

## **A recipe for national innovate entrepreneurial activity: Finance and industry with a dose of self-confidence**

CD Reddy

University of Johannesburg, Johannesburg, South Africa

creddy@uj.ac.za

**Abstract:** We study the effect of nations' financial and industrial contexts on their innovative share of entrepreneurship. We argue that this effect is not universally strongly positive as may be assumed from extant research. This argument is supported by analysis of 333 country-year observations for 88 countries from the GEM and World Economic Forum databases. The findings highlight how a nation's informal institutional context moderates the effect of its objective resource context on its innovative share of entrepreneurs. In particular, they contribute to the nascent interest in the cultural processes impacting on the sense making of a nation's innovative-oriented entrepreneurs.

**Keywords:** innovation, entrepreneurship, finance, industry, cognition, institutions

### **1. Introduction**

With the promise of large benefits for their economy, many nations vie to increase not just the quantity of entrepreneurs but also their innovative-oriented share of entrepreneurial activity. Thus far, we know that differences in innovative entrepreneurship across nations arise from differences in the availability of resources including venture capital and the latest technologies (Stenholm, Acs and Wuebker, 2013; Yoon, Kim, Buisson and Phillips, 2018). Evidence also exists that a nation's technological knowledge effects its innovative entrepreneurship when government intervention is at a minimum, which allows private actors, who possess the required technologies, to collaborate with the actual agents of innovation and entrepreneurship (Yoon et al., 2018). This moderating role of government implies an important role for regulative institutions.

But nations also possess institutions that impact more directly on the actual agents of innovation and entrepreneurship. A strong characteristic of these agents appears to be their high level of self-confidence in their ability to start a new venture (Koellinger, 2008). This self-confidence falls within the realm of the cognitive pillar of institutions, which represents the shared mental framework about entrepreneurship, through which the nation's population may interpret entrepreneurial opportunities (Stenholm et al., 2013; Valdez and Richardson, 2013). Notably, cognitive institutions have not been explicitly recognized in both the broader national innovation systems (Lundvall, 2007) and the specific innovative entrepreneurship systems perspectives (Autio, Kenney, Mustar, Siegel and Wright, 2014).

This study sets out to examine the moderating role of cognitive institutions on the relationship between a nation's resource context and its innovative share of entrepreneurship. Following extant research about the role of the availability of venture capital and the latest technologies, the study focuses on the resource context in terms of its financial system and industry context. Whereas the nation's financial system impacts on the supply of venture capital (Whitley, 1999), its industry with its large established firms may possess the latest technologies (Autio et al., 2014). We argue

that a nation's industry context and financial system have a stronger positive effect on its innovative-share of entrepreneurship when its cognitive institutions promote entrepreneurial self-confidence.

Our analysis of 333 country-year observations for 88 countries from the GEM and World Economic Forum (WEF) databases supports our argument. These findings contribute to calls for research into contextual interactions (Autio et al., 2014; Zahra and Wright, 2011; Woolley, 2014); and, particularly interactions including the social construction of innovation systems, which occurs primarily "through cognitive and cultural processes, such as individual and collective attempts at sense making" (Roundy, 2016: p233). In addition, we also demonstrate the application of the entrepreneurial cognition perspective to show how the contextual interactions manifest in the mind of innovative entrepreneurs. This builds on arguments about the cross level application of this perspective (Smith, Mitchell and Mitchell, 2009).

## **2. Theory and hypotheses**

While the average entrepreneur replicates existing ideas, innovative entrepreneurs transform "inventions and ideas into economically viable entities, whether or not, in the course of doing so they create or operate a firm" (Baumol, 1993, p.198). Recently Autio et al (2014) put forward a framework for entrepreneurial innovation and context. Among other contextual components, the framework highlights the institutional and industry context. While the industry context represents the latest technologies available to a nation's entrepreneurs, the institutional context represents the financial system and the shared cognitive frameworks about entrepreneurship. The existing framework for entrepreneurial innovation and context, however, does not possess an explicit role for cognitive institutions.

Because innovative entrepreneurship is an individual level phenomenon, the nature of contextual interactions can be theorised analogously by viewing individual entrepreneurs' attempts at sense making across different contexts. In particular, the entrepreneurial cognition perspective may be used for cross level theorising (Smith et al., 2009). This perspective combines social cognitive theory with expert information processing theory to theorise how entrepreneurs interact with their environment (Mitchell et al, 2002b).

### **2.1. The role of the financial system and industry context**

Small, young firms are more vulnerable to changes in the national resource context. Unlike large existing firms, small young firms possess fewer resources and they often they have to turn to other private actors in their environment (Begley, Tan and Schoch, 2005; Meznar and Nigh, 1995). And from the existing research about national innovative-oriented entrepreneurship we know that the availability of venture capital and the latest technologies matter (Bowen and De Clercq, 2008; Stenholm et al., 2013; Yoon et al., 2018), which maps on to the institutional and industry contexts of the framework for innovative entrepreneurship respectively (Autio et al., 2014).

As a financial resource, venture capital can be viewed as a generic resource that can be converted into the human, technological and other inputs required for innovation (Dollinger, 1999; Schneider and Veugelers, 2010). In the national innovative entrepreneurship context, it has been associated with formal institutions (Autio et al., 2014) and, in particular as part of a financial system in the national business systems' perspective (Whitley, 1999).

The presence of venture capitalists will tend to increase the strength of a financial systems with

respect to the support required by innovative entrepreneurs. Venture capitalists possess the ability to assess the risks and the chances that innovative start-ups might succeed; they can also help source finance from other private actors who may be willing to invest but lacking investment knowledge (Kenney and Patton, 2005). We hypothesize:

**Hypothesis 1:** The strength of a nation's financial system has a positive effect on its innovative share of entrepreneurs.

Innovative entrepreneurship also relies on existing suppliers from existing industries. These suppliers play a key role in creating knowledge and providing the latest technologies (Malerba and McKelvey, 2018; McKelvey, 1996), which promotes the diffusion of technological change and new knowledge as agents of innovation and entrepreneurship pursue the development of new products and open new markets (Acs, Braunerhjelm, Audretsch and Carlsson, 2008; Agarwal, Audretsch and Sarkar, 2007; Stenholm et al., 2013). Agents often apply existing scientific knowledge to develop the technological knowledge, which they can patent and exploit for its commercial potential (Etzkowitz and Brisolla, 1999; Guan and Chen, 2012; Viotti, 2002; Yoon et al., 2018).

Because differences in industry contexts across nations show up as differences in the availability of technology, we can associate the availability of the latest technologies to industry context (Autio et al., 2014). A strong industry context for innovative entrepreneurship implies high availability of the latest technologies, which can equip entrepreneurs with the ability to produce the desired technical specifications of products and services in a cost efficient manner (Dixit and Pindyck, 1994; Wernerfelt and Karnani, 1987). In nations where technology remains outdated, entrepreneurs cannot fully translate their opportunity into new product specifications (Choi and Shepherd, 2004). Thus, we hypothesize:

**Hypothesis 2:** The strength of a nation's industry has a positive effect on its innovative share of entrepreneurs.

## **2.2 The moderating role of cognitive institutions**

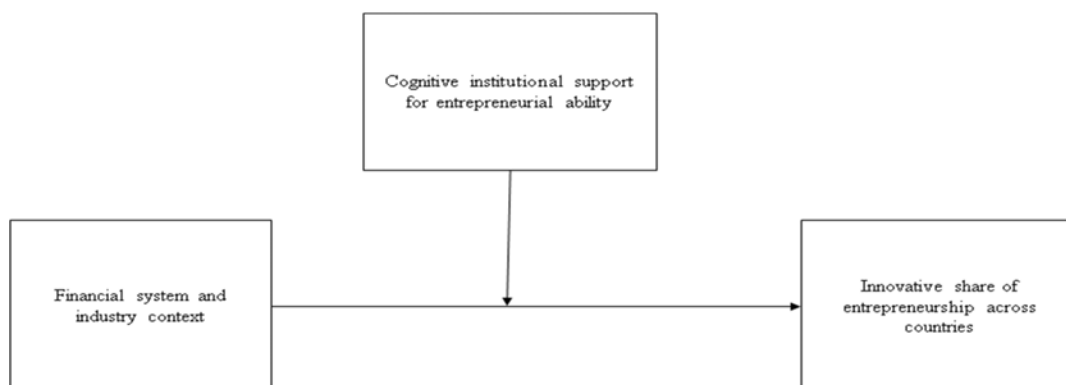
The nation's financial system and its industry serve as its assets to produce a greater innovative share of entrepreneurs. Notably, this economy-level performance can be explained by the entrepreneurial cognition perspective, which explains how entrepreneurs process information about their country environments (Smith et al., 2009). According to the entrepreneurial cognition perspective, information about entrepreneurial opportunities are processed through scripts, which are simplified mental models used "to piece together previously unconnected information that helps them to identify and invent new products or services, and to assemble the necessary resources to start and grow businesses" (Mitchell et al., 2002a: p97). The entrepreneurial cognition perspective derives from social cognition theory, which can explain how individuals respond to their environment, and how apparently heterogeneous phenomena may be subject to some underlying cognitive order (Bandura, 1977; Wood and Bandura, 1989).

For instance, differences across nations' financial and industrial contexts can lead to differences in entrepreneurs' perceptions about the accessibility of innovation resources including financial capital and the latest technologies. According to the entrepreneurial cognition perspective, perceptions about access to the required resources can affect the entrepreneur's venture arrangements scripts. Venture arrangements scripts consist of knowledge about what business resources are required and how to access them (Bull and Willard, 1993). Because entrepreneurs

look to resource availability early in the entrepreneurial process, they are likely to apply arrangements scripts before ability scripts (Mitchell, Smith, Seawright and Morse, 2000). These ability scripts consist of the knowledge structures underlying the individual’s capabilities to create a venture (Mitchell et al., 2000), which may be strengthened by the cognitive institutional pillar. This pillar reflects the dominant frameworks that the local society uses to categorize and evaluate information. Over time, particular knowledge sets become institutionalized, and certain information becomes a part of a shared social knowledge (Busenitz and Barney, 1997; Lau and Woodman, 1995). Differences in cognitive institutions may dictate that in certain nations, more than others, local people may lack the knowledge necessary to understand even the most basic steps required to found and operate a new venture (Busenitz, Gomez and Spencer, 2000; Spencer and Gomez, 2004).

Importantly, the entrepreneurial cognition perspective proposes that while arrangements scripts may be necessary to act on the start-up decision, they are not sufficient (Mitchell et al., 2000). Without ability scripts, for example, the local society may not possess adequate know-how to use arrangements scripts. At a national level this implies that without strong cognitive institutional support for venture creation knowledge there may not be sufficient know-how among the nation’s adult population to mobilize the required financial and technological resources despite their availability. In particular, business skills, has been recognized as a necessary complement to the resources available within a national innovation system (Guan and Chen, 2012). This interplay has been recognized as characteristic of innovation systems but has rarely been tested. For instance, Malerba and McKelvey (2018) have argued that the innovation systems perspective applied to entrepreneurship means that existing organizations and institutions shape entrepreneurs’ cognition and action and affect their interactions with other agents. Thus, we hypothesize: **Hypothesis 3a:** A nation’s cognitive institutions moderates the effect of its financial system on its innovation-oriented share of entrepreneurs. Financial systems have a stronger positive effect on the innovation-oriented share of entrepreneurs when cognitive institutional support for entrepreneurship is strong than when it is weak.

**Hypothesis 3b:** A nation's cognitive institutions moderates the effect of its industry context on its innovation-oriented share of entrepreneurs. Industry context have a stronger positive effect on the innovation-oriented share of entrepreneurs when cognitive institutional support for entrepreneurship is strong than when it is weak.



**Figure 1.** The hypothesized conceptual model

### 3. Method

#### 3.1 Overview of the sample and data sources

We collated data from GEM and WEF databases, on 88 countries<sup>i</sup> for the period 2011 to 2016. This dataset comprised 333 country–year observations. With an almost evenly spread distribution of developed and developing country contexts, our sample represented the different economic and social circumstances experienced by growth aspiring entrepreneurs.

From the GEM panel, we collected data on the proportion of entrepreneurs whose young firms are innovative. To arrive at annual country-level measures, GEM computes weighted national averages of individual level data (Reynolds, Bygrave, Autio, Cox and Hay, 2002). In each country, GEM uses private market survey firms to conduct interviews among a representative weighted sample of at least 2,000 adults (ages 18–64).

Finally, we also collated existing data from the WEF Global Competitiveness Index database. Specifically, we located data about each nation's availability of affordable financial services, the latest technologies and capable suppliers. These data are extracted from surveys that capture the opinions of over 14,000 business leaders in about 144 countries.

#### 3.2 Dependent variable

The value of our dependent variable for each country is the observed share of entrepreneurs who indicate that their product or service is new to at least some customers. GEM assesses country level entrepreneurship through its TEA index, which measures the proportion of a country's population aged 18 to 64 who are either in the start-up phase or are managing/owning a business less than 42 months old. The number of entrepreneurs who indicate that their product or service is new to at least some customers is then divided by the TEA index to arrive at the *innovate-oriented share of entrepreneurs* in a country.

#### 3.3 Explanatory variables

For our primary explanatory variables—*financial systems* and *industry context* -- we relied on assessments of a country's business executives about the availability of venture capital and the latest technologies respectively. The WEF assesses venture capital availability across countries by asking their business leaders a question: "In your country, how easy is it for entrepreneurs with innovative but risky projects to find venture capital?" The responses are indicated on a seven-point scale, where 1 = very difficult and 7 = very easy. In addition, the WEF assesses technology availability in a country by asking their business leaders: "In your country, to what extent are the latest technologies available? The responses are indicated on a seven-point scale, where 1 = not at all and 7 = to a great extent.

For our moderating variable--*cognitive institutional support* -- we looked at GEM's measure of perceived capabilities to start a business. GEM aggregates individual level answers to a percentage of 18-64 population in a country. Prior research on entrepreneurship measured *cognitive institutional support* by averaging two aggregates: perceived capabilities to start a business and whether fear of failure would prevent individuals from starting a business (Valdez and Richardson, 2013); or by averaging three aggregates: perceived capabilities to start a business, perceived business opportunities and the percentage of the non-entrepreneurial adult population who personally knows someone who started a business in the previous two years. Relying on Koellinger's (2008) findings about innovative entrepreneurship and self-confidence, which was

measured through GEM's measure of perceived capabilities, we use only the perceived capability measure. Ability scripts can be developed, in the national innovation context, within the education system (Lim et al., 2010). But, often objective knowledge and skills may not justify innovative entrepreneurs' self-confidence; instead, self-confidence can be effective for decisions with little evidence about their outcomes, which appears typical of innovative ideas (Koellinger, 2008).

### **3.4 Control variables**

We controlled for the level of human capital and government policy support for entrepreneurship. For human capital we drew on the WEF's data on tertiary education enrolment as a percent of the population of the age group that officially corresponds to the tertiary education level. According to the national innovative capacity framework (Porter and Stern, 2001), human resources is an important input for innovation capacity. This framework, also emphasizes the role of government policy in the innovation infrastructure and to stimulate intense firm rivalry, which can stimulate firms to produce innovative products and services to outsmart each other. To assess government policy support for entrepreneurship we drew from GEM entrepreneurial framework condition (EFC) about policy. This was a factor of the three items assessing whether government policies favour new firms through procurement, whether support for new and growing firms is a high priority for policy at the national government level and whether it is also a high priority at the local government level. Notably, we also tested a control for per capita GDP but it had a strong correlation with our explanatory variables, and therefore we omitted it.

### **3.5 Data analysis**

Due to the longitudinal structure of the data, we did not select ordinary least squares regression study. Ordinary least squares regression assumes observations are independent; but longitudinal data contains repeat observations of entrepreneurs from the same country across time, which may compromise the independence criterion of regression analysis. If these linkages are not addressed, then they will be transferred into the error term, resulting in biased and inconsistent effect sizes. Therefore, we used specific panel regression techniques to test the significance of the two-way interaction term.

To test if the coefficients estimated in both random and fixed effects models are the same, we used a Hausman-like test of fixed versus random effects: the Stata `xtoverid` command (Schaffer and Stillman, 2006). Unlike the Hausman version, the `xtoverid` test enabled us to use the coefficients of the cluster-robust panel regression. Following the test, we found that fixed and random effects were similar, which means that omitted variable bias is also minimal with random effects. When this is the case then the norm is to select random effects estimation because it is more efficient (Wooldridge, 2011). Finally, to control for serial correlation and groupwise heteroscedasticity, we used panel-clustered robust standard errors.

Because we predicted interaction effects, we include multiplicative interaction terms into the models. Still, all main effects were included in the full two-way interaction model (Cohen, Cohen, West and Aiken, 2003). Bearing in mind our hypothesis on the nature of the interaction, the significance of the interaction term also signalled the importance of examining the particular interaction further. We therefore plotted the simple slopes (Dawson and Richter, 2006) to examine the nature of the interaction: whether the primary variable causes the dependent variable to increase or decrease more sharply at certain levels of the moderating variable.

To ease our interpretation of model coefficients, we standardized our variables. Often in an unstandardized model, the difference in magnitude of coefficients can appear large. In our case, tertiary education was measured on a percent scale while supplier capability and financial affordability was measured on a seven-point scale.

#### 4. Results

Table 1 illustrates the means, standard deviations, and pairwise correlations of the variables. Poor discriminant validity is indicated by pairwise correlations above .85 (Kline, 1993), which can also lead to multicollinearity problems. The highest correlation, between technology and venture capital availability was 0.58. We also checked for multicollinearity across the entire model. Multicollinearity causes estimation problems when independent variables are highly correlated with one another, but not when they are highly correlated with a multiplicative interaction term (Dalal and Zickar, 2012). Notably, the Stata software also omits severe collinear terms from a model. The convention, for interaction models, is to mean centre all variables before the interaction terms are included (Aiken and West, 1991). Because we use standardized coefficients, there was no need to further apply the centering procedure. With our standardized model, both total and individual item variation inflation factors (VIF) were well below the recommended value of ten (Hair, Anderson, Tatham and Black, 1998).

**Table 1:** Descriptive statistics and correlations

	Mean	s.d.	1	2	3	4	5
1. Innovative entrepreneurship	25.63	10.40					
2. Tertiary education	51.49	24.46	0.27*				
3. Government policy	2.55	0.48	0.22*	0.05			
4. Financial system	3.05	0.81	0.22*	0.20*	0.43*		
5. Industry context	5.26	0.90	0.38*	0.46*	0.35*	0.58*	
6. Cognitive institutions	50.37	15.28	-0.11*	-0.48*	-0.27*	-0.40*	-0.43*

\*p<0.05

Table 2 presents the results of our panel regressions. Though we follow convention and present control, direct, and interaction effects in stages, we wish to draw attention to recent arguments that the full model presents the true effects of all our variables (Aguinis, Edwards and Bradley, 2016). Because a direct effect, in the real world, occurs among its interactions with other variables, it is appropriate to test a direct effect for any predictor in the full interaction model. Their argument becomes particularly evident when one tests for an antagonistic interaction, where an increasing moderator effect reverses the sign of the predictor estimated in a direct-effects only model.

**Table 2:** Regression models: Random effects with robust standard errors

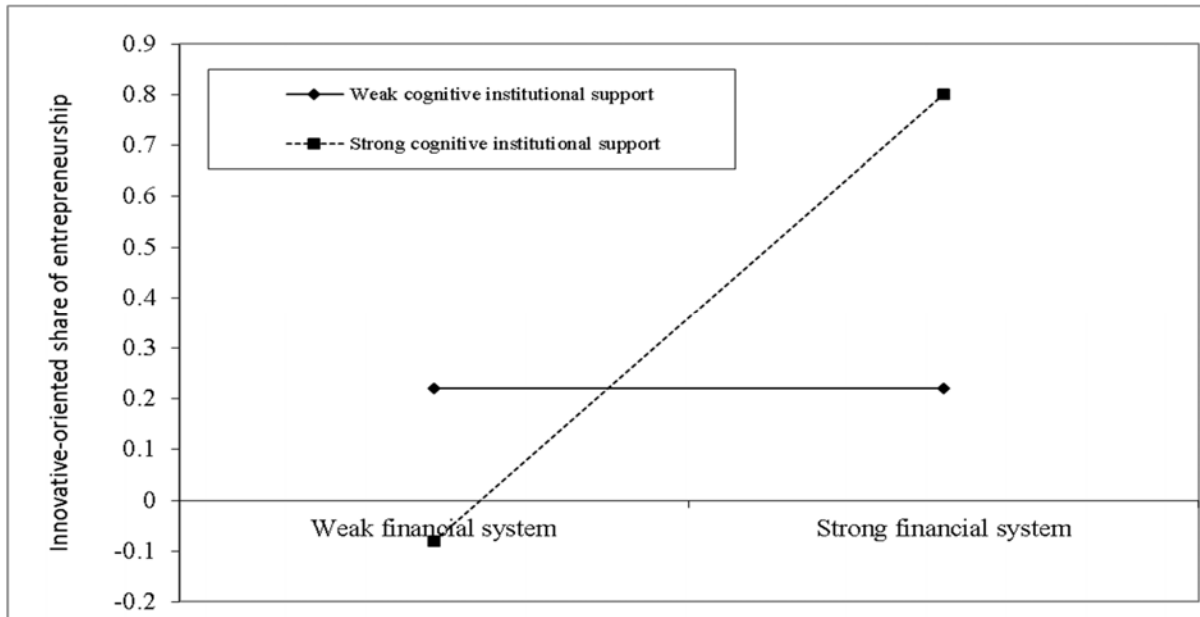
Models	1	2	3 (VC)	4	5	6(Affordable finance)
	$\beta$ (sig.)	$\beta$ (sig.)	$\beta$ (sig.)	$\beta$ (sig.)	$\beta$ (sig.)	
Constant	0.21(0.114)	0.25(0.071)	0.27(0.051)	0.17(0.182)	0.25(0.064)	0.29(0.022)
Tertiary education	0.24(0.004)	0.23(0.015)	0.22(0.016)	0.17(0.083)	0.16(0.092)	0.21(0.027)
Government policy	0.17(0.010)	0.15(0.019)	0.15(0.014)	0.15(0.025)	0.15(0.025)	0.16(0.021)
Cognitive institutions		0.01(0.945)	0.03(0.772)	0.03(0.789)	0.08(0.442)	0.07(0.526)
Financial system		0.15(0.157)	0.16(0.115)			0.22(0.010)
Industry context				0.24(0.053)	0.25(0.039)	
Financial system x Cognitive institutions			0.09(0.398)			0.22(0.014)
Industry context x Cognitive institutions					0.21(0.050)	
Overall R square	0.11	0.13	0.16	0.18	0.22	0.22
Chi square statistic	27.15(0.000)	27.05(0.001)	38.76(0.001)	34.22(0.000)	35.95(0.000)	39.6(0.000)
Likelihood ratio (sig.)		2.86(0.234)	1.33(0.249)	6.57(0.037)	7.11(0.008)	
Likelihood	-358.04	-356.61	-355.95	-354.76	-351.20	-350.24
AIC	736.08	737.22	737.90	733.53	728.41	726.49

Note: 333 observations and 88 countries. Year effects controlled for but not shown.

Hypotheses 1 was not supported our findings ( $b=0.16$ ,  $p=0.115$  in model 3, Table 2). It proposed that a country's financial system has a positive effect on its innovation-oriented share of entrepreneurs. However, our test was on venture capital availability. For robustness we tested this hypothesis with the WEF's measures of financial service availability and financial service affordability. Our test for financial services affordability lent support to Hypothesis 1 ( $b=0.22$ ,  $p=0.010$ , model 6). Notably, hypothesis 2 was supported by our findings ( $b=0.25$ ,  $p=0.039$ , model 5). It proposed that a country's industry context has a positive effect on its innovation-oriented share of entrepreneurs.

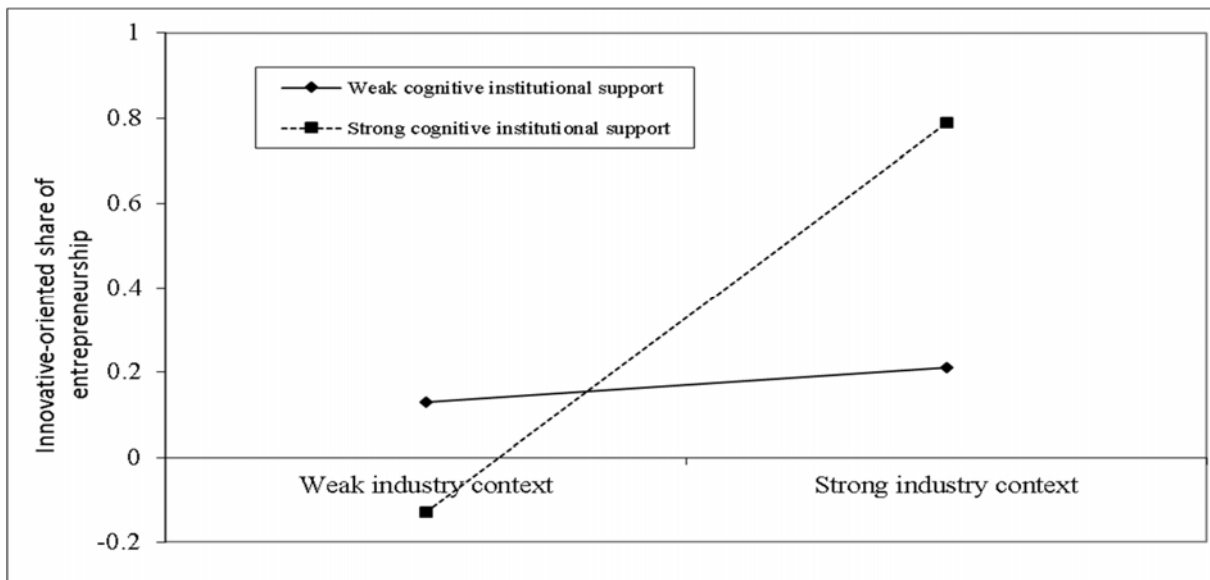
Hypothesis 3a built on hypothesis 1, suggesting that cognitive institutions moderate the effect of financial systems on a nation's innovative-oriented share of entrepreneurs. However, again this hypothesis was not supported on the basis of the venture capital measure ( $b=0.09$ ,  $p=0.398$ , model 3)). Nevertheless, it was supported on the basis of the financial affordability measure ( $b=0.22$ ,  $p=0.014$ , model 6). We show the nature of the interaction in Figure 2, which also supports hypothesis 3a's prediction that financial systems will a stronger positive effect on the innovation-oriented share of entrepreneurs when cognitive institutional support for entrepreneurship is strong than when it is weak.





**Figure 2:** Interaction effect of financial systems and cognitive institutional support

Hypothesis 3b was supported by our findings ( $b=0.21, p=0.050$ , model 5). This built on hypothesis 2, suggesting that cognitive institutions moderate the effect of a nation's industry context on its innovative-oriented share of entrepreneurs. We show the nature of the interaction in Figure 3, which also supports hypothesis 3b's prediction that the nation's industry context will a stronger positive effect on the innovation-oriented share of entrepreneurs when cognitive institutional support for entrepreneurship is strong than when it is weak.



**Figure 3:** Interaction effect of industry context and cognitive institutional support

Finally, we ran robustness checks on our hypotheses about the industry context. From the WEF database we selected both quantity and quality of suppliers. As an example, the WEF assesses

supplier quality across countries by asking their business leaders a question: “How would you assess the quality of local suppliers in your country?” This question is also on a seven-point scale, where 1 = very poor and 7 = very good. Our two-way interaction term remained significant and positive for the quality of suppliers but not for the quantity of suppliers.

## **5. Discussion**

This study set out to examine the moderating role of cognitive institutions on the relationship between a nation’s resource availability and its innovative share of entrepreneurship. It developed an argument that nations can better use their local industry and financial systems to increase innovative entrepreneurship when they possess strong cognitive institutions that can promote entrepreneurial self-confidence. Focus on the moderating role of cognitive institutions followed findings about the important role of self-confidence in increasing innovative entrepreneurship (Koellinger, 2008). In addition, focus on the finance and industry context followed from findings about the role of the availability of venture capital and the latest technologies on innovative entrepreneurship (Stenholm et al., 2013; Yoon et al., 2018), we looked first to the nation’s financial system and industry context (Autio et al., 2014).

The theoretical basis for the study’s arguments were derived from an entrepreneurial cognition perspective which combines social cognitive theory with expert information processing theory (Mitchell et al., 2002b). According to this perspective the nation’s entrepreneurs first use their arrangements script, about their ability to mobilize the resources required for an innovative start-up. This perspective also suggests that once venturing arrangements has been accomplished, then, the entrepreneur is likely to use ability scripts, which comprise the knowledge structures that individuals have to support the capabilities and knowledge to create a venture. Our analysis of 333 country-year observations for 88 countries from the GEM and WEF databases supported our arguments.

### **5.1 Contribution and implications**

These findings contribute to calls for research into the complementary interactions required to increase national innovative entrepreneurship (Autio et al., 2014; Zahra and Wright, 2011; Woolley, 2014). Together with the often used systems perspective to explain national level or cluster type innovative entrepreneurial activity, it has also been recognised that innovations develop out of the efforts of multiple actors (for example, Chesborough, 2006). This implies an interplay between systems components, institutions for example, to increase national innovative capacity. Empirically, this idea has seldom been tested, perhaps because until now it has been difficult to collate sufficient national level data.

Notably, we have demonstrated the interplay, in a national system, between components impacting on innovation resources and cultural-cognitive components impacting on perceived abilities to create a venture. Considering that business models for innovation are often “imagined,” it appears that cultural-cognitive component of a national system is salient. Specifically, it may be important because the speedy decisions required to enjoy first mover advantage rely on perceived more than objective environmental factors because it takes time to gather objective information (Downey, Hellriegel and Slocum 1977; Rumelt 1991; Tang, Kreiser, Marino and Weaver, 2010). Notably, to access any objective information, innovative entrepreneurs have to wait to test and pivot their ideas in the marketplace (Blank, 2013). To this extent there have been calls to examine particular interactions including the social construction of innovation systems, which occurs primarily

“through cognitive and cultural processes, such as individual and collective attempts at sense making” (Roundy, 2016: p233). Such informal institutions have attracted little attention in the broader national innovation systems (Lundvall, 2007) and the specific innovative entrepreneurship systems perspectives (Autio et al., 2014).

To arrive at our hypotheses, we have had to rely on extant empirical research as well as some theoretical frameworks. The findings we relied on to develop our direct effects hypotheses were based on small samples (Stenholm et al., 2013). With our large sample, we did not establish a significant positive effect for the financial system based on venture capital availability. Instead, we found that the general affordability of financial services has a stronger association with innovative entrepreneurship than venture capital availability. Perhaps the venture capital model through its requirement for return on equity and early stage management control is perceived as a constraint by innovative entrepreneurs. This finding deserves further research.

Finally, we demonstrate the application of the entrepreneurial cognition perspective to theorize about contextual interactions. After all, such interactions manifest through a cognitive mechanism in the mind of entrepreneurial individuals. This builds on an argument about the cross level application of this perspective (Smith et al., 2009). According to this argument, the relationship between cognitive scripts and entrepreneurship at an individual level may also apply to the national level, by using aggregates or equivalent institutional representations of individual level variables, for example. Similarly, comparisons of cognitive scripts across nations can also inform comparisons among entrepreneurs across different nations.

## **5.2 Limitations and further research**

This study has operationalised ability scripts through perceived ability, which it drew from GEM’s measure of perceived capabilities to start a business. Even though it has been argued that innovative entrepreneurs’ possess self-confidence in their ability to create a ventures, despite sometimes poor objective knowledge and skills (Koellinger, 2008), it has also been shown that objective ability scripts can be developed from a nation’s education system (Lim et al., 2010). With some measures at our disposal--the WEF’s tertiary education enrolment and GEM’s measure of the extent to which higher education includes entrepreneurial content--we could not establish a significant moderating effect of objective skills. Further research--conceptual and empirical--is required to confirm whether the entrepreneurial cognition perspective applies equally well to both objective knowledge and perceived ability.

## **6. Conclusion**

Through nations’ financial systems and local industry, resource availability may serve as national assets for innovative entrepreneurship; but only in the presence of strong cognitive institutional support for entrepreneurial ability. This implies that governments aspiring to increase the innovative-oriented share of entrepreneurial activity in their nations must pay attention to not only developing the formal institutions for resource availability within their countries but also fix those institutions that impact on the self-confidence of the very agents of innovation and entrepreneurship.

## References

- Acs, Z.J., Braunerhjelm, P., Audretsch, D.B., Carlsson, B., 2008. The knowledge spillover theory of entrepreneurship. *Small Business Economics* 32 (1), 15–30.
- Agarwal, R., Audretsch, D., Sarkar, M.B., 2007. The process of creative construction: knowledge spillovers, entrepreneurship, and economic growth. *Strategic Entrepreneurship Journal*. 1 (3–4), 263–286.
- Aguinis, H., Edwards, J.R. Bradley, K.J. 2016. Improving our understanding of moderation and mediation in strategic management research. *Organizational Research Methods*, 1–21.
- Aiken, L.S., West, S.G. 1991. *Multiple Regression: Testing and Interpreting Interactions*. Sage. Newbury Park, CA.
- Autio E, Kenney M, Mustar P, Siegel D, Wright M. 2014. Entrepreneurial innovation: The importance of context. *Research Policy*. 43(7):1097-108.
- Bandura. A. 1977. *Social Learning Theory*. Englewood Cliffs, NJ: Prentice Hall
- Baumol WJ. 1993. Formal entrepreneurship theory in economics: Existence and bounds. *Journal of Business Venturing*. 8(3):197-210.
- Begley TM, Tan WL, Schoch H. 2005. Politico–economic factors associated with interest in starting a business: A multi–country study. *Entrepreneurship Theory and Practice*. 29(1):35-55.
- Blank S. 2013. Why the lean start-up changes everything. *Harvard Business Review*. 91(5):63-72.
- Bowen, HP., De Clercq D. 2008. Institutional context and the allocation of entrepreneurial effort. *Journal of International Business Studies* 39 (4): 747–767.
- Bull I, Willard GE. 1993. Towards a theory of entrepreneurship. *Journal of Business Venturing*. 8(3):183-95.
- Busenitz LW, Barney JB. 1997. Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of business Venturing*. 12(1):9-30.
- Busenitz LW, Gomez C, Spencer JW. 2000. Country institutional profiles: Unlocking entrepreneurial phenomena. *Academy of Management Journal*. 43(5):994-1003.
- Chesbrough, H. 2006. Open innovation: a new paradigm for understanding industrial innovation. *Open innovation: Researching a new paradigm*, 400, 0-19.
- Choi YR, Shepherd DA. 2004. Entrepreneurs' decisions to exploit opportunities. *Journal of management*. 30(3):377-95.
- Cohen, J., Cohen, P., West, S. Aiken, L. 2003. *Applied Multiple Regression/correlation Analysis for the Behavioral Sciences*. Mahwah, N.J.: L. Erlbaum Associates.
- Dalal, D. K., Zickar, M. J. 2012. Some common myths about centering predictor variables in moderated multiple regression and polynomial regression. *Organizational Research Methods*, 15(3), 339-362.
- Dawson, J., Richter, A. 2006. Probing Three-way Interactions in Moderated Multiple Regression: Development and Application of a Slope Difference Test. *Journal of applied Psychology*. 91 (4): 917–926.
- Dixit, AK., Pindyck, RS. 1994. *Investment under Uncertainty*. Princeton, NJ: Princeton University Press
- Dollinger, M.J., 1999. *Entrepreneurship: Strategies and Resources*. Prentice-Hall, Upper Saddle River, NJ.
- Downey HK, Hellriegel D, Slocum Jr JW. 1977. Individual characteristics as sources of perceived uncertainty variability. *Human Relations*. 30(2):161-74.

- Etzkowitz, H., Brisolla, S. N. 1999. Failure and success: The fate of industrial policy in Latin America and South East Asia. *Research Policy*, 28(4), 337–350.
- Guan, J., Chen, K. 2012. Modeling the relative efficiency of national innovation systems. *Research Policy*, 41(1), 102–115.
- Hair, J.F., Anderson, R.E., Tatham, R.L., Black, W.C. 1998. *Multivariate Data Analysis*, 5th ed. NY: Prentice Hall International.
- Kenney M, Patton D. 2005. Entrepreneurial geographies: Support networks in three high-technology industries. *Economic Geography*. 81(2):201-28.
- Kline, P. 1993. *The Handbook of Psychological Testing*. London: Routledge.
- Koellinger P. 2008. Why are some entrepreneurs more innovative than others? *Small Business Economics*. 31(1):21.
- Lau CM, Woodman RW. 1995. Understanding organizational change: A schematic perspective. *Academy of Management Journal*. 38(2):537-54.
- Lim DS, Morse EA, Mitchell RK, Seawright KK. 2010. Institutional environment and entrepreneurial cognitions: A comparative business systems perspective. *Entrepreneurship Theory and Practice*. 34(3):491-516.
- Lundvall BÅ. 2007. National innovation systems—analytical concept and development tool. *Industry and Innovation*. 14(1):95-119.
- Malerba F, McKelvey M. 2018. Knowledge-intensive innovative entrepreneurship integrating Schumpeter, evolutionary economics, and innovation systems. *Small Business Economics*. 1-20.
- McKelvey, M. 1996. *Evolutionary Innovations: The Business of Biotechnology*. Oxford: Oxford University Press
- Meznar MB, Nigh D. 1995. Buffer or bridge? Environmental and organizational determinants of public affairs activities in American firms. *Academy of Management Journal*. 38(4):975-96.
- Mitchell RK, Smith B, Seawright KW, Morse EA. 2000. Cross-cultural cognitions and the venture creation decision. *Academy of Management Journal*. 43(5):974-93.
- Mitchell RK, Busenitz L, Lant T, McDougall PP, Morse EA, Smith JB. 2002a. Toward a theory of entrepreneurial cognition: Rethinking the people side of entrepreneurship research. *Entrepreneurship Theory and Practice*. 27(2):93-104.
- Mitchell RK, Smith JB, Morse EA, Seawright KW, Peredo AM, McKenzie B. 2002b. Are entrepreneurial cognitions universal? Assessing entrepreneurial cognitions across cultures. *Entrepreneurship Theory and Practice*. 26(4):9-32.
- Porter ME, Stern S. 2001. Location matters. *Sloan Management Review*. 42(4):28-36.
- Reynolds, P.D., Bygrave, W.D., Autio, E., Cox, L.W. Hay, M. 2002. *Global Entrepreneurship Monitor: Executive Report*, GEM, Babson College and Ewing Marion Kaufmann Foundation, Wellesley, MA and Kansas City, MO. Available at: [www.gemconsortium.org](http://www.gemconsortium.org)
- Roundy PT. 2016. Start-up community narratives: The discursive construction of entrepreneurial ecosystems. *The Journal of Entrepreneurship*. 25(2):232-48.
- Rumelt RP. 1991. How much does industry matter? *Strategic Management Journal*. 12(3):167-85.
- Schaffer, M. E. Stillman, S. 2006. 'Xtoverid: Stata module to calculate tests of overidentifying restrictions after xtreg, xtivreg, xtivreg2, xthtaylor'. *Statistical Software Components*. Department of Economics, Boston College.
- Schneider C, Veugelers R. 2010. On young highly innovative companies: why they matter and how (not) to policy support them. *Industrial and Corporate Change*. 19(4):969-1007.

- Smith JB, Mitchell JR, Mitchell RK. 2009. Entrepreneurial scripts and the new transaction commitment mindset: Extending the expert information processing theory approach to entrepreneurial cognition research. *Entrepreneurship Theory and Practice*. 33(4):815-44.
- Spencer JW, Gómez C. 2004. The relationship among national institutional structures, economic factors, and domestic entrepreneurial activity: A multicountry study. *Journal of Business Research*. 57(10):1098-107.
- Stenholm P, Acs ZJ, Wuebker R. 2013. Exploring country-level institutional arrangements on the rate and type of entrepreneurial activity. *Journal of Business Venturing*. 28(1):176-93.
- Tang Z, Kreiser PM, Marino L, Weaver KM. 2010. Exploring proactiveness as a moderator in the process of perceiving industrial munificence: A field study of SMEs in four countries. *Journal of Small Business Management*. 48(2):97-115.
- Valdez ME, Richardson J. 2013. Institutional determinants of macro-level entrepreneurship. *Entrepreneurship Theory and Practice*. 37(5):1149-75.
- Viotti, E. B. 2002. National learning systems: A new approach on technological change in late industrializing economies and evidences from the cases of Brazil and South Korea. *Technological Forecasting and Social Change*. 69(7), 653–680.
- Wernerfelt, B., Karnani, A. 1987. Competitive strategy under uncertainty. *Strategic Management Journal*, 8:187–194.
- Whitley R. 1999. *Divergent Capitalisms: The Social Structuring and Change of Business Systems*. OUP: Oxford.
- Wood R, Bandura A. 1989. Social cognitive theory of organizational management. *Academy of Management Review*. 14(3):361-84.
- Wooldridge, JM. 2011. *Econometric Analysis of Cross Section and Panel Data*. MIT Press. Cambridge, Massachusetts.
- Woolley JL. 2014. The creation and configuration of infrastructure for entrepreneurship in emerging domains of activity. *Entrepreneurship Theory and Practice*. 38(4):721-47.
- Yoon HD, Kim N, Buisson B, Phillips F. 2018. A cross-national study of knowledge, government intervention, and innovative nascent entrepreneurship. *Journal of Business Research*. 84:243-52.
- Zahra SA, Wright M. 2011. Entrepreneurship's next act. *Academy of Management Perspectives*. 25(4):67-83.

[i] Our original list of countries included: Argentina, Australia, Austria, Bosnia & Herzegovina, Belgium, Bolivia, Brazil, Canada, Chile, Columbia, Croatia, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, Finland, France, Germany, Ghana, Greece, Guatemala, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, South Korea, Latvia, Macedonia, Malaysia, Mexico, Montenegro, Netherlands, New Zealand, Norway, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Serbia, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Trinidad & Tobago, Tunisia, Turkey, UK, Uganda, Uruguay, Zambia.