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ARTICLE



Analyzing the macro-level determinants of user entrepreneurship. The moderating role of the national culture.

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ABSTRACT

Scholars have extensively analysed country-based determinants of entrepreneurship over the last few decades. One of these is national culture. To date such a body of knowledge was underestimated in one of the rising streams of literature observed over the last decade: user entrepreneurship. To fill this research gap, the research questions of the present paper are: What is the impact of country-level factors on user entrepreneurship? What is the role of culture in such a relationship? The study analyzes new business units' activities created by user innovators in the healthcare industry, exploring the effects of the four dimensions of the entrepreneurship model by Thai and Turkina. The adopted methodology uses statistical methods based on principal component analysis (PCA), cluster analysis, and polynomial regression models. Findings indicate a clustering behaviour among countries with similar user entrepreneurial activities. Such behaviour highlights the macro-level determinants of health user entrepreneurship, defining a curvilinear relationship among these. In particular, an inverted U-shaped curve emerges when user entrepreneurship is combined with a country's health culture. We detect a moderation effect of national culture on such a nonlinear relationship at the cross-country level.

KEYWORDS

User entrepreneurship; user innovation; macro-environment determinants; national culture; healthcare

Introduction

In the last few decades researchers have widely analysed macro-level, country-based entrepreneurship conditions (e.g. Bjørnskov and Foss 2008; Naudé et al. 2014; Thai and Turkina 2014). This body of knowledge analyzes entrepreneurship from a national level perspective and explores its significant correlations with entrepreneurial activities within a country (Verheul, Van Stel, and Thurik 2006; Stenholm, Zoltan, and Wuebker 2013; Thai and Turkina 2014). The primary goal of such an approach is to research entrepreneurial activities by inhabitants of a given location (limited to country frontiers), such as informal entrepreneurship, social entrepreneurship, or technology entrepreneurship (Shaw and Carter 2007; Beckman et al. 2012).

This macro-level perspective, quite surprisingly, was not applied to investigate one of the most attractive emerging entrepreneurial phenomena of the last few years, user entrepreneurship (Franke et al., 2006; Shah and Tripsas 2007). This phenomenon is present in the direct experience and knowledge of users (Von Hippel 2017). This form of individual, bottom-up activities partly leads to the faster development of enterprises and their transformation into global businesses (Venkataraman 2004).

In entrepreneurship research, most of the literature focuses on internal factors (microenvironment) and individual aspects (Shane 2003; Thompson 2009; Brieger and De Clercq 2019). Specific literature about user entrepreneurship (e.g. Shah and Tripsas 2016) has adopted the same perspective to date. There are currently no studies available about the country-level dimensions and characteristics of user entrepreneurship. This research gap outlines the need for further exploration of what national conditions support users in becoming entrepreneurs.

The macroeconomic drivers of national entrepreneurship (Casson and Wadeson 2007; Audretsch 2007; Baumol and Strom 2007), along with other environmental conditions such as sustainability, national culture, or management systems (Thai and Turkina 2014), should determine the decisions of the user to become an entrepreneur. In general, individual culture (which is often shaped by national culture) is an essential element supporting entrepreneurial agents to create new, innovative businesses that shape the contemporary economic environment (Minguzzi and Passaro 2001; Bouncken, Kraus, and Roig-Tierno 2019). In line with these various assumptions and analysis of the extent to which national culture, the external context, and the environment influence the idea of creating a new business by user innovators seems relevant to understand how macro-determinants contribute to (and interact for) the rise of user entrepreneurship.

The present study aims to understand how different national cultural profiles shape user entrepreneurship in one country. The present paper's research questions are: What is the impact of country-level factors on user entrepreneurship? What is the role of culture in such a relationship? To answer these questions, we first explore the vital national factors contributing to developing agglomerations of countries sharing similar user entrepreneurship levels, evaluating the national culture's role in that configuration of country clusters. Our study's findings highlight the role of national culture on user entrepreneurship by amplifying the impact provided by macro-level determinants.

The study focuses on analysing new business units' activities created by the healthcare industry innovators in 33 countries, exploring the effects of the four entrepreneurship dimensions (Thai and Turkina 2014). The study enhances the analysis by adding a fifth industry-specific (healthcare) factor and six cultural variables in Hofstede's framework to achieve more significant results. We adopted statistical methods based on the application of the explorative principal component analysis (PCA), cluster analysis, and polynomial regression. The findings indicate clustering behaviour among countries with similar user entrepreneurial activities. Such behaviour highlights the macro-level determinants of health user entrepreneurship, defining a curvilinear relationship among these, in particular an inverted U-shaped curve. We detect a moderation effect by national culture on such a relationship at cross country level.

Literature review

2.1 Macro-level determinants of entrepreneurship

In recent decades, the literature on entrepreneurship has analysed the factors determining entrepreneurship's existence and functioning at the national level (Van Stel, Carree, and Thurik 2004; Audretsch and Caiazza 2016; Schiavone et al. 2020). These factors may relate to the standard external environment linked to politics, economics, society, technology, and changing environmental and legislation forces, and may also act as cultural and institutional factors (Aparicio, Urbano, and Audretsch 2016; Hayton, George, and Zahra 2002). Arin et al. (2015), in his research on revisiting the determinants of entrepreneurship, clearly indicates that interactions of development, institutional, and human-related factors (here understood as human capital management) primarily determine the size of the measured indicator determining the level of entrepreneurship.

Both the availability of resources and competitive processes, although often acting as *cooperation* (Bouncken et al. 2015), take on a slightly different character in the form of elements of the environment, which should be taken into account at the level of analysis in order to identify the

impacts affecting economic activity in a given territorial zone (Vaillant and Lafuente 2007). The extent of both hidden (or latent) entrepreneurship and actual entrepreneurship in countries can be attributed to national-specific determinants, and cultural and macroeconomic aspects, together with economic factors (Spencer and Gómez 2004). One of the fundamental research gaps in this area is the influence of factors determining entrepreneurship (e.g. social, economic, and technological) on the development of a country's entrepreneurship, which changes once they cross national borders (Reuber et al. 2018).

The institutional theory (Scott 1995) was also used to explore the interaction between national macro-factors and national entrepreneurship. This theory's basis is to be found in the main factors that are the three-pronged basis for the functioning of specific social groups and their influence on entrepreneurship (Van Stel, Carree, and Thurik 2004), i.e. elements related to the cultural-cognitive, regulatory, and normative sphere. Undoubtedly, from the macro-level analysis at the macro-level, it should be considered sufficient to prove that the entrepreneurship created in a given country is not only an emerging market opportunity but often strictly competitive. Hechavarría and Ingram (2016) also confirm that an essential focal point for creating entrepreneurship is the so-called culture of understanding local and national entrepreneurship.

The analysed studies on entrepreneurship take into account the macroeconomic determinants of entrepreneurial activities. The vast majority of scientific works have focused on analysing externally-created entrepreneurship (Qian and Jung 2017; Von Briel, Recker, and Davidsson 2018; Barba-Sánchez and Atienza-Sahuquillo 2017). As an externally-created process, looking at entrepreneurship is a relatively new way of analysis rather than the entrepreneurship determinants defined so far, popularized by academic circles for years, that is, the micro-level factors of entrepreneurship creation. Undoubtedly, their advantages should be sought in the commercial character of entrepreneurship, but unfortunately they are losing their importance in social entrepreneurship (Saebi, Foss, and Linder 2019; Halberstadt et al. 2020). Public sector spending is one of the most important factors increasing social entrepreneurs (Kraus et al. 2014) in a given location. The subsequent results of Hechavarría (2016) show that social values (based on mutual social tolerance, level of satisfaction with life in a given community, freedom of expression, and personal freedom) also have a positive impact on the pace of transformation and acceleration of the entry of new social groups into entrepreneurship (Kraus et al. 2017).

Entrepreneurship determinants at the macro level are designed to determine the scope for growth in creative factors' social activities and offer a wide range of characteristics that determine other aspects of entrepreneurship. In the model by Thai and Turkina (2014), which is based on an eclectic theory of entrepreneurship (Verheul et al. 2002), we can identify four critical determinants at the macro level:

- demand-related factors (economic opportunities);
- supply-side factors (resources and capacities);
- cultural factors;
- quality management factors.

The results by Thai and Turkina (2014) provide a noteworthy analysis of individual factors, indicating at the same time that the same combination of factors may have different effects in individual countries, changing the trajectory of the entrepreneurship development process. Factors related to the level of management quality and specific economic opportunities accelerate the formation of formal entrepreneurship. However, it is reshaping that culture (a factor that supports active society) and the low level of national economies' growth, stimulating informal entrepreneurship formation in a bottom-up manner.

Prior research, in sum, indicates that the national factors shaping entrepreneurship are heterogeneous. Their nature and the specificity of the entrepreneurship's vision (and ultimately, the strategy understood as the enterprise's long-term direction) differ. We explore country-level factors

already suggested by Thai and Turkina (2014) and then by Schiavone et al. (2020), selecting demand-related factors (economic opportunities), supply-related factors (resources and abilities), quality management factors, and environmental factors. We also consider the national cultural dimension in the model as explicative of some effect on entrepreneurship, based on the six cultural dimensions as identified by Hofstede (Hofstede 2011; Hofstede Insights. National culture 2016):

- (1) Power distance (large versus small);
- (2) Uncertainty avoidance (strong versus weak);
- (3) Individualism versus collectivism;
- (4) Masculinity versus femininity;
- (5) Long-term orientation versus short-term normative orientation;
- (6) Indulgence versus restraint.

To conclude, such a variety of cultural values at the individual level are likely to produce heterogeneous effects on the likelihood of becoming an entrepreneur. Moreover, at the country level, the same cultural dimensions should also foster (or hamper) the impact of some macro-level determinants promoting entrepreneurship.

2.2 User entrepreneurship

The concept of *user entrepreneurship* refers to how a new product and/or service is commercialized by an individual or group of individuals who are also users of that product and/or service (Shah and Tripsas 2007). In this phenomenon, people creating new business units are already innovators (Von Hippel 2017). Contemporary literature on the subject, dealing with the analysis of entrepreneurial processes (Agarwal and Shah 2014; Holzmann et al. 2017), points to recommendations concerning enterprises whose creative originator was the user. At both the macro and national levels, user entrepreneurship is found both on the part of private entrepreneurs creating new business units and within existing firms (Shah and Tripsas 2007).

User entrepreneurship should be sought mainly on the side of start-ups and companies offering products for the two youngest generations of consumers – Generation Z (Generation 3 C, 15–21 years old.) and Generation Y (Millennials, 22–34 years old) (Khor 2017). By contrast, professional users gain knowledge and experience and thus see new consumer segments' needs in their work environment. There are cases where professional users (companies with an established market position and a significant market share) apply vertical diversification in order to create new business units and commercialize innovation processes (Autio et al. 2014).

Shah and Tripsas (2007) argue that entrepreneurship based on the micro-environment determinants is created when users benefit from innovations at the design and development stage. Here, relatively low costs of business opportunities are identifiable, and the market creates opportunities for the emergence of numerous market niches. In user entrepreneurship, an innovator who is also a user starts creating his business unit if the expected profits from the commercialization of innovative solutions turn out to be higher than the threshold of user's profits to start the entrepreneurial process (Shah and Tripsas 2016). Three essential determinants are identified in this respect, which encourage consumers to transform and take on the role of an entrepreneur (Hamdi-Kidar and Vellera 2018):

- (1) innate motivations (e.g. joy and willingness to help other people), but these motivations are generally much more significant than seeking profit or seeking immediate motivation (e.g. community recognition);
- (2) the lack of market alternatives for users to promote and disseminate the product innovations created;

- (3) no risk and no negative impact of entrepreneurial activity expressed as user entrepreneurship.

The 21st century abounds in a significant acceleration of entrepreneurial processes, mainly due to the dissemination of access to information, dissemination of technological solutions and, at the same time, lowering the barriers to information on how individual sectors function (Elia, Margherita, and Passionate 2020). The most common industrial environments are high-tech sectors and, more in general, industries focused on a high level of R&D investments (Yoo and Kim 2019). The intensive growth of business phenomena driven by new technologies highlights user entrepreneurship (Cuomo et al. 2017), which stimulates business and management practices. Among others, the health sector is also rich in examples of professional users who decide to start their own business (Barreiro Ribeiro et al. 2017) to generate added value for their activities.

2.3 Hypotheses

One of the basic assumptions of the present study is that the nature of macro-level determinants shapes users' entrepreneurial behaviour, which is closely related to country cultural conditions, economic development opportunities, resource allocation and, ultimately, the possibility of achieving high-quality management processes. Such an assumption is connected with prior research reporting countries' economies and the socio-cultural phenomena occurring in them and the different availability of resources; both economic and management capabilities lead to different entrepreneurship rates (Thai and Turkina 2014). There are significant differences at transnational level, which are interpreted as a gap between user innovation frequency in different national economies. According to Shah and Tripsas (2016), all demand-side determinants (economic opportunities) and supply-side determinants (resources and liabilities) lead to the reduction of entry barriers and the amount of costs for exploiting business opportunities for new entrepreneurs and facilitate the break-even point. These factors ultimately lead to user entrepreneurship. Macro-level determinants of entrepreneurship (Willis et al. 2019) focus on the distribution of wealth which, at the national level, is likely to facilitate the emergence of market niches in which user entrepreneurs can market their innovations. The presence of such a market acts as a catalyst for the growth rate of innovative users and ultimately for the profitability of their potential new business units. Concerning the factors on the demand side, the availability and spread of infrastructure in the sphere of broadly understood technology stimulates users' entrepreneurship, especially in new business ventures, in markets related to digital activities, and seeking new buying patterns of non-customers participating in digital platforms (Bremen, 2017; Kraus, Roig-Tierno, and Bouncken 2019). Furthermore, management quality within a national economy also has a significant impact on the intensification of entrepreneurial activities (Schiafone 2012), and this element should also thus impact the decision by user innovators to start their own business. An efficient administrative environment, combined with a modern public administration (and limited bureaucracy), should generally reduce the costs of exploiting opportunities for user innovators and, thus, positively stimulate business development processes, as well as increasing the likelihood of creating new enterprises (Srinivasan and Venkatraman 2018). These conditions should also apply homogeneously between countries sharing the same macro-level characteristics. Drawing on these considerations, we can develop the following two hypotheses:

H₁: The more countries share similar macro-level characteristics, the more their user entrepreneurship rates are similar.

H₂: The more the macro-determinants of entrepreneurship are promising in one country, the more the national rate of user entrepreneurship increases.

National culture is a special macro-level determinant. Users based in countries with a national culture supporting innovation and entrepreneurship should be more likely to raise funds quickly to start a new business. In other words, the configurations of the various cultural dimensions can shape the national orientation to foster (or not) some other macro-determinants (e.g. economic opportunities). Alternatively, an adverse national culture could lead to the lack of incentives and government initiatives to support user innovators in the creation of their business ventures. Drawing on these considerations, we can develop the following two hypotheses:

H₃: National culture directly impacts on the national rate of user entrepreneurship in one country.

H₄: National culture enhances the effect of some macro-determinants on user entrepreneurship in one country.

3. Research method

Bearing in mind the analysis of critical determinants belonging to the macro-level environment (at the national level) which influence entrepreneurship development, data concerning a narrowly defined healthcare sector were analysed. The analysis started from the findings about the macro-determinants of user entrepreneurship in healthcare (Schiavone et al. 2020). The authors identified the national macro-determinants of user entrepreneurship in healthcare, providing an exciting way to measure health user entrepreneurship. In the present study, we used a narrow set of those variables to confirm the driving force of macro determinants on user entrepreneurship in the healthcare sector. We also introduced values about culture (Hofstede, 2010) to verify possible interactions and to moderate such relationships. The study was adopted as a main statistical tool, cluster analysis, principal component analysis (PCA), and a polynomial regression model.

The environment plays a crucial role in explaining the different levels of user entrepreneurial activity across countries. The literature review suggests hard, overlapping, broad relationships between country factors and entrepreneurship with a specific research gap in health user entrepreneurial activity. The research method here adopted aims at validating these transmission mechanisms empirically, exploring the dependence structure of the context without imposing an a priori questionable theory about relationships among factors, adopting exploratory techniques such as a cluster joined to PCA.

To answer the research questions and to verify the first hypothesis, cluster analysis (Grover and Vriens, 2006) was applied as a data-driven approach to identify the possible agglomerations of countries sharing common characteristics concerning some possible country-key factors of user entrepreneurship evaluating, then, the role of the national culture in that configuration of country clusters.

The idea behind the use of such statistical techniques consists in proving a clustering behaviour of a similar level of entrepreneurship in different countries, highlighting the country factors driving the development of new business activity from users, e.g. are user innovators equally likely to become entrepreneurs in countries with the same development opportunities, and are the chances of stimulating business with creativity and innovation-driven ideas identical? Suppose entrepreneurial activity is different across groups of countries. In that case, it is possible to describe the main country characteristics that allow for a better comprehension of each variable's role within every country group and its effect on user-entrepreneurial activity.

Cluster analysis needs uncorrelated variables. Thus, an exploratory principal component analysis (PCA, Hotelling 1933; Jolliffe 2002) was performed. The method's choice was to reduce the complexity of context dimensions by exploiting their correlations, obtaining from a set of original variables a smaller set of meaningful orthogonal 'components'. Therefore, the resulting lower number of

independent components, able to explain the more considerable variability of the original data, are eligible to be used as significative dimensions to map the clusters.

Finally, a quantitative dependence analysis can be a suitable model to explain the different levels of health user entrepreneurship across countries with some national key factors, verifying H_2 and measuring how the culture affects such a relationship. A regression model aims to measure the national culture values' main effects on health user entrepreneurship and possible interaction effects between the national culture and some country key factors on health user entrepreneurship, as supposed in H_3 and H_4 . Then, to extend the flexibility and thus the applicability of regression models, a natural extension of linear dependence modelling accounts for nonlinear dependencies. Therefore, a second-order polynomial regression model was applied to control for any possible nonlinear effects. More specifically, Model 1 considers the quadratic effects of the main country-key factors on health user entrepreneurship, Model 2 adds to Model 1 the direct effect of national culture dimensions, and Model 3 also analyzes interactions between national culture dimensions and some country-key factors on health user entrepreneurship, adding a product term in Model 2 among such predictors, considering their squared values, however. Analyses were performed using R statistical software.

3.1 Sample data and measures

The study started with the main findings of Schiavone et al. (2020). The results obtained in that study were mainly focused on defining the measure of health user entrepreneurship at the national economy level and the variables able to measure the main country-level factors, not easy to identify. In the present study, we attempt to identify the macro-level determinants of user entrepreneurship using a narrower set of variables selected in Schiavone et al. (2020), also including the national culture as a possible moderator of that relationship.

To achieve representative results, a sample design was carried out in Schiavone et al. (2020) to define the health user entrepreneurship. Given different levels of health user entrepreneurship across countries, the data collection about entrepreneurship-related factors was supported by analysing the relevant literature on the country key drivers of entrepreneurial activity (Schiavone et al. 2020).

The measure of health user entrepreneurship was defined considering new forms of national economic activity in the healthcare sector that have become more widespread or have emerged due to innovation by healthcare stakeholders and Total Early-Stage Entrepreneurial Activity (TEA) in each country. Stakeholders at this level of analysis can be both patients or caregivers (external stakeholders) and professionals (internal stakeholders) in the healthcare sector.

To compare the level of health user-entrepreneurship by country, taking into account the country differences in terms of population and, then, of entrepreneurship, Schiavone et al. (2020) defined a new indicator as a measure of the health user entrepreneurship, denoted as a 'New Business Creation from Health (% TEA)' as a contribution of the number of health user innovations per country to become new businesses to the total number of new businesses created in each country. More specifically, newly created business units were considered if the innovation generated by health stakeholders has become an entrepreneurial activity (in the period 2017–2018). Therefore, a good proxy for measuring health user innovations, which is the numerator of the 'New Business Creation from Health (% TEA)' variable, has been a sample of 359 innovations, randomly selected across more than 40 countries and nine diseases. The data sample was obtained employing a content analysis applied to the Google search engine results after selecting keywords related to the study's subject, i. e. key names, identifiable diseases, disease keywords. The data sample covered innovation projects concerning, more specifically, the most widespread disease keywords: diabetes (4%), eye disease (7%), cancer (14%), ear disease (5%), heart disease (4%), mental problems (8%), motor disability (31%), neurodegenerative disease (9%), and other (undefined) diseases (17%). (Table 1) reports that new business creations originated from health innovations.

Table 1. New business creation from innovations across countries.

| Country | New Business Creation (% Innovations) | Country | New Business Creation (% Innovations) |
|------------------|---------------------------------------|-----------------------|---------------------------------------|
| <i>Argentina</i> | 100 | <i>Netherlands</i> | 40 |
| <i>Australia</i> | 83 | <i>New Zealand</i> | 100 |
| <i>Austria</i> | 100 | <i>Peru</i> | 50 |
| <i>Belgium</i> | 53 | <i>Philippines</i> | 0 |
| <i>Brazil</i> | 60 | <i>Poland</i> | 0 |
| <i>Burundi</i> | 100 | <i>Portugal</i> | 38 |
| <i>Canada</i> | 92 | <i>Russia</i> | 83 |
| <i>China</i> | 100 | <i>Singapore</i> | 100 |
| <i>Congo</i> | 100 | <i>Slovenia</i> | 100 |
| <i>Egypt</i> | 100 | <i>South Africa</i> | 50 |
| <i>France</i> | 100 | <i>South Korea</i> | 100 |
| <i>Germany</i> | 90 | <i>Spain</i> | 100 |
| <i>Ghana</i> | 50 | <i>Sweden</i> | 0 |
| <i>Greece</i> | 0 | <i>Uganda</i> | 50 |
| <i>India</i> | 100 | <i>Ukraine</i> | 100 |
| <i>Ireland</i> | 67 | <i>United Kingdom</i> | 74 |
| <i>Israel</i> | 100 | <i>United States</i> | 67 |
| <i>Italy</i> | 100 | <i>Uruguay</i> | 0 |
| <i>Kenya</i> | 100 | <i>Venezuela</i> | 100 |
| <i>Mexico</i> | 100 | <i>More countries</i> | 22 |

While the denominator of the 'New Business Creation from Health (% TEA)', measuring the total number of new businesses created in each country, was the Total Early-Stage Entrepreneurial Activity (TEA) value (GEM, 2015).

TEA values, calculated for representatives of the adult population, the so-called Commercial Group (18–64 years old), is either the number of people per country who are starting out as entrepreneurs or the owner of a newly established company. GEM was adopted for research purposes by considering the weighted sample's representativeness constructed from 200,000 interviews conducted with adults in each country studied. The data from GEM 2015 refer to the year 2018.

Data collection concerning entrepreneurship-related elements affecting entrepreneurship at the national level in several different economies (countries) was performed, where it should be noted that the model proposal of Verheul et al. (2002) was also considered. Its assumptions are based on the foundation that environmental, technological, economic, and cultural variables need to be identified to understand the impact of user entrepreneurship.

An essential element at this level of the analysis was determining supply and demand in a given country. Analysing the demand part, it is necessary to indicate the current opportunities that create the basis for entrepreneurship development, thanks to market structures, industrial development, and the very diversity of demand behaviour. In turn, the latter is determined by the rate of economic growth in a given country and the rate of technological development and opportunities for economic integration at the supranational level.

(Table 2) reports the selected variables of demand factors, such as the economic quality and business environment, both measured by the correspondent prosperity pillars (Legatum Institute 2018); the contribution of R&D to GDP (World Economic Forum 2018); and innovation of a country measured by the innovation index (World Bank 2018).

Elements related to supply suggest (Zeyen, Beckmann, and Akhavan 2014) that the development of entrepreneurship depends mainly on a given segment (in this case, understood as characteristics of the national population). Features in this respect include, among other things, access to resources and opportunities, and attitudes towards entrepreneurship development.

(Table 2) reports all variables involved in this dimension referring to the personal freedom, safety, and security pillars of prosperity (Legatum Institute 2018), to the level of national creativity (creativity index, Martin Prosperity Institute 2018), to GDP per capita (World Bank 2018), and the rate of researchers and technicians of total population (World Bank 2018).

Table 2. Determinants of entrepreneurship across countries.

| Categories | Cross-country data | Sources of data | Data year |
|--|--|--------------------------------|-----------|
| Demand factors (economic opportunities) | (1) Structural policies | Legatum Prosperity Index: | 2018 |
| | (2) Economic satisfaction and expectations | Economic Quality pillar | 2018 |
| | (3) Distribution of prosperity | Legatum Prosperity Index: | 2018 |
| | (4) Engagement | Business Environment pillar | 2018 |
| | (5) Production quality and diversity | World Economic Forum | |
| | (6) Long-run per capita income growth | World Bank | |
| | (7) Access to infrastructure (Internet, transport and to credit) | | |
| | (8) Business flexibility | | |
| | (9) Clear and fair regulation and perceptions of meritocracy and opportunity | | |
| | (10) Innovation | | |
| | (11) Contribution of R&D to total GDP | | |
| Supply factors (resources and abilities) | (1) National security | Legatum Prosperity Index: | 2018 |
| | (2) Personal precariousness | Safety and Security Pillar | 2018 |
| | (3) Personal safety | World Bank | 2018 |
| | (4) GDP per capita | Legatum Prosperity Index: | 2018 |
| | (5) Basic legal rights | Personal freedom Pillar | 2018 |
| | (6) Individual freedom | Legatum Prosperity Index: | 2015 |
| | (7) Social tolerance | Social Pillar | 2018 |
| | (8) Social cohesion and engagement | Legatum Prosperity Index: | |
| | (9) Community and family networks | Education Pillar | |
| | (10) Political participation and institutional trust | Martin Prosperity Institute: | |
| | (11) Access to education | World Bank | |
| | (12) Quality of education | | |
| | (13) Human capital | | |
| | (14) Creativity | | |
| | (15) Contribution of Researchers & technicians to total population | | |
| Quality of Governance | (1) Effective and accountable government | Legatum Prosperity Index: | 2018 |
| | (2) Fair elections and political participation | Governance Pillar | |
| | (3) Rule of law | | |
| | (4) Level of a country's democracy | | |
| Environment | (1) Natural Environment | Legatum Prosperity Index: | 2018 |
| | | Natural Environment Pillar | |
| Health | (1) Contribution of health expenditure to total GDP | World Bank | 2018 |
| | (2) Basic health outcomes | Legatum Prosperity Index: | 2018 |
| | (3) Health infrastructure and preventative care | Health Pillar | 2018 |
| | (4) Physical and mental health | Google disease search keywords | |
| | (5) New business creation in healthcare sector | | |
| Cultural values | (1) Power distance (large versus small) | Hofstede | 2010 |
| | (2) Uncertainty avoidance (strong versus weak) | | |
| | (3) Individualism versus collectivism | | |
| | (4) Masculinity versus femininity | | |
| | (5) Long-term orientation versus short-term normative orientation | | |
| | (6) Indulgence versus restraint | | |

The cultural environment here is an essential complement because, together with the institutional environment, it determines the supply side of entrepreneurship development. Finally, the study was supplemented by elements related to governance quality and the natural environment. They constitute an essential component correlated with the amount of prosperity achieved, which facilitates access to entrepreneurial initiatives in each country. The analysis focuses, as mentioned, on the health sector, as this is the part of the market where innovative solutions, created directly by users, are particularly visible (Von Hippel 2017).

To highlight results related to a narrowly defined sector, the analysis has been extended to include specific elements in the healthcare market and some cultural dimensions in Hofstede's framework (presented in Table 2). We considered the health pillar of the prosperity index and the

rate of expenditure for health services (both private and public) as an essential element to measure the attention given to health in a country, influencing entrepreneurial activity. Health expenditure can be considered a determinant of health status, measuring the country's culture of health, strictly connected to a nation's economic development, as an investment to enhance the quality of life. Experience has revealed that countries that assign due recognition to this aspect have healthier and more productive human capital (Sengupta 2015), possibly relevant user entrepreneurship drivers.

Unlike Schiavone et al. (2020), we selected a narrow set of variables in the analysis, due to the evident connections among some macro variables, using a combination of these variables, rather than single items, in explaining user entrepreneurship. We adopted the Legatum Prosperity Index 2018 as a combination of all the pillars reported in (Table 2) (Legatum Institute, 2018), reducing the whole dimension of 29 items initially grouped in nine single pillars. Thus, the analysis concerns the Prosperity Index (Legatum Institute, 2018), instead of each of the pillars which comprise this, and the other eight variables related to the percentage of new business creation from health of TEA, the contribution of health expenditure to GDP, the innovation index, the creativity index, the GDP per capita, the contribution of R&D expenditure to GDP, and the contribution of researchers and technicians to population.

Therefore, by combining different data sources and using combinations of variables, the sample size was reduced to 33 countries due to the lack of variable information for some countries in several datasets.

4. Results and conclusions

4.1. Results

The analysis explores the role of some country-key factors in entrepreneurial activity, proceeding to argue our research hypotheses' validity. It investigates a possible country clustering behaviour first and then attempts to identify the direct effects and possible interactions of macro-determinants and national culture on user entrepreneurship.

Cluster methods require orthogonal items to avoid issues related to multicollinearity, whose assumption risks attributing more weight to correlated items in the construction of the distance matrix. Therefore, given significant correlations of variables involved in the analysis (reported in Table 3), a principal component analysis (PCA) was applied to reduce these related dimensions, exploiting their correlations, and deriving orthogonal components.

The PCA applied to a narrow set of variables of (Table 2) (selecting the prosperity index as a combination of all its separated pillars) provides two standardized and orthogonalized factors (components) to explain the 77% of data variability. Each variable had a factor loading greater

Table 3. Pearson correlations and descriptive statistics.

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|--|---------|---------|---------|---------|---------|---------|--------|-------|
| 1. New Business Creation from Health (% TEA) | 1,000 | | | | | | | |
| 2. Health expenditure (% of GDP) | 0,688** | 1,000 | | | | | | |
| 3. Innovation Index | 0,464** | 0,586** | 1,000 | | | | | |
| 4. Creativity Index | 0,395* | 0,649** | 0,705** | 1,000 | | | | |
| 5. Prosperity Index | 0,315 | 0,630** | 0,754** | 0,878** | 1,000 | | | |
| 6. GDP per Capita | 0,349* | 0,452** | 0,772** | 0,788** | 0,804** | 1,000 | | |
| 7. R&D expenditure (% of GDP) | 0,316 | 0,510** | 0,845** | 0,555** | 0,569** | 0,622** | 1,000 | |
| 8. Researchers & technicians (% of Population) | -0,125 | 0,144 | 0,315 | 0,380* | 0,390* | 0,398* | 0,402* | 1,000 |
| Mean | 3,211 | 8,330 | 4,239 | 0,688 | 66,651 | 34,621 | 1,609 | 3,789 |
| St.dev | 5,879 | 2,642 | 0,931 | 0,208 | 8,986 | 19,783 | 1,080 | 6,364 |

** p < 0,01, * p < 0,05

Table 4. Factor loadings of factor analysis (PCA).

| Item | <i>Innovation driven wealth</i> | <i>Health culture-driven user entrepreneurship</i> |
|--|---------------------------------|--|
| Prosperity Index | 0.854 | |
| GDP per Capita | 0.853 | |
| Creativity Index | 0.822 | |
| Innovation index | 0.814 | |
| R&D expenditure (% of GDP) | 0.769 | |
| Researchers & technicians (% population) | 0.708 | |
| NBC (%TEA) | - | 0.897 |
| Health expenditure (% GDP) | - | 0.734 |
| Variance (%) | 60.438 | 16.392 |

than 0.5 on a single component; each component can be explained by a set of specific variables based on the correlations (factor loadings).

We denoted the first multidimensional factor as 'Innovation-Driven Wealth' because of its significant connection with the country's prosperity, the level of innovativeness, entrepreneurial creativity, and spending on research and development (Table 4). This finding is in line with Bouncken and Kraus (2013). It was assumed that innovativeness would be positively correlated with the level of creativity (Table 3). The factor related to health user entrepreneurship (see the composition in Table 4) and the rate of health expenditure (% of GDP) has been denoted as 'Health Culture-Driven User Entrepreneurship'. In particular, the attention to health was measured as the rate of expenditure on health services (both private and public). It can also measure the country's culture of health, which can influence entrepreneurial activity. Expenditure can be considered as an investment for enhancing the quality of life of the people. Health expenditure is then an essential determinant of the health status and economic development of a nation. Furthermore, since a mediating role of the culture of health emerges in the relationship between some macro-determinants and user entrepreneurship in health (see the Appendix), the use of the composite indicator 'Health culture-driven user entrepreneurship', instead of the single health user entrepreneurship item in the dependence analyses that follow seems to be more appropriate.

Mapping countries using the orthogonalized components, Innovation-Driven Wealth and Health Culture-Driven User Entrepreneurship (reported in Table 4), clustering behaviour was quite evident. Thus, a hierarchical cluster analysis was applied in order to identify the appropriate number of clusters. Such a number is an arbitrary critics (Hambrick 1984), and there is no objective selection procedure (Hair et al. 1995). Four clusters are evident by reading the dendrogram (available upon request), as one of the methods suggested in the literature (Everitt and Dunn 1991).

A non-hierarchical analysis with the k-means method (MacQueen 1967) was applied to obtain the final configuration, as in (Figure 1). (Table 5) shows the average values of the original variables involved in the k-means cluster method to describe the four clusters better. Results highlight that Cluster 3 (in Figure 1) includes the 'wealthy' countries.

Therefore, countries belonging to this cluster show the low values of Health Culture-Driven User Entrepreneurship, suggesting that innovations are probably generated in different sectors, not

Table 5. Cluster means.

| Cluster | New Business creation from health (%TEA) | Health expenditure (%GDP) | Innovation Index | Creativity Index | Prosperity Index | GDP per capita | Researchers and technicians (% Pop) | R&D expenditure (% GDP) |
|---------|--|---------------------------|------------------|------------------|------------------|----------------|-------------------------------------|-------------------------|
| 1 | 5.986 | 10.000 | 4.611 | 0.831 | 73.392 | 43.133 | 1.931 | 1.880 |
| 2 | 0.793 | 6.429 | 3.371 | 0.490 | 57.774 | 16.386 | 0.383 | 0.713 |
| 3 | 1.268 | 8.667 | 5.044 | 0.825 | 72.974 | 51.711 | 11.351 | 2.602 |
| 4 | 29.581 | 17.000 | 5.800 | 0.950 | 73.351 | 59.500 | 0.130 | 2.790 |

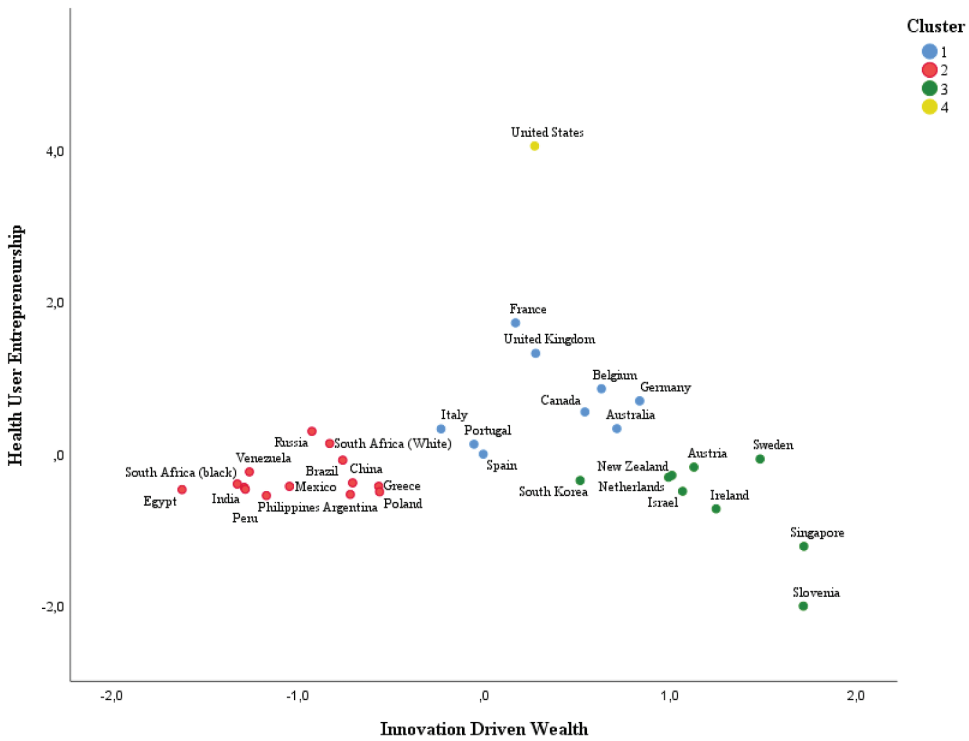


Figure 1. Cluster configuration.

Table 6. Community.

| | Initial | Extraction |
|-----------------------|---------|------------|
| Power distance | 1.000 | 0.689 |
| Individualism | 1.000 | 0.767 |
| Masculinity | 1.000 | 0.383 |
| Uncertainty Avoidance | 1.000 | 0.329 |
| | 1.000 | 0.636 |
| Indulgence | 1.000 | 0.534 |

related to health, possibly due to the lack of widespread attention to health (culture of health). Such a low culture of health can constitute a barrier to create a venture originated by patient innovations. Besides, researchers and technicians’ high rate in the total population suggests that these countries are indeed innovators, but probably not user-innovators. The health culture-driven user entrepreneurship is also low in Cluster 2 (see Figure 1), which incorporates the poorer countries, where people are not in the right conditions to develop entrepreneurial activities given their ability to innovate.

Countries in Clusters 1 and 4 show high values of user entrepreneurship in health, related to high values of the culture of health and an intermediate position in wealth, creativity, and prosperity. Such clusters are characterized by medium wealth conditions supporting innovation, which enable health user entrepreneurship to be developed, and innovations are generated in health because of the health culture. Whether countries have higher or lower levels of financial and economic wellbeing, upliftment and prosperity could not enhance user entrepreneurship in the health sector if not supported by elevated values of health status (culture of health). Such behaviour supports the

Table 7. Factor loadings on cultural values.

| | Component | |
|-----------------------|-----------|--------|
| | 1 | 2 |
| Individualism | 0.805 | -0.344 |
| Power distance | -0.754 | 0.347 |
| Indulgence | 0.609 | 0.403 |
| Uncertainty Avoidance | -0.556 | 0.142 |
| Long term orientation | -0.268 | -0.751 |
| Masculinity | 0.326 | 0.526 |
| Variance (%) | 34.573 | 21.049 |

evidence for H_1 , indicating that a group of countries sharing common macro-level conditions have the same level of health user entrepreneurship.

However, looking at the countries' configuration in (Figure 1), we can observe an inverted U-shaped relationship across countries (as shown in Figure 2). Such a relationship implies that Health Culture-Driven User Entrepreneurship increases in countries where the Innovation-Driven Wealth factor is also increasing. This behaviour changes for a certain threshold of the Innovation-Driven Wealth factor after countries show decreasing values of Health Culture-Driven User Entrepreneurship".

As a result, we estimated a second-order polynomial regression model considering the Health Culture-Driven User Entrepreneurship as dependent. A significant quadratic relationship emerges among them ($F = 8.236$, $p = 0.001$), as reported in (Figure 2).

It should be stressed that macro-level determinants of user entrepreneurship are a facilitator until a given threshold; achieving their average level, this tends to decline because they are not sufficient to support entrepreneurship in health without a high level of a culture of health within countries. This finding partially supports the hypothesis H_2 , at a given level of Innovation-Driven Wealth, but after that the hypothesis is not confirmed. Such behaviour implies that the culture of health can be considered as one of the main drivers of user entrepreneurial activities, however mediating the relationship of health user entrepreneurship for some selected macro-determinants (Figure 1A, in the Appendix).

At this point, the main question is, 'can the role of culture in the Hofstede framework enhance these connections?' The analysis tries to explore the effect of introducing the national cultural variables of Hofstede into the model, considering them as possible moderators. To work with a restricted number of dimensions related to the national culture (Hofstede 2010) and avoid issues related to multicollinearity in regression models, a factor analysis was applied to the national cultural variables of (Table 2). As a result, two main dimensions were determined (Table 6, Table 7) with PCA analysis.

The first component concerns the national culture level related to Individualism, Power distance (with a negative sign), Indulgence, Uncertainty Avoidance (with a negative sign). The second factor is more linked to the cultural values of Masculinity and of Long-term orientation.

To identify the role of culture in the accounted relationship, we must test several models where culture factors appear as regressors and moderators of such a relationship by introducing an interaction term. Model 1 considers only the direct effect of the Innovation-Driven Wealth, in a nonlinear way, considering a quadratic polynomial regression, as follows:

Model 1

$$H = Idw + Idw^2$$

Table 8. Multiple regression results.

| Dependent: Health User Entrepreneurship | | | |
|--|--------------------|----------------------|---------------------|
| Independent | Model 1 | Model 2 | Model 3 |
| Constant | 0.69 ** (0.22) | 0.57 * (0.22) | 0.62 ** (0.21) |
| Innovation driven wealth | 0.07 (0.15) | -0.20 (0.21) | -0.17 (0.20) |
| Innovation driven wealth ² | -0.71 ** (0.17) | * -0.58 ** (0.18) | -0.73 *** (0.18) |
| National Culture (1 st component) | | 0.39 * (0.16) | 0.71 ** (0.22) |
| National Culture (2 nd component) | | -0.18 (0.19) | -0.22 (0.18) |
| National Culture x Innovation driven wealth | | | 0.12 (0.16) |
| National Culture x Innovation driven wealth ² | | | -0.39 * (0.17) |
| R ² | 0.35 | 0.46 | 0.55 |
| Adj. R ² | 0.31 | 0.39 | 0.45 |
| Num. obs. | 33 | 33 | 33 |
| RMSE | 0.83 | 0.78 | 0.74 |

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, . $p < 0.10$

Where H is the Health Culture-Driven User Entrepreneurship factor, and ldw is the Innovation-Driven Wealth factor. Findings reveal a nonlinear influence of the Innovation-Driven Wealth term on the dependent variable, partially confirming H_2 . The culture of health mediates the effect of such a factor on user entrepreneurship (see the Appendix).

Then, in the relations among national cultural values and the Health Culture-Driven User Entrepreneurship across countries, the linear r correlation (Bravais-Pearson) and the non-parametric correlations (Kendall's Tau and Spearman Rho) were estimated. High linear correlations between the first component of culture and the dependent are observed ($r = 0.392$, p -value = 0.024), suggesting using a linear model for such a relationship. While not significant, correlations, both linear and nonlinear, were observed between the second factor of cultural values and the dependent variable ($r = 0.067$, p -value = 0.712, $\rho = -0.075$, p -value = 0.679 and $\tau = -0.047$, p -value = 0.698).

Therefore, adding to *Model 1* the two components of the culture, respectively, the first and second denoted as c_1 and c_2 , we get the following model:

Model 2

$$H = ldw + ldw^2 + c_1 + c_2$$

It is quite evident from (Table 8) (*Model 2*) that there is a direct positive effect of the first component of the cultural dimension on the Health Culture-Driven User Entrepreneurship factor (as stated by Pearson's correlation coefficient). The second component does not affect the dependent, as suggested by the non-significance of correlation coefficients.

Then *Model 3* reports findings about the polynomial regression model considering the interaction terms and moderating the effects of the national culture.

Model 3

$$H = ldw + ldw^2 + c_1 + c_2 + c_1ldw^2 + c_1ldw^2$$

We can show the main effect of national cultural values related to the first component¹ and the significance of the moderating role in the curvilinear relationship (Table 8). Such evidence confirms hypotheses H_3 and H_4 , considering the mediator role of the culture of health in that relationship (see

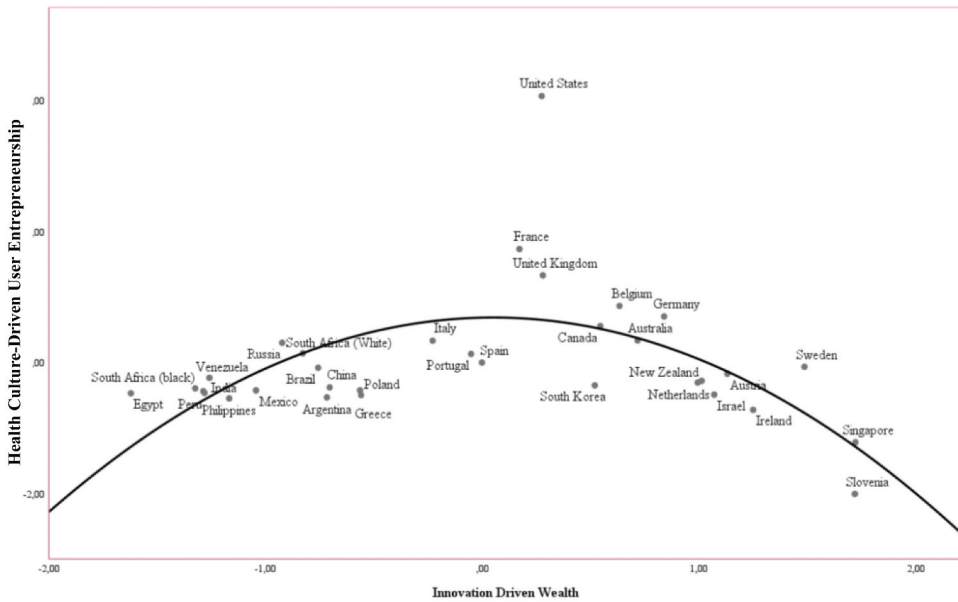


Figure 2. Inverted U-shaped relationship.

the findings in the Appendix). National cultural values positively affect user entrepreneurship supported by the health of culture and positively moderate the nonlinear relationship between the Innovation-Driven Wealth and the Health Culture-Driven User Entrepreneurship factors (Figure 3, 4). Therefore, the higher is the curve; the higher are the national cultural values.

4.2 Summary and conclusions

Concluding, the analysis found two factors as representative of the overall variability of the original dataset related to some identified macro-determinants of user entrepreneurship in the health sector. The first component is mainly related to Innovation-Driven Wealth, which is mainly correlated with high prosperity, creativity, and innovation within a country. In comparison, the second component is defined as Health Culture-Driven User Entrepreneurship. Findings reveal that the culture of health mediates the effect of some relevant country key-drivers on health user entrepreneurship.

A clustering behaviour of countries emerges, leading to identifying four clusters, which have similar levels of health user entrepreneurship related to similar macro-level conditions, confirming hypothesis H_1 . Prosperity, creativity, and innovation capacity within a country generally involved high levels of national health status, which can be joined to health user innovations, and consequently to high rates of new business creations; see, for instance, the United States and countries of Cluster 1 (Figure 1). Conversely, countries in Cluster 2 (Figure 1), which innovate in health as well as in other sectors, such as Russia and South Korea, could increase their low user entrepreneurship by enhancing the level of the culture of health, improving the quality of governance (in line with Thai and Turkina 2014), and creating better conditions for the business environment. The analysis carried out an inverse U-shaped relationship between Health Culture-Driven User Entrepreneurship and Innovation-Driven Wealth. Increasing levels of Innovation-Driven Wealth per country match increasing user entrepreneurship outcomes, making these country factors a driving force for user entrepreneurship in the presence of a high health status until a given threshold of wellbeing, after which the effect tends to decline. Such findings partially support H_2 . When national culture is added to the

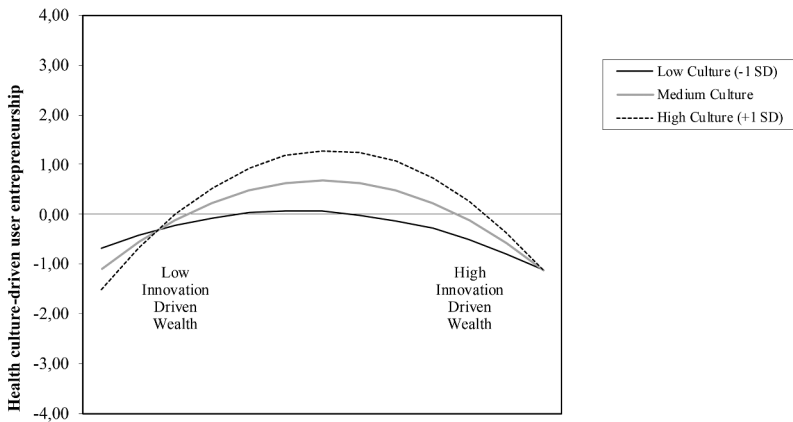


Figure 3. Moderation of the culture in the inverted U-shaped relationship.

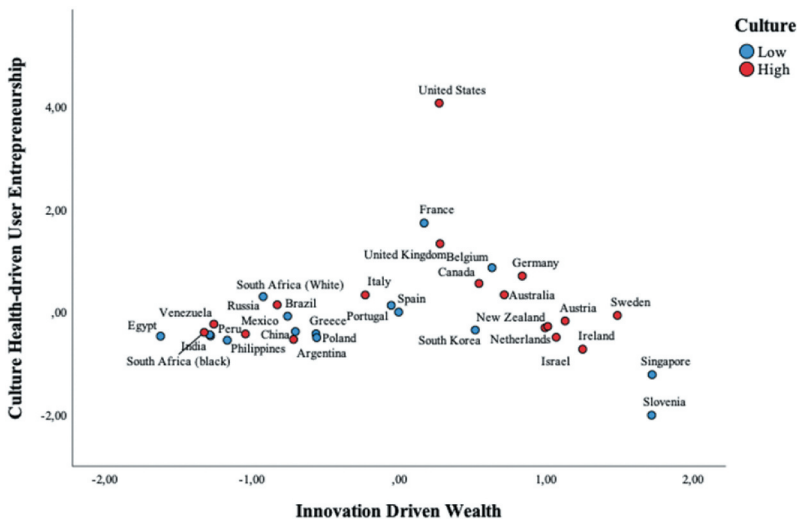


Figure 4. Map of countries by different cultural values.

model, this shows a positive direct effect on user entrepreneurship and a moderating role in the accounted curvilinear relationship, confirming hypothesis H₃ and H₄, through the country's presence's health culture values. Although the level of Innovation-Driven Wealth is the same for the United States and France, Health Culture-Driven User Entrepreneurship is more significant in the US. This would imply that the positive moderation induced by national cultural values is profoundly different between these countries.

As a consequence of these findings, the spillover effect of the Innovation-Driven Wealth factor on user entrepreneurship in healthcare is higher in countries that pay attention to the culture of health, to enhance the quality of life of the people, who are more individualistic, more comfortable with ambiguity, and more likely to take risks, more entrepreneurial, more democratic and consultative, indulgent, and which allows relatively free gratification of basic and natural human drives related to enjoying life and having fun.

5. Discussion and implications

5.1 Theoretical input

The research process was based on the verification and analysis of factors occurring at the national level, defined as determinants of business processes at the user level. By generating new theoretical input and, at the same time, filling a previously formulated research gap, this study acts to complement and broaden the knowledge. The research results complement the currently available knowledge on user entrepreneurship (Shah and Tripsas 2007, 2016) by showing the microenvironmental level determinants turn out to be insufficient for entrepreneurial process initiatives.

The existing literature focuses on determining the strength of barriers to market entry or the expected benefits of entrepreneurs. The study results take into account the essential factors that are macroenvironmental at the level of national analysis. Notably, the user-entrepreneur process is not always effective as it carries some risks. The resulting knowledge extending the available analyses (Biryukov, Romanenko, and Khairova 2015) focuses on national competitive advantages supporting entrepreneurship. This leads to the marginalization of problems identified by user-entrepreneurs. The effectiveness of management processes at the national level determines the strength and pace of economic growth. Significant differences in this respect can be seen where countries with relatively low outlay on development infrastructure do not create initiatives that respond to local markets' needs. The opposite process is noticeable in countries with increased potential social initiatives and a favourable macro-environment, where the percentage of user-entrepreneurs is much higher.

The study results contribute to the existing theory of the macro-level factors supporting entrepreneurial activities and processes (Van Stel, Carree, and Thurik 2005; Thai and Turkina 2014; Schiavone et al. 2020) linked with culture. Our findings show culture play an important role in fostering user entrepreneurship, as showed also in prior research (Verheul et al. 2002; Thai and Turkina 2014). Our study extends such literature by showing national culture as a whole is important but not sufficient in order to achieve this goal. An orientation to creativity and the culture of health are crucial to push user innovators to start-up their own company.

An element distinguishing the research process was the proposal to include a factor related to national wealth, depending on the pace of introducing entrepreneurial innovations, e.g. the value of research and development investments and user-entrepreneurs' creativity. The study introduces a significant change in the trajectory of entrepreneurship analysis, extending the factors so far popularized in research, such as economic growth, GDP per capita, or budget balance (Acs et al. 2016). Moreover, it includes a variable related to health status, which measures attention to countries' culture of health. The research explorations have focused on the demand side and its correlation with the impact on stimulating entrepreneurial processes.

Methodologically, despite relatively simple assumptions and statistical analyses, the study's research objective has been achieved, indicating how different configurations of national culture differently impact on user entrepreneurship.

5.2 External environment implications

The results of the conducted analysis significantly imply the importance of entrepreneurship impact processes at the national level, both for the user-entrepreneurs and managers of their firms. People who act as market innovators are at the same time users who, as a result, create ideas for setting up new businesses, but only when they acquire the information necessary to understand the characteristics of running this business in a given national economy.

The result allows for an accurate assessment of the external environment conditions, which are the basis for creating both entrepreneurial initiatives and, ultimately, the creation of a new business unit. Another essential element is the percentage of user-entrepreneurs in a given location. In countries where this type of entrepreneurship has not yet become widespread, the emergence of

user-entrepreneurs lays the foundations for cooperation at the international level, beyond a given country's borders. This may involve a strategic change of strategy and ultimately offer products or services in another location that is more attractive to the entrepreneur, where conditions (e.g. tax, bureaucracy, the strength of external stakeholders) are more favourable and ultimately more accessible. This is a kind of emigration based on making a profit outside national borders.

The results presented in this study indicate a facilitation of start-ups which, in their strategy of operation, adopt a much shorter (narrowly defined) time horizon compared to the mainstream. This can be described as a new normal, i.e. adjusting to the reality defined by customers' signals and their needs. User-entrepreneurs, particularly those who operate in the markets of several countries simultaneously, are thus widening the scope of their activities and stimulating entrepreneurship where it is not sufficiently popularized. Processes of this type are visible in relation to strategic planning at the national level and, in turn, transferring them stimulates innovation at the local level of strategic business units. In each of these cases, the creation of cultural, entrepreneurial initiatives should consider local features, cultural determinants, and all those features that determine the macroenvironment.

5.3. National level implications

The results of the study also imply elements that are recommendations for the external political environment. The top recommendation indicates the need at the national level in terms of the promotion and health-related culture and the outlining of clear and transparent procedures for user innovators wishing to start their entrepreneurial activity. The interpretation, based on the literal wording of the recommendation, should indicate clearly defined procedures (pathways), which should result in improving financial conditions (wealth) at the national level and/or in local regions where the number of citizens acting as innovators is higher than the national average.

Initiatives at the national level should create space for entrepreneurship and meet the conditions for effective entrepreneurship management, thus eliminating the bureaucratic factor. The operational recommendation, which serves as a supporting recommendation, is a bottom-up educational process, an informational stimulus for citizens and their interactions with user-entrepreneurs. It is necessary in this aspect to consider cultural topics related to broadly-understood local and territorial development.

For efficient functioning, it is necessary to conduct adjustment processes in each cycle of monitoring and control of national entrepreneurship processes linked with culture and apply benchmarking with countries with the highest level of activity in culture-linked entrepreneurship. Cultural characteristics are a significant influencer on the relationship between economic and institutional contexts and entrepreneurial activity.

The observations suggest that countries with existing internal cultural links should emphasize benchmarking activities and thus look for a pattern in cultural activities supporting entrepreneurship. Therefore, this element is based on cooperation, which allows for the possibility of generating a significant innovation in value (not necessarily technological) by achieving synergies. Due to globalization, small- and medium-sized enterprises face increasing competition pressure from across the world. This creates a possibility for comprehensive cooperation, even between competitors, despite belonging to the same network of countries (Kraus et al. 2018).

5.4 Limitations and future research

Although this article's overarching goal has been achieved, the study identifies specific issues that require more in-depth analysis. The concepts published in the literature and the research results and current state of knowledge presented in this paper are not free from limitations going beyond the outlined directions of further cognitive effort.

The study indicates limitations in interpreting the meaning of the process of entrepreneurship creation at the national level and its relation to the presented models of entrepreneurship management. First, the research is focused on a narrowly defined industry. Data from many industrial economic sectors may suggest different relationships between model variables from those established during this research procedure and ultimately provide different conclusions. Second, the sector analysed in this study (healthcare) is subject to different conditions, characteristics, shape, and social impacts due to the country of origin. There are economies where healthcare is strictly homogeneous (private or public), which is related to the way it is financed and is also significantly reflected in citizens' perception. These wide-ranging divergences determine the principles (as well as the pace of development and limitations) of the sector. This calls into question the research results related to the sector, which do not consider the aspect of the location factor and territorial and geographical constraints. This aspect could be enhanced by inserting in a future study a factor related to a government's health system, showing its connection with country clusters.

The results of the research of enterprises located in different countries, as well as the analysis of the literature related to entrepreneurship, confirmed the particular complexity of the barriers to the growth of competitiveness on the healthcare market, as well as indicating greater possibilities of their gradual elimination in the case of adequately defined areas of their occurrence at the macro-level (national level).

The considerations, analyses, and evaluations presented in this paper allow, on the one hand, to verify the models of functioning of entrepreneurship and the processes of its creation and development for achieving competitive advantage. On the other hand, they enable verification of their practical application's possibilities and conditions in the healthcare market. They can also inspire further research in advanced analysis of the entrepreneurship phenomenon of enterprises related to the healthcare sector.

Therefore, a plan is formed to conduct more detailed research and analyses adapted to current economic processes and their diffusion within the modern technological sphere and the turbulent environmental conditioning of enterprises' competitive position. Future research could focus on the results achieved by user-entrepreneurs from nations located in different country-related clusters. A second interesting research challenge defining the direction of future study could be analysing industries with different characteristics, where derived sectors would be analysed, extending the scope of the domestic sector. In terms of new technologies and digital transformations, user entrepreneurship is taking on a new dimension and a different, disproportionately faster growth rate than before. Therefore, it may be questionable how macroeconomic factors influence the acceleration of new business creation in times of global acceleration, time compression, and thus ultra-fast, national-level entrepreneurship and citizen interaction as the backbone of local entrepreneurial activity.

Note

1. We do not show results reporting the interaction term of the second component because its main effect on the dependent was not significant, as well as its interaction with the Innovation Driven Wealth factor.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

The study explores the mediating role of the health's culture in the relationship between some selected macro-determinants and the health user entrepreneurship given the high values Pearson's correlation between user entrepreneurship and country's culture of health. Firstly, we applied a factor analysis to some selected macro-determinants, excluding the health expenditure (as a measure of culture of health), to obtain a new component of country factor as a possible determinant of user entrepreneurship (see Table 1a). Next, the marginal effects of both variables on the health user entrepreneurship were, separately, analysed in Model 1 and Model 2 (Table 2a).

In Model 1 (Table 2a in the Appendix), the predictors were the single component, derived by a factor analysis on some selected macro determinants (Table 1a), and its squared values; in Model 2 (Table 2 a), the predictor was the culture of health measured by health expenditure. Both relations, Model 1 and 2 (Table 2a) are positive (p-value<0.05) and show evidences of direct, strong substantial on the user entrepreneurship. Perfect mediation holds if the predictor has no effect when the mediator is controlled (Baron and Kenny 1986), as in the Model 3 (Table 2a), where both coefficients of macro determinants lose their significance for Model 1, and if the predictor affects the mediator, as in the Model 4, where both coefficients are significant (p-values <0.05). The variable related to health culture appears to be a perfect mediator of the effects of some macro-determinants on user entrepreneurship in healthcare (Figure 1a).

Table 1a. Factor loadings of some macro determinants.

| | Component |
|---------------------------------------|-----------|
| innovation index | 0,904 |
| creativity index | 0,885 |
| prosperity index | 0,903 |
| GDP PER CAPITA | 0,899 |
| R&D (%of GDP) | 0,806 |
| Researches and technicians (% of POP) | 0,526 |

Table 2a. Mediation of the culture of health in the U-shaped relationship.

| | Dependent: Health User Entrepreneurship | | | Dependent: Culture of Health |
|----------------------|---|-----------------|------------------|------------------------------|
| | Model. 1 | Model. 2 | Model. 3 | Model. 4 |
| Macro determinants | 2.57* (1.04) | | 1.16 (1.00) | 2.56* (0.99) |
| Macro determinants 2 | 2.23* (0.86) | | -0.87 (1.19) | 5.64a (0.82) |
| Culture of Health | | 0.49a (0.10) | 0.55** (0.16) | |
| R ² | 0.27 | 0.41 | 0.47 | |
| Adj. R ² | 0.22 | 0.39 | 0.41 | 33 |
| Num. obs. | 33 | 33 | 33 | 5.57 |
| Rmse | 5.85 | 5.15 | 5.07 | 5.57 |

ap<0.001, ***p*<0.01, **p*<0.05



Figure 1a. Mediator role of culture of health.