

Institutional environments and entrepreneurial start-ups: an international study

Abstract

Purpose-The purposes of this research are to examine how individuals' cognition is related to the rate of entrepreneurial start-ups and how this relationship can be modified by three institutional pillars.

Design/methodology/approach- Drawing upon a multilevel analysis and a global context comprising 67 countries, cross-level analyses are performed to assess the joint effects of entrepreneurial cognition and institutions on the rate of entrepreneurial start-ups.

Findings- The findings confirm the role of entrepreneurial cognition (i.e. self-efficacy, risk attitude, and opportunity perception) in individuals' decisions to start new businesses and reveal how this relationship can be diversely influenced by country-level institutional pillars.

Practical implications- This paper could be useful for designing policies to promote entrepreneurial activity through institutions in different countries.

Originality/value- The results contribute to the development of theoretical and knowledge bases by offering a multilevel perspective on how entrepreneurial cognition and institutional environments operate as interacting determinants that influence entrepreneurship.

Keywords Institutional theory; Entrepreneurship; Multilevel analysis; GEM data

Introduction

The economic policies that countries pursue affect the development of entrepreneurship which, in turn, promotes economic growth (Aidis et al., 2012; Estrin et al., 2013). Several articles have linked various measures of entrepreneurship to economic growth. For example, Reynolds et al. (1999) argued that one-third of the differences in the rates of national economic growth can be attributed to variations in entrepreneurial activity. Acs and Szerb (2007) built a model which endogenously determines entrepreneurship along with growth. In recent years, while studies have acknowledged the importance of enhancing our understanding of the determinants of entrepreneurship, few insights have been generated into why the rates of entrepreneurial activity differ across countries (Schillo et al., 2016; Urbano and Alvarez, 2014). In order to understand this phenomenon, a wealth of studies have adopted either a micro- (e.g. Boehe, 2013; Davidsson and Honig, 2003; Ellis, 2011) or macro-oriented approach (e.g. Urbano and Alvarez, 2014; Wu and Chen, 2014), but few have integrated the two. In a literature review, Alvarez et al. (2014) revealed that 47.4% of the existing entrepreneurship studies examine entrepreneurial activity from a micro-level perspective while 45.3% of the research has taken a macro-level view. Individuals' engagement in entrepreneurial activity is a joint function of both contextual and individual factors (Shane and Venkataraman, 2000), as well as the interactions between them (Autio and Acs, 2010). Researchers have commonly acknowledged that a single-level investigation produces an incomplete understanding of variations in entrepreneurial activity across countries (De Clerq et al., 2013; Lim et al., 2016), and that a cross-level framework is fundamental to the development of entrepreneurship theory (Zahra and Wright, 2011). A multilevel analysis is therefore needed to uncover how contextual factors might facilitate or hinder individual antecedents to be leveraged into entrepreneurship (Hitt et al., 2007; Shepherd, 2010). In order to address this important gap, this paper examines how individual-level variables might interact with country-level institutional pillars to simultaneously explain the different rates of entrepreneurial start-ups across 67 countries.

From a cognitive perspective, individual entrepreneurs' cognitive ability is an important resource that can predict entrepreneurial activity (Busenitz and Lau, 1996; Mitchell et al., 2000). These cognitive attributes are embodied in entrepreneurial willingness and

entrepreneurial capability, both of which relate positively to an individual's decision to engage in venture creation (Mitchell et al., 2000). Extant research has identified environmental conditions as playing the role of an intermediary between entrepreneurial cognition and business creation (e.g. Johannisson et al., 2002; Laine and Galkina, 2017; Lim et al., 2016), but studies on the association between country-specific environments and cognitive aspects are limited. The studies by Mitchell et al. (2000) and Goktan and Gunay (2011) are exceptions. In particular, Mitchell et al. (2000) assessed whether entrepreneurs' cognitive attributes vary across different countries and suggested that power distance and individualism are related to entrepreneurial cognition. Goktan and Gunay (2011) found that a high level of power distance may negatively affect the likelihood of venture creation. Despite their contributions to enhancing understanding of the relationship between cognition and national culture, their research does not disentangle the impacts of institutional environments and cognitive factors on the entrepreneurial process. Less attention has been paid to the country-level institutional environments that could facilitate and enable cognitive attributes to drive the development of entrepreneurship activities, and this neglect might have led to the inconsistent findings in regard to the observed differences in cross-country entrepreneurial activity (Autio and Acs, 2010; De Clercq et al., 2013). This paper responds to the call for more cross-country designs and advances the existing literature by performing a cross-level interaction analysis between individual-level cognitive antecedents and systemic contexts (De Clercq et al., 2013; Stenholm et al., 2013).

There is a large body of research suggesting that contextual factors can play an important role in shaping entrepreneurship (Urbano and Alvarez, 2014). In this respect, the country-level institutional environment has been extensively researched within the entrepreneurial domain as it is one of the elements within the 'profound structure' of differences between countries (Reynolds et al., 2005). It appears that differences in institutions might give rise to distinct levels of entrepreneurial activities across countries. Institutions generate the structure of the motivations that determine the choice of entrepreneurship over other occupations (Baumol, 1990). Although the literature relating to the country-level institutional environment typically applies a macro-level approach, there are a number of primary resources that employ a micro-level perspective, which is necessary in

order to understand individuals' attitudes towards and perceptions of entrepreneurial activities (Urbano and Alvarez, 2014). From an institutional perspective, human behaviour is determined by the institutions in which individuals are embedded (North, 1990). Institutional environments set the boundary conditions for individual and environmental interactions including the decision to create a new venture (Bowen and De Clercq 2008). Desirability and feasibility considerations about entrepreneurial activities are affected by contextual factors such as social norms, attitudes, and resource availability, which are not clearly articulated within the action theory of entrepreneurship (Acs et al., 2014). This research therefore adopts a unique set of measures for examining institutional environments, developed by Scott (1995), and tests the cross-level interactions that occur in a global setting covering 67 countries. To the best of our knowledge, this research is among the first to theoretically explain and empirically assess the impacts of individual-level cognition on venture creation and the extent to which this relationship can be modified by three measures of institutions- regulative, normative, and cultural-cognitive.

This paper makes important contributions to the entrepreneurship literature. First, it incorporates individual-level cognition with an institutional approach in jointly explaining the rate of entrepreneurial start-ups across countries. It acknowledges that entrepreneurs are not a homogeneous group and that they differ in central cognitive constructs. This research offers simultaneous considerations by relying on individuals' cognitive traits in terms of entrepreneurial self-efficacy, fear of failure, and opportunity perception. The research does not assume the automatic and universal benefits of entrepreneurial cognitions but, rather, recognizes that although entrepreneurial decisions are context-dependent, individuals might perceive the benefits of entrepreneurial activity differently (Aragon-Mendoza et al., 2016). Second, this paper shows that the individual-level cognitive antecedents and entrepreneurial start-ups relationship is incomplete without considering the country-level institutional dimensions. It extends the knowledge in the existing literature in that it not only studies the direct impacts of motivational antecedents at the micro-level, but also the contextual effects of the institutional environment. Methodologically, our research advances quantitative theory-testing research into entrepreneurship and cognition. It provides empirical evidence for the possible mechanism by which country-level factors enable individuals to engage in

business start-ups. This allows us to move the conversation on from whether micro-level factors (i.e. individual cognition) matter to assessing the optimal macro-level environments (i.e. institutions) in which they are more likely to promote or inhibit the individual-level effects on entrepreneurial start-ups. Third, while prior studies have tended to use either a micro- or macro-level approach to studying entrepreneurship, the integration of these two approaches might generate new insights that would allow us to examine the heterogeneity of the rate of entrepreneurial start-ups across countries. Based on a new model spanning two levels, this research brings the divergent trends of development closer and extends the research by showing the joint effects of both micro- and macro-level antecedents on the creation of new businesses. Fourth, the empirical findings complement the existing research on the primary role of national institutions by considering that different institutional dimensions might influence entrepreneurial behaviour, both as stimulants for, or constraints to the motivation to create new ventures. It identifies three pillars of national institutions (i.e. regulative, normative, and cognitive institutions) that have divergent implications for unleashing individual cognitive forces on venture creation.

Below, first, this paper introduces the recent theoretical developments in institutional theory and entrepreneurial cognition. Next, it has a theory-based discussion of the relationship between entrepreneurial cognition and venture creation. Then, it discusses and hypothesises how country institutional pillars might modify the above-mentioned associations. In section 4, it discusses the methodology and sample. Section 5 of this paper presents the analysis and results. Sections 6 and 7 conclude with key contributions and practical implications. Figure 1 illustrates our conceptual model and hypotheses.

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Literature review

Institutional approach

From the perspective of institutional theory, entrepreneurial behaviour has been explained as individuals' response to the formal and informal support and constraints of the particular institutional context in which individuals are embedded (Contractor et al., 2007; Scott, 1995).

Khanna and Palepu's (1997) seminal framework of the institutional environment suggests that the institutional system should not be regarded as homogeneous and institutions such as policy, capital infrastructure and product market regulations significantly affect how individuals develop their entrepreneurial activities. In the entrepreneurship research, this framework has been used under the 'institutional voids' lens, which emphasises how entrepreneurs overcome the lack of effective institutions in starting and operating businesses (Cuervo-Cazurra, 2016). The impacts of institutional environments on entrepreneurship have been acknowledged by prior research.

For instance, Kostova (1997) examined how institutional pillars affect domestic business activity. By applying the institutional profile measurement instrument to ten countries, Kostova (1997) found that countries differ significantly in terms of their institutional environments with regard to the regulatory, normative, and cognitive components. Organisational behaviour can be facilitated by improving these three aspects of the institutional environment. Based on this institutional instrument, Gupta et al. (2012) compared the impacts of the institutional system on entrepreneurship between two developmental states: the United Arab Emirates (UAE) and South Korea. Their empirical findings supported the assumption that there are significant differences in the aggregate institutional profiles of these two developmental states. They also suggested that the underlying institutional conditions for entrepreneurship remain less than favourable in both UAE and Korea. Stenholm et al. (2013) conducted an international study to assess how country-level institutional arrangements affect the rate and type of entrepreneurial activity. Their research examined three distinct institutional dimensions that are related to the amount of entrepreneurial activity and a novel conducive institutional dimension that supports the quality of entrepreneurship in different countries. Their empirical findings revealed that regulative arrangements have greater impacts on entrepreneurial activity than other institutional pillars. In addition, a stronger conducive institution is likely to increase different types of entrepreneurial activity within a country. Drawing on a sample of 8,160 entrepreneurs, Estrin et al. (2013) explored how heterogeneity in country-level institutions might influence entrepreneurs' employment growth aspirations. They found that institutional corruption, weak property rights and government activity are negatively related to

entrepreneurs' aspirations to improve employment. Social networks further compensated for weaknesses in national institutions.

While a country's institutional environment shapes its economic behaviour by monitoring resource allocations, forming incentive structures, and influencing transaction costs for economic exchanges (North, 1990), it provides necessary but not sufficient conditions for initiating a new business (Stenholm et al., 2013). The accessibility and availability of opportunities and resources provided by national institutions can be recognised in different ways by individuals. In a review of the application of institutional theory to entrepreneurship research, Su et al. (2017) revealed that existing research that adopts an institutional perspective mainly focuses on explaining the founding rate of firms across countries, while the indirect role played by institutions has been largely overlooked. These authors call for an integration of institutional theory with the individual-entrepreneurship model to assess how the variations in entrepreneurial activity can be explained based on the consideration of both individual and contextual factors (Su et al., 2017). Therefore, in an extension of extant research, this paper incorporates Scott's (1995) three institutional pillars into a multilevel model and examines the diversity of institutions that present very different sets of opportunities and constraints across countries.

Entrepreneurial cognition

Entrepreneurial cognition is defined by Mitchell et al. (2000) as “knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth” (p.977). Entrepreneurs generate exclusive knowledge structures and cognitive scripts that allow them to explore information in a more effective way than non-entrepreneurs. This notion has its roots in both sociology and psychology (Wood and Bandura, 1989) but supports the view of sociologists' that individuals' cognition is environmentally constrained. According to this perspective, the socio-structural affects operate via mechanisms within the self-system of individuals to generate behavioural effects (Bandura, 2002). Existing empirical evidence has confirmed the important role played by entrepreneurial cognition in entrepreneurial activities. For example, by studying 138 individuals from a MBA program, Kickul et al. (2009) revealed the impact of cognitive style

on venture creation. They argued that individuals' cognitive style matters greatly in terms of directing their attention to stages of venture creation that fit well with their preferred cognitive style, and away from other stages associated with their less favoured cognitive style. Individuals with different cognitive styles should therefore not be seen as having equal entrepreneurial self-efficacy with regard to all the tasks involved in business creation. Aragon-Mendoza et al. (2016) defined cognitive scripts as including multiple aspects, relating to the arrangements, willingness, and cognitive ability that people need to start a new venture. By conducting an experiment on a sample of 120,536 individuals from 25 countries, they found that entrepreneurial cognitive scripts are significantly related to venture creation decisions. Raza et al. (2018) further clarified the relationship between entrepreneurial cognition and innovative entrepreneurial activity. Drawing upon 1,004,620 observations from 49 countries, their research suggested that innovative entrepreneurship increases when individuals possess a high level of entrepreneurial cognition. They also found that other individual-level demographic variables can be considered as important components of high-quality entrepreneurship. Age, gender and education appeared to significantly affect individuals' propensity to start innovative ventures. Their research addressed the methodological shortcomings by assessing innovative entrepreneurial activity from a multi-dimensional perspective.

While existing research has provided theoretical explanations and empirical evidence for entrepreneurship as an individual-level phenomenon (Autio et al., 2013; De Clercq et al., 2010), individuals' internal attributes differ, as does the way in which they selectively process the information created by subjectively constructed external environments. The differences in individual entrepreneurs' psychological profiles may explain why identical institutional forces have different impacts on individuals who then behave differently with respect to entrepreneurship. Thus, entrepreneurial cognition acts as an intermediary between institutional environments and business start-ups (Mitchell et al., 2010). However, few insights have been generated into the interplay between national institutions and entrepreneurial cognition. This paper therefore contributes to the existing research by integrating country-level and individual-level antecedents into the field of entrepreneurship and by considering the joint effects of these two-level variables. It highlights a national

system perspective on entrepreneurship proposed by Acs et al. (2014) which suggests that there are multiple levels of analyses and that considering one without the other could lead to inconclusive findings in terms of understanding entrepreneurial activity.

Theoretical frame and hypothesis development

Cognitive antecedents and entrepreneurial start-ups

Entrepreneurial start-ups refer to choices to start new ventures (Gartner, 1985), which is contingent on cognitive processes. Extant studies on entrepreneurial cognition emphasise the way in which individual entrepreneurs think, that is, the knowledge structures that individuals apply in the process of business opportunity evaluation, assessments, and exploration (Mitchell et al., 2000). The conceptualisation of entrepreneurial cognitive antecedents is one of the most comprehensive models, because cognitive antecedent phases are similar to other conceptual entrepreneurship frames such as that of Ajzen (1991), who contends that the first phase in the venture creation is the feasibility, and consequently the propensity to desire and act to create a venture. Arrangements of cognitive antecedents refer to a combination of self-efficacy, fear of failure, and perceived opportunities (Aragon-Mendoza et al., 2016). Self-efficacy is defined as an individual's estimate of their ability to complete a certain task within a specific domain (Bandura, 1997), with entrepreneurial self-efficacy denoting their belief in being able to successfully demonstrate their entrepreneurship (McGee et al., 2009). Individuals' judgements of their ability to complete tasks affect their choice of activities and behavior in given environments (Wood and Bandura, 1989). The stronger their perceived self-efficacy, the stronger an entrepreneur's belief in their ability to mobilise the courses of action and cognitive resources required to exert control over the events in their entrepreneurial activity (Wood and Bandura, 1989). Applied to entrepreneurship, entrepreneurial self-efficacy can influence individuals' motivation and consequently determine the amount of effort they exert in launching new firms. In addition, the more efforts they exert for instance growing businesses, the more knowledge and skills they will obtain and the greater their self-efficacy beliefs, which leads to further strengthened confidence in venture creation.

Fear of failure is defined as one's own risk preference (Sitkin and Pablo, 1992),

involving the willingness to pursue courses of action or decisions associated with uncertainty in regard to success or failure outcomes (Mullins and Forlani, 2005). It describes how an individual defines, orients to, and experiences failure in achievement situations. Entrepreneurs with varying willingness to take risks may categorise and subsequently frame the same environmental stimuli or challenge differently from each other in venture creation. Individuals possessing a low degree of willingness to take risks tend to consider an entrepreneurial activity as more of a threat than an opportunity and such an attitude can inhibit new venture creation (Kickul et al., 2009; Markman et al., 2002). They regard entrepreneurial activity as demanding and troublesome, and are more likely to be sensitive to the problems and difficulties they will face in business start-ups.

In entrepreneurship research, an entrepreneur's ability to perceive opportunity is another important factor underlining the desires and reasons to create and run firms (Shane et al., 2003) and refers to the readiness for entrepreneurship (Renko et al., 2012). Individuals with strong opportunity perception tend to have a higher propensity to become entrepreneurs (Fuentelsaz et al., 2015), indicating that they are inclined to use physical and psychological capabilities and skills to explore and develop opportunities that can generate more satisfaction of achievement and high status to entrepreneurship. Individuals with stronger opportunity perception might become more confident in business start-ups because they are better positioned to recognise and complement their resources (De Clercq et al, 2013), leading to positive views in entrepreneurship. Business opportunities that are less risky, closer to them, and have more immediate financial well-being are more valuable to them. Therefore, taking the sum of these arguments, it posits:

H1 Entrepreneurial cognition is positively related to the rate of entrepreneurial start-ups.

Entrepreneurial cognitive antecedents and Scott's institutional three pillars

Current studies have argued that entrepreneurial start-ups are not only affected by cognitive factors, it is also a reflection of the particular context in which entrepreneurs are embedded (Autio et al., 2013). This is in line with the reciprocal causation logic that individuals'

cognitive characteristics and environmental factors interact and jointly shape people's behaviour (Wood and Bandura, 1989). While entrepreneurs' cognitive characteristics are important in entrepreneurial behaviour, these are affected by institutions (Zahra et al., 2005). It should be noted, however, that entrepreneurial cognition differs from institutional theory in that human agency operates proactively on social environments, not just reactively (Bandura, 1989). Veblen (1914) stated that institutions are settled habits of thought, containing customs, usage, canons of conduct, and right and propriety principles. North (1990) defined institutions as regulations in a society that establish interactions and function as opportunities and constraints among individuals.

In the entrepreneurship domain, institutions refer to the rules that organise and articulate the political, economic, and social interactions between social groups and individuals, which in turn affect entrepreneurial activity and economic growth (Alvarez and Urbano 2012; Thornton et al., 2011). Hence, institutions can legitimise and delegitimise entrepreneurial activity as an attractive or socially valued activity. Two mainstreams of institutional theory exist in the literature, with one drawing upon political science and economics and the other deriving from organisational and sociology theory (Ahlstrom and Bruton, 2001). The political science and economics branch contends that rules, formal control, and procedures are the primary drivers of behaviours (North, 1990, 2005). North (1990) articulates that institutions can be formal (regulations, contracts, constitutions, etc.) or informal (attitudes, norms, or cultural values). The organisational and sociology theory branch suggests that cognitive scripts, social norms, and shared cultures are the key drivers of behaviours (Ahlstrom and Bruton, 2001). It describes institutions as the taken-for granted assumptions and less formally shared interaction sequences (DiMaggio and Powell, 1991). Integrating these two branches, Scott (1995) formulates institutional forces into three categories, namely the regulative, normative and cultural-cognitive institutional pillars. This research argues that the explanatory power of entrepreneurial cognition in venture creation can be moderated by the strength of the institutional pillars. The social system of an institutional environment interacts with an individual's cognitive scripts in influencing entrepreneurial behaviour.

Regulative dimension

Scott (1995) defines the regulative pillar as the process by which social actors (organisations and individuals) form rule systems or conform to established rules in pursuing self-interests. It consists of regulations, laws and government policies that support new firms, reduce the uncertainty associated with starting a new venture, and promote individuals' efforts to gain resources (Busenitz et al., 2000). The regulatory pillar relates closely to North's (1990) notion of the 'rule of the game' (Reynolds et al., 2005). While several studies suggest that the regulatory institution has limited impacts on venture creation and development (Van Stel et al., 2007), a country's national regulations in terms of venture legislation, business capital, and procedures might affect the probability that people will undertake entrepreneurial activities (Urbano and Alvarez, 2014).

Venture creation takes place at the individual level. However, the feasibility of decision-making for every start-up is embedded in a complex matrix of cognitive traits and institutional pillars within which each decision takes place (Baumol, 1990). Baumol et al. (2009) asserted that entrepreneurship-friendly regulations can sufficiently lower barriers and enhance an individual's self-belief in the likelihood of performing the necessary tasks to successfully initiate a firm. Strong regulative protection facilitates entrepreneurial entry by forming the beliefs that lead to economic value creation, while weak regulative protection tends to scale down entrepreneurial aspirations (Estrin et al., 2013). Individuals with strong beliefs in their self-efficacy tend to assess the availability and accessibility of institutional resources more positively and are more likely to take advantage of such resources for generating and developing business opportunities. We also argue that the impacts of regulative institutions on individuals' entrepreneurial start-ups are likely to interact with individuals' attitudes towards failure when they began their businesses. The decision about whether to launch a start-up depends not only on individuals' willingness to tolerate uncertainty, but also on their recognition of potential gains and losses that could result from engaging in the risky activity under certain institutional contexts. An efficient regulative institution generates strong national economies that reduce the perceived risks for individuals by mitigating the uncertainty involved in market transactions (Wan and Hoskisson, 2003). By contrast, when national institutions are characterised by an inadequate regulative framework,

fear of failure has a greater bearing in decision-making (Birney et al., 1999), and hence hampers individuals' entrepreneurial intentions. Moreover, national institutions can nurture entrepreneurial opportunities by offering regulatory resources and factor inputs (McGahan & Victor, 2010). Because uncertainty affects the exploration, evaluation, and exploitation of opportunities (Manolova et al., 2008), an uncertain regulative environment can hinder the perception of such opportunities for domestic businesses. For example, Garc ía-Cabrera et al. (2016) found that an institutional environment associated with a high degree of legal uncertainty makes it difficult for individuals to recognize the latent business opportunities that serve as the basis of forming goals that lead to venture creation. Therefore, taking all of these arguments together, it is argued that:

H2 A country's regulative institutions moderate the relationships between individuals' (a) entrepreneurial self-efficacy (b) fear of failure and (c) opportunity perception in the way that these relationships are strengthened when the regulative institutions are more developed.

Normative dimension

The normative pillar is depicted as an institutional element that includes the social norms, assumptions, values, and beliefs about human nature and behaviour carried by individuals that are socially shared (Scott, 1995). It introduces an evaluative, prescriptive, and obligatory dimension into society when regulations are ambiguous or sufficiently controversial and do not offer clear conduct prescriptions (Suchman and Edelman, 1997). Normative institutions impose constraints on social behaviour and meanwhile enable social action (Scott, 1995). Applied to entrepreneurship, the normative pillar affects an individual's belief that creating a firm constitutes a desirable career choice. This choice might be contingent on whether the national culture emphasises such values as self-fulfillment and personal initiative over joint responsibility (Baughn et al., 2006), and also on how relevant stakeholders perceive these issues (Reynolds et al., 2005). Krueger et al. (2000) identified the positive association between the expectations, beliefs, and attitudes of a social reference group with entrepreneurial intentions.

Since individuals are naturally embedded in the national context in which normative institutional pillars mould their behaviour through beliefs and values (Scott, 1995), it implies for our theoretical frame that there are multiple attributes, such as self-efficacy, fear of failure, and alertness to business opportunities, through which entrepreneurial decision-making might interact with socially-shared norms. As a normative institutional environment regulates individual behaviour by defining what is expected and appropriate in a social situation, it affects an individual's cognition of pursuing entrepreneurial activity as a career by rendering that choice socially legitimate (Lounsbury and Glynn, 2001). The institutional environment is responsible for differences in self-efficacy between individuals in terms of their ability to mobilise their entrepreneurial actions. According to Zhao et al. (2005), when entrepreneurship is viewed as a desirable career, individuals tend to believe they have the required abilities and skills to complete certain tasks associated with venture creation and to successfully demonstrate their entrepreneurship. More favourable impressions of entrepreneurship portrayed through the media can also give rise to a greater appreciation of entrepreneurship (Verheul et al., 2002). The publicity and visibility ascribed to successful entrepreneurship enhances individuals' entrepreneurial intentions even in countries in which opening a new business is associated with risk and uncertainty (Lounsbury and Glynn, 2001). Individuals are more likely to regard venture creation as an opportunity rather than a threat, which can offset the negative impact of fear of failure. In addition, norms and values that favour entrepreneurship also help to break down legal restrictions that inhibit entrepreneurial activity and in turn promote the business opportunities essential for venture creation (Stenholm et al., 2013). Such an institutional environment provides the business conditions that prime individuals' mental schema to act on opportunities that they have noticed in the market. If entrepreneurship is highly valued, individuals are more likely to form higher entrepreneurial cognition (Krueger et al., 2000) and desirability of entrepreneurship (Casson, 2003). Therefore, we assume:

H3 A country's normative institutions moderate the relationships between individuals' (a) entrepreneurial self-efficacy (b) fear of failure and (c) opportunity perception in the way that these relationships are strengthened when the normative institutions are more

developed.

Cultural-cognitive dimension

The cultural-cognitive pillar is a reflection of cultural structures and refers to the shared conception that constitutes the nature of reality and the social frames through which information is interpreted (Scott, 1995). Social actors are spurred to action not only by the objective conditions, such as the rule of law, but also in the light of their subjective interpretation. This pillar is necessary and important to entrepreneurship studies as it captures the degree to which countries generate a nurturing environment in which entrepreneurial activity is encouraged and accepted (Bruton et al., 2010). Existing literature suggests that cultural-cognitive structures are formed by the nature and quality of a country's educational system which affects individuals' self-confidence in performing certain entrepreneurial behaviours (Manolova et al., 2008; Schillo et al., 2016; Lim et al., 2016). It reflects the extent to which the skills and knowledge possessed by individuals pertaining to venture creation are fostered by the educational system (De Clercq et al., 2013). A more developed cognitive institution raises the number of individuals who can leverage knowledge and resources into entrepreneurial activity (Bowen and De Clercq, 2008; Mitchell et al., 2000). It can ensure a steady supply of people with the requisite skills and knowledge to undertake entrepreneurial activity (Bosma and Levie, 2010).

According to Urbano and Alvarez (2014), countries in which skills and knowledge are more widespread have a higher rate of entrepreneurial activity because individuals are more confident and positive about performing a certain entrepreneurial behaviour. Individuals tend to make more favourable judgements about their ability to pursue courses of action associated with uncertainty (i.e. stronger self-efficacy beliefs) (Begley et al., 2005). In addition, an educational system that devotes resources and attention specifically to entrepreneurship affects entrepreneurial cognition (Mitchell et al., 2000). Individuals with entrepreneurial knowledge and training bring enhanced professionalism, better technological skills, and therefore legitimacy to their entrepreneurial initiatives (Manolova et al., 2008). The prevalence of entrepreneurship-oriented training in the system strengthens entrepreneurial cognitive characteristics, especially with regard to the opportunity perception and willingness

to take risks (Vaillant and Lafuente, 2007). De Clercq et al. (2010) contended that cultural-cognitive institutions allow individuals not only to recognise opportunities but also to deal with the challenges associated with starting up a business. Taking these arguments in totality, the stronger the role played by cultural-cognitive institutions, the greater the effects on an individual's self-efficacy, willingness to tolerate fear of failure, and opportunity perception in relation to entrepreneurial start-ups.

H4 A country's cultural-cognitive institutions moderate the relationships between individuals' (a) entrepreneurial self-efficacy (b) fear of failure and (c) opportunity perception in the way that these relationships are strengthened when the cultural-cognitive institutions are more developed.

Data and method

Data

This paper tests the hypotheses using a two-level construct where individual entrepreneurs are nested within countries. The data are collected from the 2014 Global Entrepreneurship Monitor-Adult Population Survey (GEM-APS) and Global Entrepreneurship Monitor-National Expert Survey (NES) data. A geographically stratified sampling procedure is performed in order to locate participants aged from 18 to 64 for interviews. This paper involves 201,841 respondents from 67 countries.

Dependent variable

Following previous research from Stenholm et al. (2013) and Urbano and Alvarez (2014), total entrepreneurial activity (TEA) is applied to measure the rates of new venture creation. TEA is the best-known entrepreneurial start-up indicator of the GEM surveys, defining entrepreneurs as someone actively involved in starting a new firm (nascent entrepreneur) or owning and managing an operating business up to three and a half years old (young business owner). Figure 2 demonstrates the detailed assessment of TEA.

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Independent variable

Entrepreneurial cognition is measured using three variables (i.e. self-efficacy, fear of failure, and perceived opportunity) from GEM APS that have been applied in prior study (Aragon-Mendoza et al., 2016). Self-efficacy implies whether the respondents possess the knowledge, skills, and experience needed to start a firm (0=no; 1=yes). Fear of failure is measured by questioning respondents whether fear of failure prevents starting a new venture (0=yes;1=no). Perceived opportunity is determined by creating a variable in response to the following question: “*In the next six months will there be good opportunities for starting a business in the area where you live?*” (0=no;1=yes).

Institutional pillar- This paper uses validated scales from the GEM NES following Lim et al.'s (2016) research. The regulatory pillar is measured by the average scores for seven questions about government policies, laws, support programmes, and regulations associated with entrepreneurship (De Clercq et al., 2010; Reynolds et al., 2005). Three variables are applied to operationalise the normative construct that measures the respondents' perceptions of entrepreneurship as a desirable career choice, the respect and status given to individuals engaged in entrepreneurship, and the visibility of entrepreneurship in the media (Stenholm et al., 2013; Urbano and Alvarez, 2014). Following a prior study by Lim et al. (2016), the cultural-cognitive pillar is measured using the quality of countries' higher education systems with respect to entrepreneurship by looking at aspects such as education about firm formation, start-up education, and management education. Exploratory factor analysis (EFA) is performed in order to reveal the underlying structure and the distinctiveness of the latent institutional constructs. Table 1 presents the individual items of the three institutional pillars and the analytical results using a Varimax-rotation with Kaiser Normalisation. A three-factor solution is generated in the rotated factor matrix, with acceptable results (KMO=.757, $p<0.001$, cut off point 0.600). In order to test the validity and reliability of the measures, this paper assesses the three sub-scales using confirmatory factor analysis (CFA). The three latent variables suggest an acceptable fit to the data in the measurement model (Item 1 in regulative pillar is dropped), More specifically, the comparative fit index (CFI) =.94 and the root mean square error of approximation (RMSEA)=.08. The reliability measure Cronbach's Alpha for the latent variables varies from acceptable 0.783 to excellent 0.939 internal consistency. Table

1 shows the measurement items for the national institutional environment.

<Table 1 inserted about here>

A variety of other factors are controlled in this study. An inverted U-shaped relationship between age and entrepreneurship has been found in empirical research (Lévesque and Minniti 2006). This paper hereby includes age and squared age in order to verify the non-linear relationship. Gender is captured in this research as an existing study has identified the differences in venture creation between genders (De Carolis and Saporito, 2006). As household income has been shown to have an association with the level of entrepreneurial start-ups (Muralidharan and Pathak, 2016), this paper also controls for socioeconomic status, represented by three household income tiers. The educational measures are obtained by asking respondents the education degree they had achieved. More specifically, three dummy variables are generated in order to capture respondents' educational attainments: a secondary degree; post-secondary education; and a graduate degree. In addition, secondary education (and below) is used as the reference category.

Sample and design

Given that the dependent variable has a binary nature, the effect of the covariates on total entrepreneurial activity is analysed by binomial logistic models. In the multilevel modelling approaches, fixed effects captured the impact of individual factors. In order to estimate the impact of country-level factors on the dependent variable, this research performs random effects that involve unobserved specific intercepts across countries. According to Martin et al. (2007), such approaches allow for more accurate cross-level interaction estimates.

This study follows a four-step strategy to examine the hypotheses. The first model is a base model in which the control variables are entered. Next, individual-level cognitive factors are incorporated in model 2. Then, an intercept and slope as outcomes models are applied in order to assess the cross-level interaction effects of the three institutional pillars on cognition-entrepreneurship separately (models 3 to 5) and add them together in model 6 as a robustness check.

Analysis and results

Table 2 presents the correlation matrix. The possibility of multicollinearity is further tested using the Variance inflation factors (VIFs). The VIFs of the variables included do not exceed 5 (Ryan, 1997), thereby suggesting that multicollinearity is of minimal concern.

<Table 2 inserted about here>

To reveal the between-country variance, this research performs a Chi-square test with entrepreneurial start-ups as the dependent variable and country as the predictor (Ryan, 1997). This test suggests significant between-country variance within the data, with $\chi^2(66) = 1.115 \text{ E}4$ ($p < 0.000$). This thus justifies the choice of a multilevel modelling approach with country effects and accepts its use.

Table 3 shows the empirical results. Model 1 includes the demographic controls of age, age-squared, gender, household income, and educational attainment. The intra-class correlation indicates that 13.90 percent of the total variance in the total entrepreneurial activity between countries is because of country-level variables. Model 2 incorporates the main effects of entrepreneurial cognitive predictors. Then, the first interaction term (entrepreneurial cognition * regulative pillar) is added in Model 3. In Models 4 and 5, this is replaced with the second and third hypothesised interaction terms (entrepreneurial cognition * normative pillar; entrepreneurial cognition * cultural-cognitive pillar). Model 6 adds these three cross-level interactions as a robustness check (Table 4).

The results of Model 2 show that entrepreneurs' self-efficacy positively affects entrepreneurial start-ups ($p < 0.001$). Fear of failure appears to have a significant impact on the probability of individuals launching new ventures ($p < 0.001$). With regard to perceived opportunities, when opportunities can be recognised by the entrepreneurs, the odds ratio of entrepreneurs creating a new business increases by a factor of 1.82 ($p < 0.001$). Therefore, hypothesis 1 is supported.

<Tables 3 and 4 inserted about here>

The interaction terms from Models 3 to 6 are included. Comparing Models 2 and 3, the country-level variance decreases from 0.461 to 0.358. This suggests that an additional 22.34% of the country-level variance can be explained by the inclusion of the cross-level interactions. Therefore, we find that there is evidence to support the assumption that stronger institutional foundations can modify the association between entrepreneurial cognition and entrepreneurship. For example, the positive relationship between self-efficacy and entrepreneurial start-ups is enhanced by 8.43 % in odds under stronger regulative institutional foundations. Likewise, the association between fear of failure and entrepreneurial start-ups is increased by a factor of 2.64 in odds, and that between perceived opportunity and entrepreneurial start-ups by a factor of 1.70 in odds. Hence, hypotheses 2a, 2b, and 2c are supported. Normative institutions appear to positively moderate cognitive factors and entrepreneurial activity, thereby supporting hypotheses 3a, 3b, and 3c. With respect to cultural-cognitive institutions, these have significant effects on self-efficacy and fear of failure, boosting the probability of being an entrepreneur by 1.08 and 1.42 respectively in odds. Therefore, hypotheses 4a and 4b are supported. We cannot observe significant moderating effects of cultural-cognitive institutions on the relationship between opportunity and entrepreneurial start-ups. Therefore, hypothesis 4c is not supported. Consistent interaction effects are observed in Model 6, which combines the institutional pillars and proves the robustness of the empirical results.

Age is positively related to venture creation. However, as the age-squared coefficient is negative, the relationship between an individual's age and the likelihood of opening a new business peaks at a relatively early age and reduces thereafter. As for the impacts of gender, males have higher rates of entrepreneurial start-ups than females. This result is consistent with previous empirical findings (e.g. Langowitz and Minniti, 2007). Educational attainment and income exert positive impacts on entrepreneurial start-ups. In particular, an individual's probability of opening a new business increases when they have educational qualifications higher than secondary education. An individual with a higher household income will also be 19.12 % more likely to start a new business in odds.

Additional analyses

Finally, this paper conducts a cluster analysis that splits the dataset into two national groups and then performs separate regressions. Cluster analyses are conducted based on the standard k-means method, with indices of regulative, normative and cognitive institutions as the input variables. The cluster analysis and separate regression results are shown in Table 5. A number of interesting results are found. First, from a weak to strong institutional environment, there are substantial improvements in the impacts of the cognitive characteristics on the level of entrepreneurial start-ups. Such an observed relationship confirms the positive moderating effects of institutional dimensions. Second, income significantly affects new venture creation in strong institutions. However, such effects cannot be observed in a weak institutional environment. Third, age has an inverted U-shape effect on entrepreneurship. Fourth, gender appears to be influential in determining the degree of entrepreneurial start-ups across different institutional environments.

<Table 5 inserted about here>

Discussion

Findings

It has long been acknowledged that entrepreneurial behaviour is a joint function of micro- and macro-level factors and cross-level interactions between the two (Autio and Acs, 2010; Li, 2018, 2019; Zahra and Wright, 2011). Motivated by the dearth of multilevel research, this study addresses this important gap by building a theoretical framework to assess: 1) How entrepreneurial cognitive traits are related to the rate of entrepreneurial start-ups; and 2) the extent to which country-level institutional conditions moderate the cognitive antecedents and entrepreneurship relationships.

This research introduces a new construct, which reflects primary individual-level antecedents in a cognitive setting. While the cognitive traits comprising this construct have been employed in previous studies as separate variables (e.g. Stuetzer et al., 2014; Tsai et al., 2016), this research reveals that these cognitive traits (i.e. entrepreneurial self-efficacy, fear of failure, and opportunity perception) simultaneously affect the rates of entrepreneurial

start-ups across countries. More specifically, using 201,841 observations from 67 countries, the empirical findings support the hypotheses that if individuals make more positive judgements about their ability to complete entrepreneurial tasks; show a greater willingness to pursue courses of action associated with uncertainty in regard to business success or failure; and have a higher level of alertness to perceiving opportunities, they are more likely to start their own businesses. The multilevel approach also shows that differences in individuals' cognitive traits account for a large proportion of cross-country variation in the rate of entrepreneurial start-ups.

The moderating effects of institutional pillars are the focus of this research. The findings reveal the critical role of country's national institutions in driving the forces of cognitive antecedents to promote entrepreneurial start-ups. More specifically, it finds that regulatory institutions (i.e. government policy, programs, and regulations pertaining to management of new business creation) have significant and positive moderating effects on individuals' self-efficacy and venture creation relationships. This supports our hypothesis that an entrepreneurship-friendly regulatory environment might increase an individual's belief in their ability to complete the tasks that are required to set up a firm. Individuals also become more willing to take risks and more alert to opportunities when they can see that the regulatory institutional arrangements are favourable (Lim et al., 2016; Urbano and Alvarez, 2014). Moreover, this paper supports the hypotheses that country-level normative conditions positively moderate the relationships between entrepreneurial cognition and entrepreneurship. In other words, individuals' cognitive traits become more influential with regard to their engagement in entrepreneurial start-ups when the prevailing norms support pursuing a career as entrepreneur. For instance, if entrepreneurship is viewed as a desirable career, individuals tend to believe they have the required abilities and skills to complete certain entrepreneurial tasks. Entrepreneurship is therefore regarded as an opportunity rather than a threat, which prime individuals' mental schema to act on opportunities and tolerate uncertainty. These findings suggest that policy interventions to increase the status and desirability of entrepreneurship have the potential to strengthen the impacts of cognitive traits on the rate of entrepreneurial start-ups. Lastly, the empirical results support our institutional-based arguments that cultural-cognitive institutions that place greater emphasis on entrepreneurship

can adequately channel educated people towards entrepreneurial activities. Individuals' education and possession of the skills and knowledge necessary to operate a business and to spot new opportunities have significant impacts on strengthening the effects of their cognition on entrepreneurship. If governments can ensure that access to entrepreneurial knowledge and skills is readily available within a country, more individuals are likely to be attracted to entrepreneurship. This is consistent with prior studies which have identified the indirect impacts of the cognitive institutional pillar on entrepreneurial activities (e.g. Li, 2018; Lim et al., 2016).

Theoretical contributions

This paper makes a number of theoretical contributions to the extant literature. First, individuals potentially act as a bridge between the macro-environment and entrepreneurial decisions, but the individual-level mechanism through which a contextual effect might occur remains unclear. While prior studies have paid attention to the link between cognition and entrepreneurship and have implicitly assumed that entrepreneurs perceive entrepreneurial activity equally (Frese & Gielnik, 2014), this research does not assume the automatic and universal benefits of entrepreneurial cognitions, but instead recognises that individuals might perceive the benefits of entrepreneurial start-ups differently based on their cognitive attitudes towards self-efficacy, fear of failure and opportunity perception. By acknowledging the differences in individuals' cognitive traits, this research responds to the question of why individuals behave differently towards venture creation under certain institutional conditions. Second, despite the growing interest in understanding the impacts of country-level environments on entrepreneurship, institutional variables tend to draw a one-dimensional picture of entrepreneurial activity. This research contributes to the existing studies by adopting a multidimensional measure of country-level institutional systems and providing new empirical evidence on the divergent impacts of three institutional pillars. It resolves the apparent inconsistencies in institutional theories by considering institutions both as stimulants for, and constraints on individuals' cognition. Third, our research complements previous work by applying institutional theory to obtain a deeper understanding of cross-national differences in the rates of business start-ups. This research represents the first attempt to use Scott's (1995)

three institutional pillars to assess entrepreneurial activity and study how country-level environments interact with cognitive factors to jointly affect the rate of entrepreneurial start-ups across countries. By focusing on the extent to which institutional pillars can modify the association between entrepreneurial cognition and new venture creation, the empirical findings reveal that key aspects of country-level institutions have divergent implications for releasing the effects of cognitive explanatory variables on entrepreneurial start-ups. Fourth, while individuals' actions are driven primarily by their cognition and perception, the assessment and evaluation of a business opportunity is nurtured by the external environment that forms these interpretations. Based on a multilevel design, this paper fills an important gap in the existing literature by offering a multilevel perspective on how individuals' cognitive characteristics and their country macro environments operate as interacting determinants that influence venture creation. It responds to the call for cross-country multilevel analyses of the interplay between individual-level antecedents and systemic contexts in affecting entrepreneurial activity (De Clercq et al., 2013; Welter, 2011). Drawing upon an institutional approach, it bridges individual cognitive differences and country-level institutional pillars.

Practical implications

The research findings have implications and value especially for policymakers aiming to stimulate the rate of entrepreneurship by modifying the institutional environment. It reveals the importance of the macro-environment in different countries for formulating and implementing policies designed to reap the benefits of venture creation. Policy-makers should realise that entrepreneurship is a multilevel phenomenon. Individuals' cognition is part of the product of the institutional environment and therefore is a personal trait that can be nurtured and developed. More specific, the significant interactions between regulative institutions and cognitive factors imply that policymakers should formulate their environments to provide individuals who have higher self-belief, risk-taking willingness, and opportunity perception with the right political support. In the meantime, this paper reveals the importance of normative institutions and cultural-cognitive institutions in encouraging entrepreneurship. Motivating individuals to engage in venture creation requires policies that can compensate for the lack of norms surrounding performance and social desirability. Governments also need to

have more active campaigns aimed at persuading more people to regard entrepreneurship as a promising career. For example, the investment in the ICorps program made by the National Science Foundation in the United States has sought to promote entrepreneurial viable businesses. Similar program can be expected and developed with the purpose of driving up the rate of entrepreneurial start-ups.

In addition, the significant interactions between entrepreneurial cognition and institutional environments imply that a more fine-tuned institution requires a cognitive perspective on how institutions shape individuals' behaviour. Careful consideration of how institutional environments might promote individuals' ability to utilise their cognitive and motivational resources should be part of the political decision driving the development of entrepreneurship. This, in turn, can provide an important feedback loop and encourage individuals to have positive self-belief, take more risks, and accumulate experience of venture creation. For instance, individuals in more supportive institutions are motivated to invest in knowledge and skills in order to survive in a competitive environment. The knowledge and skills that individuals and their firms acquire will inform evolving perceptions about the accessibility and availability of opportunities and resources provided by country-level institutions (North, 1991). Policymakers should acknowledge that the improvement and development of the country-level institutional environment is significant but might be insufficient to enhance the rate of entrepreneurial start-ups. The government approach should embody not only a supportive institutional system from legal, normative and cognitive perspectives at the macro-level but also involve training programs inspired by entrepreneurial cognitive studies in order to encourage entrepreneurs to take active individual initiatives at the micro-level.

Limitations and scope for future research

This paper has limitations and offers interesting avenues for future research. First, because this research is built on a multilevel model, it is appropriate to focus on the individual-level as well as country-level variance. Future research might rely on a longitudinal design to look into the complexities of national institutional arrangements that vary over time. Second, this study investigates the moderating effect of institutional pillars on entrepreneurial cognition

and the entrepreneurship relationship at the national level and does not consider variations in institutions at the regional level. Prior research suggests that entrepreneurship is a local phenomenon and that the quality of regional institutions matters. Future research could investigate the conceptual model we propose in this study at the regional level in specific country contexts to enrich the understanding of the issue.

Conclusions

By incorporating an institutional approach, this research builds a multilevel framework to assess the joint impacts of entrepreneurial cognition and institutional pillars on the rate of entrepreneurial start-ups. Using data from GEM-APS and GEM-NES, the hypotheses are tested using a large sample of 201,841 respondents from 67 countries. We find that entrepreneurial start-ups are positively related to individuals' cognition in terms of entrepreneurial self-efficacy, fear of failure, and opportunity perception. Moreover, the analytical results show that regulative, normative, and cultural-cognitive institutions serve as significant moderators between entrepreneurial cognition and the rate of entrepreneurial start-ups. Our research therefore makes important theoretical contributions to the extant literature and has both political and practical implications.

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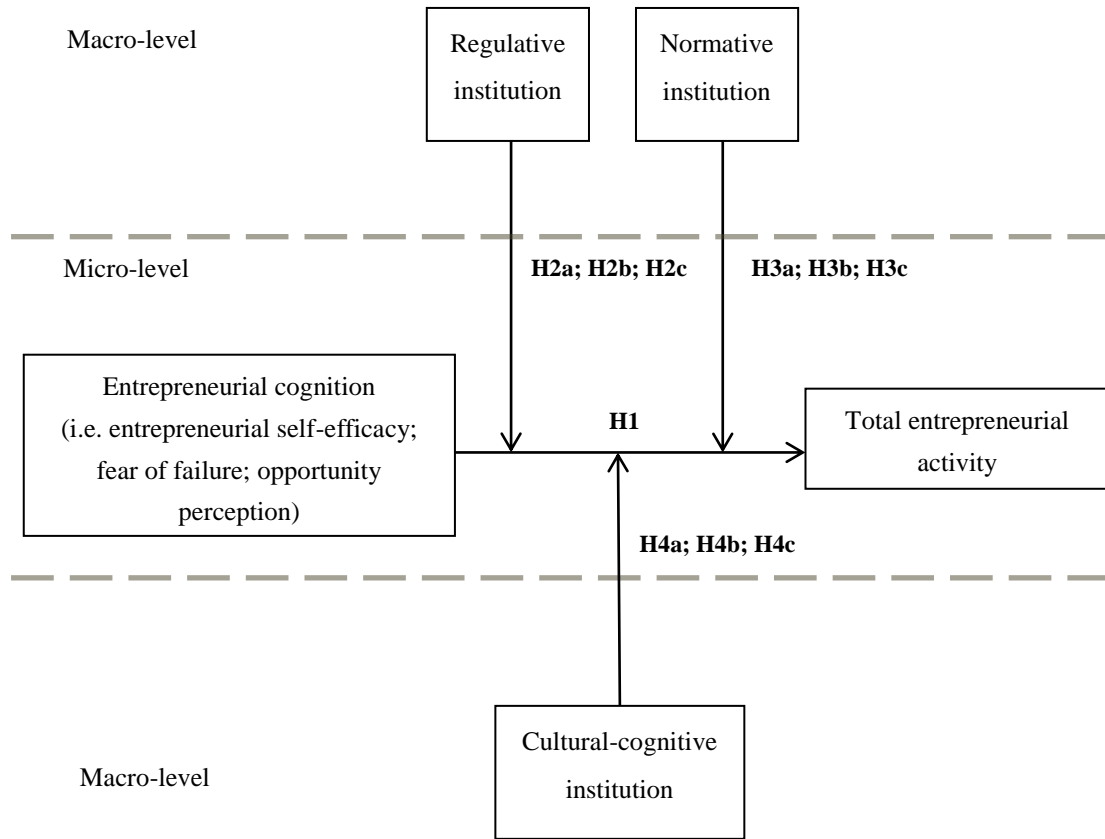


Figure 1. Conceptual frame

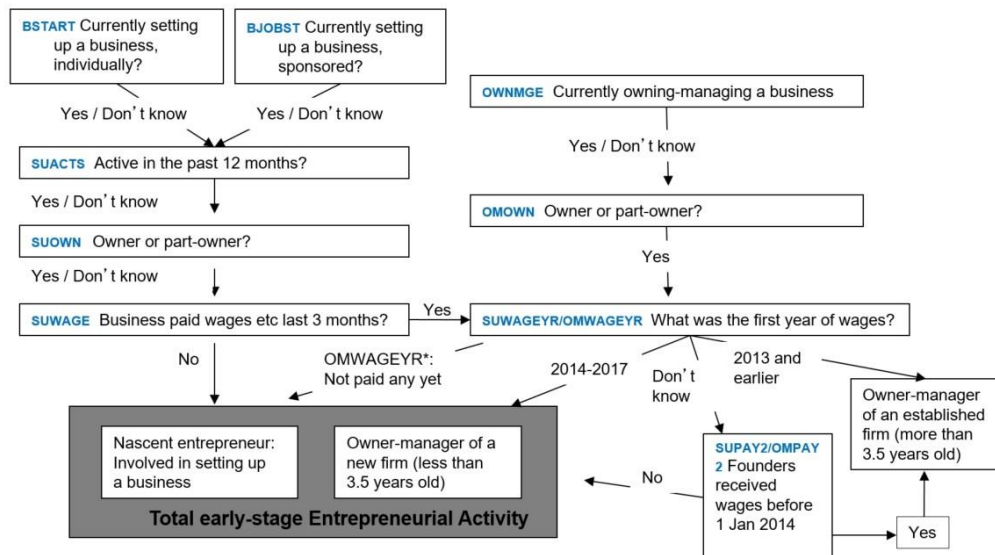


Figure 2. Total entrepreneurial activity assessment process

Table 1. Measurement items for the three institutional pillars

Item Description	Source	Factor loading
Regulatory condition (Cronbach's Alpha=0.896;CR=0.901; AVE=0.569)	GEM-NES	
Item 1:In my country, government policies (e.g., public procurement) consistently favor new firms		0.596
Item 2:In my country, the support for new and growing firms is a high priority for policy at the national government level		0.855
Item 3:In my country, the support for new and growing firms is a high priority for policy at the local government level		0.805
Item 4:In my country, new firms can get most of the required permits and licenses in about a week		0.722
Item 5:In my country, the amount of taxes is not a burden for new and growing firms		0.801
Item 6:In my country, taxes and other government regulations are applied to new and growing firms in a predictable and consistent way		0.705
Item 7:In my country, coping with government bureaucracy, regulations, and licensing requirements it is not unduly difficult for new and growing firms		0.766
Normative condition (Cronbach's Alpha=0.925;CR=0.946; AVE=0.855)	GEM-APS	
Item 1:Most people consider starting a new business a desirable career choice		0.926
Item 2:Those successful at starting a new business have a high level of status and respect		0.945
Item 3:You will often see stories in the public media about successful new businesses		0.902
Cognitive condition (Cronbach's Alpha=0.783;CR=0.827; AVE=0.618)	GEM-NES	
Item 1:In my country, colleges and universities provide good and adequate preparation for starting up and growing new firms		0.656
Item 2:In my country, the level of business and management education provide good and adequate preparation for starting up and growing new firms		0.853
Item 3:In my country, the vocational, professional, and continuing education systems provide good and adequate preparation for starting up and growing new firms		0.834

CR=construct reliability; AVE=average variance extracted

KMO=0.757, Bartlett's $p < .001$. The cut-off point is 0.600.

Table 2. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)		
Total entrepreneurial activity (1)	0.12	0.32	1.000												
Age (2)	40.61	14.18	-0.088**	1.000											
Gender (3)	0.49	0.50	0.057**	-0.025**	1.000										
Income (4)	2.00	0.75	0.062**	-0.016**	0.089**	1.000									
Secondary degree (5)	0.36	0.48	0.016**	-0.002	0.004	0.003	1.000								
Post-secondary (6)	0.28	0.47	0.009**	-0.009**	-0.002	0.077**	0.005*	1.000							
Graduate (7)	0.06	0.23	0.13**	0.021**	0.007**	0.119**	0.015**	0.034**	1.000						
Self-efficacy(8)	0.52	0.49	0.237**	-0.028**	0.114**	0.081**	0.007**	0.022**	0.029**	1.000					
Fear of failure (9)	0.61	0.50	0.094**	-0.001	0.070**	0.036*	0.012**	0.004*	-0.007**	0.152**	1.000				
Perceived opportunity(10)	0.36	0.48	0.173**	-0.080**	0.054**	0.052**	0.009**	-0.003	0.002	0.182**	0.089**	1.000			
Regulative institution (11)	0.00	1.00	0.025**	-0.060**	-0.011**	-0.050**	-0.050**	0.027**	-0.052**	0.076**	-0.019**	-0.005*	1.000		
Normative institution (12)	0.00	1.00	0.004	0.003	0.004	0.034**	0.020**	-0.006**	0.027**	0.011**	-0.032**	-0.042**	0.036**	1.000	
Cognitive institution (13)	0.00	1.00	0.019**	-0.013**	0.007**	0.039**	0.019**	0.010**	0.011**	-0.005*	0.018**	0.031**	0.146**	0.179**	1.000

Note: ** p<0.01; * p<0.05;

Table 3. Multilevel logistic regression analysis results

	Model 1		Model 2		Model 3	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Fixed effects						
Control variables						
Age	0.103***	(0.003)	0.082***	(0.004)	0.082***	(0.003)
Age-squared	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)
Gender	0.293***	(0.014)	0.143***	(0.015)	0.142***	(0.015)
Household income	0.175***	(0.010)	0.101***	(0.010)	0.100***	(0.010)
Secondary degree	0.043*	(0.019)	0.017*	(0.007)	0.016*	(0.007)
Post-secondary	0.204***	(0.020)	0.097***	(0.020)	0.098***	(0.020)
Graduate	0.431***	(0.035)	0.278***	(0.035)	0.278***	(0.036)
Individual-level predictors						
Self-efficacy			0.141***	(0.001)	0.142***	(0.001)
Fear of failure			0.320***	(0.016)	0.333***	(0.016)
Perceived opportunity			0.600***	(0.015)	0.606***	(0.016)
Country-level predictors						
Regulative institution					-2.290**	(0.750)
Normative institution						
Cognitive institution						
Cross-level two-way interaction						
Self-efficacy*regulative institution					0.081***	(0.019)
Fear of failure*regulative institution					0.972***	(0.175)
Perceived opportunity*regulative institution					0.528***	(0.165)
Self-efficacy*normative institution						
Fear of failure*normative institution						
Perceived opportunity*normative institution						
Self-efficacy*cognitive institution						
Fear of failure*cognitive institution						
Perceived opportunity*cognitive institution						
Random effects and model fits						
Residual country-level variance	0.531		0.461		0.358	
Number of obs.	201841		201841		201841	
Number of countries	67		67		67	
Log-likelihood	-66447.8		-61330.1		-61295.4	
Akaike Information Criterion (AIC)	132913.7		122684.3		122622.8	
Bayesian Information Criterion (BIC)	133005.3		122806.5		122785.8	

Note: *** p<0.001 ; ** p<0.01; * p<0.05; + p<0.1

Table 4. Multilevel logistic regression analysis results

	Model 4		Model 5		Model 6	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Fixed effects						
Control variables						
Age	0.082***	(0.003)	0.082***	(0.003)	0.082***	(0.003)
Age-squared	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)
Gender	0.142***	(0.015)	0.142***	(0.015)	0.142***	(0.015)
Household income	0.101***	(0.010)	0.101***	(0.010)	0.101***	(0.010)
Secondary degree	0.016*	(0.007)	0.017*	(0.007)	0.014*	(0.005)
Post-secondary	0.097***	(0.020)	0.097***	(0.020)	0.097***	(0.020)
Graduate	0.278***	(0.036)	0.278***	(0.036)	0.277***	(0.036)
Individual-level predictors						
Self-efficacy	0.143***	(0.001)	0.143***	(0.001)	0.144***	(0.001)
Fear of failure	0.327***	(0.016)	0.324***	(0.016)	0.339***	(0.016)
Perceived opportunity	0.606***	(0.015)	0.601***	(0.016)	0.611***	(0.016)
Country-level predictors						
Regulative institution					-2.112**	(0.728)
Normative institution	-1.379+	(0.705)			-1.172+	(0.599)
Cognitive institution			-1.272+	(0.744)	-0.777	(0.781)
Cross-level two-way interaction						
Self-efficacy*regulative institution					0.064***	(0.019)
Fear of failure*regulative institution					0.897***	(0.176)
Perceived opportunity*regulative institution					0.564***	(0.166)
Self-efficacy*normative institution	0.103***	(0.019)			0.081***	(0.019)
Fear of failure*normative institution	0.281+	(0.167)			0.272+	(0.157)
Perceived opportunity*normative institution	0.455**	(0.156)			0.486**	(0.164)
Self-efficacy*cognitive institution			0.083***	(0.015)	0.052**	(0.016)
Fear of failure*cognitive institution			0.354*	(0.143)	0.147*	(0.059)
Perceived opportunity*cognitive institution			0.155	(0.127)	0.009	(0.133)
Random effects and model fits						
Residual country-level variance	0.360		0.363		0.361	
Number of obs.	201841		201841		201841	
Number of countries	67		67		67	
Log-likelihood	-61306.6		-61308.8		-61266.2	
Akaike Information Criterion (AIC)	122645.1		122649.6		122580.5	
Bayesian Information Criterion (BIC)	122808.1		122812.5		122804.9	

Note: *** p<0.001 ; ** p<0.01; * p<0.05; + p<0.1

Table 5. Multilevel logistic regression analysis results

	Model 7		Model 8	
	Weak Institution		Strong Institution	
Fixed effects				
Control variables				
Age	0.092***	(0.005)	0.077***	(0.004)
Age-squared	-0.001***	(0.000)	-0.001***	(0.000)
Gender	0.160***	(0.022)	0.128***	(0.020)
Household income	0.011	(0.015)	0.174***	(0.014)
Secondary degree	0.012***	(0.002)	0.001	(0.029)
Post-secondary	0.130***	(0.034)	0.087**	(0.030)
Graduate	0.414***	(0.053)	0.164**	(0.051)
Individual-level predictors				
Self-efficacy	0.138***	(0.002)	0.143***	(0.002)
Fear of failure	0.275***	(0.024)	0.351***	(0.021)
Perceived opportunity	0.610***	(0.023)	0.688***	(0.021)
Random effects and model fits				
Number of obs.	91613		110228	
Number of countries	27		40	

Note: *** p<0.001 ; ** p<0.01; * p<0.05; + p<0.1