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Entrepreneurial Culture and its Effect on the Rate of Nascent Entrepreneurship

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Abstract: This paper investigates the relationship between entrepreneurial culture and the rate of nascent entrepreneurship. Embedded in trait research, we develop a new composite measure of entrepreneurial culture using data from the World Values Survey. To corroborate the results obtained when regressing this newly developed measure on 2002 levels of nascent entrepreneurship in a sample of 28 countries, we also employ existing indicators of entrepreneurial culture, i.e. McClelland's N achievement index (1961), Granato, Inglehart and Leblang's Achievement motivation index (1996), Lynn's Competitiveness index (1991), and GLOBE's (2004) performance orientation measure. In contrast with the existing measures we find a significant positive effect of our new measure of entrepreneurial culture, leading us to i) discuss the strengths and weaknesses of these existing measures, and ii) interpret the wider implications of our findings for the research into the role of entrepreneurial culture in explaining international differences in entrepreneurship rates.

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1. Introduction

In recent years a growing awareness of the importance of entrepreneurial activity for economic development has triggered research on the fundamentals of entrepreneurship. Cross-national differences in levels of entrepreneurial activity may be explained by a wide range of economic, technological, demographic, cultural and institutional factors (Verheul at al., 2002; Wennekers, 2006). In particular, differences in value systems and cultural orientations towards entrepreneurship have been argued to affect entrepreneurship (Illeris, 1986; Thomas and Mueller, 2000). McClelland's (1961) seminal study on children's stories and the role of Need for Achievement in explaining cross national differences in economic development is perhaps the most well known example of this type of research (Beugelsdijk and Smeets, 2008). Other nation level studies like those by Lynn (1991), Shane (1993), and Hofstede (1980, 2001) fit this line of reasoning. At the regional level, Davidsson and Wiklund (1997) study the role of values and beliefs in explaining regional variations in new firm formation rates. Wennekers et al. (2005) have studied the relationship between a country's rate of entrepreneurial dynamics (as measured by nascent entrepreneurship) and its level of economic development, while using population growth, social security expenditures and two proxies for cultural influences as control variables. They find robust statistical evidence for a U-shaped relationship between a country's nascent entrepreneurship rate and its level of economic development[1]. They also report a positive influence of both cultural proxies on nascent entrepreneurship. First, the authors use incumbent business ownership as a proxy for the influence of entrepreneurial role models on nascent entrepreneurship. Secondly, they include a '(former) centralized command economy' dummy, arguing that over many decades of the 20th century, culture and institutions in the (formerly) communist countries have become unfavourable for self-employment.

Obviously, the measures of culture used by Wennekers et al. (2005) are rather indirect and incomplete. In this paper we use a more direct and more complete indicator for entrepreneurial culture. Based on the Word Values Survey (WVS) we develop a composite measure embedded in trait research. We relate this newly developed measure to levels of nascent entrepreneurship across 28 countries[2]. Moreover, to test the robustness of our results and to corroborate the validity of our measure, we use a variety of existing measures that have been developed in earlier literature and can plausibly be related to differences in levels of entrepreneurship. More specifically we use McClelland's (1961) Need for Achievement, Lynn's (1991) competitiveness index, Granato et al.'s (1996) achievement motivation index, and GLOBE's (2004) performance orientation index[3]. Building on the analyses of Wennekers et al. (2005), we use the Global Entrepreneurship Monitor 2002 data for nascent entrepreneurship. Controlling for economic, institutional and demographic factors our newly developed measure of entrepreneurial culture is found to be significantly and positively related to nascent entrepreneurship. This is in sharp contrast with the four other existing measures proxying entrepreneurial culture for which we find insignificant or counterintuitive results. We discuss the strengths and weaknesses of each of these indicators and provide suggestions for future research in this area.

The structure of this paper is as follows. First, we briefly discuss the relevant literature on the hypothesized relationship between entrepreneurial culture and (nascent) entrepreneurship. Next, we describe our empirical research method and the data we use. We then present the regression results and discuss the outcomes. Finally, we present our conclusions, discuss the limitations of our study and make suggestions for future research.

[1] Cf. Carree et al. (2002 and 2007) for a related investigation of the relationship between the level of economic development and the rate of business ownership in 23 OECD countries.

[2] Our sample numbers 34 countries, but due to data limitations the number of countries in our regressions varies across the models used in our analysis.

[3] See also: http://www.thunderbird.edu/wwwfiles/ms/globe/

2. Literature review

Rates of entrepreneurship differ widely across nations and over time (Wennekers, 2006). Whereas some countries score consistently high on various indicators of entrepreneurial activity (such as several Anglo-Saxon countries), other countries (such as Belgium) remain in a backward position (cf. Reynolds et al., 2002). Entrepreneurship theorists (e.g. Schumpeter, 1934; McClelland, 1961; Illeris, 1986; Thomas and Mueller, 2000) as well as empirical work (Lynn, 1991; Shane, 1993; Davidsson, 2004; Wennekers et al. 2005) suggest a role for culture next to structural factors in explaining these cross-country differences. Certain societal values may be conducive to new firm formation and/or economic dynamism in general.

The first author who systematically discussed this relationship was McClelland. He argued his concept of achievement motivation to be crucial for economic development (McClelland, 1961). Though his analysis of 22 countries has been criticized for lack of robust results and questionable proxy measures, such as the use of changes in electricity generation to measure economic development (O'Farrell, 1986; Schatz, 1965; Frey, 1984; Gilleard, 1989; Beugelsdijk and Smeets, 2008), McClelland made the first attempt to actually measure an aspect of entrepreneurial culture and relate it to economic development.

Thirty years later Lynn (1991) made a similar attempt by measuring cultural values of students in 41 countries and combining the results into a national indicator of entrepreneurial attitude. Although Lynn, just like McClelland, does not use economic models to test for alternative explanations, his analysis does yield interesting results. In particular, a society's orientation towards competitiveness was found to be related to economic growth rates. More recently, Granato et al. (1996) used the World Value Survey to develop an alternative achievement motivation indicator and relate this to economic growth. Acknowledging that their analysis is embedded in a modern economic growth framework, re-interpretations suggest that their main finding on the positive role of an entrepreneurial culture is based on weak measures and omitted variables (Beugelsdijk and Smeets, 2008).

Instead of relating culture to economic growth on the basis of an assumed intermediary role of entrepreneurship, a limited number of other studies have related societal values to indicators of entrepreneurship directly. Shane (1993) for example applied Hofstede's four dimensional culture framework to study national differences in rates of innovation. He found that culture, defined as 'the collective programming of the mind which distinguishes the members of one group from another' (Hofstede, 1980, p. 25), affects a country's innovativeness. More specifically, Shane (1993) found that the cultural value of uncertainty acceptance is strongly related to rates of innovation. Morris et al (1994) relate Hofstede's individualism dimension to corporate entrepreneurship. They focus on individualism as this value has been associated with the willingness of people to violate norms and their level of achievement motivation (Hofstede 1980), both of which are associated with entrepreneurship. Their findings suggest that there may be an optimal level of individualism. While the Hofstede dimensions are conceptually attractive and are available for a large number of countries, they reflect *general* cultural characteristics and have not been developed to rank societies in terms of their specific entrepreneurial culture.

Lee et al. (2004) relate creativity to entrepreneurship, using the 'Bohemian Index' – a measure of the proportion of artistically creative people in the region. Although this index does not really represent entrepreneurial culture, they find that entrepreneurship is overall related to creativity. Davidsson and Wiklund (1997) study the impact of an entrepreneurial culture on regional variations in new firm formation rates, using cultural values and beliefs data. Although the cultural variation between the Swedish regions they include in the analysis was rather small, their study points to a weak influence of entrepreneurial values on regional new firm formation rates.

Wennekers et. al. (2005) have tested a model in which they explain levels of nascent entrepreneurship in a sample of 36 countries. Culture is operationalized by two indirect measures, i.e. incumbent business ownership as a proxy for the prevalence of entrepreneurial role models and a dummy variable for the communist heritage. Acknowledging that Wennekers et al. (2005) are the first to actually relate levels of nascent entrepreneurship to national culture in such a broad empirical framework, their culture measures are indirect and incomplete. We expect that devel-

oping more direct measures for entrepreneurial culture based on underlying theory and reflecting entrepreneurial value differences may improve existing analysis and contribute to the literature.

In other words, it is important to develop a measure for entrepreneurial culture by building upon micro insights regarding the value orientation of entrepreneurs. Based on the fundamental belief that entrepreneurs are different, socio-psychologists have tried to find distinguishing personality characteristics. Schumpeter (1934) already associated entrepreneurs with 'the dream and the will to found a private kingdom, usually, though not necessarily, also a dynasty. [..] Then there is the will to conquer: the impulse to fight, to prove oneself superior to others, to succeed for the sake, not of the fruits of success, but of success itself. [..] Finally, there is the joy of creating, of getting things done, or simply of exercising one's energy and ingenuity' (Schumpeter, 1934:93). Other works by scholars like Rotter (1966), Brockhaus (1982), Sexton and Bowman (1985), Chell et al. (1991) and Thomas and Mueller (2000) confirmed the general idea that entrepreneurs have distinguishing personality characteristics. In an attempt to summarize the personality trait literature, Cromie (2000) concludes there are (at least) seven characteristics distinguishing entrepreneurs or business owners from non-entrepreneurs. Without gong into detail, these relate to McClelland's need for achievement (McClelland, 1961), Rotter's idea of (internal) locus of control (Rotter, 1966), risk attitudes, and creativity (see e.g. Beugelsdijk, 2007).

In this paper we follow the above approach by developing a composite indicator of entrepreneurial culture. Our underlying items relate to core concepts of entrepreneurial trait research. Advantages of this approach over the existing literature are the facts that our measure a) is not a general cultural indicator but relates specifically to entrepreneurial values and, b) is embedded in micro insights derived from entrepreneurial trait research. To corroborate our measure and associated findings we also use alternative existing indicators of entrepreneurial culture. The empirical analysis pertains to the sample of 34 countries used in Wennekers et al. (2005). In this framework, a range of variables – among which level of economic development, institutional characteristics like tax level and social security expenditures, and demographic characteristics – explain nascent entrepreneurship. Using nascent entrepreneurship from the Global Entrepreneurship Monitor 2002 as an indicator of entrepreneurial activity, we test the following hypothesis:

H_1: Countries with an entrepreneurial culture will – ceteris paribus – experience higher rates of (nascent) entrepreneurial activity.

3. Method and data

As mentioned above, we use the data used in Wennekers et al. (2005) for our analysis. This is the Global Entrepreneurship Monitor (GEM) data set 2002, in which 37 countries participated. Additionally, we use data on entrepreneurial culture from a variety of sources. Matching the GEM database with our newly developed culture measure and existing culture measures yields a minimum of 27 observations and a maximum of 34 observations in our regressions.

Using this dataset, we carry out a series of regressions for testing the hypothesized relationship between the rate of nascent entrepreneurial activity at the country level and entrepreneurial culture. After performing a baseline regression analysis including six explanatory variables but excluding culture (our 'standard model'), we test the role of different measures of entrepreneurial culture in five successive regression models. The paragraphs below describe the variables used in our regression analyses.

3.1 Dependent variable

The GEM data set includes various indicators of entrepreneurship, as well as a wide selection of explanatory variables from standardized national statistics. Our dependent variable is the same as in Wennekers et al. (2005), i.e. the gross inflow into entrepreneurship as represented by the metric nascent entrepreneurship. Data on nascent entrepreneurial activity in 2002 are taken from the GEM 2002 Adult Population Survey. The nascent entrepreneurship rate is defined as the number of people who are actively trying to start a new business, as a percentage of the adult

population (18-64 years of age). For each participating country this measure is based on at least 2000 respondents.

3.2 A composite measure of entrepreneurial culture

To measure entrepreneurial culture, we develop a new, composite measure embedded in ongoing research. We complement this new indicator with four existing indicators that are briefly described in the next section. For the measurement details of these four complementary indicators we refer to the respective original contributions.

Our newly developed composite measure is derived from Beugelsdijk (2007) and was first introduced by Suddle et al. (2006). This measure is based on information from the World Values Survey (WVS). The WVS data set contains information about basic values, attitudes and preferences of the European respectively world population (Halman 2001). These include qualities that children can be encouraged to learn at home, aspects of a job people say are important, some political views and measures for the loci of control. Using the 1999 wave we operationalise entrepreneurial culture by a composite factor consisting of three underlying indicators derived from this WVS database. The three questions used to calculate the composite measure are based on the fraction of respondents giving the following answers on three questions:
i) Question: which aspects of a job do you think are important in a job? Answer: an opportunity to use initiative;
ii) Question: which aspects of a job do you think are important in a job? Answer: a job in which you can achieve something; and
iii) Question: why are there people in this country who live in need? Answer: because of laziness and lack of willpower.
The national scores reflect the percentage of respondents giving the indicated answers categories on these questions.

As these underlying variables relate to 'initiative', 'achieving behaviour' and 'personal influence on one's own life', which are key constructs in trait research on entrepreneurship, they have a strong theoretical base. 'Initiative' corresponds with one of the key meanings of entrepreneurship, namely 'to take in hand' (Wennekers, 2006). 'Achieving behaviour' is another relevant trait for entrepreneurship, as many studies have shown including most notably McClelland (1961). Finally, 'personal influence' represents the internal locus of control, based on Rotter (1966), that is characteristic for entrepreneurs. To develop our new measure we apply principal components analysis and derive a composite scale based on the above three variables. Doing so yields one variable representing entrepreneurial culture, explaining 67% of total variance. Cronbach's alpha of this new scale equals 0.74 suggesting the measure is reliable in the sense of 'internal consistency'. In our subsequent analysis we use this composite variable as a measure of entrepreneurial culture. To complement this measure and also test its robustness we also investigate the role of four alternative indicators of entrepreneurial culture.

3.3 Other culture variables

First, we use McClelland's index of need for achievement (N achievement). McClelland found a strong positive correlation between measures of N achievement imagery in school textbooks and the rate of economic growth. He showed that such a relationship exists in a sample of 23 respectively 41 countries by relating 1925 respectively 1955 scores on N achievement to subsequent economic growth. The intuitively attractive result that economic growth partly results from the (entrepreneurial) ambition of human beings has gradually become generally accepted. Most papers on entrepreneurship and economic development refer to McClelland's Achieving Society in the introduction as a common point of departure (see Beugelsdijk and Smeets, 2008 for an extensive discussion of this index).

Second, we use the Achievement motivation index as developed by Granato, Inglehart and Leblang (1996). This measure is based on the World Values Survey. Specifically, it is based on four questions inquiring people's opinion regarding the importance of thrift, determination, obedience and faith as four qualities which children can be taught at home. GIL's achievement

motivation index is then calculated as the percentage of respondents emphasizing thrift and determination as important qualities, minus the percentage emphasizing obedience and faith.

Third we use Lynn's measure of competitiveness. Lynn (1991) compares the four psychological theories of economic growth (Weber's work ethic, Schumpeter's competitiveness, McClelland's achievement motivation and Wiener's status of the land owner), and finds in a sample of 41 countries that differences in attitudes towards competitiveness best explain variation in economic growth rates across societies. Competitiveness can be defined as the drive to win against others and obtain some form of dominance over them through winning. This drive was identified by Schumpeter as one of the major motivations of the entrepreneur (Lynn, 1991). Therefore, we also include Lynn's competitiveness index as one of our additional proxies for entrepreneurial culture.

Fourth, we use GLOBE's index of performance orientation. This index measures the degree to which a collective encourages and rewards group members for performance improvement and excellence. It is based on the question inquiring people's opinion regarding the importance of encouraging students to strive for continuously improved performance. Originally, the GLOBE performance orientation index is based on McClelland's concept of achieving societies. These societies tend to focus on the future, achievement, taking initiative, and independent competence. In a sample of 62 different societies and cultures, Javidan (2004) finds that societies that score higher on performance orientation tend to value taking initiative, assertiveness and competitiveness. Furthermore, these societies tend to value and reward individual achievement and tend to believe that anyone can succeed if he or she tries hard enough. As these are all characteristics of an entrepreneurial mindset, we also include this measure as an additional proxy for entrepreneurial culture.

In sum, we have five indicators of entrepreneurial culture: our newly developed indicator based on EVS/WVS data, and four existing measures of respectively McClelland's N-Achievement, GIL's Achievement motivation, Lynn's competitiveness, and GLOBE's performance orientation.

3.4 Control variables

When examining the relationship between the rate of nascent entrepreneurship and entrepreneurial culture, other variables that influence nascent entrepreneurship must be taken into account. We use a number of economic, institutional and demographic variables as controls for testing our hypothesis. Level of economic development is measured as the per capita income. Gross national income per capita 2001 is expressed in purchasing power parities per US $, and these data are taken from the 2002 World Development Indicators database of the World Bank. To test for a U-shaped relationship (Wennekers et al 2005), we also include its squared term.

To control for the institutional context, we include variables on tax revenues and social security expenditures. The impact of taxes on the level of the level of entrepreneurial activity is complex and even paradoxical (Verheul et al., 2002). On the one hand high tax rates reduce the return on entrepreneurship (Gentry and Hubbard, 2000). On the other hand self-employment may offer greater opportunities to evade or avoid tax liabilities. For a selection of 12 OECD countries spanning the period 1972-1996, Parker and Robson (2004) find a significantly positive effect of personal income tax rates on self-employment. Other studies, among which Kreft and Sobel (2003), Schuetze and Bruce (2004) and Bruce (2000), find a similar positive effect. Our control variable is tax revenues as % of GDP (1999), taken from Table 2.2.09 of the World Competitiveness Yearbook 2001. Likewise, the effect of social security on entrepreneurial activity may also be two-sided. First, we may expect a negative impact in so far as generous social security for employees increases the opportunity costs of entrepreneurship. In this respect, social security benefits determining the opportunity costs of unemployed persons may also interact with unemployment (Noorderhaven et al. 2004). Second, social security in general may positively affect entrepreneurial activity by creating a safety net in case of business failure. In fact however, empirical studies suggest a negative relationship between social security and entrepreneurial activity (Wennekers et al., 2005; Davis and Henrekson, 1999; Parker and Robson, 2004; Hessels et al., 2007). Social security cost as a percentage of GDP (2000), taken from Table 2.2.01 of the World Competitiveness Yearbook 2001, is used as our control variable.

Population growth and age distribution are relevant in the demographic context. Population growth is expected to have a positive effect on entrepreneurship (Armington and Acs, 2002). A growing population provides opportunities for new economic activity as new and bigger consumer markets emerge because of the growing population (demand side of entrepreneurship). Population growth may also be a push factor to engage in new economic activity in order to make a living, particularly when population growth is driven by immigration (supply side of entrepreneurship). The population growth 1996-2002 is taken from the US Census Bureau IDB (International Data Base). As regards age distribution, while start-ups occur in all relevant age groups, the prevalence rate of nascent entrepreneurship is often seen to be highest in the age group between 25 and 34 (Delmar and Davidsson, 2000; Verheul et al., 2002). Regarding the age composition of the population in 2002, we have shares in total population of five age groups: 20-24, 25-34; 35-44; 45-54 and 55-64 years. These data are also taken from the International Data Base of the US Bureau of the Census. Because the 'age group variables' are highly inter-correlated, only the population share of age group 45-54 years is included in our analysis.

3.5 Data

Table 1 provides the nascent entrepreneurship rates and the various culture indices that we have used in our study. For reasons of presentation we have also rescaled the scores of our newly developed measure of entrepreneurial culture on a 0-100 scale (between brackets). A correlation matrix for all variables used in our study is presented in Table 2. Our newly developed measure of entrepreneurial culture correlates .538 with Lynn's competitiveness index. The correlation with the other culture indices is almost zero.

< Insert Table 1 about here >

< Insert Table 2 about here >

4. Results

We test our hypothesis starting with a 'standard model' in which we include only our control variables (see Table 3). Model 1 shows a significant negative effect of the population share variable and a significant positive effect of population growth (both at $p<.10$). The standard model also shows a significant effect of GDP per capita and its squared term ($p< .05$). From a certain level of economic development onwards, (nascent) entrepreneurship starts to rise again as per capita income increases still further. Wennekers et al. (2005) explain this U-shaped relationship by the lower levels of independent entrepreneurship in industrializing economies compared with both traditional agriculture-based and modern service-based economies.

In model 2 we include our newly developed measure for entrepreneurial culture. We find a significant positive effect for our new WVS based measure of entrepreneurial culture ($p <.05$), and an explained variance of 87%. In the models 3-6 we successively include the four existing measures of entrepreneurial culture. We find an insignificant effect of Lynn's competitiveness index, McClelland's N achievement index and GLOBE's performance orientation, and a significantly negative (counterintuitive) effect of Granato et al's WVS based measure of entrepreneurial culture ($p<.05$). These regression models thus do not show consistent evidence of the role of entrepreneurial culture in explaining nascent entrepreneurship across a wide range of cultural indices. The control variables are generally insignificant, except for GDP per capita (barring model 2) and population growth (barring models 3 and 5).

< Insert Table 3 about here >

Given the insignificant results of three of the four existing cultural measures, the negative effect of the Granato et al. (1996) index is particularly surprising. In fact, the Pearson-correlation coefficient between McClelland's index and GIL's index is negative and equals -0.18 (based on 28 observations). Since both variables aim to measure achievement motivation (i.e. for both vari-

ables, higher values imply 'more' need-for-achievement), this result is particularly disturbing. In addition to the problems related to McClelland's measure (Beugelsdijk and Smeets, 2008), the way in which GIL's achievement motivation index is measured also raises serious doubts about its validity. Moreover, it has been shown that the positive findings reported by GIL are based on a very specific choice for their regression analysis (Beugelsdijk and Smeets, 2008). In other words, the negative significant result of the GIL index could possibly be related to measurement errors, and not be interpreted as a valid test of the role of entrepreneurial culture in explaining nascent entrepreneurship.

5. Discussion

In this paper we have developed a new measure for entrepreneurial culture and tested its relationship with levels of nascent entrepreneurship across a sample of 34 countries. We find a positive and significant effect of our newly developed measure on the rate of nascent entrepreneurial activity. However, we also tested the relationship between nascent entrepreneurship and four other, existing proxy measures of entrepreneurial culture. Three of these four measures are insignificant and one is significant but with a negative (i.e. counterintuitive) sign. While, at first sight, the results of our test of the relationship between entrepreneurial culture and nascent entrepreneurship seem at best mixed, the results of this study are in fact susceptible to three different interpretations:

i) The theory of a positive relation between national cultural entrepreneurial values and nascent entrepreneurship is correct. Our newly developed measure of entrepreneurial culture is theoretically and methodologically sound and has allowed us to test this hypothesis in a proper way, and with a positive outcome. Instead, the insignificant effect of McClelland's variable may be due to its poor internal validity, reflected in the heavy criticism it received (Beugelsdijk and Smeets, 2008). Moreover, McClelland's index is based on data from the 1950s, and we are explaining nascent entrepreneurship rates in 2002. In a similar vein, the GIL index suffers from validity problems, making it difficult to interpret its negative effect in our regression model. Lynn's competitiveness index is based on the test scores of students only, and may therefore not properly reflect population level scores on these entrepreneurial values. From a theoretical and methodological perspective, the GLOBE index on performance orientation is also sound, but it has not been constructed to proxy entrepreneurial culture. Thus, our newly developed measure is the only valid, current and explicit proxy for an entrepreneurial culture. The fact that it is found to be positively and significantly related to nascent entrepreneurship supports our hypothesis.

ii) The theory is incorrect. Our hypothesis on a positive relationship between entrepreneurial culture and nascent entrepreneurship cannot be supported in a robust way across a range of five indicators of entrepreneurial values, among which a newly developed measure. This would be in line with Pryor's (2005) more general claim that no robust relationship exists between national values in general and economic growth. Pryor actually constructs three factors that each relate to different sets of national values. The factor that incorporates an achievement value actually relates negatively to growth, but as the author himself states (p.468): "this factor is so peculiar and explains such a relatively small proportion of the variance of the value sample that it is difficult to make much sense of such a result". Assuming that all measures of entrepreneurial culture used in our paper are to some extent relevant, our empirical results show that there is no robust significant relationship between entrepreneurial culture and nascent entrepreneurship.

iii) The third interpretation is a mix of the two above interpretations. The theory may be partly right, in the sense that a value system characterized by a strong emphasis on entrepreneurial behaviour may indeed be reflected in a higher level of *overall* entrepreneurial activity, but this need not necessarily be reflected in higher levels of *nascent* entrepreneurship. The positive effect may for example be offset by countervailing effects like an institutional system that is not conducive to new business start-ups. In such a case, it may be that an entrepreneurial culture primarily affects the way existing firms operate and may have economic effects through intrapreneurship, but not through higher start-up rates.

Which implications do our findings suggest for future research? Although weak, we do find some support for the thesis that entrepreneurial culture matters in explaining entrepreneurship rates. However, in order to test this more fully, we need to take multiple factors at multiple levels into account. Becoming an entrepreneur is an individual decision, and the decision to do so is based on the interplay between individual level factors as has been shown in trait research and environmental factors, of which the overall culture may indeed be an important aspect. Hence, a fruitful way forward might be to apply multilevel approaches in order to increase our understanding of country-specific differences in levels of entrepreneurship.

Table 1 Total early-stage Entrepreneurial Activity indices and culture indicators for 34 countries

Country	Nascent entrepreneurship rate 2002	Existing Measures of Entrepreneurial Culture				New Measure
		GLOBE's performance orientation	Lynn's competitiveness index	Granato, Inglehart and Leblang's culture index	McClelland's need for achievement	Suddle, Beugelsdijk and Wennekers' entrepreneurial culture[a]
Argentina	8.5	3.65	8.51	-44	3.38	-0.56 (34)
Australia	3.8	4.36	11.42	5	2.38	-
Belgium	2.1	-	10.75	30	0.43	-0.80 (29)
Brazil	5.7	4.04	11.17	-42	1.14	-0.60 (33)
Canada	5.9	4.49	12.03	14	2.29	0.42 (57)
Chile	10.4	-	11.54	-17	1.19	0.16 (51)
China	5.5	4.45	12.37	-	-	-2.03 (0)
Denmark	3.6	4.22	-	20	1.05	-0.57 (34)
Finland	2.7	3.81	-	27	1.52	-0.41 (38)
France	2.4	4.11	10.19	32	2.38	-1.18 (20)
Germany	3.5	4.09	9.1	58	2.14	-0.17 (43)
Hungary	3.5	3.43	-	19	1.81	0.85 (67)
Iceland	5.7	-	12.99	22	-	0.83 (67)
India	10.9	4.25	14.48	5	2.71	1.10 (73)
Ireland	5.7	4.36	10.99	-36	2.29	0.36 (56)
Israel	3.4	4.08	11.59	6	2.33	-
Italy	3.7	3.58	-	10	1.33	-
Japan	0.9	4.22	12.21	106	1.29	0.77 (65)
Korea	5.9	4.55	13.66	-	-	0.37 (56)
Mexico	9.2	4.10	13.82	-41	1.57	2.26 (100)
Netherlands	2.6	4.32	-	22	1.38	-0.21 (42)
New Zealand	9.1	4.72	11.13	26	2.05	-0.62 (33)
Norway	5.2	-	9.6	11	1.71	-
Poland	3.7	3.89	12	-3	0.86	-0.23 (42)
Russia	1.1	3.39	-	49	2.1	0.20 (43)
Singapore	4	4.9	11.83	7	-	-1.54 (11)
Slovenia	3.3	3.66	-	46	-	-
South Africa	4.7	4.11	12.5	46	2.33	2.03 (95)
Spain	2.2	4.01	10.45	-8	2.33	0.17 (51)
Sweden	1.8	3.72	9.05	42	1.62	-1.08 (22)
Switzerland	4.4	4.25	8.99	38	1.71	-0.35 (39)
Thailand	1.3	4.56	13.39	41	-	-
United Kingdom	2.5	4.08	10.64	7	1.67	-0.63 (33)
United States	7.1	4.49	12.76	-16	2.24	1.46 (81)

[a] This measure is based on factor scores, and higher scores reflect higher levels of entrepreneurial culture. The scores between parentheses reflect the re-scaled scores between 0-100 with zero for the country with the lowest score in this sample and 100 for the country with the highest score in the sample.

Table 2 Descriptive statistics and cross-correlations

	Mean	St. dev.	1	2	3	4	5	6	7	8	9	10	11	12
1. Nascent entrepreneurship rate	4.59	2.62	1.000											
2. GDP per capita	20.23	8.79	-0.368*	1.000										
3. GDP per capita squared	484.05	328.08	-0.280	0.979**	1.000									
4. Social security costs as % of GDP	16.87	13.32	-0.461**	-0.005	-0.061	1.000								
5. Tax revenue as % of GDP	32.02	11.06	-0.463**	0.622**	0.559**	0.330	1.000							
6. Population growth	4.46	4.79	0.493**	-0.111	-0.094	-0.397*	-0.547**	1.000						
7. Population share 45-54 years	12.97	1.95	-0.636**	0.537**	0.494**	0.305	0.533**	-0.448**	1.000					
8. McClelland's index	1.83	0.63	0.302	-0.131	-0.124	-0.142	-0.344	0.398*	-0.284	1.000				
9. Lynn's competitiveness index	11.45	1.57	0.297	-0.368	-0.310	-0.481*	-0.614**	0.339	-0.336	-0.066	1.000			
10. GIL achievement motivation index	15.06	32.04	-0.595**	0.274	0.231	0.012	0.279	-0.413*	0.484**	-0.180	-0.059	1.000		
11. Entrepreneurial culture (new measure)	0.00	1.00	0.310	0.139	0.138	-0.325	-0.20	0.199	-0.002	0.096	0.538*	0.027	1.000	
12. GLOBE's performance orientation	4.13	0.37	0.288	0.272	0.312	-0.641**	-0.365*	0.651**	-0.159	0.089	0.483*	-0.049	0.120	1.000

* $p < 0.10$
** $p < 0.05$

Table 3 Explaining nascent entrepreneurship in 2002

	Model 1: Standard model	Model 2: Entrepreneurial Culture	Model 3: Lynn's competi-tiveness index	Model 4: McClelland's index	Model 5: GIL's index	Model 6: GLOBE index
Constant	13.63**	4.08	18.49**	8.14**	12.38**	13.45*
	(2.90)	(2.94)	(6.28)	(3.92)	(2.68)	(7.79)
Social security cost as % of GDP	-0.043	-0.006	-0.060	-0.030	-0.066**	-0.029
	(0.03)	(0.02)	(0.04)	(0.03)	(0.03)	(0.04)
Tax revenue as % of GDP	0.052	0.022	0.032	-0.001	0.038	0.054
	(0.05)	(0.04)	(0.07)	(0.06)	(0.05)	(0.06)
Population growth 1996-2002	0.174*	0.637**	0.176	0.409**	0.096	0.180*
	(0.10)	(0.13)	(0.11)	(0.16)	(0.09)	(0.11)
Population share 45-54 years old	-0.459*	0.047	-0.524*	-0.008	-0.199	-0.460*
	(0.23)	(0.19)	(0.30)	(0.27)	(0.22)	(0.23)
Per capita income	-0.52**	-0.25	-0.56**	-0.46*	-0.56**	-0.533**
	(0.21)	(0.16)	(0.24)	(0.24)	(0.21)	(0.22)
Per capita income, squared	0.012**	0.004	0.013**	0.010	0.013**	0.013**
	(0.005)	(0.004)	(0.006)	(0.006)	(0.005)	(0.005)
Entrepreneurial culture (new composite measure)	-	0.502**	-	-	-	-
		(0.24)				
Lynn's (1991) competitiveness index	-	-	-0.277	-	-	-
			(0.34)			
McClelland's (1961) index	-	-	-	0.078	-	-
				(0.60)		
Granato Inglehart and Leblang's (1996) Achievement motivation index	-	-	-	-	-0.030**	-
					(0.01)	
GLOBE's performance orientation	-	-	-	-	-	-0.106
						(1.77)
R squared	*0.600*	*0.871*	*0.595*	*0.719*	*0.711*	*0.597*
Observations	*34*	*28*	*27*	*28*	*32*	*30*

Note: standard errors between parentheses. * indicates 10 % significance, ** indicates 5 % significance.

Overview of the countries included

		GEM 2002	GLOBE	Lynn	GIL	McClelland	WVS 1999
1	ARGENTINA	x	x	x	x	x	x
2	AUSTRALIA	x	x	x	x	x	x
3	BELGIUM	x		x	x	x	x
4	BRAZIL	x	x	x	x	x	x
5	CANADA	x	x	x	x	x	x
6	CHILE	x		x	x	x	x
7	CHINA	x	x	x			x
8	TAIWAN	x	x	x	x		x
9	DENMARK	x	x				
10	FINLAND	x	x		x	x	x
11	FRANCE	x	x	x	x	x	x
12	GERMANY	x	x	x	x	x	x
13	HUNGARY	x	x		x	x	x
14	ICELAND	x		x	x		x
15	INDIA	x	x	x	x	x	x
16	IRELAND	x	x	x	x	x	x
17	ITALY	x	x		x	x	x
18	JAPAN	x	x	x	x	x	x
19	KOREA	x	x	x			x
20	MEXICO	x	x	x	x	x	x
21	NETHERLANDS	x	x		x	x	x
22	NEW ZEALAND	x	x	x	x	x	x
23	NORWAY	x		x	x	x	x
24	POLAND	x	x	x	x	x	x
25	RUSSIA	x	x		x	x	x
26	SINGAPORE	x	x	x	x		x
27	SLOVENIA	x	x		x		x
28	SOUTH AFRICA	x	x	x	x	x	x
29	SPAIN	x	x	x	x	x	x
30	SWEDEN	x	x	x	x	x	x
31	SWITZERLAND	x	x	x	x	x	x
32	THAILAND	x	x	x	x	x	
33	UNITED KINGDOM	x	x	x	x	x	x
34	UNITED STATES	x	x	x	x	x	x

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