the HDI to assess measurable dimensions of human development. Many national human development report teams have not only adapted the indices, but have also come up with innovative methodologies and indicators to measure local human development inequities (Blewitt, J.; Pearce, D., Barbier, E., and A. Markandya; Ratner, B.D.). Complementing composite indicators with other forms of statistical analysis helps to strengthen the research methodology in different spheres of economic analysis. There is the Sustainable Society Index (SSI) among the most important of them. We have used its main definitions to determine a sustainable entrepreneurship.

According to a widely accepted definition, "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Report of the World Commission...). Applying this notion to entrepreneurship, a sustainable entrepreneurship should:

- function under good governance in a entrepreneurially friendly environment;
- meet the needs of the present entrepreneurs;
- do not compromise the ability of future progress in business development,
- develop the venture in a competitive, but fair way.

A sustainability of entrepreneurship, thus, can be measured with a system of quantitative indicators including a percentage of established entrepreneurs among adult population (taking into consideration especially the gender structure), a well proportion of opportunity-based vs. necessity-based entrepreneurs among nascent entrepreneurs, a relatively high percentage of non-entrepreneurial adults tolerant to entrepreneurs, a certain level of optimism about perspectives of doing/starting a business development (comparing with a number of individuals who are prevented from start-up by the fear of failure) and a reasonable share of individuals expecting to start a new venture in the future among adult population.

2.2. Good health and long life of enterprises

The UNDP HDI Methodology considers an ability to live a long and healthy life as one of three basic aspects of human development. This dimension of its progress is measured by life expectancy at birth.

The entrepreneurs' expectations of survival chances can, indeed, be separately calculated for businesses of different stages of their life-cycles.

Using the GEM data, one can introduce an indicator of *early entrepreneurship turnover*, or *entrepreneurship expansion coefficient*, consisting of the proportion of nascent entrepreneurs to entrepreneurs exited or discontinued their businesses in the same period (last year), so this indicator shows how much is indeed an expansion of entrepreneurial potential.

Summing up, an ability to live a long and healthy life for new enterprises can be measured with a system of quantitative indicators including a percentage of positive expectations of early-stage entrepreneurs for any jobs now or in future, a share of high job expectation of businesses, and an entrepreneurship expansion coefficient.

2.3. The access to knowledge and schooling

The state of progress of human capital should be measured with adults' ability to access to decent schooling, knowledge and innovations. This aspect of human development is explored by an aggregate indicator of the adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio in the UNDP HDI methodology.

The share of the adult population with the highest level of skills and capacities to start business is considered as a component which an education index have been based on to reveal differences in skills and knowledge among the countries.

Furthermore, the access to decent schooling and knowledge, training in starting a business create a basis for technological innovations and also for new products and services production. Taking both these into account, there remain good reasons to be concerned not only with secondary or post-secondary degrees, but also with calculation of the new products and latest technologies or procedures diffusion.

Hence, the educational component of the HDI can be measured as a share of high educated adults among population, able to start and manage business and to recognize latest technologies and new products (or services) importance.

2.4. HDIE – aggregate indicator for human capital of entrepreneurship

Calculation of the human development index for entrepreneurship (HDIE) is based on the United Nations Development Program (UNDP) human development index (HDI) methodology introduced by the first Human Development Reports (HDR) (Anand, S., and A. K. Sen, 1994a; Anand, S., and A. K. Sen, 1994b).

The HDI sets a minimum and a maximum for each dimension, called goalposts, and then shows where each country stands in relation to these goalposts, expressed as a value between 0 and 1.

We consider the HDIE as an additional adjustment to reflect entrepreneurial activity, so it should utilize the methods of weighting and normalization as the original HDI, making use of maximum and minimum values to create an index for the added components. At the same time HDIE involves expanding the breadth of existing component indices as it is tailored so that additional components (identified above) are included in the calculation.

It is easy to use the HDIE to monitor across-countries and inter-temporal changes of human capital in entrepreneurship in the short-term because the most of including components (except some secondary and post-secondary degrees rate) change rapidly reflecting macroeconomic oscillations. Thus, the

usefulness and versatility of the HDIE as an analytical tool for entrepreneurial potential quality at the national and sub-national levels is enhanced because we have chosen its components that reflect the peculiarities of entrepreneurship and are sensitive to their development levels, rather than rigidly using by national statistics a number of SMEs or a number of self-employers.

The HDIE has been formulated in terms of a country's deprivation or shortfall in each of separate dimensions identified above. The shortfall perspective has some merit in drawing attention to the distance a country still has to travel in order to achieve what is regarded as a desirable target or goal. Thus, at the first stage we have defined I_{ij} as the deprivation indicator for country j with respect to variable X_i :

$$I_{ij} = \frac{\max_k \{X_{ik}\} - X_{ij}}{\max_k \{X_{ik}\} - \min_k \{X_{ik}\}}$$

So, each deprivation indicator for country j named I_{ij} (where $i=1, \dots, k$) lies between 0 and 1. An average deprivation index I_j for country j across the variables was defined as a simple (non-weighted) average of the I_{ij} :

$$I_j = \frac{1}{m} \sum_{i=1}^m I_{ij}$$

The shortfall in the HDIE for country j was defined to be just this average deprivation. Thus, if H_j is HDIE for country j , we have, by definition:

$$I_j = 1 - H_j \text{ or } H_j = 1 - I_j.$$

For some purposes of interpretation it is preferable to express H_j in terms of the attainments rather than shortfall of country j . This formulation certainly seems more natural if one wishes to assess changes in HDIE over time. The attainments perspective is more relevant in assessing how well entrepreneurs are doing, whereas the shortfall perspective is more relevant in looking at the difficulty of the task still remaining. Which perspective we adopt, depends on the nature of the exercise. Let us express H_j directly in terms of the attainment levels X_{ij} :

$$\begin{aligned} HDIE_j &= 1 - \frac{1}{m} \sum_{i=1}^m I_{ij} = \frac{1}{m} \sum_{i=1}^m (1 - I_{ij}) = \frac{1}{m} \sum_{i=1}^m \left[1 - \frac{\max_k \{X_{ik}\} - X_{ij}}{\max_k \{X_{ik}\} - \min_k \{X_{ik}\}} \right] \\ &= \\ &= \frac{1}{m} \sum_{i=1}^m \frac{X_{ij} - \min_k \{X_{ik}\}}{\max_k \{X_{ik}\} - \min_k \{X_{ik}\}} = \frac{1}{m} \sum_{i=1}^m H_{ij} \end{aligned}$$

Where:

$$H_{ij} = \frac{X_{ij} - \min_k \{X_{ik}\}}{\max_k \{X_{ik}\} - \min_k \{X_{ik}\}}$$

is the i -th variable's contribution to the HDIE for country j .

This normalization of each component H_{ij} of the aggregate index H_j can not misrepresent the evaluations. For example, an improvement in the lowest-achieving country in the sample would not decrease the HDIE for country j , because the HDIE was constructed expressly as measure of relative performance across countries at a point in time. No special significance is attached to the absolute value of the index, the entire analysis being conducted in terms of the ranking of human capital in entrepreneurship of different countries relative to one another. Thus, although a higher value of $\min\{X_{ik}\}$ or $\max\{X_{ik}\}$ would indeed decrease for H_{ij} for country j , it would do so for all other countries l too, and in proportion to the gap $(H_{ij}-H_{il})$ between countries j and l . This has the effect of leaving the relative ranking of countries unchanged.

As defined, the H_j for country j is invariant to positive affine transformations of the underlying variables X_i , ($i=1, \dots, k$). Thus, if one were to substitute for each $i=1, \dots, k$, $Z_i=a_iX_i+b_i$ where $a_i>0$, the absolute value of each H_{ij} , and therefore also of H_j , would remain the same. In particular, if one changed the units of measurement of X_i by either scale changes ($a_i>0$) or level changes ($b_i=0$), the indices H_{ij} and H_j would have the same numerical values as before.

Moreover, if we were to apply a monotonic-increasing transformation Φ to the original X_i , the ranking of countries by H_{ij} would remain the same:

$$\frac{X_{ij} - \min_k\{X_{ik}\}}{\max_k\{X_{ik}\} - \min_k\{X_{ik}\}} > \frac{X_{il} - \min_k\{X_{ik}\}}{\max_k\{X_{ik}\} - \min_k\{X_{ik}\}}$$

Then:

$$\frac{\Phi(X_{ij}) - \min_k\{\Phi(X_{ik})\}}{\max_k\{\Phi(X_{ik})\} - \min_k\{\Phi(X_{ik})\}} > \frac{\Phi(X_{il}) - \min_k\{\Phi(X_{ik})\}}{\max_k\{\Phi(X_{ik})\} - \min_k\{\Phi(X_{ik})\}}$$

In this sense, each component H_{ij} of H_j is an ordinal measure – and we have to analyze its distribution or relationships between the HDIE and various macroeconomic variables on the base of special statistic methods and criteria applying for ordinal scale. So it is possible to calculate the strength of relationship between the HDIE, for example, as the dependent variable, and various variables by ordinal regression (using the SPSS PLUM procedure).

The HDIE is comparable over time when it is calculated on the base of the same methodology and of comparable trend data. To avoid inter-temporal comparisons of HDIE values we must hold constant the goalposts for each variable X_j , because H_j depends on not only X_{ij} ($i = 1, \dots, k$), but also on the time derivatives of $\min\{X_{ik}\}$ or $\max\{X_{ik}\}$. For example, one might construct the unique database for all the period observed (after adequate testing the possibility).

Thus, HDIE may be constructed as an aggregate including three composite components: sustainability of entrepreneurship (I1), state of health and age of enterprises (I2) and access to knowledge and schooling of entrepreneurs (I3) on the base of real and actual data.

Finally, the HDIE may be used in cross-countries analyses of human capital in entrepreneurship at a given point of time.

3. Data and Methodology

The GEM developed a unique data collection strategy aimed at several data sources for each year in each GEM country (Reynolds, P., e. a.). Compared with the World Bank Group Entrepreneurship

Survey Data, GEM data catch “the informality of entrepreneurship” as well as the additional group of potential entrepreneurs (Acs, Z., e. a.).

Entrepreneurship is according to GEM “any attempt to create a new enterprise or business, including self-employment, the creation of a new entrepreneurial structure or the expansion of a pre-existing business, undertaken by an individual, a group of individuals or an existing business structure”. The GEM explores four stages of entrepreneurial activity: potential, nascent, new and established business (Reynolds, P., e. a.; Sternberg, R., and S. Wennekers; Arenius, P., and S. Ehrstedt).

The analysis, basing on GEM data for 2006-2008, deals with comparing of the entrepreneurship quality features in GEM countries taking into consideration peculiarities of human capital at the different stages of entrepreneurship activity. The GEM data are appropriate to avoid cross-countries comparisons of the human capital rankings for SME on the base of the HDIE, and to examine it on the base of actual information.

The strength of relationship between HDIE and macroeconomic situation was estimated on the base of the Spearman’s Rho. Statistical instrument of variation analysis was used to study variables distribution. Finally, a non-linear regression was applied to test the relationship between material wealth development of the nation and the entrepreneurial potential activity.

4. Results

GEM uses two most important indicators of entrepreneurial activity: a share of established business owners (EBO, %) and a share of early stage entrepreneurs (TEA, %) among adult population. As it is shown at the Table 1, these entrepreneurial cohorts form the whole entrepreneurship.

Table 1 show, moreover, that while the average TEA value remained stable at around 9%, the country-level indicators – which were only moderately varied in 2006 – demonstrated a significant level of variation in 2007 (with a variation coefficient of more than 70%), and the same figures (variation near 70%) in 2008.

In countries with high levels of necessary driven entrepreneurship, entrepreneurial activity does not yield high labor productivity or high-quality macroeconomic dynamics. To the contrary, in countries with high levels of economic development (as measured by per capita GDP) entrepreneurial activity is dominated by opportunity entrepreneurship, with higher levels of creativity and making a greater contribution to economic growth.

And yet the aggregate EBO Index in the past year saw significant changes. The reference groups by growth coefficient for the EBO Index are likewise highly heterogeneous (with variation coefficients of more than 120%), while the relative value of the gap between countries with high levels and low levels of established entrepreneurship increased by almost 2.5 times. A Spearman’s-rank correlation criteria supports significant variation between key indicators in 2006 and 2007 (Table 3).

However, a more detailed analysis finds support for a statistically significant relationship between the level of entrepreneurial activity (at the different stages) and levels of material wealth of nations. Statistical analysis of data on early-stage entrepreneurial activity, when put together with per capita GDP (PPS, by the time gap of 1 year), support a non-linear relationship (the regressions parameters are significant at a confidence level of 0.95). Moreover, the statistical criteria demonstrate that highly developed countries form a tight cluster, while countries with developing or transition economies

show significant entropy. At the Fig. 1-2 there are TEA observations, Quadratic Regression Models and their evaluations.

It is evident from Fig.1 that there are absolutely same pictures in 2007-2008 although descriptive statistics show that qualitative indicators of entrepreneurial potential and of established business vary very much (see in Table 2). This is especially unambiguous in regards to established business owners, managing already persistent firms.

Thus, the development of various categories of entrepreneurial potential is not synchronized, and the various entrepreneurial strata yielded clusters that were characterized by varying levels of socio-economic development and types state policy vis-à-vis entrepreneurship.

No support was found for the dependence of established entrepreneurship on per capita GDP as an aggregate indicator of socio-economic conditions.

It seems logical to suggest that what is important is not the aggregate indicator of early-stage entrepreneurial activity (including, beyond established businesses, nascent entrepreneurship), but rather the structure: the higher the proportion of opportunity driven entrepreneurship (new and established entrepreneurship), the higher – *ceteris paribus* – the likelihood of falling into the cluster with high levels of economic development. The closeness of the relationship between entrepreneurial activity and levels of economic development is also found to be higher.

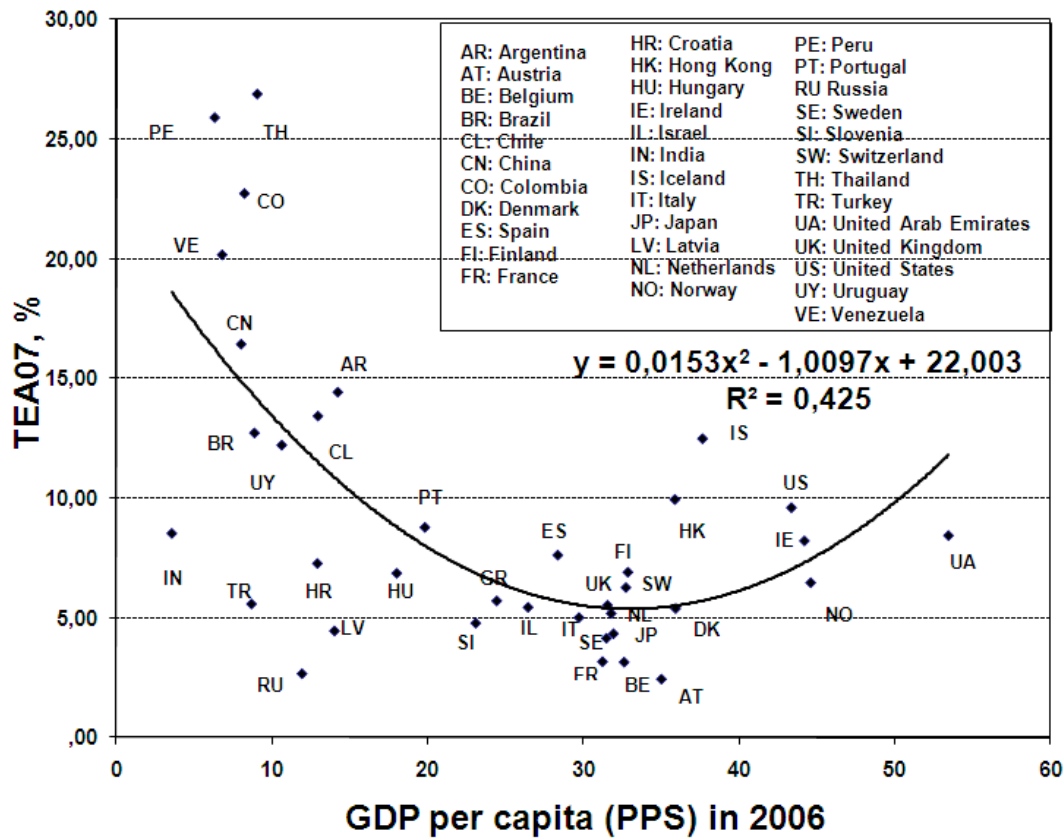
A finding of parabolic correlation between the EBO Index and per capita GDP should explain the heterogeneous composition of the clusters. However, a non-linear dependence of levels of established entrepreneurship on per capita GDP was not supported (with an R^2 of 0.114, the null hypothesis was not rejected to a significance level of 5%) (Obraztsova, O. 2008a). It is possible that the issue is not only in the level, but also in the pace of development of entrepreneurial activity, given the dominance of opportunity driven entrepreneurship among the owners of established businesses (Bosma, N., e.a.).

Early-stage entrepreneurial activity includes two cohorts: nascent entrepreneurs and the owners of new businesses. For each of these categories, expected relationships were evaluated on the basis of non-parametric statistics, due to the impossibility as yet of formulating well grounded hypothesis about the form of potential causal relationships. Independent variables included per capita GDP growth rates in constant prices, consumer price indices, and GDP deflators. Dependent variables included indices of entrepreneurial activity on all indicators developed by the GEM methodology, tested consecutively.

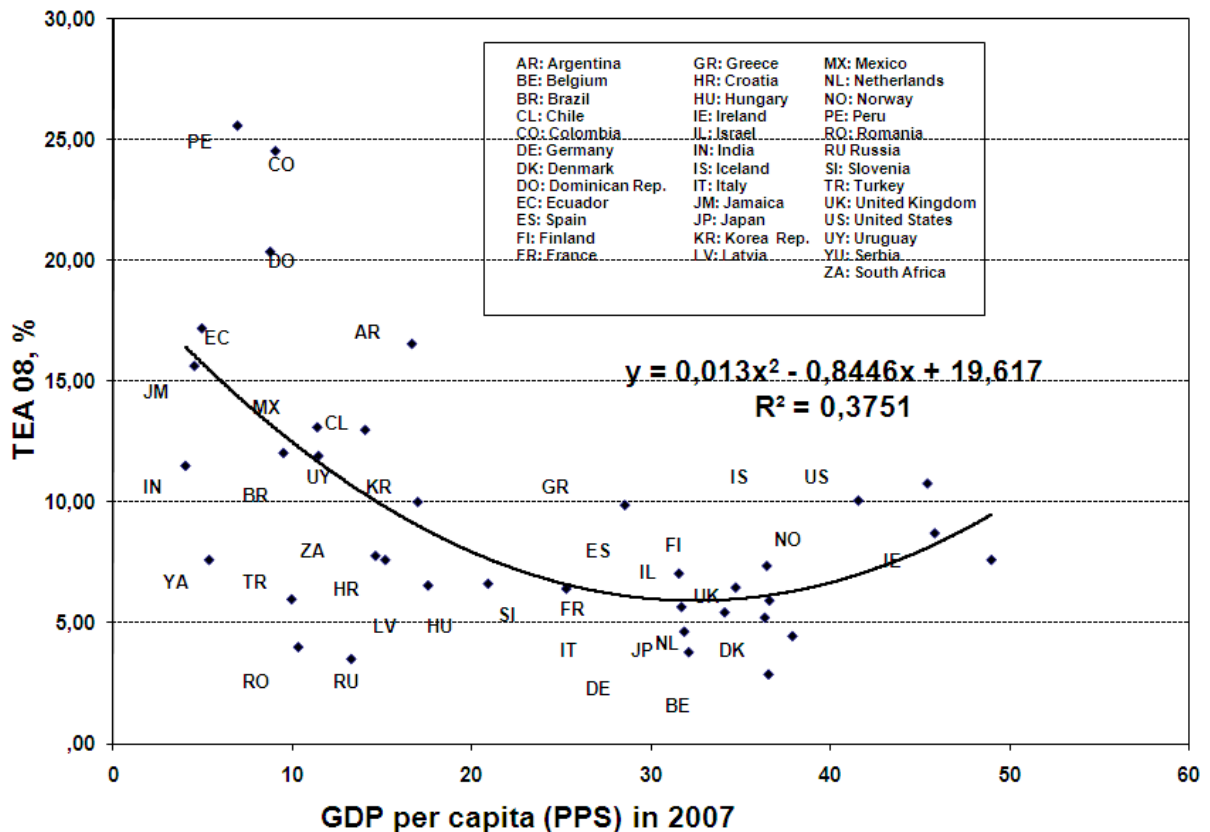
The only statistically significant positive correlation found for all categories of early-stage entrepreneurs (nascent and new, necessary and opportunity driven, male and female) was found with the GDP deflator. Moreover, the closeness of the relationship is somewhat higher for almost all entrepreneurial strata if the factor and result variables are lagged by one year (Obraztsova, O., 2008b). Thus, for early-stage entrepreneurs as a whole, the Spearman coefficient was 0.613 and 0.626, respectively, significant at 5%, while the result for early-stage non-voluntary entrepreneurs was 0.697 and 0.714, respectively, significant at 1%.

Fig. 1 (a – b). Relationship between level of economic development and early-stage economic activity in 2007 – 2008 (with short-term time gap).

a)



b)



In analyzing the qualitative characteristics of the economic structure of entrepreneurial potential, it is worth noting the factor of innovation (Table 4). A comparison on parameters of innovation is drawn for countries grouped according to similarities in economic, socio-political and historic conditions: countries of Central and Eastern Europe, including Russia, given their shared historical development. These countries, including Russia, endured first an era of planned economics, followed by a complex and socially painful transition of their socioeconomic systems. Second, there are Brazil, India and China, rapidly modernizing countries known as the so-called BRIC group (without Russia). Third group: Venezuela and the UAE are countries, benefiting merely from natural resources exploitation. Finally, two Latin American countries, Chile and Colombia, as two polar examples, either along the lines of catch-up modernization (with clearly authoritarian government) towards liberal market, or the total 'cocainization' of social structures, with economic and political dominance by criminal clans.

The motivational structure does not significantly vary among GEM countries (it has been presented in Table 5). For example, this one of Russian early-stage entrepreneurship does not in general differ greatly from that found in the countries of Central and Eastern Europe (CEE) and is significantly more favorable than in Brazil, for example, which is important from the point of view of qualitative evaluations of Russia's entrepreneurial potential.

Entrepreneurship is a pushed choice for almost 50% of early-stage entrepreneurs with secondary education and for 40% of those with professional education, as well as for 54% of respondents older than 45 years of age. Hence, higher levels of education attainment are positively correlated with voluntary motives for entrepreneurship, while the role of involuntary motivation grows after a person reaches 45 years of age. Women are more likely to be forced into entrepreneurship. Among new business owners, a bit more than a third of men and women can be characterized as opportunity driven entrepreneurs. Thus, the analyze of variables describing different dimensions if entrepreneurship development have given support to our meaning that adequate measurement of human capital development in entrepreneurship is not available without construction of an aggregate composite statistic (named HDIE), including different dimensions of economic progress.

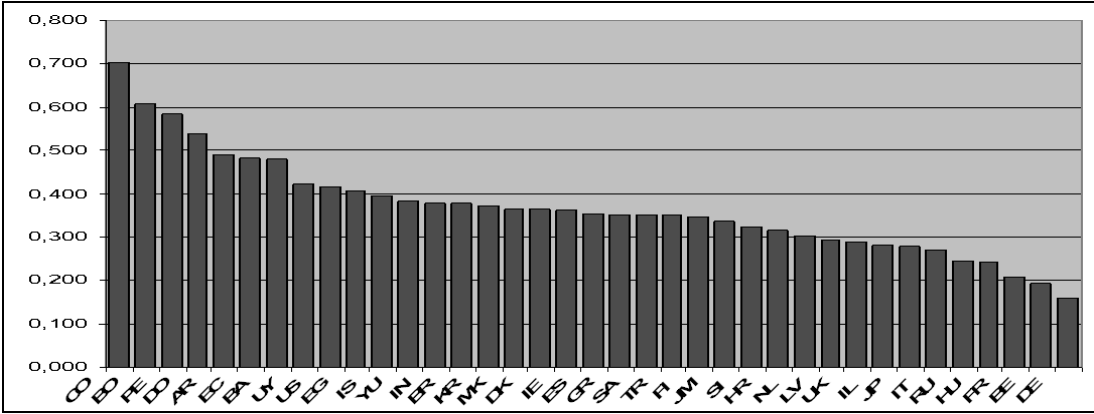
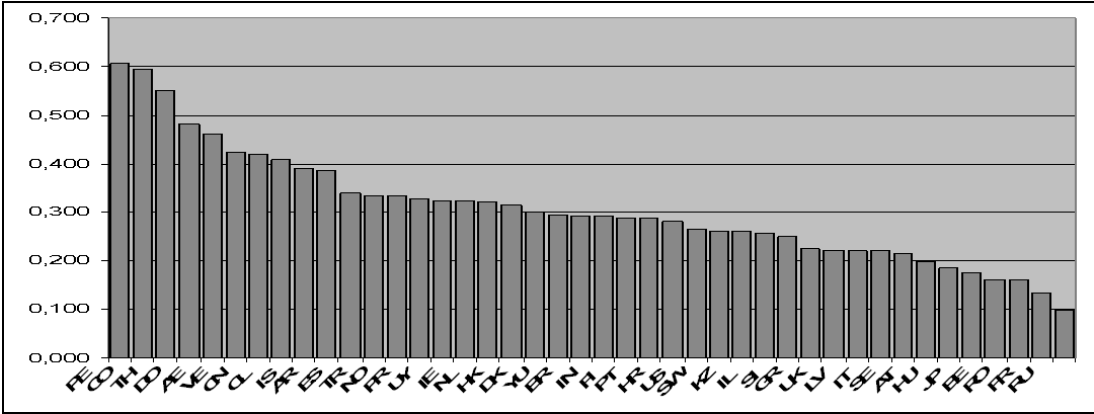
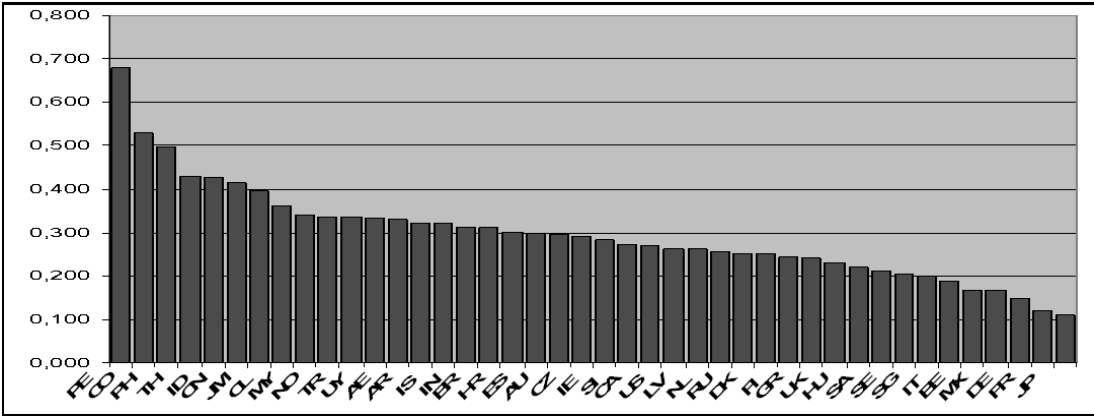
The additional outcome of the research is a well-structured system of nearly twenty entrepreneurship development indicators applicable – after suitable selection from the list of more than 180 individual dimension measures – for the future study of major changes. We have constructed a system of indicators to calculate indeed a rate of progress for each dimension of entrepreneurship development, thus hypotheses H2 - H4 have been corroborating. Variable definitions, including descriptive statistics, are presented in Table 2.

Then, the HDIE were been calculated for 2006 – 2008. Each GEM country has got a value of aggregate indicator - and a rank in the countries' distribution by human capital in entrepreneurship achievements because HDIE is a monotonic-increasing function measured in ordinary scale. Thus, the data confirm the real possibility to establish the aggregate statistic including three composite components: sustainability of entrepreneurship (I1), good health and long life of enterprises (I2) and access to knowledge and schooling of entrepreneurs (I3). The results are represented in Table 7.

The overall score of the HDIE distribution draws a total picture of the entrepreneurship and its human capital in the world. In 2006 and especially in 2007 the HDIE's variation highlights the statistically significant gaps in well-being and life chances of entrepreneurs and enterprises at the different national markets. But the dynamics of interquartile range is in the opposite tide: it has been decreasing since 2006, and all the measures of central tendency have been rather close. In 2008 the variation level

decreased a little but the gaps in entrepreneurship development continue to divide our increasingly interconnected world.

Fig. 2 – 4. Variation of HDIE in the GEM countries in 2006 - 2008

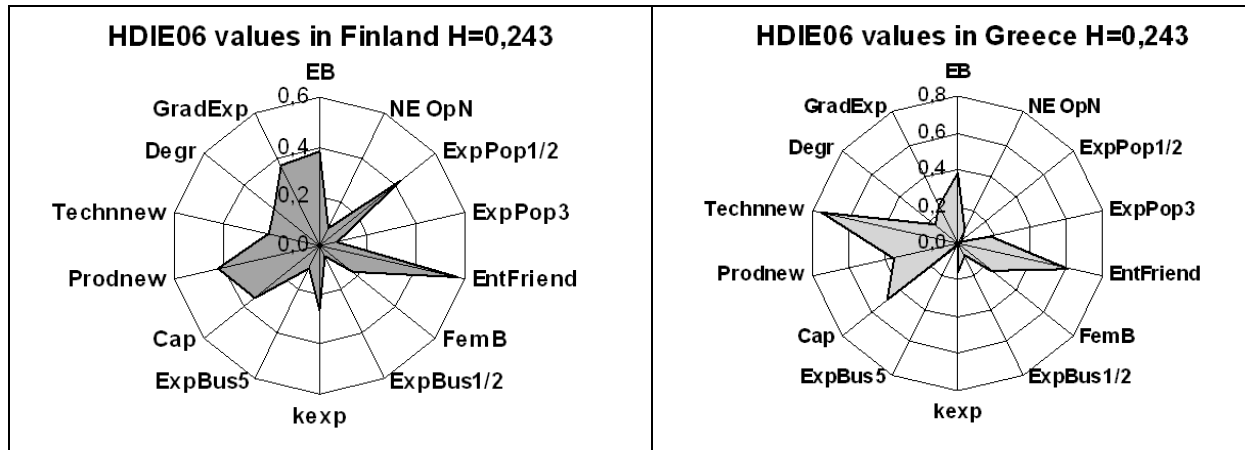


As one might see at Fig. 2 – 4, the population of countries has become more homogenous, and Spearman’s Rho rank criteria supports significant correlation between HDIE in 2006 and 2007 at the 0.05 level (Table 6). Nevertheless some countries positions by HDIE have much changed (Fig. 3-5). For example, Russia had 28-th rank in 2006, but the last 42nd rank - in 2007 and 33rd rank by HDIE in 2008.

On the contrary, the US were at 25th, then at 26th position, but at 9th position by HDIE in 2008 – the entrepreneurial potential of the US society was strongly activated under global slowdown conditions.

It is necessary to add the distribution analysis to have a closer look at HDIE structure, i.e. on values of individual indicators behind the total score. For example, the overall HDIE scores of Finland and Greece were equal in 2006. However spider web below (Fig. 5) shows that rather different dimensions dominated there (compare indicators of innovation or short-terms expectations of business perspectives).

Fig. 5. HDIE06 structure in Finland and Greece compared



This illustrates that it is not only the overall score which is important, but also – and perhaps even more – the HDIE structure that allow to identify achievements and shortfalls at the separate dimensions of small and medium entrepreneurship developments. As a result, on the base of HDIE it could be estimated, what governments can do to stimulate progress in entrepreneurship indeed, or what are the real consequences of governmental policy of maintaining small and medium enterprises. Thus, the hypothesis concerning the HDIE features and its availability to analyze human capital in entrepreneurship at a given point of time is confirmed.

5. Concluding Remarks

The results of this paper show that in cases when purely material indicators are not sufficient to explain difference in entrepreneurship development, the HDIE is a good explanatory tool for assessing the development of entrepreneurship in a country.

The relationship model between GDP per capita and level of entrepreneurial activity (at different stages of entrepreneurship) is not homoscedastic one. Hence, the necessity of (another) aggregate evaluation of entrepreneurial process correlation with economic development is proved.

The statistical structure of HDIE allows its usage to measure of ‘wellbeing’ of entrepreneurs in countries with very different models of economic development. Another advantage of the HDIE is it is applicable for short-term over time cross-country and relationship analyses.

We have also shown that the HDIE, as an ordinary statistic, has its limitations in the processing of inter-temporal data. The HDIE values are comparable over time when they are calculated on the base of the same methodology and of comparable trend data when we hold constant the goalposts for each variable X_j to avoid inter-temporal comparisons of HDIE values, and the HDIE dynamic analysis should be subject of further studies.

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TABLES

Table 1

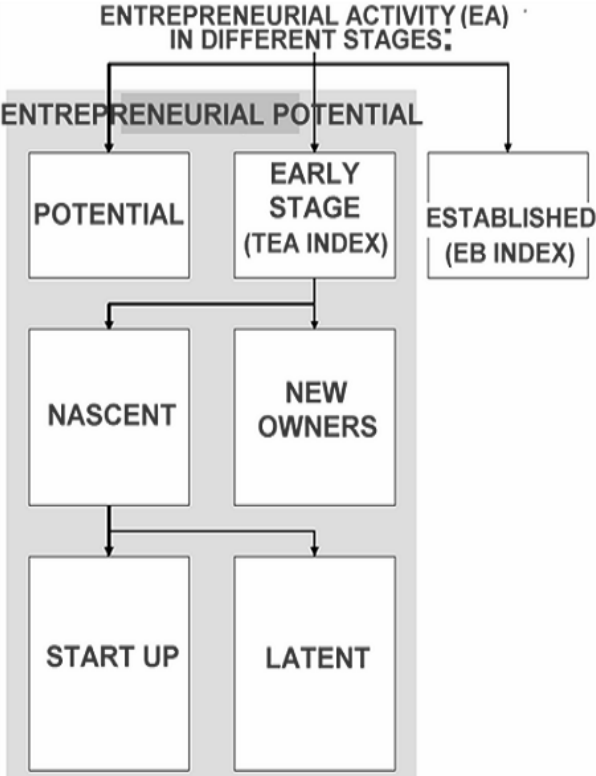


Table 2. Variable definitions and descriptive statistics

№	Variable	Brief description	Mean06	Std.Dev.06	Mean07	Std.Dev.07	Mean08	Std.Dev.08			
	H₁		A sustainable entrepreneurship			0,321	0,144	0,315	0,130	0,350	0,144
1	X ₁₁	EB	Establish business owners, %	0,308	0,231	0,260	0,190	0,388	0,232		
2	X ₁₂	NE _{OpN}	Start –ups with Opportunity motive / Start –ups with Necessity motive Ratio, %	0,120	0,177	0,166	0,190	0,155	0,192		
3	X ₁₃	ExpPop ^{1/2}	Good conditions to start business next 6 months in area I live / Fear of failure would prevent starting a business Ratio, %	0,379	0,252	0,433	0,244	0,497	0,278		
4	X ₁₄	ExpPop3	Expects to start a new business in the next 3 years, %	0,229	0,204	0,230	0,227	0,252	0,240		
5	X ₁₅	EntFriend	People consider starting business as good career choice and attach high status to successful entrepreneurs, %	0,653	0,211	0,596	0,194	0,581	0,191		
6	X ₁₆	FemB	Female Entrepreneurship, %	0,240	0,208	0,202	0,210	0,225	0,209		
	H₂		A good health and long life of enterprises			0,217	0,105	0,264	0,128	0,368	0,131
8	X ₂₁	ExpJob5	Early-stage entrepreneurs, expecting any jobs now or in 5 years, %	0,150	0,168	0,235	0,237	0,276	0,253		
9	X ₂₂	k _{exp}	Nascent entrepreneurs / entrepreneurs exited a business in past year (business did not continue) Ratio, %	0,296	0,210	0,259	0,210	0,389	0,233		
10	X ₂₃	ExpBus5	High job expectation (10+ jobs and over 50% in 5 years), %	0,205	0,187	0,296	0,204	0,439	0,234		
	H₃		An access to knowledge and schooling of entrepreneurs			0,350	0,141	0,342	0,133	0,387	0,143
11	X ₃₁	Cap	Has required knowledge, capacities and skills to start business, %	0,499	0,212	0,528	0,206	0,584	0,256		
12	X ₃₂	Prod ^{new}	Product new to all or some customers, %	0,387	0,216	0,390	0,221	0,354	0,228		
13	X ₃₃	Techn ^{new}	Uses very latest or new (1 to 5 years) technology, %	0,317	0,221	0,280	0,174	0,319	0,226		
14	X ₃₄	Degr	Some secondary degree, %	0,250	0,233	0,222	0,216	0,295	0,220		
15	X ₃₅	GradExp	Graduate experience, %	0,290	0,190	0,283	0,206	0,353	0,212		
	H	HDIE	Human Development Index of small and medium Entrepreneurship			0,296	0,110	0,307	0,116	0,368	0,115

Table 3. Correlations (Spearman's rho)

	Indicators	TEA07*	EB07**	TEA06*	EB06**
TEA07*	Correlation Coefficient	1,000	,658(***)	,257	,139
	Sig. (2-tailed)	.	,000	,114	,399
	N	39	39	39	39
EB07*	Correlation Coefficient	,658(***)	1,000	,255	,189
	Sig. (2-tailed)	,000	.	,116	,249
	N	39	39	39	39
TEA06*	Correlation Coefficient	,257	,255	1,000	,879(***)
	Sig. (2-tailed)	,114	,116	.	,000
	N	39	39	39	39
EB06**	Correlation Coefficient	,139	,189	,879(***)	1,000
	Sig. (2-tailed)	,399	,249	,000	.
	N	39	39	39	39

* % 18-64 pop TEA involvement: setting up firm or owner of young firm (SU or BB)

** % 18-64 pop ESTABL BUS OWNER (EB): owns-manages business with income>3.5 years

*** Correlation is significant at the 0.01 level (2-tailed).

Table 4. Innovation in early-stage and established entrepreneurship

Country	Level of innovation in early-stage entrepreneurship (% of entrepreneurs)				Level of innovation in established entrepreneurship (% of entrepreneurs)			
	By product		By technology		By product		By technology	
	2006	2007	2006	2007	2006	2007	2006	2007
Russia	9,68	17,96	18,8	22,78	6,85	21,18	13,47	4,34
Hungary	3,28	0,93	12,26	10	2,01	2,25	3,91	2,26
Latvia	8,81	10,4	17,62	29,23	16,98	1,63	12,83	11,92
Serbia	-	7,81	-	34,83	-	8,87	-	29,75
Croatia	13,44	10,47	51,62	51,42	17,38	2,74	36,87	26,75
Slovenia	17,01	16,64	37,42	31,37	10,76	10,07	17,03	17,06
Romania	-	6,49	-	23,13	-	3,99	-	6,68
China	9,25	13,82	60,61	31,31	10,28	11,98	44,02	11,28
India	32,98	5,58	39,42	39,1	15,55	8,76	33,64	40,16
Brazil	13,7	3,24	21,63	18,06	14,12	0,55	10,9	10,4
Chile	29,1	23,01	42,19	22,93	18,97	18,81	22,05	9,55
Colombia	23,26	21,38	44,98	51,5	21,86	13,7	20,3	21,95
Venezuela	-	14,73	-	18,13	-	14,06	-	10,71
UAE	28,95	48,87	43,09	61,82	37,39	33,72	37,49	77,98

Table 5. Main Qualitative Indicators of Entrepreneurial Activity among Some GEM Participating Countries²

Country	Early-stage			Established			Early-stage		Failed
	Total	Men	Women	Total	Men	Women	Necessary	Opportunitive	
2006									
Russia	4,86	7,33	2,57	1,19	1,83	0,61	1,44	3,39	1,27
Hungary	6,04	8,09	4,05	6,72	9,03	4,48	1,33	4,64	1,13
Latvia	6,57	9,41	3,92	5,69	8,12	3,41	1,04	5,05	1,98
Serbia	-	-	-	-	-	-	-	-	-
Croatia	8,58	12,35	4,87	4,12	5,8	2,46	3,81	4,41	1,81
Slovenia	4,63	6,93	2,29	4,44	6,42	2,44	0,47	4,05	1,02
Romania	-	-	-	-	-	-	-	-	-
China	16,19	18,46	13,79	8,98	11,56	6,26	6,27	9,59	6,18
India	10,42	11,6	9,16	5,6	7,26	3,84	2,86	6,71	15,02
Brazil	11,65	13,74	9,61	12,09	14,77	9,45	5,55	5,99	4,55
Chile	9,19	11,38	7,02	6,79	9,2	4,4	2,59	6,57	3,03
Colombia	22,48	27,97	17,3	10,41	14,19	6,85	8,74	13,68	10,52
Venezuela									
UAE	3,74	5,87	0,29	1,39	2,19	0,1	0,32	2,95	4,71
2007									
Russia	2,67	3,79	1,64	1,68	1,63	1,73	0,51	1,92	1,09
Hungary	6,86	9,29	4,52	4,83	5,88	3,81	1,6	5,01	1,56
Latvia	4,46	7,7	1,41	3,41	4,9	2,02	0,67	3,67	0,74
Serbia	8,56	12,11	5,06	5,27	7,74	2,83	3,94	4,02	2,75
Croatia	7,27	9,44	5,13	4,22	5,79	2,67	2,9	4,16	2,95
Slovenia	4,78	6,84	2,68	4,59	6,84	2,31	0,46	4,24	1,56
Romania	4,02	4,95	3,09	2,51	3,34	1,7	0,56	2,68	2,52
China	16,43	19,27	13,43	8,39	9,66	7,04	6,21	9,84	10,34
India	8,53	9,51	7,49	5,53	8,69	2,18	1,67	5,51	15,13
Brazil	12,72	12,73	12,71	9,94	12,7	7,24	5,29	7,23	6,44
Chile	13,43	16,45	10,43	8,73	11,89	5,59	3,2	9,79	4,92
Colombia	22,72	26,91	18,77	11,56	15,49	7,84	9,28	12,57	8,86
Venezuela	20,16	23,5	16,81	5,39	5,87	4,9	6,46	13,33	3,77
UAE	8,55	10,62	5,27	3,42	4,76	1,32	1,47	6,69	8,44

Table 6. HDIE Correlation

Rank correlations			HDIE06	HDIE07
Spearman's rho	HDIE 06	Correlation Coefficient	1,000	,391(*)
		Sig. (2-tailed)	.	,011
		N	42	42
	HDIE 07	Correlation Coefficient	,391(*)	1,000
		Sig. (2-tailed)	,011	.
		N	42	42

* Correlation is significant at the 0.05 level (2-tailed).

² To meet our obligations under GEM Consortium, we can disseminate only generalized data of 2008 before GEM 2008 Global report publishing (see: <http://www.gemconsortium.org/>)

Table 7. HDIE EVALUATIONS IN GEM COUNTRIES IN 2006-2008

Rank	Code	Country	HDIE06	Rank	Code	Country	HDIE07	Rank	Code	Country	HDIE08
1	PE	Peru	0,679	1	PE	Peru	0,606	1	CO	Colombia	0,703
2	CO	Colombia	0,530	2	CO	Colombia	0,595	2	BO	Bolivia	0,607
3	PH	Philippines	0,499	3	TH	Thailand	0,550	3	PE	Peru	0,585
4	TH	Thailand	0,431	4	DO	Dominican Republic	0,481	4	DO	Dominican Re- public	0,539
5	ID	Indonesia	0,428	5	AE	United Arab Emir- ates	0,462	5	AR	Argentina	0,490
6	CN	China	0,416	6	VE	Venezuela	0,422	6	EC	Ecuador	0,482
7	JM	Jamaica	0,395	7	CN	China	0,418	7	BA	Macedonia	0,480
8	CL	Chile	0,363	8	CL	Chile	0,409	8	UY	Uruguay	0,422
9	MY	Malaysia	0,341	9	IS	Iceland	0,390	9	US	United States	0,417
10	NO	Norway	0,337	10	AR	Argentina	0,387	10	EG	Egypt	0,405
11	TR	Turkey	0,335	11	ES	Spain	0,339	11	IS	Iceland	0,397
12	UY	Uruguay	0,333	12	TR	Turkey	0,335	12	YU	Serbia	0,384
13	AE	United Arab Emirates	0,329	13	NO	Norway	0,334	13	IN	India	0,379
14	AR	Argentina	0,323	14	PR	Puerto Rico	0,328	14	BR	Brazil	0,379
15	IS	Iceland	0,322	15	UY	Uruguay	0,324	15	KR	Korea Republic	0,373
16	IN	India	0,313	16	IE	Ireland	0,323	16	MK	Bosnia and Herzegovina	0,365
17	BR	Brazil	0,312	17	NL	Netherlands	0,321	17	DK	Denmark	0,364
18	HR	Croatia	0,302	18	HK	Hong Kong	0,314	18	IE	Ireland	0,361
19	ES	Spain	0,299	19	DK	Denmark	0,302	19	ES	Spain	0,355
20	AU	Australia	0,298	20	YU	Serbia	0,295	20	GR	Greece	0,352
21	CZ	Czech Republic	0,290	21	BR	Brazil	0,292	21	SA	South Africa	0,351
22	IE	Ireland	0,284	22	IN	India	0,291	22	TR	Turkey	0,351
23	SI	Slovenia	0,274	23	FI	Finland	0,289	23	FI	Finland	0,345
24	CA	Canada	0,270	24	PT	Portugal	0,287	24	JM	Jamaica	0,335

25	US	United States	0,263	25	HR	Croatia	0,281	25	SI	Slovenia	0,324
26	LV	Latvia	0,262	26	US	United States	0,266	26	HR	Croatia	0,315
27	NL	Netherlands	0,256	27	SW	Switzerland	0,261	27	NL	Netherlands	0,301
28	RU	Russia	0,253	28	KZ	Kazakhstan	0,261	28	LV	Latvia	0,295
29	DK	Denmark	0,251	29	IL	Israel	0,255	29	UK	United Kingdom	0,290
30	FI	Finland	0,243	30	SI	Slovenia	0,250	30	IL	Israel	0,280
31	GR	Greece	0,243	31	GR	Greece	0,225	31	JP	Japan	0,278
32	UK	United Kingdom	0,230	32	UK	United Kingdom	0,221	32	IT	Italy	0,270
33	HU	Hungary	0,221	33	LV	Latvia	0,220	33	RU	Russia	0,244
34	SA	South Africa	0,211	34	IT	Italy	0,220	34	HU	Hungary	0,241
35	SE	Sweden	0,206	35	SE	Sweden	0,214	35	FR	France	0,208
36	SG	Singapore	0,199	36	AT	Austria	0,199	36	BE	Belgium	0,194
37	IT	Italy	0,189	37	HU	Hungary	0,185	37	DE	Germany	0,160
38	BE	Belgium	0,169	38	JP	Japan	0,177				
39	MX	Mexico	0,167	39	BE	Belgium	0,161				
40	DE	Germany	0,149	40	RO	Romania	0,160				
41	FR	France	0,122	41	FR	France	0,133				
42	JP	Japan	0,110	42	RU	Russia	0,097				
		min	0,110			min	0,097			min	0,160
		max	0,679			max	0,606			max	0,703
		mean	0,296			mean	0,307			mean	0,368
		StDv	0,110			StDv	0,116			StDv	0,115
		max-min=R	0,569			max-min=R	0,509			max-min=R	0,544
		Kvar	0,371			Kvar	0,378			Kvar	0,312