Economics

How does the tango of cultural factors and economic stages affect entrepreneurship? An answer from GLOBE and GEM

--Manuscript Draft--

Manuscript Number:	ECONJOURNAL-D-23-00047
Full Title:	How does the tango of cultural factors and economic stages affect entrepreneurship? An answer from GLOBE and GEM
Article Type:	Research Article
Keywords:	Entrepreneurial activities; Motivation Hygiene Theory (MHT); GLOBE; Motivation culture; Hygiene culture; Economic stages
Manuscript Region of Origin:	CHINA
Abstract:	This paper studies the divergent roles of Motivation culture and Hygiene culture in entrepreneurial activities at various economic stages globally. With the tool of Factor Analysis, culture dimensions from 54 countries by the Global Leadership and Organizational Behavior Effectiveness Project (GLOBE) are descaled into two factors, Motivation culture and Hygiene cultures. Approaching them by Herzberg's Motivation and Hygiene Theory (MHT), Motivation culture is featured with a high level of performance, future orientation and uncertainty avoidance, while Hygiene culture with a high level of power distance and ingroup collectivism and a low level of egalitarianism. Empirically, the total entrepreneurial activity (TEA) and the ratio of opportunity-driven to necessity-driven entrepreneurship (OPP/NEC) from the Global Entrepreneurship Monitor (GEM) represent the number and quality of entrepreneurial activities, respectively. For the direct effects, the results show that the economy improves OPP/NEC while discouraging TEA. Motivation culture enhances the ratio of OPP/TEA and constrains TEA, while Hygiene culture stimulates TEA and constrains OPP/NEC. For the interaction effects, the economy strengthens the positive relationship between Motivation culture and OPP/NEC. At the same time, there is a negative interaction effect between Motivation culture and Hygiene culture, which subdues motivation's contribution and deteriorates Hygiene's hindrance to OPP/NEC.
Manuscript Classifications:	12.3.7: Entrepreneurship; 13.2.5: Corporate Culture • Diversity • Social Responsibility; 15: Economic Development, Innovation, Technological Change, and Growth

How does the tango of cultural factors and economic stages affect entrepreneurship? An answer from GLOBE and GEM

Abstract
This paper studies the divergent roles of Motivation culture and Hygiene culture in entrepreneurial activities at various economic stages globally. With the tool of Factor Analysis, culture dimensions from 54 countries by the Global Leadership and Organizational Behavior Effectiveness Project (GLOBE) are descaled into two factors, Motivation culture and Hygiene cultures. Approaching them by Herzberg's Motivation and Hygiene Theory (MHT), Motivation culture is featured with a high level of performance, future orientation and uncertainty avoidance, while Hygiene culture with a high level of power distance and in-group collectivism and a low level of egalitarianism. Empirically, the total entrepreneurial activity (TEA) and the ratio of opportunity-driven to necessity-driven entrepreneurship (OPP/NEC) from the Global Entrepreneurship Monitor (GEM) represent the number and quality of entrepreneurial activities, respectively. For the direct effects, the results show that the economy improves OPP/NEC while discouraging TEA. Motivation culture enhances the ratio of OPP/TEA and constrains TEA, while Hygiene culture stimulates TEA and constrains OPP/NEC. For the interaction effects, the economy strengthens the positive relationship between Motivation culture and OPP/NEC. At the same time, there is a negative interaction effect between Motivation culture and Hygiene culture, which subdues motivation's contribution and deteriorates Hygiene's hindrance to OPP/NEC.
Keywords: Entrepreneurial activities, Motivation Hygiene Theory (MHT), GLOBE, Motivation culture, Hygiene culture, Economic stages

1. Introduction

In the age of Post- COVID-19, the economic downturn in most countries is severe and evident, which inspires more researchers and policymakers to rethink the question: what can boost new employment and stimulate continuous economic growth? They unanimously turn their eyes to entrepreneurship, a lasting locomotive for economic growth (Stoica et al. 2020) and an essential contributor to economic growth via employment, innovation and welfare effects (Acs et al. 2012; Wennekers and Thurik, 1999; Wennekers et al. 2005).

This contribution of entrepreneurship to economic growth has long been discussed. Entrepreneurship is "at the heart of national advantage" (Porter, 1990, p. 125), conducive to innovations. Concerning the role of entrepreneurship in stimulating economic growth, both the role of the entrepreneur in carrying out innovations and enhancing competition for economic growth are self-evident (Wennekers and Thurik 1999) . However, empirical research on the role of entrepreneurship as a driving force of economic development still needs to be well developed, and the reality is much more complicated.

According to the OECD, entrepreneurship results from framework conditions, government programs and cultural attitudes (Fernández et al., 2013). Culture plays a fundamental role in the entrepreneurial activity of a society. In this sense, Some authors argue that the social and cultural surroundings influence the corporate behavior of each individual, particularly in

starting a new business; thereby, some cultures encourage more entrepreneurship than others (Mueller and Thomas 2001; Reynolds et al. 2002; Gurel et al. 2010).

As we all know, culture is a multi-facet concept with various dimensions, and so are entrepreneurial activities. These activities can be divided into opportunity-driven and necessity-driven according to the motivations of entrepreneurship in Global Entrepreneurship Monitor (GEM). Thus, depending on the wealth of a country, culture may have a positive or negative effect on entrepreneurial activities (Zhao et al. 2012). Although a nation's economic development depends on successful entrepreneurship combined with the force of established corporations, economic development's backlash on entrepreneurship is too evident to be ignored. Therefore, in terms of the influence of culture on entrepreneurship, it is too general to roughly classify culture as a psychological or institutional factor without considering different economic development levels.

In previous studies, this lack of clarity in the relationship between culture and entrepreneurship can be blamed for the theoretical deficiency in particular. The current study focuses on the role of culture in determining entrepreneurial activities in different countries or regions at various economic stages. We mainly follow the stream of psychology by employing Motivation Hygiene Theory (MHT) to justify the Motivation culture's and Hygiene culture's explanation of entrepreneurship motivations with the consideration of interaction effects between cultural factors and the economy as well as cultural factors in between.

Empirically, the paper proposes models in which economic development level and cultural dimensions affect entrepreneurial activities. An interaction effect between cultural values and per capita income comes into effect in their relationship with entrepreneurship. Theoretically, we fill this gap of cultural factors' contribution to entrepreneurial motivations in the literature by exposing the complex relationship between culture, entrepreneurship and economic development by justifying motivation-hygiene theory. Practically, by generalizing the findings in this study, some policy suggestions have been made for policymakers to make their cultural adaptation according to the corresponding economic stage to unlock the locomotive of entrepreneurial activities and accelerate economic growth.

The content of this paper is structured as follows: after this introduction, previous literature works on the relationships among culture, economy and entrepreneurship are presented; Section 3 proposes the hypotheses within the framework of MHT; Section 4 describes the data sources, the variables, the methodology of empirical analyses; Section 5 presents the results, and elucidates the main findings of this research; Section 6 presents the contributions, policy implication and research limitations.

2. Literature review and theoretical consideration

2.1 Studies on the relationship between culture and entrepreneurship

For the study of culture, the first classification of cultures distinguishes between individualist and collectivist ones (Hofstede 1980, 1994, 2011; Schwartz 1999). Hofstede (1980) defines culture as " the collective programming of the mind distinguishing members of a group or category of people from others" (Hofstede 1980). The outer layers of a culture are often made up of rituals, heroes and symbols, while the hard core of a culture is its values (Hofstede and McCrae 2004). An alternative approach to culture is the Schwartz value scale (SVS), which has been proposed by Schwartz and has shown strong potential in assessing the fundamental

value system of culture. Schwartz, in 1987, wrote an article pointing out the importance of the universal paradigm of values (Schwartz and Bilsky 1987) and sequentially put forward the theory of basic human values in 1992 (Schwartz 1992) , which has been continuously improved since then.

Generally speaking, there are two streams of literature on culture's influence on entrepreneurship (Davidsson 1995) . One steam is psychological, while the other is institutional. For the psychological, the social and cultural context influences the individual's psychology and behaviors. Culture makes a potent guide of people's behaviors under certain cultural circumstances (Hofstede 1980). Thus, culture influences the values and behavior of individuals in one country, which further support or prevent their entrepreneurial behaviors. An entrepreneurship-favorable culture would encourage more people to explore more entrepreneurial potentials and promote the number of entrepreneurial activities (McGrath et al. 1992; Mueller and Thomas 2001).

For the institutional, based on the Institutional Economic Theory (IET) from North, culture is taken as an informal institution (North 2005) . North's approach can be a valid theoretical framework for studying environmental factors affecting the creation of new businesses (Díaz-Casero et al. 2012). On the one hand, a supportive culture would lead to social legitimation, which makes the entrepreneurial career more valued and socially recognized, thus creating a more favorable institutional environment. On the other hand, many institutional conditions are conducive to business activities, for example, a free and competitive market, protection of private property, and an inspirational educational system. In the current research, however, we mainly follow the former stream by applying Motivation Hygiene Theory (MHT) to justify the roles of culture in entrepreneurship.

2.2 The connection between economy and entrepreneurship

Entrepreneurship matters for the economy. Harper (2003) views entrepreneurship as the main force of the economy and puts entrepreneurship as an activity of profits search by identifying and solving specific problems in uncertain situations (Harper 2003) . Entrepreneurship is essential to innovations' progress by introducing new products or production processes to markets (Acs and Audretsch 1990, 2003) . The reasons to justify entrepreneurship's contribution to economic growth are that it promotes the creation of job opportunities, increases productivity by stimulating competition, accelerates knowledge spillovers, and enriches the variety of businesses (Wennekers and Thurik 1999; Geroski 1989; Nickell 1996; van Stel et al. 2005).

As Wennekers & Thurik (1999) and Carree & Thurik (2005) referred, most macroeconomic variables are inter-determined and intertwined. The backlash of entrepreneurship on economic growth is too obvious to be ignored (Wennekers and Thurik 1999; Carree and Thurik) . Among previous research, however, the impact of the economy on entrepreneurship is never simply linear. A U-shaped relationship between economic activity and entrepreneurship is common in the global economy (Carree et al. 2002; Sternberg and Wennekers 2005; Carree et al. 2007) . In the early or middle stage of economic development, the entrepreneurial activity would be negatively related to economic improvement since most people will move from self-employment to wage earner (Pinillos and Reyes 2011), while increased income can be conducive to more startup activities (Acs 2006).

However, it is self-evident that even countries with similar development levels demonstrate huge differences in their dynamics of entrepreneurial activities (Pinillos and Reyes 2011; van Stel et al. 2005). To illuminate these differences in the current research, not only the number of nascent entrepreneurship (TEA) is measured, but the composition of entrepreneurial activities (OPP/NEC) is investigated.

2.3 The opportunity v.s. necessity entrepreneurship

Regarding entrepreneurship motivation, the Global Entrepreneurship Monitor (GEM) has discussed two types of entrepreneurship: Opportunity-driven Entrepreneurial Activity and Necessity-driven Entrepreneurial Activity (Reynolds et al. 2002; Reynolds et al. 1999).

Opportunity entrepreneurs are eager to start a business to pursue an opportunity in the market. In contrast, necessity entrepreneurs are forced to start a business by unemployment or dissatisfaction with their previous jobs. Opportunity entrepreneurs usually have more locomotive initiatives and strong motivation to launch their own businesses with competition in their familiar fields and expertise than necessity entrepreneurs. Entrepreneurs often conduct entrepreneurial activities not for survival but for self-actualization (Wennekers et al. 2005), which obviously leads to higher economic contributions, such as a longer survival rate, higher business growth, and stronger growth aspirations. New companies founded by opportunity entrepreneurs are expected to have larger long-run effects on the economy in terms of employment, innovation and growth than by necessity entrepreneurs. Therefore, the ratio of opportunity-to-necessity entrepreneurship is an ideal indicator to describe the quality and contribution of entrepreneurship given both opportunity and necessity entrepreneurship (Acs 2006).

These different motivations for entrepreneurship cannot be fully explained by economic variables alone (Davidsson 1995; Frederking 2004) . Some scholars have explained the variations of entrepreneurial activity between nations by economic levels (Acs 2006; Lepoutre et al. 2013; Reynolds et al. 1999; Reynolds et al. 2002) and cultural values (Morris et al. 1993; Freytag and Thurik 2007); however, the interaction between culture and economic stages has long been neglected. In order to straighten out the factors and mechanism of entrepreneurial motivation, both cultural factors and economic stage, as well as their interaction effects, are considered in this research.

By employing the method of Exploratory Factor Analysis, with the data from GLOBE and GEM, we descale cultural dimensions into motivation factors and hygiene factors within the framework of MHT. This article aims to synthesize disparate strands of literature and propose the models to examine：1. The direct effects of Motivation culture and hygiene factors on the number and quality of entrepreneurship; 2. The relationship between the economic stage and entrepreneurial activities; 3. The interaction effects of cultural factors, economy, and cultural factors in-between, on entrepreneurship.

3. Theoretical consideration and working hypotheses

3.1 Theoretical consideration

In this research, we follow the psychological trend of literature and take culture as a set of practices shared by one population and differentiated from others. These cultural practices determine, among other things, the behaviors of individuals through the psychological or motivational effects in the process of entrepreneurship. In line with psychological satisfaction,

Motivation-hygiene theory (MHT) is applied to investigate the roles of cultural factors in two types of entrepreneurial activities at different economic stages.

The motivation-hygiene theory is also known as Herzberg's two-factor theory (Herzberg 1966) , whose main concept is that job satisfaction can be affected by two categories: motivation factors and hygiene factors. Hygiene factors are related to the need to avoid unpleasantness, while motivation factors can bring job satisfaction because of the need of the individual for self-growth and self-actualization (Herzberg 1966; Herzberg 1976, 2017). The core of MHT is the difference between motivation and hygiene factors or intrinsic and extrinsic factors (Alshmemri et al. 2017). Herzberg described motivation factors as intrinsic to the job and hygiene factors as extrinsic. These two factors are parallel to each other rather than two ends of one dimension. According to Herzberg et al., motivation factors operate to only increase job satisfaction. When met, they inspire satisfaction. While absent, they do not bring dissatisfaction. On the contrary, hygiene factors work only to reduce job dissatisfaction. When satisfied, they don't generate satisfaction. While absent, they cause large dissatisfaction (Alshmemri et al. 2017; Kotni and Karumuri 2018).

3.2 Working hypotheses

By investigating the literature on the relationship between economy, culture, and entrepreneurship (Cressy 2000; Kan and Tsai 2006; Pinillos and Reyes 2011; Zhao et al. 2012) , we find that various cultural factors influence the will to engage in entrepreneurial activities in a different manner.

Entrepreneurs in less developed economies tend to be motivated by necessity and improvement-driven motives (Naude et al. 2008). In more developed economies, necessity motives gradually diminish, and improvement-driven ones increase accordingly (Wennekers et al. 2005) . Necessary entrepreneurship is usually poor in economic performance and innovation, and when the economic situation improves, this type of entrepreneurship can be easily suspended, while opportunity entrepreneurship is more persistent and makes more contributions to economic quality and innovation.

Hypothesis 1a: Economic stage is negatively related to TEA. When an economic stage is low, basic survival and employment are threatened. For the sake of avoidance of unpleasantness, entrepreneurship is resorted to as a means of self-employment, thus a large number of entrepreneurship activities are shown up.

Hypothesis 1b: Economic stage is positively related to OPP/NEC. When an economic stage is low, the main type of entrepreneurship is necessity, which directly causes a low rate of OPP/NEC. As the economy improves, it can equip potential entrepreneurs with more abilities and resources to facilitate entrepreneurial activities, and the ratio of OPP/NEC is promoted.

Motivation culture focuses on interior factors, making entrepreneurship a channel of opportunity exploitation. People are motivated to seek more opportunities for entrepreneurship and higher self-actualization, less consideration of short-term profit, and larger stress on future interest. Moreover, people in these countries manage their time more conscientiously to perform tasks more efficiently, but they also prioritize the future (Bortolotti et al. 2015). Although this intrinsic motivation cannot guarantee a large quantity of nascent entrepreneurship, it can stimulate opportunity-driven entrepreneurship, thus

increasing entrepreneurship satisfaction and promoting entrepreneurial quality.

Hypothesis 2a: Countries with a Motivation culture are high in OPP/NEC and low in TEA.

In countries with a Hygiene culture, interpersonal relationship is the top priority. They emphasize the values of obedience to power, authority and gender inequality, loyalty to collective interest, and prioritize the value of traditional family and parent-child ties (Zhao et al. 2012). People like to follow trends and seek stability in work and life. These factors make people more sensitive to exterior conditions and social networks. However, these interpersonal relationships are built on stable, fixed social structures and networks. People in these cultures can obtain plenty of social and emotional support from the extended family structure when starting new businesses. Though the dissatisfaction with entrepreneurship's initiation is reduced with the operation of entrepreneurial activities, these hygiene factors could be more conducive to the maturity and consistent improvement of entrepreneurial quality.

Hypothesis 2b: Countries with a Hygiene culture are high in TEA and low in OPP/NEC.

Since both culture and economic levels affect entrepreneurial activities, thus cultural values and economic development are closely intertwined. Correspondently, economic development's backlash on entrepreneurship is too evident to be ignored. In this respect, considerable interdependence between culture and economic development is found (Mueller et al. 2002; Shane 1993) . However, previous studies focus mainly on the direct effect of certain cultural aspects on entrepreneurial activities, such as startups (Morris et al. 1993; Levie and Hunt 2004) , and innovative activities (Shane 1993) . This previous research's controversial results entail us attempting some interactive or mediating effects between culture and other variables.

Therefore, the current regression models test the interaction effects of economic stages and two cultural factors. Within a differentiated economic development framework, entrepreneurship motivations are divergent and adaptable to their respective cultural features, so interaction effects between culture and economic stages on entrepreneurial activities are postulated respectively.

Hypothesis 3a: As to TEA, it measures the number of entrepreneurship, which is predominantly determined by economic stage or living conditions, while both Motivation culture's and Hygiene culture's roles are secondary, let alone the interaction effect between culture and economy.

Hypothesis 3b: As to OPP/NEC, since it measures the quality of entrepreneurship, its performance pivots on cultural and economic factors. Moreover, economic conditions strengthen the effects of both motivation and Hygiene culture.

Both types of culture shape the performance of entrepreneurial activities simultaneously within specific social contexts. There is an interaction effect between Motivation culture and Hygiene culture on entrepreneurial activities, which makes certain cultural combinations conducive to economic development, while others cause economic stagnation. A certain combination of cultural factors can achieve resonance, making the cultural role more significant in entrepreneurial activities, while other combinations can subdue and constrain these cultural effects. These effects on entrepreneurship pass down to economic development,

which economically is distinguishable, and explain countries' different economic performance via respective cultural combinations.

Hypothesis 4: There are interaction effects in-between cultural factors on entrepreneurial activities.

Hypothesis 5: The interaction effects of cultural factors find their way into economic development and cultural combinations shape countries' economic performance.

3. Measurements of cultural factors

Culture is multi-dimensional (Hofstede 2001; House et al. 2004) . Traditionally, cultural dimensions related to entrepreneurial activities cover individualism, power distance and uncertainty avoidance, though the empirical evidence for such relationships is weak or contradictory (Hayton et al. 2002).

Under the framework of MHT, motivation factors include achievement, recognition, the work itself, responsibility, advancement and the possibility for growth, while hygiene factors include company policies and administration, relationship with supervisors, interpersonal relations, working conditions and salary (Herzberg 1966; Herzberg 2017) . For the sake of measurements of motivation and hygiene factors, cultural variables are measured in the GLOBE project from methodological and theoretical perspectives (House et al. 2004), which enables us to ground our research on a relatively large sample size. GLOBE is closely related to entrepreneurship in theory, with 9 cultural dimensions across 62 countries (or regions) identified. For the sake of consistency and balance of data between GLOBE and the entrepreneurship data source GEM, this empirical analysis adopts data from 54 countries (or regions) altogether.

Statistically, Factor Analysis is a method commonly used to remove the redundant variables from the survey data and to reduce the number of variables into fewer dimensions, especially when variables cannot be measured directly. Before it, the KMO test and Bartlett sphere test are conducted. The result (0.678) is larger than 0.5, while the P value is significantly smaller than 0.05; the data are structurally validated to run factor analysis. Initially, 9 variables of culture practice in GLOBE were processed altogether using the principal component extraction method with varimax rotation, and three factors are extracted. Within the current study, the dimension of Institutional Collectivism is equally loaded on two factors (Factor 1: 0.546; Factor 3: 0.588). Like most previous literature also found, its relationship with entrepreneurial performance is not significant (Hayton et al. 2002), so it was removed in the following parts. With the rest eight components, three factors with eigenvalues greater than one were extracted, explaining 79.5% of the cumulative variance in Table 2. Orthogonal rotation (Varimax) with Kaizer normalization resulted in the factor loadings reported in Table 3. The rotation was converged in five iterations, where the original orders of the responses were rearranged to reflect the order of the factor structure.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.678
Bartlett's Test of Sphericity	Approx.	235.076

	Chi-Square	
	df	36
	Sig.	0.000

Table 2: Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.105	38.813	38.813	2.705	33.818	33.818
2	1.817	22.713	61.526	2.125	26.564	60.382
3	1.438	17.976	79.502	1.530	19.119	79.502
4	0.499	6.240	85.742			
5	0.472	5.894	91.636			
6	0.350	4.380	96.016			
7	0.177	2.217	98.234			
8	0.141	1.766	100.000			

Table 3: Rotated Component Matrix

	Component		
	1	2	3
Future	.894		
Performance	.853		
Uncertainty	.822		
In-group		.805	
Gender		-.747	
Power		.735	
Humanity			.848
Assertive			-.834

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. rotation converged in 5 iterations.

Factor 1 includes Future orientation, Performance orientation, and Uncertainty avoidance, representing motivation factors' achievement, advancement, future growth and responsibility (Alshmemri et al. 2017) . Factor 2 includes In-group collectivism, Gender egalitarianism (negative coefficient) and Power distance, which are shown as hygiene factors in interpersonal relationships with supervisors, families, and opposite-sex (Alshmemri et al. 2017). Factor 3 covers Human Orientation and Assertiveness (negative coefficient), which are grouped as humanity factor yet not supported by previous literature on the relationship between entrepreneurship and the economy. Moreover, the following correlation results of variables also confirm this conclusion that there is no correlation between Humanity Factor

and entrepreneurial activities and economic levels, so it is not included in the current research. Consistent with Gusfield's view on Tradition and Modernity, we argue that Motivation culture and Hygiene culture are two parallel factors, independent of each other, which are not in one bipolar, but in two polarities (Gusfield 1967). In other words, for each country (or region), there are two cultural scores, meaning the motivational culture is not necessarily contradictory to hygienic culture, and vice versa.

4. Data and Methodology

4.1 Variables and Sources

$$TEA_i = \alpha_{1T} Glevel_i + \beta_{1T} Motivation_i + \beta_{2T} Hygiene_i + \gamma_{1T} Motivation_i * Glevel_i + \gamma_{2T} Hygiene_i * Glevel_i + Framework_i + u_i \quad (4.1)$$

$$OPP/NEC_i = \alpha_{1R} Glevel_i + \beta_{1R} Motivation_i + \beta_{2R} Hygiene_i + \gamma_{1R} Motivation_i * Glevel_i + \gamma_{2R} Hygiene_i * Glevel_i + Framework_i + u_i \quad (4.2)$$

$$TEA_i = \alpha_{1T} Glevel_i + \beta_{1T} Motivation_i + \beta_{2T} Hygiene_i + \gamma_{3T} Motivation_i * Hygiene_i + Framework_i + u_i \quad (4.3)$$

$$OPP/NEC_i = \alpha_{1R} Glevel_i + \beta_{1R} Motivation_i + \beta_{2R} Hygiene_i + \gamma_{3R} Motivation_i * Hygiene_i + Framework_i + u_i \quad (4.4)$$

Variables are all measured with i as the unit of observation in each country (or region). These selected variables in the current article are described as follows.

Dependent variables

The Global Entrepreneurship Monitor (GEM) data are used to investigate Total Entrepreneurial Activity (TEA) among the working population, as well as two types of activity within TEA in countries, one for necessity and the other for Opportunity. The ratio of opportunity-to-necessity entrepreneurship indicates the importance of opportunity entrepreneurship relative to necessity entrepreneurship (Acs 2006) . Since countries participating in the GEM program change from year to year, the range of the data is extended from 2011 to 2015 with meaningful and latest observations to maximize the number of countries available, and the results are smoothed by variable means.

a. *Total Entrepreneurial Activity (TEA):* the percentage of the population aged 18-64 who are either a nascent entrepreneur (starting a venture or just started one with no more than 3 months of existence) or owner-manager of a new business (owning and managing a running business more than three months, but not more than 42 months). According to GEM methodology, the TEA includes nascent entrepreneurs and young business owners.

b. *Opportunity/Necessity ratio (OPP/NEC):* the ratio of opportunity-driven entrepreneurship to necessity-driven entrepreneurship. Depending on the motivation of individuals to engage in entrepreneurship (Opportunity vs. necessity), GEM identifies two types of entrepreneurial activity: opportunity-driven and necessity-driven. The ratio of opportunity-to-necessity entrepreneurship can reflect the quality of entrepreneurship and be a useful indicator of economic growth (Acs 2006).

Independent variables

As for the cultural variables, there are two explanatory factors- Motivation culture and Hygiene culture, which are extracted from the data in the GLOBE project:

c. Motivation culture: the mean value of Future Orientation, Performance Orientation, Avoidance of Uncertainty.

d. Hygiene culture: the mean value of In-group Collectivism, Gender inequality (the negative value of egalitarianism) and Power Distance.

We classified development stages for the economic development level according to The Global Competitiveness Report (2017–2018).

e. Economic stages: According to The Global Competitiveness Report 2017-2018, two criteria are used to allocate countries into development stages: the GDP per capita level at market exchange rates and the driving force for its development. Countries (or regions) are classified into 3 stages and 2 transition states: stage 1 (Factor-driven), Transition 1 from stage 1 to stage 2, Stage 2 (Efficiency-driven), Transition 2 from Stage 2 to Stage 3, and Stage 3 (Innovation-driven). It is coded as an ordinal variable from 1 to 5 in this research.

Control Variables

Potential entrepreneurs' decision whether to start a business is also influenced by some Entrepreneurial Framework conditions, which comprise one country's fundamental conditions and institutional environment for the startups, together with their capabilities and skills (Acs 2006) . To control the entrepreneurial environment and institutional impacts, we add EFC (entrepreneurship framework condition) from GEM to the regression to improve the reliability of this research.

f) *Framework:* Entrepreneurship Framework Conditions contain 12 subscales, Financing for Entrepreneurs, Governmental Support and Policies, Taxes and Bureaucracy, Governmental Programs, Basic School Entrepreneurial Education and Training, Post School Entrepreneurial Education and Training, R&D Transfer, Commercial and Professional Infrastructure, Internal Market Dynamics, Internal Market Openness, Physical and Services Infrastructure, and other factors related to entrepreneurship. Same as for the dependent variables like TEA and OPP/NEC, the range of the data is extended from 2011 to 2015, and the values are averaged.

4.2 Analysis Method

Firstly, in order to ascertain the presence of variables' differences, One-Way ANOVA of different economic development stages is performed to study the differences of cultural factors and entrepreneurial activities. Then, a bi-variant Correlation is conducted to determine the possible direct relationship among variables. After that, hierarchical regression analysis is used to test the interaction effects by following the instruction of Aiken and West (Aiken et al. 1991) . To avoid multicollinearity, we standardized the relevant variables in the interaction models. With the Framework of Entrepreneurship as the control variable, economic stage and cultural practice factors were included stepwise. The interaction item between the economic stages and cultural factors and the cultural factors in-between was put into regression equation respectively. In order to illustrate the interaction effects visually, we draw corresponding figures by following the instruction of Dawson and Richter (2006) and plot the interaction effects. Finally, a cultural quadrant distribution is drawn globally.

4.3 Results

In general, the results are quite consistent with previous hypotheses. Table 4 shows the descriptive statistics of all the variables. Table 5 shows the One-Way ANOVA of different economic stages. Table 6 tells the bi-variant correlation results between variables. Table 7 and 8 reports the results of hierarchical regression analyses of variables, followed by illustrating the interaction effects of culture and economy in predicting OPP/NEC, as shown in Figure 1, 2, 3.

Table 4: The descriptive statistics of all variables.

Variable	Obs.	Mean	Std. Dev.	Min	Max	Median	Sources
Dep. variables							
TEA	54	12.31	7.92	4.19	40.68	9.18	GEM
OPP/NEC	54	3.65	2.30	1.04	13.20	3.07	GEM
Indep. variables							
Motivation	54	3.99	0.43	3.05	5.09	4.00	GLOBE
Hygiene	54	2.30	0.43	0.99	2.94	2.37	GLOBE
Humanity	54	1.40	0.32	0.67	1.98	1.36	GLOBE
E-level	54	2.44	0.60	1.00	3.00	2.50	GCI
Control variables							
Framework	54	33.10	3.45	26.47	40.97	32.84	GEM

As for economic development level, E-level is taken stage 1 as 1, Transition from stage 1 to stage 2 as 1.5, Stage 2 as 2, Transition from stage 2 to stage 3 as 2.5, Stage 3 as 3.

One-Way ANOVA is applied to pin down the difference between different variables. An overview of the research-related conditions of corresponding countries at different economic stages is shown in Table 5. Judging from the results, we can find statistically significant differences in entrepreneurial framework, motivation factor, hygiene factor and entrepreneurial activities at different economic stages.

Table 5: The results of One-Way ANOVA of different economic stages

Economic stages	stage 1 (Factor-driven)	Transition from stage 1 to stage 2	Stage 2 (Efficiency-driven)	Transition from stage 2 to stage 3	Stage 3 (Innovation-driven)	F-value	Sig
GNIpc(2018)	5205.24	11465.66	12463.46	23217.2	46562.82	21.60	0.00
Framework	33.63	31.57	31.37	32.25	34.68	3.11	0.02
Motivation	4.08	3.81	3.81	3.73	4.20	3.60	0.01
Hygiene	2.80	2.55	2.51	2.4	2.05	6.06	0.00
Humanity	1.83	1.41	1.40	1.29	1.39	1.09	0.37
TEA	24.89	20.61	15.65	10.88	8.05	7.36	0.00
OPP/NEC	2.03	2.33	2.35	2.93	5.06	6.15	0.00
Number of countries	2	4	17	6	25	---	---

According to the classification of economic stages in the current study, the mean of GDP per capita is increasing from 5505.24 to 46562.82 ($F=21.6$, $P\leq0.01$). With the evolvement of the economy into higher levels, it seems that the entrepreneurial framework is continuously improving from the lowest 33.63, to the highest 34.68 ($F=3.6$, $P\leq0.05$). As for the cultural factors, interestingly enough, the motivation factor is high in both innovation-driven countries (4.20) and factor-driven countries (4.08). Comparatively, the hygiene factor shows a consistent changing trend from the highest (2.80) to the lowest (2.05) while the economy is improving. However, the humanity factor represents no difference among different economic stages. Therefore, humanity is removed from the following study.

With the economic development, the number of total entrepreneurial activities (nascent entrepreneurship) is decreasing from factor-driven economy's 24.89 to innovation-driven economy's 8.05 ($F=7.36$, $P\leq0.01$), while the ratio of Opportunity to necessity motivated entrepreneurship is significantly increasing from 2.03 to 5.06 ($F=6.15$, $P\leq0.01$). From these results, we can safely say that these entrepreneurial and cultural variables are hugely different in different stages.

In order to demonstrate the direct relationship of variables, Pearson Correlation is performed, and presented in Table 6.

Table 6: Pearson Correlation results among variables

Correlations

		TEA	OPP/NEC	Frame	E-grade	Motivation	Hygiene	Humanity
TEA	Pearson Correlation	1.00						
	Sig. (2-tailed)							
	N	54.00						
OPP/NEC	Pearson Correlation	-.301*	1.00					
	Sig. (2-tailed)	0.03						
	N	54.00	54.00					
Frame	Pearson Correlation	-0.23	.516**	1.00				
	Sig. (2-tailed)	0.10	0.00					
	N	54.00	54.00	54.00				
E-grade	Pearson Correlation	-.610**	.535**	.358**	1.00			
	Sig. (2-tailed)	0.00	0.00	0.01				
	N	54.00	54.00	54.00	54.00			
Motivation	Pearson Correlation	-0.16	.613**	.663**	.341*	1.00		
	Sig. (2-tailed)	0.25	0.00	0.00	0.01			
	N	54.00	54.00	54.00	54.00	54.00		
Hygiene	Pearson Correlation	.337*	-.646**	-.296*	-.560**	-.377**	1.00	
	Sig. (2-tailed)	0.01	0.00	0.03	0.00	0.00		
	N	54.00	54.00	54.00	54.00	54.00	54.00	
Humanity	Pearson Correlation	0.10	0.20	.362**	-0.14	.365**	-0.07	1.00
	Sig. (2-tailed)	0.48	0.14	0.01	0.31	0.01	0.60	
	N	54.00	54.00	54.00	54.00	54.00	54.00	54.00

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

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

From the results, the relation between TEA and OPP/NEC is negatively correlated (-0.30, P≤0.05), which shows that with the increase of TEA, the number of necessity-driven entrepreneurship increases disproportionately faster than that of opportunity-driven entrepreneurship. As for the association between entrepreneurship and the economy, OPP/NEC is positive (0.54, P≤0.01), while TEA is negative (-0.61, P≤0.01) with the economy. These results are in line with the results of former studies that opportunity-driven entrepreneurship is more efficient and beneficial to economic development. In contrast, necessity-driven entrepreneurship lack motivation and innovation (Acs 2006). As more and more of the population becomes involved in opportunity entrepreneurship and quit necessity entrepreneurship, rising levels of economic development are witnessed (Acs 2006). In turn, economic development also relieves the survival pressure for necessity-driven entrepreneurship and self-employment, and further facilitates social institution and economic conditions for opportunity-driven entrepreneurship (Pinillos and Reyes 2011).

In terms of culture, Motivation culture is positively correlated with almost all variables except

TEA. The correlation results indicate that the motivation factor is positively connected with OPP/NEC (0.62, P≤0.01), and economic development (0.34, P≤0.05). However, the negative relationship between motivation and TEA is not supported (-0.16, P>0.1). In contrast, Hygiene culture positively correlated with TEA (0.34, P≤0.05), while negatively correlated with almost all the rest variables, including OPP/NEC (-0.64, P≤0.01), which echoes the results of ANOVA analysis.

In total, we can find motivation and hygiene cultures make different contributions to economic development and bring forward different types of entrepreneurship. However, one truth cannot be ignored that culture and economy are closely intertwined with each other, and both play roles in entrepreneurship. Moreover, taking the results of ANOVA and bi-variate correlation, the entrepreneurial framework is also closely related to almost all variables, including TEA and OPP/NEC. Therefore, in order to paraphrase this inner mechanism of interaction between cultural factors and economy, as well as cultural factors in-between on entrepreneurial activities, and control the institutional influence of entrepreneurial framework, hierarchical regression is conducted to investigate the possible interaction effects. Viewing the influence of possible heteroscedasticity into account, the Z-test based on White's heteroskedasticity-robust standard error is more reliable. Thus, Robust SE regression is applied in the current study.

Table 7: Hierarchical regression results concerning TEA

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	TEA	TEA	TEA	TEA	TEA	TEA
z_Framework	-0.226*	-0.187	-0.009	-0.068	-0.066	-0.192
	(-1.81)	(-0.98)	(-0.08)	(-0.37)	(-0.34)	(-1.02)
z_Motivation		0.079		0.098	0.062	0.089
		(0.41)		(0.52)	(0.34)	(0.47)
z_Hygiene		0.309**		0.012	0.073	0.267
		(2.17)		(0.11)	(0.37)	(1.57)
z_Economic stages			-0.606***	-0.612***	-0.539***	
			(-3.43)	(-3.32)	(-3.01)	
z_Motivation* z_Economic levles					0.001 (0.01)	
z_Hygiene* z_Economic stages					-0.127 (-0.55)	
z_Motivation* z_Hygiene						0.109 (0.71)
Constant	0.000	0.000	0.000	0.000	-0.070	0.040
	(0.00)	(0.00)	(0.00)	(0.00)	(-0.51)	(0.28)
Observations	54	54	54	54	54	54

R-squared	0.051	0.133	0.372	0.377	0.385	0.139
R-squared	0.0511	0.133	0.372	0.377	0.385	0.139
inter	NO	NO	NO	NO	YES	YES
cent	NO	NO	NO	NO	YES	YES
F stat	3.266	2.922	7.097	3.882	3.212	2.932
F test	0.0765	0.0429	0.00191	0.00812	0.0100	0.0299

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 8: Hierarchical regression results concerning OPP/NEC

	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	OPP/NEC	OPP/NEC	OPP/NEC	OPP/NEC	OPP/NEC	OPP/NEC
z_Framework	0.516***	0.123	0.372***	0.123	0.098	0.178
	(5.31)	(1.05)	(4.83)	(1.05)	(0.94)	(1.54)
z_Motivation		0.330***		0.330***	0.245***	0.287**
		(2.90)		(2.90)	(2.80)	(2.54)
z_Hygiene		-0.396*		-0.396*	-0.230	-0.284**
		(-1.97)		(-1.97)	(-1.57)	(-2.40)
z_Economic			0.401***	0.158*	0.313***	
stages			(4.29)	(1.85)	(3.39)	
z_Motivation*					0.255***	
z_Economic					(3.13)	
levles						
z_Hygiene*					-0.215	
z_Economic					(-1.56)	
stages						
z_Motivation*						-0.488***
z_Hygiene						(-3.30)
Constant	-0.000	-0.000	-0.000	-0.000	-0.203**	-0.180**
	(-0.00)	(-0.00)	(-0.00)	(-0.00)	(-2.32)	(-2.05)
Observations	54	54	54	54	54	54
R-squared	0.266	0.606	0.406	0.606	0.657	0.709
R-squared	0.266	0.606	0.406	0.606	0.657	0.709
inter	NO	NO	NO	NO	YES	YES
cent	NO	NO	NO	NO	YES	YES
F stat	28.15	18.32	19.25	18.32	17.10	19.54
F test	2.34e-06	2.91e-09	5.92e-07	2.91e-09	2.32e-10	1.14e-09

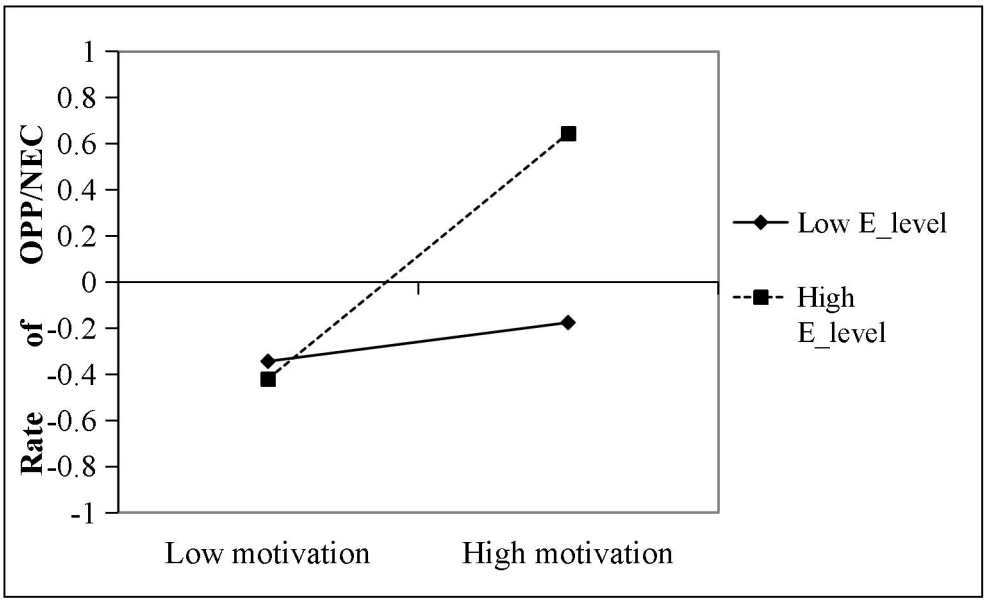
Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The regression analysis results show that cultural factors and economic stages influence TEA and OPP/NEC. Moreover, the interaction effects between cultural factors and the economic stages as well as cultural factors in-between on OPP/NEC are also significant.

From Model 1 to Model 6 in Table 7, TEA is the dependent variable, while from Model 7 to Model 12 in Table 8, OPP/NEC is the dependent variable. Since the entrepreneurial framework may be closely related to economic development, it is taken as a control variable to eliminate its possible influence on entrepreneurship. Taken into the regression model initially, it is hugely consistent with our expectance. The results show in Model 1 and 7 that it makes a negative and statistically significant impact (-1.81, P≤0.1) on entrepreneurial activity (TEA) while a positive and statistically significant impact (5.31, P≤0.001) on OPP/NEC. In Model 2, motivation and hygiene factors are taken to explain TEA. It seems that the hygiene factor makes a positive impact (2.17, P≤0.05) on TEA significantly, while motivation makes no influence on it. In Model 8, the promotion of the motivation factor (2.90, P≤0.001) and the hinderance of hygiene factor on OPP/NEC (-1.97, P≤0.1) are predominant. In Model 3 and 9, the economic stages are taken into the model tentatively. The results show that it has a negative and statistically significant impact (-3.43, P≤0.001) on entrepreneurial activity (TEA), while in Model 9 it has a positive and statistically significant impact (4.29, P≤0.001) on OPP/NEC. The intriguing parts are that without consideration of economic stages, the enhancement of hygiene factor to TEA is evident as in model 2. However, when the economic stage is considered in Model 4, the significant promotion effect of hygiene factor on TEA is gone. Instead, the appeasing effect of economic development on TEA is so strong that hygiene factor's influence is belittled. The results show that with the improvement of economic conditions, the disappearance of pivotal dissatisfaction with survival and living makes play safe and diminishes the need for entrepreneurship. Similarly, motivation, hygiene factors and economic stages are employed to explain OPP/NEC in Model 10. Distinctive from the scenario of TEA, even when economic stages are considered, the trends and orientation of the motivation factor and hygiene factor are unchanged and unwavering (2.90, P≤0.01; -1.97, P≤0.1), which means that the motivation factor plays huge roles in the promotion of opportunity-driven entrepreneurship and discourages people from necessity-driven entrepreneurship, while hygiene factor exactly plays the opposite roles.

The interaction effects of economic stages and cultural factors are listed in Model 5 and 11. As for TEA, there is no interaction effect between cultural factors and economic stages. As for OPP/NEC, however, there is a strong positive interaction effect between economic development and motivation factor (3.13, P≤0.001). It means that with the continuous improvement of economy, the promotion effect of motivation factor on opportunity-driven entrepreneurship is even stronger because affluent economic conditions can stimulate people to pursue their inner goals of entrepreneurship in order to make self-actualization rather than dissatisfaction with outer environment factors like survival and living (Carree et al. 2002; Carree et al. 2007). To illustrate this effect more directly, this two-way interaction effect is plotted as shown in Fig 1.

Figure 1：Moderation effect of economic stages.



The interaction effects of cultural factors between themselves are shown in Model 6 and 12. As to TEA, there is neither direct effects nor interaction effect of cultural factors. As to OPP/NEC, however, the situation is totally different. There are both direct effects and interaction effects of cultural factors. More interestingly, the interaction effects are negative at a significant level (-3.30, P≤0.001). It means that in the case of motivation, even though it consistently contributes to OPP/NEC (2.54, P≤0.01), this contribution is subdued by the hygiene factor as shown in Figure 2. On the contrary, the hygiene factor keeps containing OPP/NEC (-2.40, P≤0.01). However, this containment is even worsened by increased motivation, as shown in Figure 3.

Figure 2：Moderation effect of Hygiene on motivation

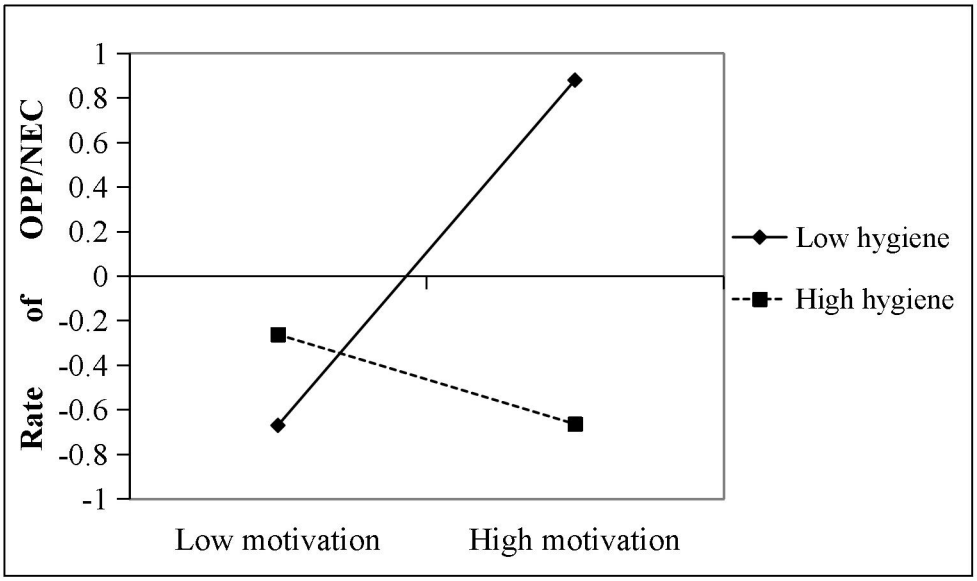
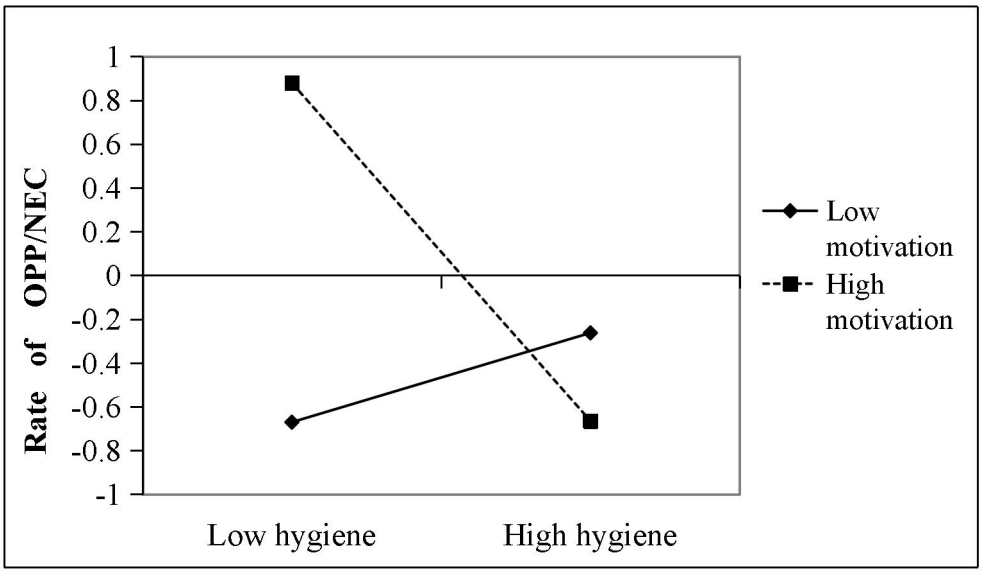
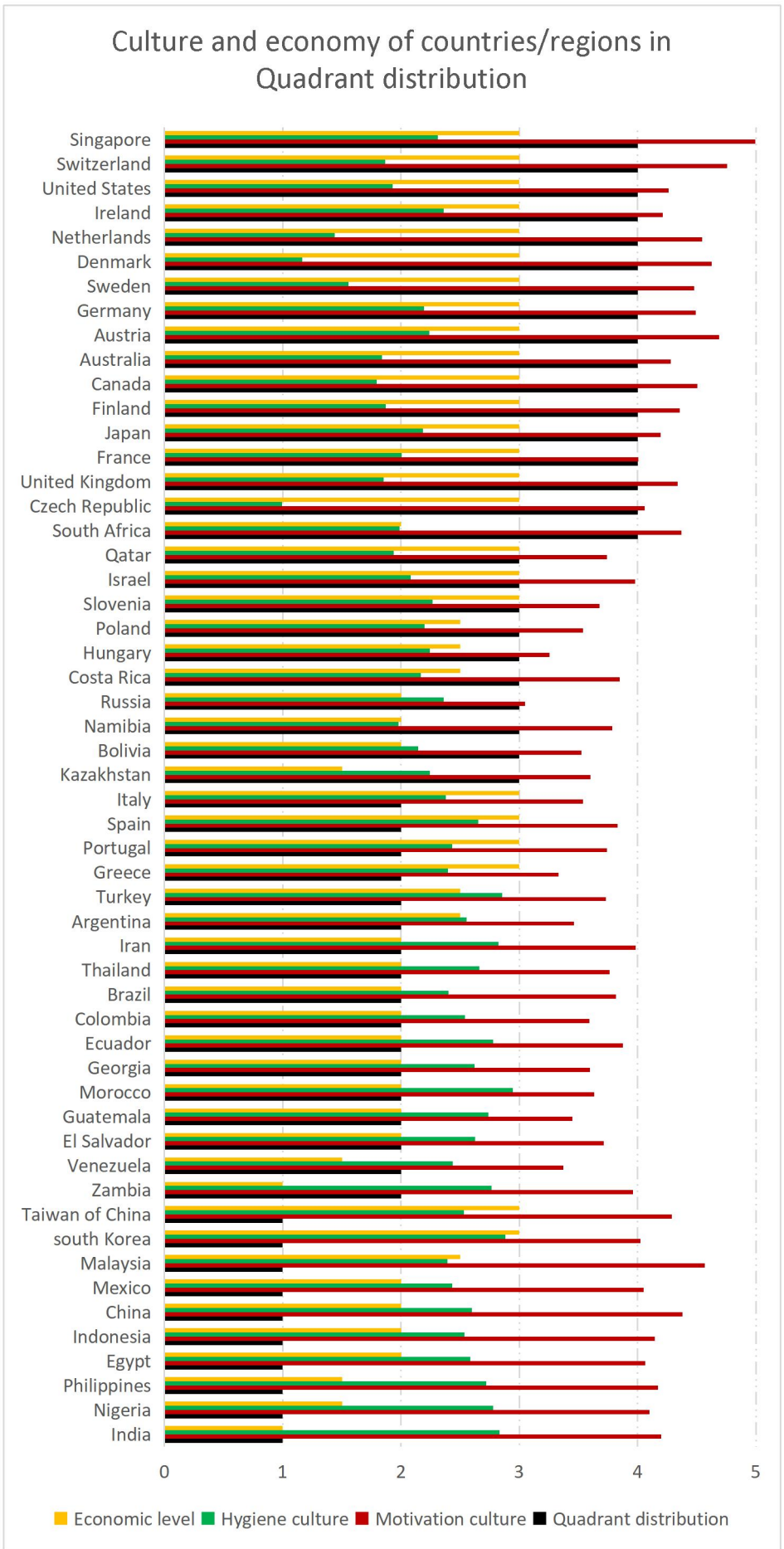


Figure 3：Moderation effect of motivation on Hygiene



Since the interaction effect between two cultural factors exists, their combinations can cause myriad effects on entrepreneurial activities and further pass down to economic development. Countries (regions) are classified based on four cultural combinations. We use the medians of motivation factor (4.00) and hygiene factor (2.37) to construct a quadrant classification. Countries or regions are allocated in a motivation-hygiene Quadrant distribution in Figure 4.

Figure 4：Countries/regions in Quadrant distribution of culture factors


Culture and economy of countries/regions in Quadrant distribution
Singapore
Switzerland
United States
Ireland
Netherlands
Denmark
Sweden
Germany
Austria
Australia
Canada
Finland
Japan
France
United Kingdom
Czech Republic
South Africa
Qatar
Israel
Slovenia
Poland
Hungary
Costa Rica
Russia
Namibia
Bolivia
Kazakhstan
Italy
Spain
Portugal
Greece
Turkey
Argentina
Iran
Thailand
Brazil
Colombia
Ecuador
Georgia
Morocco
Guatemala
El Salvador
Venezuela
Zambia
Taiwan of China
south Korea
Malaysia
Mexico
China
Indonesia
Egypt
Philippines
Nigeria
India
0
1
2
3
4
5
Economic level
Hygiene culture
Motivation culture
Quadrant distribution

Countries or regions in Quadrant I are featured with high motivation (mean=4.20) and high Hygiene culture (mean=2.63), such as China, India, and Philippines, shown at the bottom of the diagram. Countries or regions in Quadrant II are featured with low motivation (mean=3.67) and high Hygiene culture (mean=2.62), such as Thailand, Spain and Turkey, in the lower middle of the diagram. Countries or regions in Quadrant III are featured with low motivation (mean=3.60) and low Hygiene culture (mean=2.16), such as Poland, Russia, and Slovenia in the upper middle of the diagram. Countries or regions in Quadrant IV are featured with high motivation (mean=4.43) and Anti-Hygiene culture (mean=1.86), such as Japan, the United States and Switzerland at the top of the diagram.

To specify the difference in cultural values, entrepreneurial activities and economic performance of countries (regions) in quadrant distribution and to verify that cultural combinations account for some of the countries' economic differences, One-Way ANOVA of countries (or regions) in Quadrant distribution is conducted and the results listed in Table 9.

Table 9: One-way ANOVA among countries (or regions) in Quadrant distribution

	Quadrant I	Quadrant II	Quadrant III	Quadrant IV	F-Value	Sig.
2018GNI pc(2011ppp)	19135.58	16588.00	30957.70	46388.06	10.00	0.00
Economic stage	2.05	2.21	2.40	2.94	9.28	0.00
Framework	34.66	30.64	32.16	35.19	8.34	0.00
Motivation	4.20	3.67	3.60	4.43	42.27	0.00
Hygiene	2.63	2.62	2.16	1.86	32.38	0.00
TEA	14.26	15.26	12.50	8.10	2.86	0.05
OPP/NEC	2.94	2.45	2.94	5.69	10.08	0.00
Number	10	17	10	17	---	---

5. Discussion of conclusions and contribution, Implication, and limitations

5.1 Conclusions and contribution of the current research

Judging from the results of One-Way ANOVA at different economic stages in Table 5, we can find that the TEA (total entrepreneurial activities) plummets with improving economic conditions from 24.89 at stage 1 to 8.05 at stage 3, which testifies Hypothesis 1a. At the same time, OPP/NEC keeps improving from 2.03 to 5.06, which supports Hypothesis 1b. The reason is that self-employment provides job opportunities and creates product markets at lower national income levels. However, as economic stages develop from factor-driven to innovation-driven, new technologies and economies of scale allow larger and established firms to satisfy the increasing demand of growing markets and discourage self-employment's role in the economy. The number of new business startups decreases as many people find stable employment. Gradually, as people’s income keeps increasing, for the sake of self-actualization, more individuals have the resources to go into business in a business environment that allows the exploitation of entrepreneurial opportunities, which stimulates OPP/NEC.

As Herzberg has stated, motivation factors are intrinsic to the job and entrepreneurial activities, which include achievement, recognition, the work itself, responsibility, advancement, and the possibility for growth (Herzberg 1966; Herzberg 2005; Alshmemri et al. 2017). The current study measures motivation culture by performance, future orientation, and uncertainty avoidance. Countries (regions) with a Motivation culture encourage individual freedom, personal achievement, self-expression, subjective well-being, and self-actualization, which are favorable for entrepreneurship, especially opportunity-driven ones. With the increasing cultural components of motivators, individual satisfaction is associated with long-term positive effects of entrepreneurship, especially opportunity-driven ones. In Table 6, Motivation culture is positively correlated with OPP/NEC and economic development. However, the negative relationship between motivation and TEA is not significant. So, Hypothesis 2a is partly supported.

On the other side, hygiene factors are extrinsic to the job and, if well maintained, lead to the prevention of job dissatisfaction because hygiene factors center on the environment and workplace to avoid unpleasantness (Alshmemri et al. 2017), which is measured by in-group collectivism, gender egalitarianism and power distance in the current study. Countries with a Hygiene culture, emphasize the value of being subject to power, authority, loyalty to collective interest and obeyance to large gender imparity. Since entrepreneurial activities are quite risky, greatly change the status quo of individuals, and bring up unpleasantness, TEA may be contained in a Hygiene culture. However, on the other hand, people living in this culture pay full attention to and benefit from the exterior interpersonal relationship, so they can obtain plenty of social and emotional support from their extended family and in-group social network, which is largely built on family kinship. In Table 6, Hygiene culture positively correlated with TEA, while negatively correlated with almost all the rest variables, including OPP/NEC. Thus, Hypothesis 2b is fully supported.

As the results of hierarchical multiple regression have shown in Table 7, when the economic stage is low, the stimulating effect of Hygiene culture is more obvious. People pay more attention to exterior factors, such as social network, interpersonal relationship and inner-collectivism, which can relieve the pressure of starting new businesses, it stimulates the number of entrepreneurship. While Motivation culture makes people more attentive to their interior factors, yet the resources available are limited, it makes no difference. When the economic stage is high, since employment rate is high, and the survival-pushed entrepreneurship diminishes, and the interpersonal support from family members become unnecessary, TEA is lowered in both the Hygiene culture or Motivation culture at the high economic stage. TEA is determined predominantly by economic stages, without interaction effects between culture and economy or within culture themselves. Therefore Hypothesis 3a is confirmed.

In the case of OPP/NEC, Motivation culture tangos well with economic stages in promoting OPP/NEC. When the economic conditions improve, the promoting effect of Motivation culture is more dominant. After their fundamental survival risk disappears, people here are more likely to pursue the values of self-fulfillment and self-actualization in the form of entrepreneurial activities, especially opportunity-driven rather than necessary-driven. OPP/NEC is even more enhanced in the Motivation culture (3.13, $P<0.01$). Moreover, as a

further increase in income is experienced, the role played by the entrepreneurial sector enlarges as more individuals have the resources to go into business for themselves in a business environment that allows the exploitation of more entrepreneurial opportunities (Fairlie and Fossen 2018) . As illustrated by Figure 1, economic development can hugely consolidate the stimulation of a Motivation culture on opportunity-driven entrepreneurship. However, in the Hygiene culture, when economic conditions improve, the unpleasantness of external factors is gone. People like to run less risk and prefer to play safe and are more satisfied to be employees rather than employers, which resonates with the values in the Hygiene culture that large power distance and lack of mobility in society worsen the OPP/NEC. While on the other hand, improving the economy brings more opportunities and improvement of entrepreneurial facilities. Therefore, affected by both these effects, there is no significant interaction effect between Hygiene culture and economic stages on OPP/NEC.

Up to now, Hypothesis 3b is only partly supported that there is a strong positive interaction effect between the Motivation culture and the economic stage, while this effect does not exist between the Hygiene culture and the economic stage.

As to the interaction effects of Motivation culture and Hygiene culture themselves, the results are intriguing and far-reaching. Since they are not opposite but compatible with each other, both of them exert a crucial influence on entrepreneurship. As proved in Model 6, there are neither direct or interaction effects of cultural factors on TEA. Our discussion mainly concentrates on the part of OPP/NEC. Since the interaction effects of cultural factors are negative at a significant level (-3.30, $P \leq 0.001$), the positive stimulation of motivation on OPP/NEC is undermined by Hygiene culture, as shown in Figure 2.

Just like the previous studies supporting MHT (Alshmemri et al. 2017) , the Motivation culture operates to increase job satisfaction or entrepreneurial satisfaction here in particular. As for Hygiene culture, it highlights in-group collectivism, social distance and gender inequality. In countries with a Hygiene culture, interpersonal relationship is the top priority of people's work and life. They emphasize the values of obedience to power, authority and gender inequality, loyalty to collective interest, and top priority on the value of traditional family and parent-child ties (Zhao et al. 2012) . People like to follow the trends and seek stability in work and life, especially when people are content with the status quo, so they lack the motivation to make progress. Labor mobility is also highly restricted, resulting in poor spillover of knowledge and opportunity identification. Some new-found prosperity and Opportunity cannot find an easy way out of family boundaries, resulting in an economy without dynamism. Therefore, a Hygiene culture makes people more reluctant to change people's status quo and reduces the mobility of society, which hugely compromise people's competence of innovation and increase the cost of human resources.

On the other way round, Hygiene culture makes people more sensitive to exterior conditions and social networks. Since interpersonal relationships are built on stable and fixed social structures and networks. The collectivist orientation fosters commitment and sacrifice among employees and provides a protective environment that minimizes the uncertainty associated with business creation (Gelfand et al. 2004). Stimulated by high Motivation culture, the hindrance of Hygiene culture on OPP/NEC is strengthened. As shown in Figure 3, in low Hygiene culture, the OPP/NEC of high motivation is much larger than in low Motivation

culture, while the plummeting OPP/NEC of high motivation in high Hygiene worsens the situation and performs even poorer than in low motivation. This phenomenon can be boiled to the fact that Motivation culture is characterized by a higher level of performance orientation and uncertainty avoidance, thus creating lower incentives for risky jobs like innovation and entrepreneurship, which reinforces the side effects of power distance and family boundary (Achim et al. 2019). Thereby, the interaction effect between cultural factors in Hypothesis 4 is only tangible in the case of OPPNEC but not in TEA.
To illustrate the combined effects of cultural factors, 54 countries are classified into a Quadrant map according to the motivation and hygiene scores, as shown in Figure 4. It is easy to find that the countries in Quadrant IV perform best in both economic development and entrepreneurship quality, whose Motivation culture is the highest and Hygiene culture is the lowest. How can we address this puzzle?

Probing into the results of One-Way ANOVA among countries in quadrant cultural distribution in Table 9, we can find that countries (regions) in Quadrant I and IV share high Motivation culture, while their corresponding OPP/NEC and TEA are largely different. Though the OPP/NEC is the largest and TEA is the lowest in the countries(regions) of Quadrant IV, the corresponding situation does not exist in Quadrant I. Also, countries or regions in Quadrant I and II are identical in high Hygiene culture, while interesting enough, their corresponding OPP/NEC and TEA show identical trends, like high TEA and low OPP/NEC. Regarding entrepreneurial activities, countries/regions in quadrant IV have the lowest TEA and highest rate of OPP/NEC. All of the above results are significant at 95% or 99%. So far, high motivation culture and low hygiene culture in one country are secret recipes for good economic development, and Hypothesis 5 is supported.

6. Contribution, Limitations and future research

6.1 Contributions

From the very beginning of the current study, we are encouraged to give a tentative answer to the question, "What kinds of marriage between cultural factors and economic stages can conceive fruitful entrepreneurship?" Though previous studies indicate a significant influence of both culture and economic growth on entrepreneurial activities, because of multiple dimensions of culture as well as different economic situations, the answers to it are far from easy and consistent.
In this study, firstly, we measure two factors of culture employing factor analysis statistically via the dataset of 9 cultural dimensions of 56 countries (regions) in the GLOBE project, thanks to more recent data and advanced methodological developments (Hanges and Dickson, 2006).
Secondly, the Motivation Hygiene Theory (MHT) is first employed in culture study, which greatly broadens the horizon and helps us paraphrase the different motivations among various entrepreneurial activities, including necessity-driven and opportunity-driven entrepreneurship at different economic stages.

Thirdly, resorting to hierarchical regression, the interaction effects between culture and economy on entrepreneurship and cultural factors in-between are investigated. In some sense, this research complements the literature on the mechanism of entrepreneurial motivation via

the empirical investigation of heterogeneous effects of cultural factors at different economic stages and their interaction effects. Based on these investigations, some practical policy implications are proposed accordingly.

Finally, by categorizing 54 countries into four areas with their scores in hygiene and Motivation culture, a global culture map is drawn to facilitate the illustration of the distinctive cultural features and their interaction effects.

6.2 Policy implication

In line with the previous research on the negative impact of entrepreneurship on GDP growth for developing countries (van Stel et al. 2005), our research reaches the same conclusion. For example, the entrepreneurial activities in developing countries such as China and India are far more active than those in Europe and the United States, but the economic contribution of these entrepreneurial activities is disproportionately low, mainly because of a large number of necessity-driven entrepreneurship.

It has important practical implications that cultural factors play divergent roles in entrepreneurial activities at variable economic levels. Motivation factors and hygiene factors play different roles respectively in entrepreneurial activities, and various economic stages further complicate these roles.

Thereby, there are no universal rules of cultural practices and entrepreneurial activities for different countries to pursue. Without specifying the cultural contexts, and economic stages, it would be too risky to suggest that, for example, Hygiene culture stimulates entrepreneurial activities or Motivation culture promotes entrepreneurial quality. Similarly, it is not the case that opportunity-driven entrepreneurship is preferable for a given country (or region) without considering its cultural factors, economic stage and their interaction combinations.

Suppose

this research conclusion can stand the test of time and practice. In that case, these findings may reveal a frustrating fact: developing countries dominated by high Hygiene culture are easy to encourage a large number of entrepreneurial activities at a low economic stage,while the quality of these entrepreneurial activities keeps poor. With the continual economic development, entrepreneurial activities shrink, few of them can be transformed into opportunity-driven.

Oppositely, owing to self-actualization and good performance, motivation factors can also bring about opportunity-driven entrepreneurship and enhancement of entrepreneurial quality, and more importantly, this interior pushing force of culture is greatly stimulated with the improvement of economic development. Thereby, the initial economic conditions of one country will make positive feedback on entrepreneurship and innovation, which brings forward the spiral promotion of economy sequentially.

For developing countries who are eager to strengthen the entrepreneurial quality, they should largely promote Motivation cultural practices, at the same time, lower hygiene cultural practices. However, it is difficult and slow in progress, if not impossible. Because a country's culture is very stable, just like the ocean current in the sea, it may take several centuries to make significant changes (Weiner and Ronch 2003). In order to accelerate this process, under the circumstances of subduing hygiene practices, all walks of one country should pay special

attention to the cultivation of motivational practices such as stressing performance, future-orientation and establishing more constructive institutions to avoid uncertainty.

6.3 Limitations and future research

Firstly, because the data of this study are from two completely independent databases, though it greatly reduces the risk of collinearity, some of the imbalanced data must be dropped out. Compared with the previous studies, though the number of sampled countries has significantly increased, it is still relatively small in an empirical study. The limited sample size may restrain the generalization of the research conclusions and directly undermine the effectiveness of statistical tests (Aguinis, 1995); anyway, there is still a significant interaction effect between Motivation culture and economic development levels on entrepreneurial activities.

Secondly, culture is a multi-level phenomenon, defined in different layers, including national, regional, organizational, and individual cultural orientation. It can also be measured by various means and tools with different terms and concepts. While in the current study, we only approach it with the data source of GLOBE, without re-testing other cultural models. In addition, this study only derives data from cultural practices rather than cultural values; however, it does not guarantee that the same findings can be drawn from cultural values. Future research may investigate the mechanism of the impact and results of cultural values and cultural practices on entrepreneurial activities from hierarchical levels.

Thirdly, in the current study, Herzberg's motivation-hygiene theory is employed to paraphrase the mechanism of various cultural dimensions of entrepreneurial activities. Though this theory is mature in the study of job satisfaction, it is a new trial in the study of entrepreneurship motivation. This new try is not well grounded currently given the complexity of cultural dimensions and concepts. Future research is needed to solidify the theoretical explanation of entrepreneurship motivation and mechanism.

Lastly, entrepreneurship is a large and complex combination which hugely influences people's social and economic life. However, in the current study, we only approach it from the perspective of motivation between opportunity-driven and necessary-driven. Moreover, the entrepreneurship's backlash on culture factors, as well as their interaction effects on the economy is too strong to be ignored, which calls for our future research.

Publication bibliography

Achim, Monica Violeta; Borlea, Sorin Nicolae; Văidean, Viorela Ligia (2019): Culture, Entrepreneurship and Economic Development. An Empirical Approach. In *Entrepreneurship Research Journal* 0 (0). DOI: 10.1515/erj-2018-0091.

Acs, Zoltan (2006): How is entrepreneurship good for economic growth? In *Innovations: technology, governance, globalization* 1 (1), pp. 97–107.

Acs, Zoltan J.; Audretsch, David B. (1990): Innovation and small firms: MIT Press.

Acs, Zoltan J.; Audretsch, David B. (2003): Innovation and technological change. In : Handbook of entrepreneurship research: Springer, pp. 55–79.

Acs, Zoltan J.; Audretsch, David B.; Braunerhjelm, Pontus; Carlsson, Bo (2012): Growth and entrepreneurship. In *Small Bus Econ* 39 (2), pp. 289–300.

Aiken, Leona S.; West, Stephen G.; Reno, Raymond R. (1991): Multiple regression: Testing and interpreting interactions: Sage.

Alshmemri, Mohammed; Shahwan-Akl, Lina; Maude, Phillip (2017): Herzberg's two-factor theory. In *Life Science Journal* 14 (5), pp. 12–16.

Bortolotti, Thomas; Boscari, Stefania; Danese, Pamela (2015): Successful lean implementation: Organizational culture and soft lean practices. In *International Journal of Production Economics* 160, pp. 182–201.

Carree, Martin; van Stel, Andre; Thurik, Roy; Wennekers, Sander (2002): Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976–1996. In *Small Bus Econ* 19 (3), pp. 271–290.

Carree, Martin; van Stel, André; Thurik, Roy; Wennekers, Sander (2007): The relationship between economic development and business ownership revisited. In *Entrepreneurship & Regional Development* 19 (3), pp. 281–291.

Carree, Martin A.; Thurik, A. Roy: Understanding the role of entrepreneurship for economic growth. Papers on Entrepreneurship, Growth and Public Policy.

Cressy, Robert (2000): Credit rationing or entrepreneurial risk aversion? An alternative explanation for the Evans and Jovanovic finding. In *Economics Letters* 66 (2), pp. 235–240.

Davidsson, Per (1995): Culture, structure and regional levels of entrepreneurship. In *Entrepreneurship & Regional Development* 7 (1), pp. 41–62.

Díaz-Casero, Juan Carlos; Ferreira, Joao José M.; Hernández Mogollón, Ricardo; Barata Raposo, Mario Lino (2012): Influence of institutional environment on entrepreneurial intention: a comparative study of two countries university students. In *Int Entrep Manag J* 8 (1), pp. 55–74.

Fairlie, Robert W.; Fossen, Frank M. (2018): Opportunity versus necessity entrepreneurship: Two components of business creation.

Fernández, José; Liñán, Francisco; Romero, Isidoro (2013): Cultural values and start-up rates in the Spanish provinces. In : Conceptual Richness and Methodological Diversity in

Entrepreneurship Research: Edward Elgar Publishing.

Frederking, Lauretta Conklin (2004): A cross-national study of culture, organization and entrepreneurship in three neighbourhoods. In *Entrepreneurship & Regional Development* 16 (3), pp. 197–215.

Freytag, Andreas; Thurik, Roy (2007): Entrepreneurship and its determinants in a cross-country setting. In *Journal of evolutionary Economics* 17 (2), pp. 117–131.

Gelfand, Michele J.; Lim, Beng-Chong; Raver, Jana L. (2004): Culture and accountability in organizations: Variations in forms of social control across cultures. In *Human Resource management review* 14 (1), pp. 135–160.

Geroski, Paul A. (1989): Entry, innovation and productivity growth. In *The Review of Economics and Statistics*, pp. 572–578.

Gurel, Eda; Altinay, Levent; Daniele, Roberto (2010): Tourism students' entrepreneurial intentions. In *Annals of Tourism Research* 37 (3), pp. 646–669.

Gusfield, Joseph R. (1967): Tradition and modernity: Misplaced polarities in the study of social change. In *American journal of sociology* 72 (4), pp. 351–362.

Harper, David A. (2003): Foundations of entrepreneurship and economic development: Routledge.

Hayton, James C.; George, Gerard; Zahra, Shaker A. (2002): National culture and entrepreneurship: A review of behavioral research. In *Entrepreneurship theory and practice* 26 (4), pp. 33–52.

Herzberg, F. I. (1966): Work and the nature of man. Oxford, England: World (Work and the nature of man).

Herzberg, Frederick (1976): One More Time: How Do You Motivate Employees? In Michael M. Gruneberg (Ed.): Job Satisfaction — A Reader. London: Palgrave Macmillan UK, pp. 17–32.

Herzberg, Frederick (2005): Motivation-hygiene theory. In *Organizational behavior one: Essential theories of motivation and leadership, eds JB Miner, ME Sharpe Inc, New York* 2 (4), pp. 61–74.

Herzberg, Frederick (2017): Motivation to work: Routledge.

Hofstede, Geert (1980): Culture and organizations. In *International studies of management & organization* 10 (4), pp. 15–41.

Hofstede, Geert (1994): The business of international business is culture. In *International business review* 3 (1), pp. 1–14.

Hofstede, Geert (2001): Culture's consequences: Comparing values, behaviors, institutions and organizations across nations: Sage publications.

Hofstede, Geert (2011): Dimensionalizing cultures: The Hofstede model in context. In *Online readings in psychology and culture* 2 (1), 2307-0919.

Hofstede, Geert; McCrae, Robert R. (2004): Personality and culture revisited: Linking traits and dimensions of culture. In *Cross-cultural research* 38 (1), pp. 52–88.

House, Robert J.; Hanges, Paul J.; Javidan, Mansour; Dorfman, Peter W.; Gupta, Vipin (2004): Culture, leadership, and organizations: The GLOBE study of 62 societies: Sage publications.

Kan, Kamhon; Tsai, Wei-Der (2006): Entrepreneurship and risk aversion. In *Small Bus Econ* 26 (5), pp. 465–474.

Kotni, V. Devi PrasadV; Karumuri, Venkateswarlu (2018): Application of Herzberg two-factor theory model for motivating retail salesforce. In *IUP Journal of Organizational Behavior* 17 (1), pp. 24–42.

Lepoutre, Jan; Justo, Rachida; Terjesen, Siri; Bosma, Niels (2013): Designing a global standardized methodology for measuring social entrepreneurship activity: the Global Entrepreneurship Monitor social entrepreneurship study. In *Small Bus Econ* 40 (3), pp. 693–714.

Levie, J.; Hunt, S. (2004): Culture, institutions and new business activity: Evidence from global entrepreneurship monitor. Frontiers of Entrepreneurship Research 2004: Babson College Babson Park.

McGrath, Rita Gunther; MacMillan, Ian C.; Scheinberg, Sari (1992): Elitists, risk-takers, and rugged individualists? An exploratory analysis of cultural differences between entrepreneurs and non-entrepreneurs. In *Journal of Business Venturing* 7 (2), pp. 115–135.

Morris, Michael H.; Avila, Ramon A.; Allen, Jeffrey (1993): Individualism and the modern corporation: Implications for innovation and entrepreneurship. In *Journal of management* 19 (3), pp. 595–612.

Mueller, Stephen L.; Thomas, Anisya S. (2001): Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness. In *Journal of Business Venturing* 16 (1), pp. 51–75.

Mueller, Stephen L.; Thomas, Anisya S.; Jaeger, Alfred M. (2002): National entrepreneurial potential: The role of culture, economic development, and political history. In : Advances in Comparative International Management, vol. 14: Elsevier, pp. 221–257.

Naude, Wim; Gries, Thomas; Wood, Eric; Meintjies, Aloe (2008): Regional determinants of entrepreneurial startups in a developing country. In *Entrepreneurship & Regional Development* 20 (2), pp. 111–124.

Nickell, Stephen J. (1996): Competition and corporate performance. In *Journal of political economy* 104 (4), pp. 724–746.

North, Douglass C. (2005): The contribution of the new institutional economics to an understanding of the transition problem. In : Wider perspectives on global development: Springer, pp. 1–15.

Pinillos, María-José; Reyes, Luisa (2011): Relationship between individualist–collectivist culture and entrepreneurial activity: evidence from Global Entrepreneurship Monitor data. In *Small Bus Econ* 37 (1), pp. 23–37.

Reynolds, Paul D.; Camp, S. M.; Bygrave, W. D.; Autio, E.; Hay, M. (2002): Global entrepreneurship monitor gem 2001 summary report. In *London Business School and Babson College*, pp. 61–77.

Reynolds, Paul D.; Hay, Michael; Camp, S. Michael (1999): Global entrepreneurship monitor. In *Kansas City, Missouri: Kauffman Center for Entrepreneurial Leadership*.

Schwartz, Shalom H. (1992): Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In : Advances in experimental social psychology, vol. 25: Elsevier, pp. 1–65.

Schwartz, Shalom H. (1999): A theory of cultural values and some implications for work. In *Applied psychology* 48 (1), pp. 23–47.

Schwartz, Shalom H.; Bilsky, Wolfgang (1987): Toward a universal psychological structure of human values. In *Journal of personality and social psychology* 53 (3), p. 550.

Shane, Scott (1993): Cultural influences on national rates of innovation. In *Journal of Business Venturing* 8 (1), pp. 59–73.

Sternberg, Rolf; Wennekers, Sander (2005): Determinants and effects of new business creation using global entrepreneurship monitor data. In *Small Bus Econ* 24 (3), pp. 193–203.

Stoica, O.; Roman, A.; Rusu, V. D. (2020): The Nexus between Entrepreneurship and Economic Growth: A Comparative Analysis on Groups of Countries. In *SUSTAINABILITY* 12 (3). DOI: 10.3390/su12031186.

van Stel, Andr; Carree, Martin; Thurik, Roy (2005): The Effect of Entrepreneurial Activity on National Economic Growth. In *Small Bus Econ* 24 (3), pp. 311–321. DOI: 10.1007/s11187-005-1996-6.

Weiner, Audrey S.; Ronch, Judah L. (2003): Culture change in long-term care: Routledge.

Wennekers, Sander; Thurik, Roy (1999): Linking entrepreneurship and economic growth. In *Small Bus Econ* 13 (1), pp. 27–56.

Wennekers, Sander; van Wennekers, André; Thurik, Roy; Reynolds, Paul (2005): Nascent entrepreneurship and the level of economic development. In *Small Bus Econ* 24 (3), pp. 293–309.

World Economic Forum (2022): The Global Competitiveness Report 2017-2018. Available online at https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018, updated on 3/28/2022, checked on 3/28/2022.

Zhao, Xiangyang; Li, Hai; Rauch, Andreas (2012): Cross-country differences in entrepreneurial activity: The role of cultural practice and national wealth. In *Frontiers of Business Research in China* 6 (4), pp. 447–474.