**Cultural values and innovation: The mediating role of entrepreneurial learning capacity**

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**Abstract**

Although both cultural values and innovation are widely acknowledged as collective embodiments of individual values and assets, little is known about the mechanisms through which cultural values influence the likelihood of innovation by some entrepreneurs rather than others. We argue that institutional pressures arising from cultural values affect entrepreneurial learning capacity which in turn impacts innovation activities. Our multi-level analysis of entrepreneurs from 19 countries between 2006 and 2011 suggests that entrepreneurial learning capacity serves as a mediator through which entrepreneurs maximize the innovation-related benefits of cultural values to their businesses.

***Keywords****:* Entrepreneurial learning capacity, cultural values, formal regulations, institutional theory, innovation and multi-level analysis.

**1. Introduction**

Entrepreneurs have been identified as an important source of innovation (Autio et al., 2014; Schumpeter, 1942) and the ability of entrepreneurs to introduce new products and services is acknowledged as a key determinant of innovation performance (Laursen et al., 2012). However, entrepreneurs need not only tangible resources and capabilities to innovate, but also intangible resources such as legitimacy and social acceptance by the society in which they operate. Legitimacy helps entrepreneurs gain support from regulators, government agencies, interest groups, local communities, suppliers and customers (Lounsbury et al., 2003; Pollock and Rindova, 2003; Zimmerman and Zeitz, 2002). Their innovative behavior is, to a large extent, shaped by the behavioral expectations created by the finely woven web of values, norms, perceptions and routines (Deephouse, 2017; DiMaggio and Powell, 1988), in addition to personal characteristics and skills (Lumpkin and Dess, 1999). The cultural and regulatory contexts have become increasingly important to entrepreneurial innovation as the rapid pace of globalization in the past few decades has presented new opportunities for entrepreneurs to pursue innovation activities across different institutional settings (Autio et al., 2014; Levie and Autio, 2011).

While it has been established in prior studies that institutional pressure serves as either an enabler or impediment to innovation (Bowen and De Clercq, 2008; Baumol et al., 2009), the mechanisms underlying this relationship are divergent and have not yet been thoroughly investigated. Institutional forces pressure entrepreneurs to engage in isomorphic activities, such as entrepreneurial learning, to gain legitimacy (DiMaggio and Powell, 1983; Miller, 2012; Nicholls, 2010). Building on the concept of entrepreneurial learning (Cope, 2005; Lumpkin and Lichtenstein, 2005; Politis, 2005), we define entrepreneurial learning capacity (ELC) as individuals’ ability to acquire, assimilate and organize newly formed knowledge in order to act upon entrepreneurial opportunities.

The strategies entrepreneurs use to respond to different types of institutional pressures often carry profound implications for their likelihood to introduce innovation (Kraatz and Zajac, 1996; Philippe and Durand, 2011). For instance, in Thailand and Turkey, normative pressures arising from an emphasis on cohesiveness among individuals may enhance an entrepreneur’s ability to collect and integrate new knowledge within his or her firm, which will lead to innovation. In stark contrast to how entrepreneurial learning works in collectivist societies, mimetic pressures arising from uncertainty reduction in countries such as Finland, Japan and Russia, may constrain entrepreneurs’ learning from failure and experimenting with novel options, which is crucial if innovation is to flourish in their firms.

Although isomorphism and innovation are considered as two sets of competing activities, prior studies have shown that individuals and their organizations gain legitimacy for innovation by conforming to commonly accepted structures and procedures (Goes and Park, 1997; Blind, 2012). Still, little is known about whether and how entrepreneurs’ engagement with such isomorphic activities propelled by their strategic capabilities, such as ELC, can be translated into innovation-related benefits. This is partly because previous studies have tended to consider isomorphic activities as an exogenous determinant of innovation with little attempt to examine their impact on managers or their firms’ likelihood to innovate as an internally determined strategy (Haveman, 1993; Wang et al., 2015; Tan et al., 2013). However, the endogeneity of isomorphic activities has been implicitly acknowledged by researchers studying the antecedents of entrepreneurial learning (Crobett, 2005; Politis, 2005; Rae, 2007). In fact, entrepreneurs, through experience, often develop ELC that enables them to recognize and act upon entrepreneurial opportunities (Politis, 2005). Another specific reason for this is that entrepreneurial learning as an emerging concept is operationalized theoretically but not empirically, due to data and measurement constraints, which makes it harder to unpack the link between institutional pressures, ELC and innovation activities.

Moreover, we know little about the extent to which a variety of institutional forces jointly affect entrepreneurs’ likelihood of introducing innovation in their firms through their ELC (Autio and Acs, 2010). Institutions can be broadly classified into formal and informal institutions. The former refers to codified and explicit rules and government regulations, whereas the latter consists of enduring systems of shared meanings and collective understandings which reflect socially constructed reality that shapes individual behavior, but are not codified into documented rules and standards (Scott, 2005). Mirroring shared values, beliefs and noncodified norms, culture is an important reflection of a country’s informal institutions (North, 1990; Peng et al., 2008). Equally, the regulatory dimension of institutions denotes formal institutions that matter to entrepreneurial activity, as it comprises and depicts the specific ways in which laws and government policies provide support to new businesses in order to reduce the start-up risk exposure for entrepreneurs, and facilitate their efforts to acquire resources such as grants and government sponsored programs (Russo, 1992). Regulations also represent the ability of laws and policies to protect the interests of entrepreneurs such as enforcement efficiency, investment and financial freedom protection (Blind, 2012; McMullen et al., 2008; Nystròm, 2008). The impact of formal and informal institutions is sometimes inadvertently intermixed as formal regulations and enforcement characteristics shape the development trajectory of cultural norms (North, 1990). For instance, formal regulations may strengthen or weaken the impact of cultural norms on individual behavior. Equally, formal regulations are established and maintained by individuals who are constrained by their own unique cultural values (Rodrik, 2007; Triandis et al., 1986). Examining each type of institution in isolation is very unlikely to give us a comprehensive understanding and precise insights into the origins, processes and diverse outcomes of entrepreneurial actions. Thus, it is important to recognize their connections and even conflicts with formal institutional contexts when unpacking the relationships between cultural values, entrepreneurial behavior and innovation.

By integrating institutional theory with ELC in an innovation context, we advance a macro-micro conceptual framework to examine the extent to which different types of institutional pressures and their complex interactions shape entrepreneurs’ ELC, which in turn influences their likelihood of introducing innovation in their firms. We propose ELC as an important instrument in assisting the implementation of an entrepreneur’s isomorphic response to institutional pressures to engage in innovation activities. In particular, we examine the role of two dimensions of informal or cultural institutions – uncertainty avoidance and collectivism – which characterize the mimetic and normative pressures underpinned by institutional theory (Mueller and Thomas, 2001). They are closely associated with the characteristics of entrepreneurial activity, such as tolerance for failure and ambiguity, knowledge-sharing and access to resources which are crucial for entrepreneurs’ entrepreneurial learning and innovation (Hayton et al., 2002; Mueller and Thomas, 2001). These two dimensions are widely used to capture the extent to which individuals or entrepreneurs perceive uncertainty as well as in-group identity in a society (Triandis and Suh, 2002; Zahra and Wright, 2011).We hypothesize that cultural values, as a key element of informal institutions, can either facilitate or hinder entrepreneurs’ ELC and thus increase or constrain their likelihood to innovate. Moreover, using formal regulations as an indicator of coercive pressure, we specify an important boundary condition for the mediating effect of ELC. We argue that the indirect effect of cultural values on entrepreneurs’ likelihood to innovate through their ELC is reinforced by the rigorousness of the regulatory environments. The results from our analysis of a large-scale, cross-country, cross-individual panel dataset on the institutional environments and innovation activities of 7,680 entrepreneurs in 19 countries during the period 2006-2011 provide empirical support for our predictions. The findings also show that the mediating effect of entrepreneurs’ ELC is stronger when they compete in highly regulated environments than in poorly regulated environments.

Our study makes a number of contributions to the existing literature. First, while managers’ isomorphic response to institutional pressures becomes increasingly important in both strategy and institution research (Scott, 2005), little is known about how entrepreneurs leverage the institutional pressure to conform with the economic pressure to differentiate. Our study makes one of the first attempts to theoretically explain and empirically test the relationship between institutional pressures and innovation channelled through ELC. This advances our understanding of how institutional pressures shape individual behavior and its innovation-related outcomes. Second, by examining the indirect effects of normative and mimetic pressures on entrepreneurs’ innovation activities, and the moderating effect of coercive pressure, we complement existing research on institutional theory which adopts an indistinct view of institutions (Rodrik, 2007; Triandis et al., 1986). We argue, and attempt to demonstrate, that the indirect effect of normative and mimetic pressures on entrepreneurs’ likelihood to introduce innovation through ELC depends on the rigorousness of the regulatory environments. Finally, our study enhances understanding of ELC as an emerging phenomenon in the context of innovation by systematically examining its antecedents and related innovation outcomes. The findings offer new insights into the role of ELC in affecting entrepreneurs’ likelihood of introducing innovation under different types of institutional pressures.

**2. Theoretical Background**

***2.1. Institutional isomorphism***

Institutional theory emphasizes that entrepreneurs or their firms have to incorporate institutionalized norms and rules to survive, as conformity to these established institutional patterns is considered to be a pathway to legitimacy, and to receiving support and attracting resources (DiMaggio and Powell, 1983; Meyer and Rowan, 1977). Entrepreneurs require resources such as raw materials, capital and labour to create and sustain their businesses, and to innovate. However, entrepreneurs may have all these resources but lack acceptance from the society in which they operate i.e. from regulators, government agencies, laws and courts, professions, interest groups and mobilized public opinions, will end up failing (Hatch, 2013). Thus, entrepreneurs need to have not only tangible resources, but also social legitimacy to be able to innovate. For example, the likelihood of new product success is greater for entrepreneurs who acquire legitimacy by hiring reputed executives or scientists on board, than those who do not (Rao et al., 2008). Legitimacy is “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” ([Suchman, 1995](https://www.sciencedirect.com/science/article/pii/S0883902617301829?casa_token=2tlSUZRPS-gAAAAA:yNOJcrL5Zq-8BMI2ZfEuTGLk-5cY4k4jzFh8o_5p2uLKCT6smwYFak_C-oF_EN9Sqlx5vWIPTw#bb0615), p. 574). It is considered as the fundamental intangible resource on which any organisation depends for its continuous survival (Pfeffer and Salancik, 1978). Entrepreneurs depend on formal institutions and cultural expectations for legitimacy. Both regulatory and cultural legitimacy helps entrepreneurs to not only stimulate the provision of investment, support and acceptance at the early stages of their innovation process, but also maintain political and public support for established technologies at the later stages of their innovation journey (Lounsbury and Glynn, 2001; Lounsbury et al., 2003; Zimmerman and Zeitz, 2002). In exchange, they have to conform to the formal and informal rules of the game (Meyer and Rowan, 1977), otherwise they will face sanctions for deviating from the widely accepted norms (Schein, 2009; Suchman, 1995).

Legitimacy can be built through three mechanisms of institutional isomorphism – mimetic, normative and coercive isomorphism (DiMaggio and Powell, 1983). They constitute cognitive, normative, and regulative bases or sources of legitimacy (Scott, 1995). Mimetic isomorphism results from typical responses to uncertainty, and uncertainty encourages imitation. In particular, entrepreneurs or managers are more likely to mimic competitors who are perceived to be successful under circumstances where a clear course of action is not available. Doing so also allows their firms to avoid risk through imitating their rivals. Thus, a culture with less tolerance for uncertainty may constrain entrepreneurs or firms such that they only learn from prior success.

Normative isomorphism primarily stems from two main aspects of professionalization – legitimisation inherent in educational achievement, and professional networks that span organizations and promote the dissemination of ideas among their members (Deephouse, 1996; Ruef and Scott, 1998). Thus, normative isomorphic change is group centric, emphasizing the necessity of convergence towards identical opinions or common ground. This is reinforced in a collectivist culture that promotes collaboration and socialization among individuals belonging to the same societal groups, such as entrepreneurs operating in the same value networks or industries. Their interaction through such social networks facilitates access to, and diffusion of, innovative ideas or resources, encouraging learning and knowledge-sharing. Moreover, the emphasis on interdependence among members of the society underpinned by such cultural values or normative legitimacy provides an opportunity for individuals to innovate through collaboration. In this sense, normative isomorphism derived from a collective culture facilitates knowledge flows through socialization and collaboration, which helps entrepreneurs to gain access to new knowledge.

Coercive isomorphism derives from political influence, such as governmental regulations, and underpins the pressure of entrepreneurs and their companies to conform to external stakeholders such as government expectations. Coercive pressure reduces uncertainty (North, 1990). The requirement of conformity to wider institutions, such as government mandates derived from contract laws, financial reporting requirements and so on, reinforces the mutual control over each other’s activities and increases the behavioral interdependence of firms, which effectively helps prevent unpredictable outcomes and potential harm (DiMaggio and Powell, 1983). Thus, coercive isomorphism may intensify the underpinning mechanisms characterized by collectivist culture, such as cooperation and reciprocity, since belonging to the same social networks exposes an entrepreneur of one company to social pressures brought about by entrepreneurial founders of other companies, which implies at least some degree of external coercion (Perrow, 1986).

*2.2. Entrepreneurial learning capacity and innovation*

Learning is an essential element of entrepreneurship (Minniti and Bygrave, 2001). As exceptional learners, effective entrepreneurs learn from everything including prior experience, customers, suppliers, employees, other entrepreneurs, and especially competitors. They solve problems via learning by doing, which allows them to learn from what works and, most importantly, from what does not work (Hilmersson, 2012). The cumulative and path dependent nature of ELC implies the importance of the possession of a certain degree of prior knowledge and absorptive capacity which allow entrepreneurs to develop related problem-solving abilities (Cohen and Levinthal, 1990). Existing knowledge in particular areas enhances one’s ability to assimilate new knowledge in the same domain. Absorptive capacity plays an important role in shaping the development of ELC through which entrepreneurs acquire and transfer new knowledge into new products and/or services to exploit entrepreneurial opportunities (Zahra and George, 2002). Specifically, it enables entrepreneurs to hone their problem-solving skills by fostering their capacity to apply external knowledge creatively in solving existing problems and this can create opportunities and demands for new products and services (Levinthal and March, 1993). The development of ELC not only depends on general knowledge or problem-solving skills, but also relies on entrepreneurs’ sustained efforts to constantly learn, adapt and respond to external conditions (Engelen et al., 2014; Patel and Fiet, 2011).

Individuals with high levels of ELC are the main contributors to know-how trading and converting know-how into new products and/or services for several reasons. First, the well-developed, rich base of knowledge embodied in entrepreneurs with great ELC implies that they are more capable of recognizing, acquiring and applying external knowledge for internal use in an effective manner (Cater, 1989; Adomako et al., 2019). Second, the introduction of new products and services typically requires entrepreneurs to explore new areas outside the current knowledge base via external knowledge acquisition and/or recombine existing knowledge with new external knowledge (Levinthal and March, 1991). Finally, ELC can be developed through the accumulation of tacit knowledge, including personal experience and knowledge established through individuals’ experiential learning (learning by doing). Tacit knowledge is an important component of innovation (Dosi, 1988) as such knowledge often provides new ways of tackling the unknowns associated with discovery, and how to bring this out into a final innovative product prototype. Thus, we propose:

**Baseline Expectation***: Entrepreneurs’ entrepreneurial learning capacity is positively related to their likelihood of new product and/or service introduction.*

**3. Hypotheses**

*3.1. Uncertainty avoidance and entrepreneurial learning capacity*

As a participant of the economic system, entrepreneurs make decisions that are more likely to reflect the cultural norms of uncertainty avoidance vs acceptance (Steenkamp et al., 1999). In the entrepreneurial context, uncertainty avoidance contradicts ambiguity tolerance, risk-taking, and acceptance of change from established norms/routines. Given high risk-averse societal norms, entrepreneurs from such cultures are more likely to assess the level of risk before venturing into unknown territories, which may discourage them from learning how to recognize and exploit new opportunities and/or overcome barriers to success (Shane and Venkataraman, 2000; Shane and Khurana, 2003). It is worth-noting that entrepreneurs themselves may be high-risk tolerant even in high uncertainty-avoiding societies. However, entrepreneurship is a collective process of individuals coming together turning opportunities into commercially viable new products or services that meet the expectation and demands of customers (Deakins and Freel, 2009) who are affected by their national culture. Thus, to be successful in entrepreneurship, entrepreneurs have to compromise on the dominant norms of their societies, particularly their customers.

The process by which entrepreneurs extrapolate their learning from previous experiences of dealing with customers, suppliers and other stakeholders, and develop new ways of looking at the world, involves changes in the patterns of cognition of individual entrepreneurs and shifts in the way that knowledge is transferred within entrepreneurial firms’ systems (Cope, 2011). For these tacit changes to take place within entrepreneurial firms, entrepreneurs need to first break the existing routines before being able to transform the experiential learning they have gained into newly codified norms, routines and procedures (Lumpkin and Lichtenstein, 2005; Schumpeter, 1968). However, in uncertainty avoidance societies, individuals or firms are highly resistant to any change from established norms, routines and procedures, as deviating from these established social norms may be perceived as lacking legitimacy. Despite the fact that entrepreneurs themselves are adventurous, it is more difficult for them to convince conservative bankers, high risk-averse employees, sceptical customers and unimaginative bureaucrats about their new product ideas or concepts, specifically the potential benefits and merits, than their counterparts in societies that appreciate initiatives and novelty (Klamer and McCloskey, 1994; Lavoie and Chamlee-Wright, 2000). This is more likely to restrict entrepreneurs’ ability to bring forward prior learning to new situations when a good fit is present. Empirical research suggests that entrepreneurs in societies with a low tolerance for uncertainty are restricted in their ability to embark on new product concepts and directions (Crossland and Hambrick, 2011).

High uncertainty-avoiding cultures tend to have little tolerance for failure and ambiguity. However, failure provides a critical and valuable learning opportunity for entrepreneurs, and is a necessary stepping-stone for entrepreneurs to learn not only to spot new opportunities but also to exploit those opportunities (Cope, 2011). Failure may lead to the development of entrepreneurial knowledge as well as founding experiences ([Ucbasaran](https://scholar.google.co.uk/citations?user=05gh128AAAAJ&hl=en&oi=sra) et al., 2013). The process of recovery and re-emergence from failure allows entrepreneurs to learn about themselves and entrepreneurship, which enhances their entrepreneurial preparedness for the subsequent entrepreneurial activities (Cope, 2005; Lumpkin and Lichtenstein, 2005). Such experiences may also provide entrepreneurs with the opportunity to acquire new knowledge that can be readily redeployed in other businesses, and the ability to enter into new markets and technologies, as well as products, with greater success (Politis, 2005). Equally, tolerance of ambiguity enables entrepreneurs to continue learning to grapple with complex problems to find novel solutions. The more entrepreneurs can tolerate ambiguous situations, the more they are eager to learn how to deal with them. Ambiguity-tolerant individuals are able to overcome feelings of anxiety and psychological discomfort naturally provoked by the ambiguity associated with new and difficult situations, and this can facilitate learning and how to respond to novel and complex stimuli (Stoycheva, 2003; [Zenasni](https://scholar.google.co.uk/citations?user=2ryBYTkAAAAJ&hl=en&oi=sra) et al., 2008). Thus, we propose:

**H1a.** *Uncertainty avoidance is negatively related to entrepreneurs’ entrepreneurial learning capacity.*

*3.2. Collectivism and entrepreneurial learning capacity*

Collectivism and individualism are important dimensions of cultural variation and refer to the relationship between the collectivity and the individual that prevails in a given society (Hofstede, 2001). These two competing concepts are often used to explain differences in the effectiveness of knowledge absorption between cultures (Ang and Slaughter, 2000). Collectivism or individualism affects the way an individual thinks about, processes and interprets knowledge. Members from a more individualistic society believe that withholding information is the key to success and they prefer to venture out on their own (Shane, 1993). They are independent and have less incentive to share knowledge with others. By contrast, members from more collectivist societies believe that success depends on the ability to share knowledge with others, and they prefer to involve others in every aspect of their work. A collective society encourages normative isomorphism which helps facilitate knowledge-sharing through collaboration, thus fostering ELC.

Despite a desire for social harmony, the boundaries between in-groups and out-groups are often salient in collective societies (Triandis, 1995). The presence of impermeable intergroup boundaries and strong in-group identification exacerbates competition for social power. Different societal groups may compete rather than cooperate for resources, such as for external knowledge valuable for innovation, as a way to increase their relative power (Pfeffer and Salancik, 1978). Individuals who identify the source of valuable external knowledge that is necessary to acquire, but do not belong to the in-group, may be excluded (Davison et al., 2013).

Equally, a collectivist culture facilitates interaction, the creation of trust, reciprocity and mutual dependence among individuals (Crossland and Hambrick, 2011). This allows individual entrepreneurs to identify and access the appropriate source of external knowledge, as well as facilitate a better understanding of the knowledge acquired from external partners through intensive interaction and established trust. Over time, these partners become more comfortable with, and confident about, each other’s competencies and reliability in economic exchanges (Lauren et al., 2012). In this sense, collectivism may augment entrepreneurs’ learning capacity and their incentive to exchange information relevant to transforming externally acquired knowledge into innovations, and to inform entrepreneurial innovation (Zahra et al., 2000; Freixanet et al., 2019). Moreover, close and frequent interaction also boosts the level of personal intimacy among partners necessary to establish effective communication of tacit knowledge, which is an essential element of innovation, and can only be generated and transferred through body language or physical demonstrations of skills, as opposed to formal language (Spring, 2003). Empirical studies find that firms with greater collaborative experience benefit more from tacit knowledge transfer (Inkpen and Pien 2006; [Bresman](https://scholar.google.co.uk/citations?user=LJP_pHMAAAAJ&hl=en&oi=sra) 2010; Černe et al., 2013).

The positive effect of collectivism is more likely to prevail for several reasons. First, the commercialisation of their innovation requires entrepreneurs to interact with their employees and external partners, such as key customers and suppliers, as well as encourage teamwork (Eby and Dobbins, 1997). As discussed previously, collectivism fosters the social interaction and cooperative team behavior that is required to address the special challenges and resistances associated with innovative projects (Crossland and Hambrick, 2011). This creates a favorable environment for learning through experimenting with novel options. Second, the more collectivist a society is, the more the organizational members engage in cross-functional teamwork to support and collaborate with each other (Shane, 1993). In particular, entrepreneurial founders tend to take floating roles in their businesses (Deakins and Freel, 2009). Cross-functionality offers entrepreneurs greater access to more and different types of information, and provides timely integration of critical information to achieve meaningful solutions and address future challenges (Edmondson and Nembhard, 2009). The combined experiences and diverse knowledge backgrounds of such teams enhance entrepreneurs’ ability to recognize the value of new opportunities (Cohen and Levinthal, 1990; Crobett, 2007). Thus, we hypothesize:

**H1b.** *Collectivism is positively related to entrepreneurs’ entrepreneurial learning capacity.*

The Baseline Expectations, H1a and H1b, imply that ELC will mediate the relationship between cultural values, such as uncertainty avoidance and collectivism, and entrepreneurs’ likelihood of new product and/or service introduction in their firms. The direct effect of cultural values on the likelihood of introducing a new product or service has been widely examined in previous studies (Rogers, 2003; Troy et al., 2008; Waarts and Everdingen, 2005). However, to our knowledge, there are no studies linking cultural values to the likelihood of entrepreneurs’ introducing a new product or service through ELC. Evaluating this mediation relationship can help the interpretation of previous findings and enhance our understanding of innovation performance variations across different national cultural contexts. For instance, previous studies suggest that high uncertainty avoidance cultures reduce an entrepreneur’s likelihood of new product or service introduction, because exploration of novel situations and objects is neither valued nor instilled in the citizens of countries with greater cultural intolerance of uncertainty (Steenkamp et al., 1999). However, a mediating effect of ELC would suggest a different interpretation. The high likelihood of new product development failure could be caused by entrepreneurs’ lack of ELC due to mimetic pressure arising from minimizing uncertainty, which makes them less capable of capturing the commercial value of new products and services than those in high uncertainty-acceptance countries. Likewise, it is well established in the extant literature that a collectivist culture that advocates group accountability may promote new product development because the more distinct the collectivist traits of the new product team members, the higher is the chance the team members will embrace cross-functional integration (Nakata and Sivakumar, 1996). When communications, cooperation and harmony are high between different functions, such as marketing and R&D functions, the likelihood of new product success is greater (Gupta et al., 1985; Gupa and Whilemon, 1988; Souder, 1988). Moreover, collectivism is an asset at the implementation stage of new product development, as the more collaborative and interdependent the members of the new product development teams, the more likely new products will be successfully commercialized within the given budgets, schedules and objectives (Nakata and Sivakumar, 1996; Troy et al., 2008). However, a mediating effect would suggest that this could be achieved by the greater ELC of entrepreneurs from collectivist societies, which is crucial for the successful acquisition and transformation of external knowledge into new products or services. Therefore, we propose:

**H2a.** *Entrepreneurs’ entrepreneurial learning capacity will mediate the effect of uncertainty avoidance on their likelihood of introducing new products and services in their firms.*

**H2b.** *Entrepreneurs’ entrepreneurial learning capacity will mediate the effect of collectivism on their likelihood of introducing new products and services in their firms.*

*3.3. Regulations, uncertainty avoidance and entrepreneurial learning capacity*

Formal institutions tend to be seen as a way of regulating action to eliminate uncertainty (North, 1990). The national regulatory framework is partly a reflection of a society’s attitude and expectations towards uncertainty avoidance (Hofstede, 1991). For instance, in contrast to broad general principles in high uncertainty-tolerant societies, well-codified regulatory frameworks provide explicit guidelines that apply to all citizens of uncertainty-avoiding societies. However, specific rules and rigid standards promote highly structured thinking and reduce the intellectual flexibility needed for entrepreneurs to learn through experimenting freely with new possibilities. More precise rules and regulations in such societies make the operating environment much more certain for businesses, and entrepreneurs become accustomed to this certainty, which decreases their ability to embrace and cut through ambiguity and complexity (Minniti and Bygrave, 2001). Stringent regulations that prescribe specific materials or technology requirements may hinder entrepreneurs’ creativity, as they give only a limited market prospect to those who want to experience alternative solutions. Moreover, entrepreneurs can be discouraged if they are forced to comply with too many rules and procedural requirements where they are expected to report to an array of institutions, and have to spend substantial time and money in fulfilling documentation requirements (Soto, 2000).

In addition to uncertainty reduction and constraining intellectual flexibility, the regulatory environment plays an important role in shaping social acceptance towards entrepreneurial failure (Cope, 2011; Levie and Autio, [2011](https://link.springer.com/article/10.1007/s11187-013-9519-3#CR37); Haselmann et al., [2010](https://link.springer.com/article/10.1007/s11187-013-9519-3#CR28)). Essentially, it is in the interest of stakeholders of a country and their societal goals to protect constituents from being harmed by illegitimate entrepreneurs, whose exits from failed businesses are socially stigmatized and associated with illegitimated behavior (Hudson, 2008). This illegitimacy is therefore based on a diminished social rather than personal identity, and may often result in a permanent exit from entrepreneurial activity if it is reinforced by the formal institutional pressures (Ragins, 2008). Prior studies show that attitudes toward giving failed entrepreneurs the chance to start new businesses are closely in line with the regulatory frameworks and reporting requirements (Armour and Cumming, 2008). Active and fierce regulatory implementation and enforcement of severe bankruptcy laws escalates the stigmatization of entrepreneurial failure and deprives failed entrepreneurs of their legitimacy, which subjects them to economic and social sanctioning of future entrepreneurial activity (Acharya and Subramanian, [2009](https://link.springer.com/article/10.1007/s11187-013-9519-3#CR1); Hessels et al., 2011; Scott, 1987). Failed entrepreneurs who were once legitimate in their countries find themselves stereotypically grouped with illegitimate entrepreneurs and are afforded more limited access to the human, social and financial resources that are important to the survival and growth of their firms (Simmons et al., 2014). Thus, we hypothesize:

**H3a.** *The negative impact of uncertainty avoidance on entrepreneurial learning capacity is stronger when regulations are more rigorous.*

*3.4. Regulations, collectivism and entrepreneurial learning capacity*

Regulatory institutions can reduce the boundaries between in-groups and out-groups through regulatory measures such as incentive schemes and initiatives aimed at strengthening the links between these groups; one example would be university and industry collaboration programmes to facilitate access to, and commercial exploration of, academic research. In more collectivistic societies, such knowledge is rarely made available to people outside these groups, unless they are the original intellectual property holders. Individuals exposed to diverse information and a broad knowledge base, as a result of participation in these collaborative programmes, are more frequently able to access external knowledge and utilize their learning capability to convert such knowledge into new products and/or services (Corbett, 2007; Lumpkin and Lichtenstein, 2005).

Moreover, isomorphic pressures from coercive regulatory frameworks may reinforce the interactions and trust among individuals in collectivist societies. The use of formal contracts may both extend the expected duration of a partnership and restrict the gains from one-time deviations from cooperative behavior in such relationships (Baker et al., 1997). This strengthens the mutual dependence among partners. Coercive regulatory frameworks can set the stage for the development of trust within a long-term interaction (Anderson and Weitz, 1989; Larson, 1992). For example, cooperative behavior in the present, as a result of supporting formal regulations, reinforces an expectation of cooperation in the future (Zenger et al., 2001). As discussed previously, increased interaction and trust enhances individual entrepreneurs’ ability to access and transfer tacit knowledge, thus amplifying the positive impact of collectivism on ELC.

**H3b.** *The positive effect of collectivism on entrepreneurial learning capacity is stronger when regulations are more rigorous.*

The above discussion suggests that a moderated mediation model will illustrate more comprehensively the indirect relationship between cultural values and an entrepreneur’s likelihood of new product and/or service introduction. Figure 1 summarizes our model.

**4. Methods**

*4.1. Data and sample*

To analyze the mediating effect of ELC on the relationship between cultural values, regulations, and entrepreneurs’ likelihood of launching new products and/or services, we constructed a database by merging data from the Adult Population Survey (APS) constructed by Global Entrepreneurship Monitor (GEM) with a variety of time-varying national institutional indicators and macroeconomic variables. Culture and regulation indicators were collected from the World Governance Indicators (WGI) and the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project, respectively. To obtain measurements for control variables at country level, we matched data from the World Development Indicators (WDI), the Urban Development Index (UDI), the Ease of Doing Business Index by the World Bank groups, the Global Competitive Indicators, and the Economic Freedom Index (EFI). Listwise deletion was utilized to drop observations where at least one of our independent variables was missing. Our final sample consists of 7,680 observations from a representative sample of randomly selected adults aged between 18 and 64, in 19 countries covered by the GEM APS in the period 2006-2011[[2]](#footnote-2). To ensure this final sample is representative of our target population, we ran the Komogorov-Smirnov two-sample tests. The results show no significant difference between the subsample used in our analysis and the original sample. Table 1 reports the country-level mean of individual entrepreneurs’ likelihood of new product or service introduction in total early stage entrepreneurial activity (TEA). Table 2 displays the descriptive statistics of our variables. The variance inflation factors (VIF) scores are below 10 with no indication of multicollinearity.

*4.2. Measures*

We measure the likelihood of new product or service introduction by whether or not an entrepreneur introduced a new product or service in the entrepreneur’s TEA driven by his or her activity or initiative. The data for this variable are collected from the GEM APS which provides information on the level and nature of entrepreneurial activity around the world. The measure is widely used as an indicator of the level of entrepreneurial innovation activity (Laursen et al., 2012).

We measure ELC by an entrepreneur’s ability to acquire, assimilate and organize new knowledge via three main entrepreneurial learning channels – education level, social network and prior entrepreneurial experience (Cope, 2011; Lumpkin and Lichtenstein, 2005; Politis, 2005). This empirical construct is based on Zahra et al. (2000) and Nicolaou et al. (2009). The education level is an ordinal variable which measures the amount of prior knowledge stock and skills individual entrepreneurs possess. According to Minbaeva et al. (2003), individuals’ educational level reflects their ability to acquire, assimilate and use external knowledge, which can affect entrepreneurs’ ability to envision, identify and choose what potential market and technological opportunities to pursue (Klein, 2008; Burgelman and Grove, 2007). Entrepreneurs’ social network is operationalized according to whether or not an entrepreneur knows other entrepreneurs involved in any start-up business personally. Individuals’ social networks are important for the identification and assimilation of new knowledge, and influence what knowledge and/or resources are shared and assimilated (Dhanaraj et al., 2004; Volberda et al., 2012). Thus, we use this indicator to capture an entrepreneur’s ability to access and assimilate externally available new knowledge for opportunity realization. Prior entrepreneurial experience is a dummy variable which denotes whether or not an entrepreneur has previously owned or managed a business. Prior related entrepreneurial experience influences entrepreneurs’ learning abilities, and accumulated experience of successfully turning a business idea into an entrepreneurial venture or commercialization of new business ideas via entrepreneurship improves an entrepreneur’s ability to create valuable inventions (Cohen and Levinthal, 1990). This indicator is therefore utilized to capture an entrepreneur’s ability to organize new knowledge for successful external opportunity exploitation. We obtained data for these three indicators from the GEM APS. We performed a principle component analysis (PCA) to develop a composite measure for ELC. The results from the PCA suggest that a one-factor solution with eigenvalue equal to 1.17 explained 90% of the total variance and all factor loadings greater than 0.70.

Following Li and Zahra (2012), we drew our measure for the formal regulations of the sample countries and regions from WGI, which captures the ability of a government to formulate and implement sound and rigorous regulations that permit and promote private sector development (Li and Zahra, 2012; Kaufmann et al., 2007). This is an aggregate indicator based on over 30 individual sources produced by a variety of non-governmental and international organizations with substantially smaller margins of measurement error than any of the individual sources (Kaufmann et al., 2007).

We drew the data from the GLOBE project and adopted its measures for two cultural values: collectivism and uncertainty avoidance. The GLOBE survey is an extension of Hofstede’s measures of cultural dimensions and enables us to take a closer look at cultural institutions through the lens of cultural values (House and Javidan, 2004).

Additionally, we controlled for a set of country-level, confounding factors, including the annual GDP per capital and GDP growth of a country, as there may be more attractive opportunities available for entrepreneurs to launch new products or services in a rapidly growing economy. We further broke down GDP per capital into a set of quartile dummy variables to account for the economic productivity of different countries, because the rate of new product or service introduction is much higher in emerging and/or developing market economies than in the rest of the world (Fu et al., 2011). In addition, we introduced a set of industry dummy variables to account for the sector variation that may affect an entrepreneur’s likelihood of pursuing product or service innovation activities. The characteristics of entrepreneurs are found to have a considerable impact on innovation (Schumpeter, 1942; Maskell, 2001). We controlled for the age of the entrepreneurs, as empirical findings unequivocally indicate that young entrepreneurs are more likely to innovate as compared to older entrepreneurs (Avermaete et al., 2004; Bamberger and Weir, 1990; Diederen et al., 2002). We also controlled for an entrepreneur’s current level of employment, as entrepreneurs with lower initial levels of employment are more determined to innovate and change their lives (Katsoulacos, 1984; Gatti, 2000). Being a male may affect entrepreneurial aspirations, especially with respect to new product or service development (Estrin and Mickiewicz, 2011), and thus we included a dummy variable (1=male, 0 otherwise) to control for the gender effect. Finally, we controlled for entrepreneurial motives by two dummy variables indicating whether or not starting a new business is driven by necessity or improvement. Improvement-driven entrepreneurs are willing to invest more in new opportunities and innovate more successfully than their necessity-driven counterparts, who tend to have less knowledge, skill and networks necessary for innovation (Block et al., 2015).

*4.3. Analytical approach*

Due to the different characteristics of our dependent variables, we tested our hypotheses using multiple statistical techniques. First, in H1 and H3, we examined the relationship between cultural values and ELC and the moderating effect of regulations. Our data contained 1,536 entrepreneurs (7,680 observations) across 19 countries resulting in a nested dataset where the dependent variable, ELC*,* was a continuous variable. To capture the impact of both individual and country levels in our analysis, we used multilevel mixed-effect linear regressions to test H1a, H1b, H3a and H3b. Second, to analyzse the mediating effect of ELC on the relationship between cultural values and entrepreneurs’ likelihood of new product and/or service introduction, we employed a multilevel Logit estimation for testing H2a and H2b, as our dependent variable (an entrepreneur’s likelihood of new product and/or service introduction) in this case is a binary variable and our data have a multilevel nested nature. This mixed model captures the hierarchical structure of our dataset in which individual entrepreneurs represent level one, and countries represent level two. In doing so, we were able to control for the clustering of the data, first within an individual, and second within a country.

**5. Results**

Table 3 reports the results of the multilevel mixed-effect linear estimate of ELC based on an unbalanced panel of 7,680 observations from 19 countries during the 2006-2011 period. Model 1 was estimated with all control variables, and Model 2 reports the main effects of the independent variables. Model 3 shows the interaction terms to test the moderating effect of regulations on the relationship between cultural values and ELC.

As shown in Model 2 in Table 3, the coefficient of uncertainty avoidance is negative and statistically significant (*β* =-0.186, *ρ*< .005). The result supports H1a that uncertainty avoidance is negatively related to entrepreneurs’ ELC. The coefficient of collectivism is positive and statistically significant in Model 2 (*β* =0.832, *ρ*< .005), providing support for H1b. The result implies that high collectivist cultures promote entrepreneurs’ ELC.

Following Zhang et al. (2009), we tested the multilevel mediating effect of ELC in H2a and H2b. According to this approach, the presence of a mediating effect is indicated if (1) cultural values are related to ELC; (2) there is a decrease in the coefficients of cultural values on entrepreneurs’ likelihood of new product and/or service introduction when ELC is included in the analysis; (3) this reduction in the coefficients is significant. The results obtained from this analysis confirm that ELC mediates the effect of cultural values, including uncertainty avoidance and collectivism, on the likelihood of entrepreneurs’ new product and/or service introduction. In Table 3, we find a negative and significant relationship between uncertainty avoidance and ELC. In contrast, collectivism has a positive and significant impact on ELC. Table 4 illustrates the results from our multilevel Logit estimation of entrepreneurs’ likelihood of new product and/or service introduction. Models 2 and 3 add the mediator and main effect. Model 4 estimates the mediating effects. As Table 4 shows, the odd ratios of both uncertainty avoidance and collectivism decrease from Models 3-4 while the significance levels remain the same when ELC is included in the regression analysis. To test the significance of the reduction in the odd ratio of each variable, and therefore the proposed multilevel mediating effect, we performed Freedman and Schatzkin’s (1992) test. Our results show that ELC significantly mediates the impact of uncertainty avoidance (t = 3. 506, *p*<.01, df =18) and collectivism (t = 1.764, *ρ*<.05, df =18) on the likelihood of entrepreneurs’ new product and/or service introduction. Thus, H2a and H2b are supported.

We find support for H3a. Model 3 in Table 3 shows the coefficient of the interaction term between regulations and uncertainty avoidance is negative and significant (*β* = -0.183, *ρ*< .01). As predicted, the negative effect of uncertainty avoidance on ELC becomes stronger when regulations are more rigorous. Consistent with H3b, Model 3 in Table 3 shows that the coefficient of interaction among regulations and collectivism is positive and statistically significant (*β* =0.110, *ρ*< .01). The result suggests that the importance of collectivist cultures in promoting entrepreneurs’ ELC is stronger when they operate in a more rigorous regulatory environment. Figures 2 and 3 plot the moderating effect of regulations. Figure 2 shows that an increase in the level of uncertainty avoidance would have a negative impact on entrepreneurs’ ELC when they compete in more rigorous regulatory environments, supporting H3a. Figure 3 illustrates that when regulatory environments are highly rigorous, the positive effect of collectivism on entrepreneurs’ entrepreneurial capacity is stronger, lending visual support to H3b.

Table 5 reports results for the moderated mediation model for entrepreneurs’ likelihood of new product and/or service introduction. To formally test if the mediating effectof ELC on the relationship between cultural values and entrepreneurs’ likelihood of new product and/or service introduction is stronger when regulations are more rigorous, we performed the Preacher et al. (2007) and Hayes (2013) moderated-mediation test and used 5,000 bootstrap resamples and a bias-corrected and accelerated 95 per cent confidence interval. The conditional indirect effect of each cultural dimension on entrepreneurs’ likelihood of new product and/or service introduction is estimated at low, moderate, and high levels of regulatory rigorousness. The analysis further confirms our main results, showing that ELC mediates the relationship between cultural values and entrepreneurs’ likelihood of new product and/or service introduction at different levels of regulatory rigorousness.

To check the robustness of our results, we performed a number of sensitivity analyses. First, to ensure that the country-level effects are correlated with the properties of individual-level variables, we estimated the possibility of introducing a new product and/or service and ELC using the one-stage random effects model developed by Mundlak (1978) with the inclusion of Mundlak instruments in Model 3 in both Tables 3 and 4, which are country-specific average values of individual-level covariates. The Mundlak instruments distinguish country-level variance caused by individual-level covariates, and are advantageous in reducing the bias in country-level coefficients while utilizing the entire variation of individual-level data (Reitzig and Puranam, 2009). The results remained consistent with those reported in Tables 3 and 4. Second, to exclude entrepreneurs who did not intend to introduce new products or services as part of their early stage entrepreneurial activity from the rest of the sample, we conducted a Heckman sample selection analysis. We created a dummy variable that took the value of one if an entrepreneur introduced new products or services, and zero otherwise. The inverse mills ratio was insignificant, suggesting that entrepreneurs’ new product /service development propensity does not generate significant sample selection bias. Third, we used the scores for cultural values from Hofstede (2001) as alternative measures for collectivism[[3]](#footnote-3) and uncertainty avoidance, and included them in the regression analyses. The results obtained were consistent with those reported in Tables 3 and 4. Fourth, we also controlled for the quality of scientific institutions, university and industry collaboration in R&D, and GDP per capita in the estimation. The results were very similar to those reported in Table 3. Fifth, to assess the direction of causality between entrepreneurs’ ELC and their likelihood of new product or service introduction, we set entrepreneurs’ likelihood of new product or service introduction as an independent variable and their ELC as a dependent variable and tested the effect of the new independent variable on the new dependent variable following Landis and Dunlap’s approach (2000). The results showed no significant effect of the reverse independent variable, suggesting that reverse causality is of minimal concern in our data (Cao et al., 2009). Finally, we tested the sensitivity of the results to the 2008 Global Financial Crisis by including a dummy variable that captured the crisis period (1= within the crisis period, and 0 otherwise) in the estimation of models in Tables 3 and 4. We found that the coefficient of this dummy variable was negative but insignificant across all models, with the direction and significance level of each independent variable remaining the same.

**6. Discussion and Conclusions**

This study provides a new account of the extent to which cultural values affect innovation and evokes a new underlying mechanism for the relationship between cultural values and innovation – entrepreneurs’ ELC as an important instrument for implementing isomorphic responses to different types of institutional pressures from an institutional perspective. Based on an analysis of entrepreneurs from 19 countries that were randomly sampled during the 2006–2011 period, we have obtained several interesting and important findings. First, the results suggest that entrepreneurs’ ELC is an explanatory mechanism of the relationship between cultural values, such as uncertainty avoidance and collectivism, and their likelihood to innovate. Entrepreneurs from high uncertainty avoidance societies are less innovative than their counterparts from high uncertainty-tolerant societies because uncertainty avoidance constrains their ELC. Equally, entrepreneurs from highly collectivist societies are more likely to launch new products and/or services than their rivals from highly individualist societies because collectivist social norms and values promote the development of entrepreneurs’ ELC through knowledge-sharing and collaboration. The finding differ from previous studies which directly link cultural values to innovation. The direct link may obscure the underlying mechanism which underpins the way that cultural value affects innovation (Busenitz et al., 2000; Wennekers et al., 2002),

Second, our findings reveal that government regulations moderate the extent to which informal norms and values favor or hinder the development of entrepreneurs’ ELC, resulting in divergent extents to which they engage in innovation activity. Although prior studies have found that a highly regulated environment may limit entrepreneurial opportunities (Bartelsman et al., 2005; Klapper et al., 2006), much of this line of inquiry tends to examine the direct effect of government regulations on the rate of start-ups or entrepreneurship across countries without taking account of the interaction effect between cultural values and formal institutions (Grilo and Thurik, 2005; Noorderhaven et al., 2004). Our study reveals that government regulations as a coercive institutional pressure can hinder entrepreneurial innovativeness in a high uncertainty avoidance society. While well-codified regulatory frameworks and specified rules provide stability to help reduce uncertainty, stringent regulations and rigid standards may constrain an entrepreneur to flexibly experiment with innovative opportunities. Moreover, such stringency may also come with significant compliance costs (Renda et al., 2014). Specifically, high uncertainty avoidance societies tend to deliberately impose regulatory requirements that are overly distant from current technologies to protect the safety of customers and vulnerable users (Blind, 2012; Li and Zahra, 2012). However, when the distance between regulatory environment and the status quo is excessive, entrepreneurs who fail to comply with the new requirements due to technical or financial reasons, may miss the opportunity to turn their entrepreneurial learning into innovation. As a result, the innovation-enhancing potential of regulations is more likely to be replaced by a discouraging effect on entrepreneurial learning and venturing.

Equally, we find that in a collective society, a highly rigorous regulatory framework may help to develop ‘sponsored’ trust which in turn enhances the positive impact of collectivism on ELC, given that trust and close interaction facilitates knowledge flows and enables entrepreneurs to access external knowledge. In contrast to the “substitution hypothesis” (Tolbert and Zucker, 1996), our finding favors the complementarity view of institutions that well-established formal arrangements can be used to maximize the desirable impact of cultural value or informal norms on entrepreneurial innovation (Sitkin and Roth, 1993), specifically the amount of ELC that can be transformed into innovative products and/or services. The finding further indicates that on top of the provision of a fair and conducive playing field for entrepreneurs that motivates them to take risks with the promise of getting good returns on their investment (North, 1990), formal regulations are established and maintained by individuals who are shaped by their own unique cultural values.

*6.1. Theoretical implications*

Our study makes several important contributions to the literature on institutional theory, entrepreneurial learning and innovation. First, while prior literature suggests that isomorphism either hinders or enhances innovation (Wu and Salomon, 2016), our study makes one of the first attempts to advance isomorphism through ELC as a mediator of the relationship between cultural values and entrepreneurs’ likelihood to innovate. This allows us to not only identify the underlying mechanism for their relationship but also assess more precisely the extent of the indirect effect of institutional pressures arising from conforming to cultural values and formal regulations on innovation, in particular those that can be channelled through isomorphism. Our findings provide broad support for the argument that institutions affect entrepreneurs’ innovativeness by shaping their isomorphic behavior (North, 1990; DiMaggio and Power, 1983). Our findings also help to reconcile the significant variations in the rate of innovation across countries with similar institutional contexts (Thompson, 2004; Holmes et al., 2013; [Fuentelsaz](https://www.sciencedirect.com/science/article/pii/S1075425318300917" \l "!) et al., 2020) by highlighting the heterogeneity in entrepreneurs’ ability (ELC) to respond to institutional pressures.

Second, instead of examining the standalone effect of any specific type of institutional pressure in isolation, we articulate, using empirical evidence, how the different types of isomorphic pressures derived from two cultural dimensions and regulations interact to shape entrepreneurs’ ability to transform their ELC into innovative outcomes. In doing so, our study not only assists in addressing the indistinct view of formal and informal institutions that results from single dimensions, but also helps to explain why countries with substantially diverse cultures and norms achieve similar outcomes. A vast amount of prior research has examined the standalone effects of formal and informal institutional constraints on entrepreneurship and innovation (Rodrik, 2007; Triandis et al., 1986). However, their interactions, and the extent to which these interactions shape entrepreneurial innovation, have been underexplored (Autio et al., 2014). Given that individual entrepreneurs are exposed to a mixture of formal and informal institutional pressures (Leitch et al., 2012), an examination of the extent to which these alternative enforcement mechanisms interact with each other in shaping the behavioral process and outcome is of pivotal importance. Moreover, we complement and extend existing literature on the ‘complementarity’ and/or ‘substitution’ views of formal and informal institutions (Sitkin and Roth, 1993; Tolbert and Zucker, 1996), by drawing attention to the importance of the type of institutional pressure which matters in shaping their relationship. Specifically, our findings suggest that coercive institutional pressure arising from obeying formal regulations reinforces the impact of mimetic and normative institutional pressures associated with conforming to cultural values on entrepreneurs’ isomorphic behavior.

Finally, our study contributes to empirical research on ELC, and sheds new light on its role in innovation. Although research on entrepreneurial learning has received increasing attention recently, most existing studies have focused on exploring the conceptual and theoretical underpinnings of entrepreneurial learning (Cope, 2005; Politis, 2005; Lumpkin and Lichtenstein, 2005). We extend this body of literature by making one of the first attempts to empirically examine not only the factors that influence ELC, but also its implications for innovation activities, thus adding much needed evidence in this research area. The current study therefore advances our understanding of ELC as a mediator between cultural values and innovation, given government regulations, as opposed to the widely acknowledged direct effect (Ravasci and Turati, 2005; Sweeney, 1987). Moreover, by examining the complex interaction of multiple institutional forces in shaping entrepreneurs’ ELC, we move beyond previous research with a predominant focus on the impact of ‘human’ factors such as entrepreneurs’ prior experience, career path and cognition, on their ELC (Crobett, 2005; Holcomb et al., 2009; Real et al., 2014) and draw particular attention to the importance of cultural values and regulations.

*6.2. Limitations and future research directions*

Despite its contributions, this study is subject to several limitations that deserve future inquiry. First, our study provides a springboard for research aimed at exploring entrepreneurs’ strategic responses to different types of institutional pressures and the related innovation and/or performance implications. Specifically, the negative impact of uncertainty avoidance on ELC found in our study opens an avenue for future investigation into the range of innovation mechanisms that can be used to effectively address and alleviate mimetic pressure arising from uncertainty reduction. Second, our findings may only be limited to the nineteen countries included in our sample. Future studies should validate our findings using data from other collectivist countries such as China, South Korea and Venezuela and non-collectivist countries, namely the US, France and Germany, in addition to those countries with more distinct cultural values and formal institutions. Moreover, further cross-national comparative studies of the relationships examined in this study are certainly needed to deepen our understanding of the extent to which ELC mediates the impact of culture values on innovation across different institutional settings. Third, due to data constraints, we measured innovation using a dummy variable indicating whether or not an entrepreneur introduces product or service innovation driven by his or her activity or initiative. Future research should verify our findings using more precise measurements for innovation outcomes such as new product sales as a percentage of total turnover and forward patent citation counts. Fourth, apart from government regulations, other formal institutional factors, such as legal frameworks, property rights and information systems, may also interact with cultural values and jointly affect entrepreneurial learning and innovation. Future studies should move beyond political institutions by taking account of other components of formal institutions. Finally, due to data constraints, our unit of analysis is limited at individual level only. Future research should rule out the possible effects of organizational factors, such as organizational culture on entrepreneurs’ innovativeness in the analysis of the relationship between ELC and innovation and/or explore their organizational level boundary conditions. This will advance our understanding of how different levels of factors foster or hinder ELC and hence entrepreneurs’ likelihood to introduce innovation.

*6.3. Managerial and policy implications*

Our findings have several important implications for how entrepreneurs and governments from collectivist and uncertainty avoidance societies can nurture the growth of innovation activities. First, it is important for entrepreneurs to realize that some strategies that prove to be conducive to their innovation activities may be constrained by institutional pressures. For instance, entrepreneurial learning as an innovation strategy is less effective for entrepreneurs from high uncertainty avoidance societies as the pressure to minimize uncertainty limits their ability to learn from exploiting novel options and failure, which are crucial if innovation is to flourish. Conversely, those from high collectivist societies should take advantage of knowledge-sharing and relationship-based transactions with out-groups, as well as the legitimacy of their entrepreneurial learning, to maximize their innovation-related benefits.

Second, an important implication for governments of high uncertainty avoidance societies is to introduce legislation or strengthen the existing legal framework to provide some minimum degree of protection from failure, such as the US bankruptcy laws. Failure is a necessary part of the innovation process because from failure comes learning, iteration, adaptation, and the building of new conceptual and physical models for new products or services through an iterative learning process. For countries that score low on individualism, our study points to the need to build a conducive formal institutional framework to compensate for the downside of collectivist norms and values, and to focus on the synergy between formal rules and informal constraints. Specifically, governments of collectivist societies can pay more attention to building a regulatory environment to prevent or weaken any power concentration in the hands of a minority of the population, while taking a light-touch approach to facilitate entrepreneurial activities by enhancing inter-organizational interactions and knowledge flows.

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**Table 1**

**Summary of the likelihood of new product or service introduction in total early stage entrepreneurial activity (TEA) grouped by country**

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Mean the likelihood of new product or service introduction in TEA | Country | Mean the likelihood of new product or service introduction in TEA |
| Argentina | 0.493 | Russia | 0.282 |
| Australia | 0.287 | Singapore | 0.360 |
| Finland | 0.335 | Slovenia | 0.492 |
| Greece | 0.367 | South Africa | 0.496 |
| India | 0.263 | Spain | 0.357 |
| Ireland | 0.359 | Sweden | 0.271 |
| Israel | 0.377 | Thailand | 0.508 |
| Italy | 0.360 | Turkey | 0.611 |
| Japan | 0.440 | United Kingdom | 0.322 |
| Mexico | 0.418 | Total | 0.361 |

**Table 2**

**Correlation matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable name | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1. New product or service introduction | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Regulations (R)*t-1* | -0.018 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. Level of uncertainty avoidance (UA) | 0.023 | 0.463 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| 4. Level of collectivism (CT) | 0.034 | 0.232 | -0.109 | 1 |  |  |  |  |  |  |  |  |  |  |
| 5. Entrepreneurial learning capacity (ELC) *t-1* | -0.072 | -0.074 | -0.045 | -0.028 | 1 |  |  |  |  |  |  |  |  |  |
| 6. Age*t-1* | -0.041 | 0.171 | 0.103 | 0.017 | 0.016 | 1 |  |  |  |  |  |  |  |  |
| 7. Gender*t-1* | 0.006 | 0.025 | 0.017 | 0.000 | -0.103 | 0.032 | 1 |  |  |  |  |  |  |  |
| 8. Current employment*t-1* | -0.001 | 0.005 | 0.012 | -0.003 | -0.004 | -0.003 | -0.001 | 1 |  |  |  |  |  |  |
| 9. Improvement-driven entrepreneurship | 0.070 | 0.105 | 0.065 | 0.013 | -0.002 | -0.044 | -0.049 | 0.005 | 1 |  |  |  |  |  |
| 10. Necessity-driven entrepreneurship | -0.061 | -0.166 | -0.102 | -0.066 | 0.030 | 0.024 | 0.065 | -0.004 | -0.555 | 1 |  |  |  |  |
| 11. GDP growth*t-1* | 0.038 | -0.422 | -0.056 | -0.020 | 0.027 | -0.089 | -0.020 | 0.010 | -0.032 | 0.027 | 1 |  |  |  |
| 12. GDP per capita*t-1 quartile 1* | 0.074 | -0.430 | -0.278 | 0.156 | 0.006 | -0.067 | -0.011 | 0.012 | -0.069 | 0.098 | 0.361 | 1 |  |  |
| 13. GDP per capita*t-1 quartile 2* | -0.034 | -0.027 | -0.096 | 0.072 | -0.025 | -0.004 | -0.024 | -0.005 | 0.069 | -0.077 | -0.057 | -0.259 | 1 |  |
| 14. GDP per capita*t-1 quartile 3* | 0.018 | 0.303 | 0.036 | 0.090 | -0.014 | 0.062 | 0.002 | -0.004 | 0.018 | -0.095 | -0.192 | -0.259 | -0.310 | 1 |
| Mean | 0.361 | 0.913 | 4.245 | 5.690 | 2.255 | 44.357 | 1.374 | 28.273 | 0.455 | 0.278 | 3.910 | 0.212 | 0.225 | 0.220 |
| S.D. | 0.480 | 0.756 | 0.582 | 0.246 | 1.028 | 12.227 | 0.484 | 2275.575 | 0.498 | 0.448 | 2.923 | 0.409 | 0.418 | 0.414 |

N=7,680; the absolute value of coefficient greater than 0.01 is significant at *p*>0.05 level (two-tailed).

**Table 3**

**Multilevel mixed-effect linear regressions of entrepreneurial learning capacity**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dependent variable | Model 1 |  | Model 2 |  | Model 3 |  |
| Entrepreneurial learning capacity | Coef. |  | Coef. |  | Coef. |  |
| Country level variables |  |  |  |  |  |  |
| GDP growth*t-1* | -0.055 | \*\*\* | -0.027 | \*\* | -0.038 | \* |
|  | 0.009 |  | 0.010 |  | 0.011 |  |
| GDP per capita*t-1* quartile 1 | 0.380 | \*\*\* | -0.876 | \*\*\* | -0.807 | \*\*\* |
|  | 0.050 |  | 0.088 |  | 0.098 |  |
| GDP per capita*t-1* quartile 2 | 0.119 | \*\* | -0.403 |  | -0.500 | \*\*\* |
|  | 0.044 |  | 0.051 | \*\*\* | 0.059 |  |
| GDP per capita*t-1* quartile3 | 0.204 | \*\*\* | -0.062 |  | -0.110 | \* |
|  | 0.040 |  | 0.042 |  | 0.044 |  |
| Regulations (R)*t-1* | |  | -0.578 | \*\*\* | -0.415 | \*\*\* |
|  |  |  | 0.046 |  | 0.115 |  |
| Level of uncertainty avoidance (UA) H1a |  |  | -0.186 | \*\*\* | -0.073 | \* |
|  |  |  | 0.042 |  | 0.058 |  |
| Level of collectivism (CT) H1b |  |  | 0.832 | \*\*\* | 0.824 | \*\*\* |
|  |  |  | 0.084 |  | 0.091 |  |
| UV x R*t-1* H3a |  |  |  |  | -0.183 | \*\* |
|  |  |  |  |  | 0.057 |  |
| CT x R*t-1* H3b |  |  |  |  | 0.110 | \*\* |
|  |  |  |  |  | 0.045 |  |
| Individual-level variables |  |  |  |  |  |  |
| Age*t-1* | -0.008 | \*\*\* | -0.007 | \*\*\* | -0.007 | \*\*\* |
|  | 0.001 |  | 0.001 |  | 0.001 |  |
| Gender*t-1* | 0.018 |  | 0.008 |  | 0.009 |  |
|  | 0.029 |  | 0.029 |  | 0.029 |  |
| Current employment*t-1* | 0.000 |  | 0.000 |  | 0.000 |  |
|  | 0.000 |  | 0.000 |  | 0.000 |  |
| Improvement-driven entrepreneurship | 0.115 | \*\* | 0.134 | \*\*\* | 0.134 | \*\* |
|  | 0.033 |  | 0.033 |  | 0.033 |  |
| Necessity-driven entrepreneurship | 0.093 | \* | 0.087 |  | 0.082 |  |
|  | 0.043 |  | 0.044 |  | 0.044 |  |
| Sector dummies | Yes |  | Yes |  | Yes |  |
| Random effect variance |  |  |  |  |  |  |
| Between country variance | 0.426 | \*\*\* | 0.214 | \*\*\* | 0.290 | \*\*\* |
|  | 0.064 |  | 0.046 |  | 0.053 |  |
| Log likelihood | -8817.07 | \*\*\* | -7383.17 | \*\*\* | -7377.64 | \*\*\* |
| Akaike Information Criterion | 17658.13 |  | 14796.340 |  | 14789.26 |  |

\* *p*<0.05; \*\* *p*<0.01; \*\*\* *p*<0.001 (two-tailed). Number of country groups =20; Number of year groups = 5; N = 7,680. Standard errors are shown in parentheses.

**Table 4**

**Multilevel Logit regressions of new product and / or service introduction**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dependent variable | Model 1 |  | Model 2 |  | Model 3 |  | Model 4 |  |
| The likelihood of new product and/  or service introduction | OR |  | OR |  | OR |  | OR |  |
| Country level variables |  |  |  |  |  |  |  |  |
| GDP growth*t-1* | 0.977 |  | 1.008 |  | 0.981 |  | 1.014 |  |
|  | (0.030) |  | (0.042) |  | (0.036) |  | (0.041) |  |
| GDP per capita*t-1* quartile 1 | 1.434 |  | 1.831 |  | 0.918 |  | 0.717 |  |
|  | (0.399) |  | (0.617) |  | (0.326) |  | (0.312) |  |
| GDP per capita*t-1* quartile 2 | 0.755 | \* | 0.615 | \* | 0.678 | \* | 0.576 | \* |
|  | (0.104) |  | (0.135) |  | (0.117) |  | (0.125) |  |
| GDP per capita*t-1* quartile3 | 1.069 |  | 1.049 |  | 1.192 |  | 1.068 |  |
|  | (0.105) |  | (0.170) |  | (0.142) |  | (0.170) |  |
| Regulations (R)*t-1* |  |  |  |  | 0.605 | \* | 0.557 | \* |
|  |  |  |  |  | (0.129) |  | (0.147) |  |
| Level of uncertainty avoidance (UA) H2a | |  |  |  | 0.641 | \* | 0.511 | \* |
|  |  |  |  |  | (0.141) |  | (0.136) |  |
| Level of collectivism (CT) H2b |  |  |  |  | 2.826 | \* | 2.280 | \* |
|  |  |  |  |  | (1.824) |  | (1.050) |  |
| Individual level variables |  |  |  |  |  |  |  |  |
| Mediating variable |  |  |  |  |  |  |  |  |
| Entrepreneurial learning capacity*t-1* | |  | 1.070 | \* |  |  | 1.112 | \*\*\* |
|  |  |  | (0.040) |  |  |  | (0.045) |  |
| Age*t-1* | 0.996 | † | 0.996 |  | 0.997 |  | 0.997 |  |
|  | (0.002) |  | (0.004) |  | (0.003) |  | (0.004) |  |
| Gender*t-1* | 1.060 |  | 1.058 |  | 1.138 | † | 1.098 |  |
|  | (0.058) |  | (0.090) |  | (0.084) |  | (0.098) |  |
| Current employment*t-1* | 1.001 | \* | 1.006 |  | 1.005 |  | 1.006 |  |
|  | (0.000) |  | (0.005) |  | (0.003) |  | (0.005) |  |
| Improvement-driven entrepreneurship | 1.228 | \*\* | 1.065 |  | 1.157 | † | 1.061 |  |
|  | (0.076) |  | (0.103) |  | (0.097) |  | (0.107) |  |
| Necessity-driven entrepreneurship | 0.829 | \* | 0.721 | \* | 0.808 | \* | 0.765 | \* |
|  | (0.067) |  | (0.086) |  | (0.086) |  | (0.097) |  |
| Sector dummies | Yes |  | Yes |  | Yes |  | Yes |  |
| Random effect variance |  |  |  |  |  |  |  |  |
| Between country variance | 0.389 | \*\*\* | 0.394 | \*\*\* | 0.098 | \*\*\* | 0.137 | \*\*\* |
|  | (0.140) |  | (0.173) |  | (0.059) |  | (0.089) |  |
| Log likelihood | -4068.47 | \*\*\* | -1730.70 | \*\*\* | -2214.53 | \*\*\* | -1541.2 | \*\*\* |
| Akaike Information Criterion | 8160.94 |  | 3487.39 |  | 4459.06 |  | 3114.39 |  |
|  |  |  |  |  |  |  |  |  |

\* *p*<0.05; \*\* *p*<0.01; \*\*\* *p*<0.001 (two-tailed). Number of country groups =20; Number of year groups = 5; N = 7,680. Estimates represent Odd Ratio (OR). OR greater than 1 represents a positive relationship and OR less than 1 represents a negative relationship. Standard errors are shown in parentheses.

**Table 5**

**The moderating role of regulations on the indirect effect of cultural values on the likelihood of new production or service introduction through entrepreneurial learning**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | DV: The likelihood of new product or service introduction | | | | | |
| Mediator: Entrepreneurial learning | | | | | |
| Observed Coef. | Bias | Bootstrap SE | 95% | CI |  |
|  |  |  |  |  |  |  |
| Uncertainty avoidance at low levels of regulatory rigorousness | 0.003 | 0.00007 | 0.0004 | 0.002 | 0.004 | (P) |
|  |  |  |  | 0.002 | 0.004 | (BC) |
| Uncertainty avoidance at moderate levels of regulatory rigorousness | 0.002 | 0.00004 | 0.0002 | 0.001 | 0.002 | (P) |
|  |  |  |  | 0.001 | 0.002 | (BC) |
| Uncertainty avoidance at high levels of regulatory rigorousness | 0.001 | 0.00002 | 0.0003 | 0.000 | 0.001 | (P) |
|  |  |  |  | 0.000 | 0.001 | (BC) |
| Collectivism at low levels of regulatory rigorousness | 0.001 | -0.00002 | 0.0005 | -0.002 | 0.000 | (P) |
|  |  |  |  | 0.002 | 0.000 | (BC) |
| Collectivism at moderate levels of regulatory rigorousness | 0.003 | -0.00003 | 0.0005 | 0.002 | 0.004 | (P) |
|  |  |  |  | 0.002 | 0.004 | (BC) |
| Collectivism at high levels of regulatory rigorousness | 0.007 | -0.00004 | 0.0008 | 0.006 | 0.009 | (P) |
|  |  |  |  | 0.006 | 0.009 | (BC) |

Uncertainty avoidance

Collectivism

Entrepreneurs’ entrepreneurial learning capacity

Entrepreneurs’ likelihood of new product /service introduction

Regulations

H3a & H3b

H1a & H1b

H2a & H2b

**Fig. 1. The conceptual model**

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**Fig. 2.**

**The moderating effect of regulations on the relationship between uncertainty avoidance and ELC**

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**Fig. 3.**

**The moderating effect of regulations on the relationship between collectivism and ELC**

1. Corresponding author [↑](#footnote-ref-1)
2. Due to data constraints, some major countries are missing from our analysis. In particular, German data are missing in 2007, and Chinese data are missing in 2008 and 2011. Canadian data are absent from 2007. USA, Brazil and France are excluded from the analysis due to a large number of missing observations of the key variables of interest such as entrepreneurial motivation (improvement-driven and necessity-driven entrepreneurship) during our sample period. [↑](#footnote-ref-2)
3. We used the minus of the Hofstede measure of individualism to measure collectivism. [↑](#footnote-ref-3)