ISSN: 1576-0162
DOI: http://dx.doi.org/10.33776/rem.v0i55.3830

The Effect of Economic and Cultural Factors on Entrepreneurial Activity: An Approach through Frontier Production Models

El efecto de factores económicos y culturales en la actividad emprendedora: un enfoque a través de modelos de producción con frontera

Francisco Javier Ortega Irizo
Universidad de Sevilla
fjortega@us.es

José Manuel Gavilán Ruiz
Universidad de Sevilla
gavi@us.es

Inmaculada Jaén Figueroa
Universidad de Sevilla
inmajaen@us.es

Recibido: julio de 2019; aceptado: enero de 2020

Abstract

The objective of this paper is to analyse how the economic conditions and the cultural values of a country influence its level of entrepreneurial activity. To this end, panel data is utilised. An innovative approach is applied, which adapts itself to the fact that the cultural values remain fairly stable over time, while the economic conditions are changeable. Specifically, a stochastic frontier production model is set in which the changeable economic conditions determine the frontier (maximum) for the entrepreneurship rate of a country, while the stable prevailing cultural values explain the level of efficiency-inefficiency. Specifically, embeddedness is the cultural value that has the strongest relationship with the level of efficiency.

Key Words: cultural values; entrepreneurial activity; stochastic frontier production models; efficiency.

Resumen

El objetivo del trabajo es analizar cómo influyen las condiciones económicas y los valores culturales de un país en su actividad emprendedora, utilizando un panel de datos. Se aplica un enfoque novedoso, que se adapta al hecho de que los factores culturales son bastante estables en el tiempo, mientras que las condiciones económicas son cambiantes. Concretamente, se plantea un modelo de producción con frontera, en el que las condiciones económicas (cambiantes) determinan la frontera máxima para la tasa de emprendimiento de un país, mientras que los valores culturales predominantes (estables) explican el nivel de eficiencia-ineficiencia. En concreto, el arraigo es el valor cultural que presenta la relación más fuerte con el nivel de eficiencia.

Palabras clave: Valores culturales; Actividad emprendedora; Modelos de producción con frontera; Eficiencia.

Clasificación JEL / JEL classification: A13; L26; O11.

1. Introduction

The relationship between economic development and entrepreneurial activity has been broadly discussed in the scientific literature. However, these attempts to study the differences in the levels of entrepreneurial activity between different countries have not been entirely satisfactory. In previous work on this topic, an overall inverse relationship between economic and entrepreneurial activities has been found (Liñán and Fernández-Serrano, 2014; Wennekers et al., 2005). Nevertheless, in developed countries, increases in income can lead to higher rates of entrepreneurship. The wealthiest countries have economic systems of greater complexity and a higher demand for new and differentiated products, which can entail an increase in entrepreneurial opportunities, but it is also true that this may entail a decrease in the need to start up an entrepreneurial venture (Carre et al., 2002; Reynolds et al., 1994). However, economic conditions by themselves remain insufficient to explain the entrepreneurship rate.

An alternative and complementary explanation is given through the analysis of the role played by the social context and the institutions in the development of the entrepreneurial activity (Blackburn and Kovalainen, 2009). Institutional economic theory constitutes a suitable tool towards understanding such effects, since it suggests that human behaviour is influenced by the institutional environment (North 1990, 2005). It is therefore also necessary to focus on the analysis of the entrepreneurial activity in this context to better understand the diversity of such activity (Zahra, 2007).

The social context in which individuals are immersed exerts influence over their personal motivations, knowledge, intentions, and actions (Welter, 2011). In this respect, the decisions regarding an entrepreneurship can be influenced by the prevailing values in the social context in which they are involved (Hayton et al., 2002; Pinillos and Reyes, 2011). The structure of the social values of a cultural environment can therefore play a significant role in explaining the entrepreneurial activity of its members. The mechanisms through which such effects are exerted are, however, by no means clear. Although there are certain contributions on the influence of the cultural values on entrepreneurship (Davidsson and Wiklund, 1997; Frederking, 2004; Davidsson, 1995), research into this area remain limited.

Certain authors have analysed the institutional role in the field of entrepreneurial activity (Urbano and Álvarez, 2014). Busenitz et al.

(2000) introduce and validate a measure of the institutional profile for entrepreneurship. This approach has been applied in subsequent studies (Spencer and Gómez, 2004; Manolova et al., 2008). However, hitherto, few attempts have been made to analyse the impact of the institutional dimension on the entrepreneurial activity using data at country level (Urbano and Álvarez, 2014). It should be stressed here that certain institutional elements (especially factors related to cultural values) are relatively stable and change slowly over long periods of time. By contrast, the economic situation changing in the short term also affects decisions of the individuals on whether to undertake an entrepreneurial venture.

The aim of this study is focused on the influence on entrepreneurship by both cultural factors and economic conditions (specifically, level of wealth, economic growth, and unemployment rate). This is aimed at contributing towards filling the gap that exists in the literature on the complex relationship between development, culture, and entrepreneurship. In particular, this paper proposes a theoretical framework in which the cultural values (stable over time) and the level of economic activity (changeable in the short term) jointly explain the entrepreneurial activity of a country. In Liñán et al. (2015), a linear regression model using panel data is considered in which the explanatory factors of the entrepreneurship are both economic and cultural. A limitation of this approach is that cultural factors remain constant over time, thereby considerably reducing the scope of application of the various econometric techniques suitable for panel data.

In this work, an innovative approach is set, which applies stochastic frontier analysis (SFA). In this framework, the economic factors determine the maximum frontier in the entrepreneurship rate, while the cultural variables establish the "efficiency/inefficiency", that is to say, the degree of closeness of the observed entrepreneurship rate to the maximum possible frontier. In this way, by assuming the hypothesis that efficiency follows a distribution invariant over time, the economic and the cultural information can be better integrated, since it is also possible to identify the economic and cultural factors that favour entrepreneurship.

The SFA model has been widely used in various fields, as for example, in economics (Kumbhakar and Zhang, 2013), healthcare (O'Donnell and Nguyen, 2013), universities (Sav, 2011), sports (Park and Lee, 2012), bibliometrics (Ortega and Gavilán, 2013), fisheries (Parinduri and Riyanto, 2014), ports (Wang et al., 2013), and agriculture (Kumbhakar et al., 2014).

Following this introduction, the next section describes the relevant theory on which this work is based; in Section 3, the generic formulation of the stochastic frontier model is explained; in Section 4, the variables utilised herein are established, as is the specific model to be estimated; in Section 5, the main results obtained from the estimated model are analysed; and in Section 6, the obtained conclusions are explained.

2. Economic conditions, culture, and entrepreneurship

In this section, the relationship between economic development and entrepreneurship is first considered. Secondly, the role of culture in economic development and entrepreneurial activity are also studied.

2.1. Economic development and entrepreneurship

The entrepreneurial activity plays a major role in the economic development process. Not only does it increase employment opportunities, but it also improves the level of technical innovation and promotes economic growth, that is, the economic conditions (Audretsch and Fritsch, 1999; Reynolds et al., 2002; van Stel and Storey, 2004; Fritsch and Mueller, 2004).

From a dynamic perspective, the entrepreneurs are agents of change, since entrepreneurship entails starting a new business, experimenting with new techniques and a new organization of the production, introducing new products, and/or even creating new markets (Wennekers et al., 2002).

However, economic development is generally accompanied by a greater demand for labour, especially skilled labour, and hence higher real salaries. Therefore, the opportunity cost of self-employment would increase. As a consequence, a greater level of development could reduce entrepreneurial activity (Bjornskov and Foss, 2006; Noorderhaven et al., 2004).

Specifically, the most complex characteristics of the economic system might require the highly qualified companies to be started by highly qualified individuals (Cullen et al., 2014), who are in turn those with better prospects in the labour market. This negative effect of incomes on entrepreneurial activity may therefore be even more pertinent for opportunity-based entrepreneurship. Nevertheless, the GEM report shows that the motivations for initiating new companies differ widely between countries. The motivations of entrepreneurs must therefore be taken into consideration in countries with different levels of development, since they influence the creation of new companies (Kuratko et al., 1997).

In developed countries, it can be expected that entrepreneurs show greater opportunity-based motivation. These entrepreneurs are likely to prepare their entry to self-employment in a more solid way and tend to initiate their business in an area where they have greater experience, which leads to a longer survival rate and to a greater business growth (Fernández-Serrano et al., 2018). They also enjoy greater growth aspirations (Wennekers et al., 2005).

On the other hand, Minniti, Bygrave and Autio (2006), and Lee and Peterson (2000), found that income level exerts an effect on entrepreneurial activity. Specifically, it has been established that income growth rate influences entrepreneurship rates (Armington and Acs, 2002; Lee et al., 2004).

A higher rate of economic development is reflected in the rising levels of disposable income and consumption, which is a more favourable situation for

the launching of new business projects. For this reason, a higher growth rate implies the existence of additional opportunities for new entrepreneurs, which subsequently lead to an increase in the creation of new businesses. Even the necessity-based entrepreneurs have better prospects in a booming economy and, therefore, it encourages them to start their companies.

Similarly, income level, if it is measured as GDP per capita, also has a positive effect on the entrepreneurial spirit, at least in industrialised economies (Parker and Robson, 2004; Fishman and Sarria-Allende, 2004).

Economic development induces the formation of new businesses, since the opportunities and the expected benefits from starting a business are higher (Reynolds et al., 1994; Carree et al., 2002).

Therefore, although a negative relationship between GDP per capita and entrepreneurship can generally be expected, this relationship could be weaker for higher-income levels (Carree et al., 2002; Liñán et al., 2013; Sternberg and Wennekers, 2005; Wennekers et al., 2005). In this regard, several authors (van Stel et al., 2003; Verheul et al., 2002) suggest the existence of a U-shaped influence of income on entrepreneurship.

Another significant indicator of the short-term economic situation of a country is the unemployment rate. It has been argued that an increase in unemployment leads to an increase in entrepreneurial activity, since the opportunity cost of starting a business is lower for the unemployed (Halicioglu and Yolac, 2015). Therefore, people may be pushed into entrepreneurship due to the loss of their paid employment (Laguna, 2013). This effect is probably stronger in the case of necessity-based entrepreneurship, which is characterised by lack of alternative employment options.

However, unemployment rate is also a reflection of the economic situation. Consequently, the growth of unemployment entails a reduction in domestic demand and less favourable prospects for new businesses in the market, which in turn reduces entrepreneurial activity. Moreover, the impact of unemployment could also be detrimental to self-employment, because human capital and the entrepreneurial skills required for new business activities may be lost or may depreciate during periods of unemployment (Aubry et al., 2015).

2.2. Culture and entrepreneurship

In analysing the role of culture, Inglehart (1997) defines it as being the set of common basic values that contribute towards moulding the behaviour of people in society. Cultural values operate unconsciously, since they are deeply embedded within political institutions and technical systems. Therefore, these values and beliefs are continuously reinforced (Pinillos and Reyes, 2011). Culture shapes the cognitive maps of individuals, by programming behaviour patterns consistent with the cultural context (Hofstede, 1991, 2003).

Culture can influence the entrepreneurial spirit by means of two principal mechanisms (Davidsson, 1995). Firstly, a supportive culture would lead to social legitimacy, thereby making the entrepreneurial career more appreciated

and socially acknowledged in that culture, and thus creating a favourable institutional environment. Consequently, more people would try to start their businesses, regardless of their personal beliefs and attitudes (Etzioni, 1987).

Secondly, a culture sharing values and thinking patterns of a more pro-entrepreneurial nature would lead more people to show psychological traits and attitudes consistent with the entrepreneurial activity (Krueger, 2000, 2003; Liñán et al., 2011a). Subsequently, more people would strive to become entrepreneurs (Mcgrath and Macmillan, 1992; Mueller and Thomas, 2001). In this regard, it has been suggested that a perceived high valuation of entrepreneurship in a society generates more positive attitudes and intentions on the part of individuals (Krueger and Carsrud, 1993; Liñán et al., 2011b).

The first and most common classification of cultures distinguishes between the individualistic and the collectivistic (Hofstede, 1980; Triandis, 1995; Schwartz, 1999). Nevertheless, alternative characterizations have also been carried out, such as the GLOBE project, initiated by Robert House, in which the prevailing culture in a country can determine which leadership characteristics are accepted (Chand and Ghorbani, 2011).

From an empirical point of view, Hofstede's cultural dimensions (Hofstede, 1980, 1991, 2003) have often been utilised as a reference in research studies regarding the influence of culture on entrepreneurship (Hayton et al., 2002; Mcgrath and MacMillan, 1992; Mitchell et al., 2000; Shane et al., 1991; Mueller and Thomas, 2001; Mueller et al., 2002; Liñán and Chen, 2009). The results confirm that culture influences national rates of business formation, innovation, and/or entrepreneurial intentions. However, Hofstede's measures have been criticised for their methodological flaws (Jabri, 2005; Tang and Koveos, 2008).

Schwartz (1990) has proposed an alternative approach to measure culture. According to Schwartz (1990), values shape the motivational goals of the individual. A circular structure is proposed, representing the dynamic relationships between values in accordance with the principles of compatibility and logical contradiction. Following this circular structure, the quest for adjacent values is compatible, while the quest for opposite values would cause conflict (Schwartz, 2004, 2006b, 1999).

This interpretation of the cultural dimensions as an integrated system, derived from a prior theorisation, differentiates this approach from others. In this manner, Hofstede (1980, 2003) conceptualized these dimensions as independent, whilst Inglehart (1997) empirically inferred two generic cultural components.

This study follows Schwartz's theory, which considers the cultural values as averaged individual values (Schwartz, 1994, 1999, 2004, 2006b). This theory is based on a system of universal values that guide human behaviour. The specific cultural backgrounds cause some of these values prevail over the others (Schwartz, 2006a, 2008). This mechanism works by means of the social institutions and their actions (through legislation, government directives, the education system, etc.), selecting and prioritising certain values over others. In

this respect, people tend to perform what they believe to be socially appropriate behaviour (Bourdieu, 1991; Markus and Kitayama, 1991; Schwartz, 1994).

At the aggregate level, seven cultural value orientations can be identified (Schwartz, 1994): Embeddedness, Intellectual Autonomy, Affective Autonomy, Hierarchy, Egalitarianism, Mastery, and Harmony. These may be grouped into three bipolar dimensions:

- Autonomy (intellectual and affective) vs. Embeddedness: This dimension covers the problematic relationship between the individual and the group. At the very extremity of embeddedness, the person is seen as an entity that is included in the community (examples of these values can be social order, respect for tradition, family security, and wisdom). At the same time, at the other extreme, people are autonomous bodies that find a meaning in their own difference (being curious, open-minded, and creative are values within the intellectual autonomy; while pleasure, a varied or exciting life are values of the affective autonomy). Of course, the relative importance of the affective and intellectual autonomy can differ in each culture (see Schwartz and Ros, 1995, for a comparison of western countries). Many theorists associate individualism with the selfish search for personal goals (Triandis, 1995). However, self-interest is likewise present in the two sides of the autonomy-embeddedness dimension (Schwartz, 2004, 2006b).
- Egalitarianism vs. Hierarchy: The second problem in society is to ensure responsible behaviour that preserves the social fabric. People must be induced to consider the welfare of the other, to coordinate with them and, therefore, to manage their unavoidable interdependencies. It addresses the responsible and cooperative behaviour, which will carry out the social tasks, either by different roles or by internalising commitment and voluntary cooperation (Schwartz, 1994). At the end of egalitarianism of this dimension, all members of society are considered as equal beings that share a commitment to cooperate each other and to pursue the common good (social values as justice, freedom, responsibility and honesty). Meanwhile, in hierarchy, the unequal distribution of power, roles and, other resources are considered legitimate (social values as power, authority, humility and wealth).
- Harmony vs. Mastery: this dimension helps towards the regulation of the management of natural and human resources. It solves problems regarding relationships between people, and those between people and nature. The cultures strongly oriented towards the pole of competition are seeking personal profit through the exploitation and control of nature (ambitious, successful, competitive, risk-taking). On the side of harmony, in contrast, the cultures seeking individuals who fit in harmony with nature are located (unity with nature, environmental protection, a peaceful world, etc.).

2.3. Relationship between culture and development

As might be expected, a considerable interdependence between culture and economic development is found (Ros, 2002; Mueller et al., 2002; Shane, 1993). The least developed countries are generally characterised by a predominance of embeddedness and hierarchy, while autonomy and egalitarianism tend to prevail in developed countries (Schwartz, 2008). In particular, autonomy seems to be more strongly associated with economic growth, whilst egalitarianism is more strongly related to social change (Schwartz, 2004). In regard to the relationship between harmony-mastery and economic development, no sound evidence can be found (Schwartz and Ros, 1995; Schwartz, 2004). This concept of harmony has been related to post-materialism by Inglehart (1997) and it is found to be greater in the most developed countries. Specifically, this cultural orientation is greater in Western Europe (Schwartz and Ros, 1995), while in English-speaking countries (especially in the United States) and in Confucianism countries, mastery prevails (Schwartz, 2008).

It has generally been supposed that individualism is more related to the creation of new business. However, certain theoretical and empirical approaches suggest that collectivistic societies can offer resources that facilitate, rather than impede, the proliferation of entrepreneurial activities (Dheer, 2017; Fernández-Serrano et al., 2018).

In this respect, there is evidence suggesting that the relationships between culture and entrepreneurship are not permanent, and that these change with the level of development (Liñán and Fernández-Serrano, 2014). In low-income countries, a high level of entrepreneurship coexists with a collectivistic culture (Pinillos and Reyes, 2011; Wennekers et al., 2007). In turn, in developed countries, a greater individualism is associated with a higher entrepreneurial activity (Busenitz and Lau, 1996; Mueller et al., 2002).

3. Stochastic frontier models

The basic formulation of a stochastic frontier model for panel data is:

$$y_{it} = f(x_{it}, \beta) + v_{it} - \mathrm{u}_{it}, \quad i = 1,...,\mathrm{N} \quad \mathrm{t} = 1,...,\mathrm{T} \qquad [1]$$

where y_{it} is the production of the firm *i* in the period *t*, x_{it} is the vector of all its inputs, β is a vector of parameters to be estimated, and $f(\cdot)$ is the production function. The error term (also named random perturbation) $\varepsilon_{it} = v_{it} - u_{it}$ is composed of parts (which is why it is also known as the composite error model), $v_{it} \epsilon \mathrm{R}$ which includes the random sources of variation and $u_{it} \geq 0$ that represents the inefficiency in the productive process. Commonly, it is supposed that $v_{it} \sim N(0, \sigma_v^2)$, although it is also possible to

relax this hypothesis, thereby allowing for the presence of heteroscedasticity (Hadri,1999).

If the hypothesis that states that inefficiency is invariant over time is assumed, the model is $y_{it} = f\left(x_{it}, \beta\right) + v_{it} - u_i$. In this case, it is possible to estimate without making any distributional hypothesis about u_i, by applying the estimation techniques of fixed effects in panel data and subsequently carrying out a change of origin in the estimations of u_i in order to make all the estimations greater than or equal to zero (Greene, 2008). Alternatively, a positive probability distribution for u_i can be assumed and maximum likelihood estimation can then be applied.

The most commonly utilised distribution is the Normal distribution truncated at zero, denoted as N^+ (Bogetoft and Otto, 2011; Ortega and Gavilan, 2014), although the use of Exponential and Gamma distributions is also worthy of note, especially in the Bayesian methodology (Koop et al., 1995; Koop and Stell, 2003).

However, the modelling that has acquired the greatest usage is that proposed in Battese and Coelli (1995) due to its flexibility, since it allows the expectation of the inefficiency term to vary cross-sectionally and/or over time, and at the same time, it enables the introduction of explanatory factors for said variability.

Specifically, the approach herein considers the model $y_{it} = f\left(x_{it}, \beta\right) + v_{it} - u_i$, where $u_{it} \sim N^+\left(m_{it}, \sigma_u^2\right)$ and m_{it} is given by a linear equation involving the explanatory factor of the inefficiency that can vary cross-sectionally and/or over time. Therefore, $m_{it} = z_{it}^{'}\delta$, where z_{it} is the vector of factors and δ is a vector of unknown parameters.

To finish this section, it is important to point out that the dependent variable is measured on a logarithmic scale and, when the inefficiency $u_{it} \geq 0$ is estimated, then a measure of efficiency is obtained by $EF_{it} = \exp\left(-u_{it}\right)$, which is bounded between 0 and 1, whereby 1 indicates maximum efficiency.

4. Variables utilised and model set

The empirical analysis is performed for the period 2005-2016 on a sample of 53 countries that present very different levels of GDP per capita (see Table 3). The selection of the countries is based on the availability of data. Specifically, the elected countries are those that participate both in the projects *Global Entrepreneurship Monitor* (GEM) and *Schwartz Value Survey* (SVS). The data panel is not balanced, since there are a significant number of missing items of data in specific periods and countries. The sample as a whole contains a total of 461 observations.

4.1. Variables

The proposed model explains the entrepreneurship rate as a function of the GDP per capita, the unemployment rate, and the cultural values. The variables employed are:

- Entrepreneurship data from the project GEM[1]:

- *Total Entrepreneurial Activity (TEA)*: percentage of the population between the ages of 18 and 64 who are "nascent entrepreneur" (starting a new venture, or having just started a business of no more than 3 months in existence) or "new entrepreneur" (manager-owner of an ongoing business of more than 3 months, but no more than 42 months).

- Data on the economic variables obtained from the World Bank:

- *Gross Domestic Product per capita (GDP-pc)*. Yearly data in thousands of constant US dollars.

- *Growth rate of the GDP per capita (GR-GDP)*. Interannual rate of change, as a percentage.

- *Unemployment rate (UR). Percentage of unemployed workers in the total labour force.*

- In relation to the cultural values, the Schwartz Value Survey (SVS) has been used. In that survey, 57 items are analysed, from which seven cultural orientations are obtained (Schwartz and Ros, 1995; Schwartz, 2004). The data is accessible on more than 60 countries and has been gathered in various surveys carried out in the period 1985-2005. The entire survey includes more than 75,000 individuals. Following the proposal by Schwartz (2006b, 2008), the seven cultural values have been grouped into three bipolar dimensions, and the score is calculated in the second cultural orientation (autonomy, egalitarianism, and harmony) minus the score in the first cultural orientation (embeddedness, hierarchy, and mastery). As a consequence, the three dimensions utilised in the empirical analysis are:

- *Autonomy*[2] *vs. Embeddedness (AUT-EMB)*: A positive value represents predominance of the autonomy value, while a negative result means the prevalence of the embeddedness value.

- *Egalitarianism vs. Hierarchy (EGA-HIE)*: A positive value indicates that the egalitarianism value predominates, whilst a negative outcome expresses the prevalence of the hierarchy value.

- *Harmony vs. Mastery (HAR-MAS)*: A positive value represents dominance of the harmony value, whereas a negative result captures the predominance of the mastery value.

[1] Since 1999, the Global Entrepreneurship Monitor (GEM) project has measured and compared the levels of entrepreneurship for various countries and periods of time. Available from the GEM consortium web page: http://www.gemconsortium.org/key-indicators.

[2] Following the proposal by Schwartz (2006b), the autonomy value is obtained by averaging intellectual and affective autonomy.

In Table 1, the main descriptive statistics of the variables included in the analysis are shown (considering all the available data for each variable).

Table 1. Descriptive statistics

	TEA	*GR-GDP*	*GDP-pc*	*UR*	*AUT-EMB*	*EGA-HIE*	*HAR-MAS*
Average	9.90	2.10	24.97	8.03	0.27	2.33	0.02
Median	7.78	1.94	14.14	7.10	0.22	2.38	0.06
Maximum	40.08	24.76	91.62	31.10	1.80	3.56	1.14
Minimum	1.88	-12.98	0.48	0.60	-1.48	0.74	-0.80
Stan-Dev	6.47	3.51	21.57	5.24	0.74	0.67	0.46
Observ.	461	634	635	636	55	55	55

Source: Authors' own.

4.2. Model

As mentioned in Section 3, the stochastic frontier model is considered, in which the economic variables are the explanatory factors of the frontier or maximum rate of entrepreneurship, while the cultural variables are the determinants of the efficiency.

In relation to the production function, a linear-type relationship is considered and, for modelling the inefficiency, a formulation is established similar to that in Battese and Coelli (1995), in which the determinants of the inefficiency are the cultural variables.

Specifically, the considered model is given by:

$$Ln\left(TEA_{it}\right) = \beta_0 + \beta_1 GR - GDP_{it} + \beta_2 GDP - pc_{it} + \beta_3 UR_{it} + v_{it} - u_i \qquad [2]$$

where $v_{it} \sim N\left(0, \sigma_v^2\right)$ is the term corresponding to the random errors. In relation to the inefficiency term, it is assumed that its expectation is time invariant and a Battese-Coelli (1995) model is adopted through the hypothesis $u_i \sim N^+\left(m_i, \sigma_u^2\right)$, where

$$m_i = \delta_0 + \delta_1 AUT - EMB_i + \delta_2 EGA - HIE_i + \delta_3 HAR - MAS_i \qquad [3]$$

It is important to highlight the interpretation of the parameters $\delta_i s$ associated to the cultural variables in this considered formulation. To this end, it must be taken into account that u_i is the inefficiency and that the efficiency is obtained through the expression $EF_i = exp(-u_i)$. Thus, for example, a positive estimation of δ_1 would mean that in the countries where AUT predominates over EMB, the inefficiency is larger (the observed rate of entrepreneurship is further away from its maximum possible value) and

therefore the efficiency is smaller. In short, a positive estimated value of δ_1 would indicate that EMB promotes the entrepreneurship, while a negative value signifies the opposite situation. Parameters δ_2 and δ_3 are interpreted in a similar way.

For the estimation of the model, the method of maximum likelihood implemented in the package frontier v1.0 of the software R is carried out (Coelli and Henningsen, 2013), which uses a reparametrisation of the variances σ_v^2 and σ_u^2. Specifically, they consider $\sigma^2 = \sigma_v^2 + \sigma_u^2$ and $\gamma = \sigma_u^2 / \sigma^2$. This latter parameter indicates the proportion of variance of the composite error term due to inefficiency in relation to its total variance: its interpretation is crucial, since a non-significant value is an indication that the inefficiency terms are not relevant and therefore the global approach of the model remains in question.

5. Results and discussion

The most significant results of the estimation of the considered model are offered in Table 2.

Table 2. Estimated model

	Estimate	*Std. Error*
(Intercept)	3.8180***	0.0572
GR-GDP	0.0073	0.0068
GDP-pc	-0.0068***	0.0016
UR	-0.0202***	0.0048
Z_(Intercept)	1.7050***	0.0874
Z_AUT_EMB	0.3519***	0.0509
Z_EGA_HIE	-0.2245***	0.0588
Z_HAR_MAS	0.3953***	0.0729
sigmaSq	0.2205***	0.0155
gamma	0.9999***	0.0002

Note: Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.', 0.1 ' '.
Log likelihood value: -289.3139
Source: Authors' own.

Firstly, it is observed that the parameter is highly significant, from which it can be concluded that the introduction of the inefficiency term in the model is indeed appropriate. Thus, cultural values influence the entrepreneurship rate, causing some countries to be more "efficient" than others, that is to say, that they have a greater rate of entrepreneurship *ceteris paribus* (if they were under the same economic conditions).

With regard to the establishment of the frontier, it can be seen that the estimated sign for the GDP growth is positive, although it is not significant (its p-value is 0.28), while the estimated coefficient for GDP is negative (and highly significant). That is to say, an increase of economic growth entails an increase of the maximum potential of entrepreneurship, while an increase of GDP per capita leads to a decrease of the aforementioned potential. These results are consistent with those obtained in Liñán et al. (2015).

The variable *unemployment rate* presents a negative sign (and highly significant), and consequently an increase in unemployment rate entails a decrease in the maximum frontier of the entrepreneurship rate. This result appears to be reasonable, when one takes into consideration that the increase in unemployment is usually linked to a decrease in economic growth.

In this respect, Fuentelsaz et al. (2015) found that unemployment exerts a positive effect on necessity-based entrepreneurship, while its effect on opportunity-based entrepreneurship remains negative. It seems therefore that the negative impact of higher unemployment prevails in the economic and market prospects.

The cultural variables are all highly significant in determining the efficiency (let us indicate that the output provided by the software R adds 'Z_' before the name of the variables that determine the efficiency in order to distinguish them from the factors that explain the production frontier). Thus, it can be concluded that the cultural factors of a country influence the entrepreneurship rate, by shifting it closer to or further from its maximum possible value.

The estimated parameter for AUT_EMB presents a positive sign. As explained in Section 3, this means that the countries in which AUT predominates are more inefficient or, equivalently, the countries in which EMB prevails are more efficient. It may therefore be concluded that the dimension EMB promotes entrepreneurship. It is likely that in countries where EMB prevails, community feeling facilitates support of the group's own members towards nascent entrepreneurs (Cullen et al., 2014; De Clercq et al., 2014).

Similarly, the signs for EGA_HIE and HAR_MAS signify that the dimensions that favour entrepreneurship are EGA and MAS, respectively. All these findings are in accordance with those obtained in Liñán et al. (2015).

In Table 3, the estimated values of the efficiency for each country are shown, ordered according to the level of development of The Global Competitiveness Report 2016–2017 (Schwab and Sala-i-Martin, 2016), which constitutes another objective of this kind of modelling. As explained in Section 4, the estimated efficiency is obtained from the combination of the cultural factors prevailing in each country. A greater efficiency does not mean a higher entrepreneurship rate, but instead means that the actual entrepreneurship rate is closer to its maximum possible attainable entrepreneurship rate in the country on the basis of its potential for entrepreneurship.

Any *a posteriori* statistical analysis of the relationship between efficiency and cultural and/or economic factors must be taken cautiously, since this type of two-step procedure can lead to biased results, as indicated in Green

Table 3. Average efficiency per country

Stage 1: Factor-driven		Transition from 1 to 2		Stage 2: Efficiency-driven		Transition from 2 to 3		Stage 3: Innovation-driven			
Country	*Effic.*	*Country*	*Effic.*	*Country*	*Effic.*	*Country*	*Effic.*	*Country*	*Effic.*	*Country*	*Effic.*
Ghana	0.748	*Bolivia*	0.758	*Peru*	0.632	*Chile*	0.514	*Canada*	0.428	*Hong Kong*	0.226
Uganda	0.737	*Venezuela*	0.542	*Thailand*	0.470	*Argentina*	0.414	*Australia*	0.405	*Spain*	0.225
India	0.223	*Philippines*	0.464	*Indonesia*	0.457	*Costa Rica*	0.367	*United States*	0.394	*Finland*	0.211
		Russia	0.117	*Brazil*	0.439	*Mexico*	0.314	*Norway*	0.316	*Sweden*	0.208
				Iran	0.361	*Latvia*	0.307	*Ireland*	0.305	*South Korea*	0.206
				China	0.356	*Poland*	0.266	*Switzerland*	0.270	*Austria*	0.204
				Herzeg-Bosnia	0.300	*Turkey*	0.265	*Singapore*	0.267	*France*	0.175
				South Africa	0.290	*Croatia*	0.231	*Portugal*	0.264	*Denmark*	0.173
				Jordan	0.276	*Hungary*	0.210	*Greece*	0.263	*Slovenia*	0.164
				Egypt	0.272	*Malaysia*	0.143	*Netherlands*	0.258	*Germany*	0.157
				Romania	0.200			*Israel*	0.242	*Belgium*	0.150
								United Kingdom	0.231	*Italy*	0.141
										Japan	0.124

Source: Authors' own.

(2008). This, indeed, is the main reason why there should not be firstly made a regression only with the economic factors to determine the efficiency and then a second regression made between efficiency and cultural factors. Nevertheless, at a merely descriptive level, it may be useful to analyse the simple correlations between the efficiency and the many variables utilised in the model. It can be seen that both the averages of the economic variables by country and the cultural factors bear very little correlation with the values of efficiency. Regarding the cultural values, the only dimension that presents an important relationship with efficiency is AUT-EMB with a coefficient of linear correlation equal to -0.515, which is indicative that this cultural variable has a greater incidence in the entrepreneurial efficiency.

In this regard, it is worth inquiring into the relationship between culture and level of development. According to several authors, culture plays a relevant role in the economic development processes (Minkov and Hofstede, 2012; Thornton et al., 2011). Cultural values can help explain the differences in the economic conditions of the countries (Jaén and Liñán, 2013; Schwartz, 2004, 2008). Therefore, a significant interdependence between culture and economic development should be found (Liñán et al., 2013; Mueller et al., 2002; Ros, 2002).

Schwartz (2008) claims that the least developed countries are characterized by the predominance of embeddedness and hierarchy, while autonomy and egalitarianism tend to prevail in high-income countries. Likewise, although the relationship is not so strong, it is found that mastery predominates in the least developed countries (Schwartz, 2004; Schwartz and Ros, 1995).

However, our results show that the most efficient countries in relation to the entrepreneurship rate have a low level of development (Bolivia, Ghana, Uganda, Peru, Venezuela, etc.), while the least efficient are, in general (with certain exceptions), developed countries, such as Russia, Japan, Italy, Belgium, Germany, Denmark, and France.

The interpretation of the levels of efficiency can be better understood if countries with a similar level of development are compared, as is the case of Canada, Australia, and the United States, which have a higher level of efficiency than Germany, Belgium, Italy, and Japan.

The explanation can be found in the prevalence of embeddedness and mastery, which have been observed to favour entrepreneurship. In particular, as indicated before, embeddedness shows the strongest relationship with the level of efficiency.

Furthermore, in relation to the egalitarianism-hierarchy dimension, the prevalence of hierarchy in countries with a lower income would be a factor that negatively affects entrepreneurship. However, since the relationship between egalitarianism and efficiency is weak, it would exert a relatively minor effect (in comparison with the positive effect exerted by embeddedness).

6. Conclusions

In this work, an innovative way is proposed for the analysis of the effect of changeable economic conditions and the relative stable cultural values on entrepreneurial activity at country level.

In general terms, it is observed that economic growth is directly related to the maximum rate or "potential" of entrepreneurship, while the level of wealth has a negative relationship; such findings are consistent with those obtained in Liñán et al. (2015). In accordance with the behaviour of economic growth, an increase in the unemployment rate diminishes the maximum rate of entrepreneurship.

With regard to the cultural dimension, it is concluded that those dimensions that increase the efficiency, that is to say, that lead to a smaller difference

between the maximum rate and the observed rate, are embeddedness, egalitarianism and mastery, from among which embeddedness is the cultural value presenting the strongest relationship with the level of efficiency. In general, a negative relationship is observed between efficiency and the level of development, since the least developed countries are those with the greatest indicators of efficiency, and vice versa.

The set of data utilised corresponds to a group of highly heterogeneous countries, which provides a worldwide global view. It should be borne in mind that, if similar analyses are carried out that confine the sample to include only those countries with a similar level of development, then it is possible that the results could differ.

The entrepreneurial activity analysed in this study is the global activity rate. As future research lines, it would be of interest to study the various motivations of entrepreneurship, since necessity-motivated entrepreneurship is more directly related to the economic situation. When the economic situation improves, the availability of employment alternatives increases, and there becomes less need for the initiation of a new business. In contrast, opportunity-motivated entrepreneurship should present a clearer association with the predominance of certain cultural values over others.

References

Armington, C. and Acs, Z. J. (2002): "The Determinants of Regional Variation in New Firm Formation", *Regional Studies*, 36, 33-45.

Aubry, M., Bonnet, J., and Renou-Maissant, P. (2015): "Entrepreneurship and the Business Cycle: the "Schumpeter" Effect versus the "Refugee" Effect—a French Appraisal Based on Regional Data", *The Annals of Regional Science*, 54(1), 23-55.

Audretsch, D. B. and Fritsch, M. (1999): "The Industry Component of Regional New Firm Formation Processes", *Review of Industrial Organization*, 15, 239-252.

Battese, G.E. and Coelli, T.J. (1995): "a Model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for Panel Data", *Empirical Economics*, 20, 325-332.

Bjornskov, C., and Foss, N. J. (2006): *Economic freedom and entrepreneurial activity: Some cross-country evidence*. DRUID Working Paper, 06-18.

Blackburn, R. and Kovalainen, A. (2009): "Researching Small Firms and Entrepreneurship: Past, Present and Future", *International Journal of Management Reviews*, 11(2), 127-148.

Bogetoft, P. and Otto, L. (2011): *Benchmarking with DEA*, SFA, and R. Springer.

Bourdieu, P. (1991): *Language and Symbolic Power*, Cambridge, Polity Press.

Busenitz, L. W. and Lau, C. M. (1996): "A Cross-cultural Cognitive Model of new Venture Creation", *Entrepreneurship Theory and Practice*, 20(4), 25-39.

Busenitz, L.W., Gómez C. and Spencer, J.W. (2000): "Country Institutional Profiles: Unlocking Entrepreneurial Phenomena", *Academy of Management Journal*, 43(5), 994-1003.

Carree, M. A., van Stel, A., Thurik, A. R. and Wennekers, A. R. M. (2002): "Economic Development and Business Ownership: an Analysis Using Data of 23 OECD Countries in the Period 1976-1996", *Small Business Economics*, 19(3), 271-290.

Chand, M. and Ghorbani, M. (2011): "National Culture, Networks and Ethnic Entrepreneurship: A Comparison of the Indian and Chinese Immigrants in the US", *International Business Review*, 20(6), 593-606.

Coelli, T. and Henningsen, A. (2013): frontier: *Stochastic Frontier Analysis*. R package version 1.1-0. http://CRAN.R-Project.org/package=frontier.

Cullen, J. B., Johnson, J. L., and Parboteeah, K. P. (2014): "National Rates of Opportunity Entrepreneurship Activity: Insights From Institutional Anomie Theory", *Entrepreneurship Theory and Practice*, 38(4), 775-806.

Davidsson, P. (1995): "Culture, Structure and Regional Levels of Entrepreneurship", *Entrepreneurship and Regional Development*, 7(1), 41-62.

Davidsson, P. and Wiklund, J. (1997): "Values, Beliefs and Regional Variations in new Firm Formation Rates", *Journal of Economic Psychology*, 18(2-3), 179-199.

De Clercq, D., Lim, D. S. K., and Oh, C. H. (2014): "Hierarchy and Conservatism in the Contributions of Resources to Entrepreneurial Activity", *Small Business Economics*, 42(3), 507-522.

Dheer, R. J. S. (2017): "Cross-national Differences in Entrepreneurial Activity: Role of Culture and Institutional Factors", *Small Business Economics*, 48(4), 813-842.

Etzioni, A. (1987): "Entrepreneurship, Adaptation and Legitimation: A Macro-behavioral Perspective", *Journal of Economic Behavior & Organization*, 8, 175-189.

Fernández-Serrano, J., Berbegal, V., Velasco, F., and Expósito, A. (2018): "Efficient Entrepreneurial Culture: a Cross-country Analysis of Developed Countries", *International Entrepreneurship and Management Journal*, 14(1), 105-127.

Fishman, R. and Sarria-Allende, V. (2004): *Regulation of Entry and the Distortion of Industrial Organization. Working Paper No. 10929*, Cambridge, MA, National Bureau of Economic Research.

Frederking, L.C. (2004): "A Cross-national Study of Culture, Organization and Entrepreneurship in three Neighbourhoods", *Entrepreneurship and Regional Development*, 16(3), 197-215.

Fritsch, M. and Mueller, P. (2004): "Effects of New Business Formation on Regional Development over Time", *Regional Studies*, 38, 961-975.

Fuentelsaz, L., González, C., Maícas, J. P., and Montero, J. (2015): "How Different Formal Institutions Affect Opportunity and Necessity Entrepreneurship", *BRQ Business Research Quarterly*. 18(4), 246-258.

Greene, W. (2008): *The Econometric Approach to Efficiency Analysis*. In Fried, H.; Lovell K. and Schmidt (ed.): *The Measurement of Productive Efficiency and Productive growth.* Oxford University Press, Oxford.

Hadri, K. (1999): "Doubly Heteroscedastic Stochastic Frontier Cost Function Estimation", *Journal of Business & Economic Statistic*, 17(3), 359-363.

Halicioglu, F., and Yolac, S. (2015): "Testing the Impact of Unemployment on Self-employment: Evidence from OECD Countries", *Procedia-Social and Behavioral Sciences*, 195, 10-17.

Hayton, J.C., George, G. and Zahra, S.A. (2002): "National Culture and Entrepreneurship: a Review of Behavioural Research", *Entrepreneurship Theory and Practice*, 26(4), 33-52.

Hofstede, G. (1980): *Culture's Consequences: International Differences in Work-related Values*, Beverly Hills, Sage Publications.

Hofstede, G. (1991): *Cultures and Organizations: Software of the Mind*, London, McGraw-Hill.

Hofstede, G. (2003): *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*, Newbury Park, Sage Publications.

Inglehart, R. (1997): *Modernization and Postmodernization,* Princeton, Princeton University Press.

Jabri, M. M. (2005): "Commentaries and Critical Articles: Text-context Relationships and Their Implications for Cross Cultural Management", *International Journal of Cross Cultural Management*, 5, 349-360.

Jaén, I. and Liñán, F. (2013): "Work Values in a Changing Economic Environment: the Role of Entrepreneurial Capital", *International Journal of Manpower*. 34(8), 939-960.

Koop, G. and Steel, M.F.J. (2003): "Bayesian Analysis of stochastic frontier models", In Baltagi, B.H. (ed.): *A companion to theoretical econometrics*, 520-537, Oxford: Blackwell.

Koop, G., Steel, M.F.J. and Osiewalski, J. (1995): "Posterior Analysis of Stochastic Frontier Models Using Gibbs Sampling", *Computational Statistics,* 10, 353-373.

Krueger, N. F. (2000): "The Cognitive Infrastructure of Opportunity Emergence", *Entrepreneurship Theory and Practice*, 24, 5-23.

Krueger, N. F. (2003): *The Cognitive Psychology of Entrepreneurship,* In: Acs, Z. J. & Audretsch, D. B. (eds.) *Handbook of Entrepreneurship Research: An interdisciplinary survey and introduction*, London: Kluwer.

Krueger, N. F. and Carsrud, A. L. (1993): "Entrepreneurial Intentions: Applying the Theory of Planned Behaviour", *Entrepreneurship and Regional Development*, 5, 315-330.

Kumbhakar, S.C. and Zhang, R. (2013): "Labor-use Efficiency and Employment Elasticity in Chinese Manufacturing", *Economia e Politica Industriale*, 40, 5-24.

Kumbhakar, S.C., Lien, G. and Hardaker, J.B. (2014): "Technical Efficiency in Competing Panel Data Models: A study of Norwegian grain farming", *Journal of Productivity Analysis*, 41, 321-337.

Kuratko, D. F., Hornsby, J. S., and Naffziger, D. W. (1997): "An Examination of Owner's Goals in Sustaining Entrepreneurship", *Journal of Small Business Management*, 35(1), 24-34.

Laguna, M. (2013): "Self-efficacy, Self-esteem, and Entrepreneurship among the Unemployed", *Journal of Applied Social Psychology*, 43(2), 253-262.

Lee, S. M. and Peterson, S. J. (2000): "Culture, Entrepreneurial Orientation, and Global Competitiveness", *Journal of World Business*, 35, 401-416.

Lee, S. Y., Florida, R. and Acs, Z. J. (2004): "Creativity and Entrepreneurship: A Regional Analysis of new Firm Formation", *Regional Studies*, 38, 879-891.

Liñán, F. and Chen, Y. W. (2009): "Development and Cross-cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions", *Entrepreneurship Theory and Practice*, 33, 593-617.

Liñán, F. and Fernandez-Serrano, J. (2014): "National Culture, Entrepreneurship and Economic Development: Different Patterns Across the European Union", *Small Business Economics*, 42(4), 685-701.

Liñán, F., Fernández-Serrano, J., and Romero, I. (2013): "Necessity and Opportunity Entrepreneurship: The Mediating Effect of Culture", *Revista de Economía Mundial*, 33, 21-47.

Liñán, F., Jaén, I. and Ortega, F. J. (2015): "Understanding the Role of Culture and Economic Conditions in Entrepreneurship", In Peris, M.; Merigó, J.M. (ed.): *Entrepreneurship, Regional Development and Culture* (pp. 53-73), Springer International Publishing.

Liñán, F., Santos, F. J. and Fernández, J. (2011a): "The Influence of Perceptions on Potential Entrepreneurs", *International Entrepreneurship and Management Journal*, 7, 373-390.

Liñán, F., Urbano, D. and Guerrero, M. (2011b): "Regional Variations in Entrepreneurial Cognitions: Start-up intentions of university students in Spain", *Entrepreneurship and Regional Development*, 23, 187-215.

Manolova, T., Brush, C. and Edelman, L. (2008): "What Do Women Entrepreneurs Want?", *Strategic Change*, 17(3/4), 69–82.

Markus, H. R. and Kitayama, S. (1991): "Culture and the Self: Implications for Cognition, Emotion and Motivation", *Psychological Review*, 98, 224-253.

Mcgrath, R. G. and Macmillan, I. C. (1992): "More Like Each Other Than Anyone Else? A Cross-Cultural Study of Entrepreneurial Perceptions", *Journal of Business Venturing*, 7, 419-429.

Minkov, M., and Hofstede, G. (2012): "Is National Culture a Meaningful Concept? Cultural Values Delineate Homogeneous National Clusters of In-Country Regions", *Cross-Cultural Research*, 46(2), 133-159.

Minniti, M., Bygrave, W. D. and Autio, E. (2006): *GEM, Global Entrepreneurship Monitor, 2005 Executive Report*, London, U.K. & Babson Park, MA, London Business School & Babson College.

Mitchell, R. K., Smith, B., Seawright, K. W. and Morse, E. A. (2000): "Cross-cultural Cognitions and the Venture Creation Decision", *Academy of Management Journal*, 43, 974-993.

Mueller, S. L. and Thomas, A. S. (2001): "Culture and Entrepreneurial Potential: A nine Country Study of Locus of Control and Innovativeness", *Journal of Business Venturing*, 16, 51-75.

Mueller, S. L., Thomas, A. S., and Jaeger, A. M. (2002): "National Entrepreneurial Potential: the Role of Culture, Economic Development and Political History", In Hitt, M.A and Cheng, J.L. (Ed.), *Managing Transnational Firms: Resources, Market Entry and Strategic Alliances* (Vol. 14, pp. 221-257), JAI Press, Amsterdam.

Noorderhaven, N., Thurik, R., Wennekers, A. R. M., and van Stel, A. (2004): "The Role of Dissatisfaction and per capita Income in Explaining Self-employment Across 15 European countries". *Entrepreneurship Theory and Practice*, 28(5), 447-466.

North, D.C. (1990): *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge.

North, D.C. (2005): *Understanding the Process of Economic Change*. Princeton University Press, Princeton.

O'Donnell, C.J. and Nguyen, K. (2013): "An Econometric Approach to Estimating Support Prices and Measures of Productivity Change in Public Hospitals", *Journal of Productivity Analysis*, 40, 323-335.

Ortega, F.J. and Gavilan, J.M. (2013): "The Measurement of Production Efficiency in Scientific Journals through Stochastic Frontier Analysis Models: Application to quantitative economics journals", *Journal of Informetrics*, 7, 959-965.

Ortega, F.J. and Gavilan, J.M. (2014): "A Comparison Between Maximum Likelihood and Bayesian Estimation of Stochastic Frontier Production Models", *Communications in Statistics – Simulation and Computation*, 43(7), 1714-1725.

Parinduri, R.A. and Riyanto, Y.E. (2014): "Bank Ownership and Efficiency in the Aftermath of Financial Crises: Evidence from Indonesia", *Review of Development Economics*, 18, 93-106.

Park, I. and Lee, Y.H. (2012): "Efficiency Comparison of International Golfers in the LPGA", *Journal of Sports Economics*, 13, 378-392.

Parker, S. C. and Robson, M. (2004): "Explaining International Variations in Self-Employment: Evidence from a Panel of OECD Countries", *Southern Economic Journal*, 71, 287-301.

Pinillos, M.J. and Reyes, L. (2011): "Relationship Between Individualist–Collectivist Culture and Entrepreneurial Activity: Evidence from Global Entrepreneurship Monitor data", *Small Business Economics*, 37(1), 23-37.

Reynolds, P. D., Storey, D. J. and Westhead, P. (1994): "Cross-National Comparison of the Variation in new Firm Rates", *Regional Studies*, 28(4), 443-456.

Reynolds, P. D., Bygrave, W., Autio, E. and Hay, M. (2002): *Global Entrepreneurship Monitor. 2002 summary report*, Kansas City, Ewin Marion Kauffman Foundation.

Ros, M. (2002): "Los valores culturales y el desarrollo socioeconómico: una comparación entre teorías culturales", *Revista Española de Investigaciones Sociológicas*, 99, 9-33.

Sav, G.T. (2011). "Cost Efficiencies and Rankings of Flagship Universities", *American Journal of Economics and Business Administration*, 3, 596–603.

Schwab, K., and Sala-i-Martin, X. (2016): The Global Competitiveness Report 2016-2017. Geneva: World Economic Forum.

Schwartz, S. H. (1990): "Individualism-Collectivism. Critique and proposed refinements", *Journal of cross-cultural psychology*, 21, 139-157.

Schwartz, S. H. (1994): *Beyond Individualism-Collectivism: New cultural dimensions of values*. In: Kim, U., Triandis, H. C., Kagitçibasi, C., Choi, S. C. and Yoon, G. (eds.) *Individualism and collectivism. Theory, method, and applications*. Thousand Oaks, CA: Sage.

Schwartz, S. H. (1999): "Cultural Value Differences: some Implications for Work", *Applied Psychology: An International Review*, 48, 23-48.

Schwartz, S.H. (2004): "Mapping and Interpreting Cultural Differences around the World". In Vinken H.; Soeters J.; Ester, P. (ed.): *Comparing Cultures, Dimensions of Culture in a Comparative Perspective*. Brill, Leiden, The Netherlands.

Schwartz, S. H. (2006a): "Les valeurs de base de la personne: théorie, mesures et applications", *Revue Française De Sociologie*, 47, 929-968.

Schwartz, S.H. (2006b): "A Theory of Cultural Value Orientations: Explication and Applications", *Comparative Sociology*, 5 (2-3):137-182.

Schwartz, S.H. (2008): *Cultural Value Orientations: Nature and Implications of National Differences*, Publishing House of SU HSE, Moscow.

Schwartz, S.H. and Ros, M. (1995): "Values in the West: A Theoretical and Empirical Challenge to the Individualism-Collectivism Cultural Dimension", *World Psychology*, 1, 99-122.

Shane, S. (1993): "Cultural Influences on National Rates of Innovation", *Journal of Business Venturing*, 8, 59-73.

Shane, S., Kolvereid, I. and Westhead, P. (1991): "An Exploratory Examination of the Reasons Leading to New Firm Formation across Country and Gender", *Journal of Business Venturing*, 6, 431-446.

Spencer, J.W. and Gomez, C. (2004): "The Relationship among National Institutional Structures, Economic Factors, and Domestic Entrepreneurial Activity: a Multicountry Study", *Journal of Business Research*, 57, 1098-1107.

Sternberg, R., and Wennekers, A. R. M. (2005): "Determinants and Effects of New Business Creation Using Global Entrepreneurship Monitor Data", *Small Business Economics*, 24(3), 193-203.

Tang, I. and Koveos, P. E. (2008): "A Framework to Update Hofstede's Cultural Value Indices: Economic dynamics and institutional stability", *Journal of International Business Studies*, 39, 1045-1063.

Thornton, P. H., Ribeiro-Soriano, D. and Urbano, D. (2011): "Socio-cultural Factors and Entrepreneurial Activity", *International Small Business Journal*, 29(2), 105-118.

Triandis, H. C. (1995): *Individualism and Collectivism*, Boulder, Co: Westview Press.

Urbano, D. and Alvarez, C. (2014): "Institutional Dimensions and Entrepreneurial Activity: An International Study", *Small Business Economics*, 42(4), 703-716.

Van Stel, A. and Storey, D. J. (2004): "The Link Between Firm Births and Job Creation: Is there a Upas Tree Effect?", *Regional Studies*, 38, 893-909.

Van Stel, A., Wennekers, A. R. M., Turik, A. R., Reynolds, P. D., de Wit, G. (2003): Explaining nascent Entrepreneurship Across Countries. SCALES-paper (Vol. SCALES). Zoetermeer: EIM Business and Policy Research.

Verheul, I., Wennekers, A. R. M., Audretsch, D. B., and Thurik, A. R. (2002): An eclectic Theory of Entrepreneurship: Policies, Institutions and Culture. In D. B. Audretsch, A. R. Thurik, I. Verheul, and A. R. M. Wennekers (Eds.), *Entrepreneurship: Determinants and Policy in a European-US Comparison* (pp. 11–81). Boston and Dordrecht: Kluwer Academic Publishers.

Wang, G.W., Knox, K.J. and Lee, P.T.-W. (2013): "A Study of Relative Efficiency between Privatised and Publicly Operated US Ports", *Maritime Policy and Management*, 40, 351–366.

Welter, F. (2011): "Contextualizing Entrepreneurship - Conceptual Challenges and Ways Forward", *Entrepreneurship Theory and Practice*, 35(1), 165-184.

Wennekers, A. R. M., Uhlaner, L. M., and Thurik, A. R. (2002): "Entrepreneurship and its Conditions: A macro Perspective", *International Journal of Entrepreneurship Education*, 1(1), 25-64.

Wennekers, A. R. M., Thurik, R., van Stel, A., and Noorderhaven, N. (2007): "Uncertainty Avoidance and the Rate of Business Ownership Across 21 OECD countries, 1976–2004", *Journal of Evolutionary Economics*, 17(2), 133-160.

Wennekers, A.R.M., van Stel, A., Thurik, A.R. and Reynolds, P.D. (2005): "Nascent Entrepreneurship and the Level of Economic Development", *Small Business Economics*, 24 (3), 293-309.

Zahra, S.A. (2007): "Contextualizing Theory Building in Entrepreneurship Research", *Journal of Business Venturing*, 22(3), 443-452.