Academic logic and corporate entrepreneurial intentions: A study of the interaction between cognitive and institutional factors in new firms

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Abstract

By focusing on the context in which new firms are established, this article studies the extent to which corporate entrepreneurial intentions are enacted differently by academic and non-academic entrepreneurs. Using constructs from cognitive research and exploiting the theory of institutional logics, we observe that academic entrepreneurs, notwithstanding their engagement in entrepreneurship, still implement their corporate entrepreneurial intentions acting in accordance with the academic institutional environment they belong to. Using a matched-pairs research design, our results show that academic entrepreneurs (compared to non-academic ones) leverage their awareness of technical competencies significantly more, and their entrepreneurial self-efficacy and awareness of managerial skills considerably less. We discuss the theoretical and managerial implications related to how cognitive and institutional factors interact to foster entrepreneurial value in newly established firms.

Introduction

To date, research suggests that firm success is considerably determined by factors related to human capital rather than only by organizational-level aspects (Baron, 2007). For newly established firms, recent findings show that firms' ability to create value depends on their founders' cognitive characteristics and skills (Unger, Rauch, Frese and Rosenbusch, 2009). Indeed, managerial teams and firm-level routines are most likely not yet in place, and entrepreneurs' human capital becomes critical in predicting firms' behaviors and success (Rasmussen, Mosey and Wright, 2011). A consolidated tradition in entrepreneurship cognitive research has acknowledged the importance of intentionality in predicting entrepreneurial activity (Zhao, Seibert and Lumpkin, 2010). Individual entrepreneurial intentions, however, do not fade away after a new firm has been established; rather, they have a long-lasting impact on its development. Yet, in newly established firms, entrepreneurs still act as forward thinkers, implementing corporate entrepreneurial intentions (Fini, Grimaldi, Marzocchi and Sobrero, 2012).

In a recent attempt to answer both cognitivists' (Mitchell, Busenitz, Bird, Gaglio, McMullen, Morse and Smith, 2007) and institutionalists' (Greenwood, Oliver, Sahlin and Suddaby, 2008) calls for a better understanding of how cognitive dimensions function in different institutional contexts, scholars have started to investigate the influence of institutions on entrepreneurial activity (Thornton, Ribeiro-Soriano and Urbano, 2011). Accordingly, entrepreneurs who are exposed to a given cultural or institutional environment will implement their intentionality differently (Powell and Colyvas, 2008). Notwithstanding the relevance of the topic, research that addresses the impact of the institutional environment on the implementation of entrepreneurial intentions is, to date, very limited. The few existing contributions have focused only on the establishment of new ventures (Linan and Chen, 2009), without targeting existing organizations. This is an important omission because we still need to illuminate how individual and institutional dimensions, as well as their interactions, account

for heterogeneity in the implementation of entrepreneurship in corporate environments (Bruton, Ahlstrom and Han-Lin, 2010).

Accordingly, this article lays out a model of the determinants of corporate entrepreneurial intention (CEI) in newly established firms, studying the extent to which entrepreneurs' exposure to a specific institutional environment (i.e., institutional logic) influences its implementation. To test for differences in CEI, the study employs a matched-pairs research design. Relying on a sample of 104 Italian entrepreneurs, it compares academic entrepreneurs (i.e., researchers who have created a business to commercialize university knowledge (Fini, Grimaldi and Sobrero, 2009)) with non-academic entrepreneurs. Results show that academic entrepreneurs implement their CEI differently, mostly leveraging those cognitive dimensions that reinforce their role as public researchers. In particular, academic entrepreneurs leverage their awareness of technical competencies significantly more—and their entrepreneurial self-efficacy and awareness of managerial skills considerably less—compared to non-academic ones.

The contribution is twofold. First, by bringing together cognitive and institutional approaches, the article advances our knowledge of how institutional environments determine heterogeneity in the implementation of CEI in newly established firms. Second, it illuminates the differences in how academic and private entrepreneurship unfolds (Colombo and Piva, 2012). By complementing organizational and institutional-level approaches in explaining spin-out activity by existing organizations (Ferriani, Garnsey and Lorenzoni, 2012), this article makes a strong case for how and to what extent individual-level dimensions—when interacting with institutional facets—predict science-based entrepreneurial activities (Rasmussen, 2011).

The remainder of the article is organized as follows. The second section explicates the cognitive determinants of CEI in newly established firms, characterizing the impact of the institutional logic on its enactment. The third proposes a set of hypotheses on the differences in the determinants of CEI between academic and non-academic entrepreneurs. Section four

discusses the methodology and research design; section five presents the results and is followed by a conclusion that focuses on the results and their implications.

Theory

Corporate Entrepreneurial Intention

Corporate entrepreneurial intention (CEI) can be described as the entrepreneurs' willingness to create new value in their firms by engaging in innovative, risky, and proactive actions (Fini et al., 2012). *Innovativeness* describes an entrepreneur's intention to have his/her firm engaged in experimentation and creative processes that may result in new products, services, or technological processes. *Proactiveness* indicates an entrepreneur's forward-looking perspective, which anticipates future demand and shapes the environment. *Riskiness* measures an entrepreneur's willingness to engage in risky projects and preferences for bold versus cautious actions to achieve the firm's objectives (Covin and Slevin, 1989).

According to Bird's (1988) intentional model and in line with Ajzen (1991) and Krueger, Reilly and Carsrud (2000), CEI can be rooted in both entrepreneurs' personal characteristics and perceptions of the context (both inside and outside a firm's boundaries). In newly established firms, the entrepreneurs' perceptions of the environment in which firms operate, combined with their personal characteristics, determine CEI because organizational-level factors are most likely not yet in place (Lubatkin, Simsek, Ling and Veiga, 2006). Notwithstanding the scholarly attention given to this topic (Zhao et al., 2010), the determinants of entrepreneurial intentionality in existing organizations remain inadequately understood. In particular, we still do not know whether CEI is enacted in a similar fashion for all entrepreneurs or follows different paths. The existing research has examined cognitive dimensions with the assumption that differences in psychological characteristics, awareness of individual skills, and perception of the context may explain heterogeneity in how intentionality is implemented (Mitchell, Smith, Morse, Seawright, Peredo and McKenzie, 2002). Results,

however, have been largely inconclusive because of scant theoretical grounding or questionable research designs (Mitchell et al., 2007). Furthermore, they have neglected the importance of studying the determinants of entrepreneurial intentions in a corporate setting, as well as variation in their enactment. In an attempt to fill this void, entrepreneurship scholars have started to look at institutions and culture as a source of variance in how individual entrepreneurship is implemented (Powell and Colyvas, 2008). This research suggests that cognitive dimensions may function differently under the influence of varied institutional forces and logics (Battilana, 2011), thus originating differences in how entrepreneurial behaviors are determined.

The Institutional Logics of Academia

Institutions are characterized by logics that guide their organizing principles (Alford and Friedland, 1985). Logics represent the set of rules, material practices, premiums, and sanctions that, in particular contexts, are constructed and socialized by individuals in such a way that their behaviors become regularized and predictable (Thornton and Ocasio, 2008). Institutional logics operate through legitimacy, which assumes that the actions of an entity are appropriate within a given, socially constructed set of norms and values (Suchman, 1995). Logics are, therefore, experienced by individuals. They influence individual cognition and form the behavioral roles via which actors implement their intentions (Misangyi, Weaver and Elms, 2008).

Subject to regulatory and professional control, universities[1] are ruled by four norms, constituting the ethos of science (Merton, 1968). These four norms, which fully characterize the "academic logic" (Jain, George and Maltarich, 2009; Sauermann and Stephan, 2013), are: (a) *universality of scientific knowledge* (separating the scientific observation from the observer), (b) *communality* (the assumption that researchers should share their results with the scientific community for the common good), (c) *disinterestedness* (the assumption that

[1] We use the term "university" for both universities and public research organizations.

researchers are not emotionally or financially attached to their work), and (d) *skepticism* (that all facts must be considered by the researchers before being deemed a validated scientific finding). Consistent with these norms, both research and teaching can be considered taken-for-granted, legitimated activities (Colyvas and Powell, 2006). However, over the past 30 years, in addition to these, the interaction with the socioeconomic environment (Sánchez-Barrioluengo, 2014) has also started to be considered the third mission[2] in which universities should engage (see Perkmann, Tartari, McKelvey, Autio, Broström, D'Este, Fini, Geuna, Grimaldi, Hughes, Krabel, Kitson, Llerena, Lissoni, Salter and Sobrero, 2013) for an extensive review on the topic). Indeed, as a result of legislative changes (e.g., the Bayh-Dole Act in 1980 in the US), the vast majority of Western countries' universities have adopted more outward-looking attitudes toward commercialization activities in an attempt to build closer links with the market (Lockett, Kerr and Robinson, 2008; Grimaldi, Kenney, Siegel and Wright, 2011). These changes (in both societal norms and organizational practices) have significantly reshaped universities' environments, influencing public researchers' identities and attitudes, and encouraging them to be aware of and interested in these new activities (Fini and Lacetera, 2010).

The *academic logic* operates according to a set of norms comprising the ethos of science and through tangible organizational practices that are intended to support all sets of legitimated activities (i.e., research, teaching, and commercialization efforts). The academic logic, thus, exerts institutional influences on universities' employees, causing them to cohere around similar cognitive templates (Battilana, 2011). Accordingly, we might expect that individuals who are exposed to the institutional logic would: (i) develop cognitive similarities and (ii) approach behaviors according to the logic to which they have been exposed.

[2] According to Perkmann et al. (2013), the university "third mission" can be distinguished between academic engagement and commercialization. The former refers to knowledge-related collaborations between academic researchers and non-academic organizations through formal activities (e.g., collaborative research, contract research and consulting) and informal activities (e.g., ad hoc advice and networking with practitioners). The latter, which represents the focus of our article, constitutes immediate, measurable market acceptance for academic research (Jones et al., 2008).

Hypotheses

Consistent with the debate on the cognitive foundation of entrepreneurship, we consider three types of determinants of CEI (Bird, 1988): psychological characteristics, individual skills, and external factors. The first includes entrepreneurial risk-taking propensity (Keh, Foo and Lim, 2002) and entrepreneurial self-efficacy (Zhao, Seibert and Hills, 2005); the second refers to technical and managerial skills (Shane, 2000). The last includes government tax incentives (Munari, Pasquini and Toschi, 2014) and local contexts with tangible and intangible resources (Feldman, 2001). Figure 1 shows the conceptual model.

Insert Figure 1 about here

Psychological Characteristics

The overall orientation of an individual toward risk may predispose some individuals to make riskier decisions than their more risk-averse counterparts (Palich and Bagby, 1995; Sitkin and Weingart, 1995; Baron, 2007). The greater their propensity toward risk, the stronger their entrepreneurial intent (Zhao et al., 2010). However, the environments in which entrepreneurs act provide different structural support to CEI, influencing individuals' entrepreneurial risk-taking propensity (Busenitz, Gomez and Spencer, 2000). Specifically, the stronger the entrepreneurial support received, the lower the entrepreneurial risk aversion, and the more likely the engagement in entrepreneurial activities (Forlani and Mullins, 2000).

As for the university setting, academic entrepreneurs can deliver high-quality research and commercialize the results by exploiting the facilities provided by the parent organization. In addition to their traditional infrastructures and laboratories, many universities have established supporting tools for commercialization activities (Rasmussen, Mosey and Wright, 2014), such as technology transfer offices, science parks, and incubators (McAdam and Marlow, 2007), and internal policies to effectively market the developed technologies (Baldini, Fini, Grimaldi and Sobrero, 2014). Conversely, non-academic entrepreneurs may engage in

entrepreneurship by leveraging their own resources without exploiting any resources provided by other organizations. Furthermore, being exposed to academic norms allows researchers to freely choose projects based on their personal interests, even if extremely risky and not fully profitable. Non-academic entrepreneurs, on the other hand, are more driven by financial logics and choose their projects based on the needs and requirements of their industrial contexts, according to potential revenue (Sauermann and Stephan, 2013). We might therefore expect that, within the university, the extensive support and resources provided for entrepreneurial activities would encourage academic researchers to frame entrepreneurship as a moderately risky activity. It then follows that, while engaging in entrepreneurship, academic entrepreneurs may support a higher degree of risk compared to their non-academic counterparts. Accordingly, we propose the following:

> HYPOTHESIS 1. In newly established firms, exposure to the academic logic will positively moderate the relationship between entrepreneurial risk-taking propensity and corporate entrepreneurial intention.

Entrepreneurial self-efficacy can be defined as entrepreneurs' beliefs about and confidence in their capabilities to affect the environment and to be successful in implementing entrepreneurial behaviors (McGee, Peterson, Mueller and Sequeira, 2009). According to Boyd and Vozikis (1994) and Chen, Greene and Crick (1998), CEI is more likely to be positively affected by individuals who have strong beliefs in their ability to influence the achievement of business-related goals. The stronger the perceived self-efficacy, the higher the goals that people set for themselves, and the firmer their resolution (Bandura, 1997). It follows that CEI is more likely predicted by entrepreneurial self-efficacy for those who consider themselves more able to perform entrepreneurial roles and tasks (Hmieleski and Baron, 2008).

Self-efficacy operates through a social-comparison process. Seeing peers succeed by sustained effort raises observers' beliefs about their own ability to implement the focal behavior (Kacperczyk, 2013). Therefore, cultural, social, and institutional exposures influence

the way in which entrepreneurs leverage their self-efficacy to enact behavior (Linan and Chen, 2009). Academic entrepreneurs engage extensively with peers who behave in accordance with the academic logics and, thus, have chosen to pursue scientific quality and knowledge advancement rather than entrepreneurial success (Tartari, Perkmann and Salter, 2014). Academics' primary reward is recognition and status in the scientific community, which is determined by the quality of their research. It then follows that, as a result of such social proximity, they will reinforce their beliefs of being more successful as scientists rather than as entrepreneurs (Moynihan and Pandey, 2007). Conversely, non-academic entrepreneurs are exposed to an environment composed of individuals who have chosen to be entrepreneurs, guiding their actions towards profit maximization. The community comprises business people who try to be successful in performing entrepreneurial activities. In this case, the reward system is based on business success in the industry and the personal appropriation of financial returns (Lacetera, 2009). Thus, it can be argued that, in relation to entrepreneurial activities, the academic logic weakens the effect of entrepreneurial self-efficacy on intentionality. Accordingly, we propose the following:

> HYPOTHESIS 2. In newly established firms, exposure to the academic logic will negatively moderate the relationship between entrepreneurial self-efficacy and corporate entrepreneurial intention.

Individual Skills

Skills and abilities are also predictors of entrepreneurial behaviors (Autio and Acs, 2010) because they provide individuals with a better evaluation of the focal behavior, encouraging individual action (Bidwell and Briscoe, 2010). This is particularly true in the entrepreneurship domain, in which prior knowledge (Shane, 2000) and personal abilities (Wiklund and Shepherd, 2003) have been conceptualized as determinants of both entrepreneurial intentions and behaviors. More precisely, scholars have acknowledged the great relevance of technical

and managerial skills (i.e., planning, organizing, staffing, leading, and controlling). The former enable the entrepreneur to recognize opportunities and, more generally, trigger the entrepreneurial process (Shane, 2000). The latter are important for attaining entrepreneurial goals (Haber and Reichel, 2007). Both facets are important antecedents of CEI. The entrepreneur's awareness of his/her technical and managerial skills fosters the development of specific mindsets, influencing the individual's ability to engage in value-creation in existing organizations (Baum, Locke and Smith, 2001).

Both cognitivists and institutional scholars argue that organizations nurture the development of abilities that are coherent with the surrounding institutional environment (Burton and Beckman, 2007). In this vein, the existence of a clear division of labor between academia and industry has been widely accepted. On the one hand, academia mainly conducts basic research, which results in fundamental insights but with uncertain commercial use (Lacetera, 2009). On the other hand, firms generally focus on applied research, directed toward the resolution of clear and concrete market-related problems (Aghion, Dewatripont and Stein, 2008). Consequently, different abilities have to be developed to efficiently perform these two tasks. Basic research, which is executed without thought of an applied end-goal, is mainly based on valuable technical skills. Applied research, involving the practical application of science, needs strong managerial and marketing experience and a deep knowledge of the industry, especially in terms of how to serve markets and address customer needs. Thus, we can hold that the core competencies owned by academic entrepreneurs are technical skills; by contrast, non-academic entrepreneurs mostly emphasize managerial skills (Munari and Toschi, 2011). This division of labor occurs because different logics reward individuals based on different systems. Academia mainly compensates public researchers for their scientific and technological achievements (Vanaelst, Clarysse, Wright, Lockett and Moray, 2006). Industry, instead, declares an entrepreneurial activity successful according to the market's response; thus, the individuals' abilities to exploit successful business opportunities become crucial.

These arguments suggest that the academic logic would strengthen the functioning of technical skills and weaken that of managerial skills. Thus, the following two hypotheses are advanced:

> HYPOTHESIS 3. In newly established firms, exposure to the academic logic will positively moderate the relationship between technical skills and corporate entrepreneurial intention.
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> HYPOTHESIS 4. In newly established firms, exposure to the academic logic will negatively moderate the relationship between managerial skills and corporate entrepreneurial intention.

Perceived Environmental Support

The existing literature finds that people are not completely free from their environments; they actively perceive those environments in which they participate and are influenced by their perceptions rather than by some objective reality (Berger and Luckmann, 1966). In the entrepreneurship domain, researchers have widely acknowledged the importance of mechanisms put in place by governments to support entrepreneurial activities, such as business incubators (Marlow and McAdam, 2012), science parks (Feldman, 2001), business-plan competitions (Foo, Wong and Ong, 2005), and potential financial incentives (Munari et al., 2014). Accordingly, the greater the perception of government support, the greater the CEI. Government policy shapes the institutional environment in which entrepreneurial decisions are made and, thus, it affects both academic and non-academic entrepreneurs. However, the two groups may perceive its utility and effectiveness differently. The former could have a more favorable perception of government interventions for two main reasons. First, because (public) universities explicitly legitimate government intervention in their operations, academic researchers are prepared to deal with it and accept government support to reinforce their statuses and roles within the universities (Greenwood et al., 2008). Non-academic entrepreneurs, instead, who act independently (without any link with parent organizations) do

not perceive government as a tool to reinforce their position within their community. Second, even if the government acts to foster entrepreneurship *per se*, most of the instruments have been created to explicitly support the commercialization of knowledge that originates within universities, such as university seed funds, incubators dedicated to academic spin-offs, and links between university and industry (Mustar and Wright, 2010). The underlying rationale is that academic entrepreneurship is mostly based on technologies developed in the university labs and, thus, it faces higher degrees of market uncertainty compared to entrepreneurship that originated from more-applied industrial research. It then follows that, for academic entrepreneurs, government can be seen as being supportive in overtaking the existing barriers to successfully reach the market. Consequently, we propose:

> HYPOTHESIS 5. In newly established firms, exposure to the academic logic will positively moderate the relationship between perceived government support and corporate entrepreneurial intention.

Methodology

Research Design

To test the hypotheses, we collected evidence on the determinants of entrepreneurship in newly established technology-based firms (NTBFs), defined as a company established in the last 10 years, based on a piece of technology, and not controlled at its establishment by any other organization (Autio, 1997; Colombo and Delmastro, 2002). To ensure internal validity, we selected a specific regional context to control for normative environment, contextual munificence, and entrepreneurial opportunities (Beckman and Burton, 2008). The study was conducted in the Emilia Romagna region in Italy, which represents one of the EU's leading regions for entrepreneurial and technology-transfer activities (Eurostat, 2007). With 89

NTBFs, spun-off from the eight regional universities[3], Emilia Romagna leads Italy in academic start-ups and is one of the few Italian regions in which the commercialization of public research takes place effectively (Bolzani, Fini, Grimaldi and Sobrero, 2014). Second, all academic entrepreneurs were currently exposed to a similar, equally strong academic logic. At the time of the study, they were still working as public researchers and had been exposed to the same set of norms because all Italian universities are public and under the authority of the central government. Third, we ensured that non-academic entrepreneurs had limited—random—exposure to any institutional logics. Indeed, all private start-ups included in the control sample had virtually no relationships with universities, with no university-affiliated individuals among the shareholders (since incorporation) as well as very limited interaction with universities or any other institution (e.g., legal and medical institutions)[4]. Finally, we dealt with unobserved heterogeneity and confounding effects that might impact entrepreneurs' cognitive dimensions, both by design as well as in the econometric specifications, controlling for individual- and firm-level dimensions.

Questionnaire

Two questionnaires (at the individual and firm levels) were developed to gather primary data from entrepreneurs. The questionnaires were administered face-to-face between December 2006 and May 2007 by the same interviewer. At the individual level, we gathered demographic data and information about previous experience (e.g., serial entrepreneurship, previous employment, and affiliation with universities), psychological characteristics (e.g., entrepreneurial risk-taking propensity and entrepreneurial self-efficacy), developed skills (e.g., awareness of technical skills and managerial skills) and perceptions of entrepreneurial support received (e.g., government, contextual, and university support). Then, we assessed the

[3] We generally refer to "universities," but the 8 academic institutions of the sample were 5 universities and 3 public research organizations (Fini et al., 2009).

[4] This was assessed by relying on the collected primary and secondary information at both individual and firm levels. Data are available upon request.

measurement scale of CEI. To verify the consistency of our primary data, a CV was collected from each entrepreneur, who was also searched for on the Internet, including social networks (e.g., www.linkedin.com). Additionally, we gathered corporate information, such as shareholders' characteristics and management-team composition, firms' innovative and market performances, debt and equity financing, and business networks and collaborations. Firm-level data were complemented and cross-checked with secondary information gathered from the Italian Companies House (https://telemaco.infocamere.it). Before starting the data collection, a field pre-test with a panel of 10 experts (i.e., professors and technology transfer managers) and 10 entrepreneurs was conducted to validate the questionnaire. All items were translated into Italian and translated back into English by two independent coders. No discrepancies emerged.

Sampling Strategy

The sampling strategy relied on a two-pronged approach. First, a firm-level matching procedure was adopted to identify two comparable groups of academic and private start-ups based in the same region, founded in the same year, and operating in the same industry[5]. Second, relying on the firm-level sampling strategy, a matched-pairs sample of academic and non-academic founders was selected to identify entrepreneurs of similar age and gender who most likely would have been exposed to the same set of entrepreneurial opportunities and logics (i.e., one to the academic logic vs. a control group not exposed to the academic logic)[6].

Matching firms. First, the regional population of 89 academic start-ups was contacted. We conducted face-to-face interviews with 132 entrepreneurs involved in 72 academic start-ups, corresponding to an individual-level response rate of 39% (= 132/337). The 72 academic

[5] An academic start-up is defined as a company that was established during the last 10 years to commercialize a technology developed inside a university with either an academic or at least one public researcher among the founders, not controlled by any other organization (Fini et al., 2009). A private start-up is defined as a company that was established in the last 10 years, with neither universities nor public researchers among the founders and not controlled at its establishment by another private organization (Colombo and Delmastro, 2002).

[6] An academic entrepreneur is defined as an individual who has established and currently shares equity in an academic start-up and who is still employed by a university. A non-academic entrepreneur is an individual who has established and currently shares equity in a private start-up, with no formal or informal relationship with universities (i.e., none of the shareholders have an academic affiliation and the firm has no interaction with universities), and who is not and has never been employed by a university.

start-ups were then matched with 72 private firms in terms of ATECO industry code (5-digit hierarchical industry code), year of establishment, and location. The data collection was closed with a total of 61 private start-ups visited and 75 individuals interviewed (68 entrepreneurs and 7 executives), corresponding to an individual-level response rate of 37% (= 68/186). Nine pairs were then dropped because, for the private start-ups, it was only possible to collect information on executives or some of the entrepreneurs had on-going relationships (as adjuncts) with universities[7]. The final sample comprised 52 matched-pairs of academic and private start-ups. The results of the matching were checked through a propensity-score matching process. We used a probit estimation of the probability of being an academic spin-off by looking at industry, year of establishment, and location with a one-to-one matching without replacement. The procedure resulted in a mean difference between academic and private firms of 4.26% (Std. Dev. = .079), equaling a matching under a Caliper radius[8] of .30. Table 1 reports the firms' operational characteristics.

Insert Table 1 about here

Matching individuals. The individual-level matching procedure was then implemented. We had information on 92 academic entrepreneurs and 63 non-academic entrepreneurs among the founders of the 52 matched-pairs firms. The response rate for academic entrepreneurs was 52% (= 92/176), and 39% for non-academic entrepreneurs (= 63/160). No significant differences were recorded between respondents and non-respondents in terms of gender or year of birth in either sample. In line with a multiple-respondent research design, we implemented three matching procedures: a multiple-respondent-per-firm *one-to-one matching with replacement (92 vs. 92),* a multiple-respondent-per-firm *one-to-one matching without replacement (63 vs.*

[7] The members of this group started their commitments with universities after the establishment of their firms. However, based on the aforementioned definition, they cannot be considered non-academic entrepreneurs, and both the individuals as well as their firms have to be excluded from the study.

[8] The Caliper radius defines the size of difference between the matching variables of potential matches; its value is denominated in units of standard deviations of the propensity score (Althauser and Rubin, 1970). Calipers below .40 are considered small enough to constitute a practical yet meaningful equality of pairs (Normand et al., 2003).

63), and a single-respondent-per-firm *one-to-one matching without replacement (52 vs. 52),* as shown in Table 2. For each procedure, we calculated the propensity score using a *probit* estimate (probability of being/not being an academic entrepreneur), encompassing both firm-level (i.e., year of establishment, location, industry, and presence of a private-firm among the founders) and individual-level covariates (i.e., gender and age). All three specifications were equally robust (i.e., the data that were considered when building the pairs were uniform both within and between the pairs). Because the Caliper radius resulted in values below the suggested threshold of .40 in all three specifications (Normand et al., 2003), the single-respondent approach (52 vs. 52) was preferred to avoid the non-independence of the observations. Table 3 reports the group means and *t*-tests of the pre-treatment observables for the 52 selected pairs.

Insert Tables 2 and 3 about here

Measures and Validity

The CEI construct was operationalized through an individual version of the strategic posture scale (Covin and Slevin, 1989). The rationale for this is twofold. First, the strategic posture has been indexed as a firm-level construct in the literature—reflecting a firm's tendency to be innovative and proactive, and take risks. In studying small, newly established companies, some scholars have referred to this concept as an individual-level construct, perceiving the firm's strategic posture as a reflection of the CEO/entrepreneur's strategic decision (Wiklund and Shepherd, 2003; Fini et al., 2012). This is consistent with the idea that, in newly established firms, corporate entrepreneurial behaviors are likely to reflect the behaviors of the entrepreneurs who lead them because of the overlap between the organizational and individual domains. Second, unlike the entrepreneurial-intent construct (Thomson, 2009), there are no existing, validated scales that could be used. We have thus characterized CEI in terms of an

entrepreneur's willingness to create new value in his/her firm during the following year. This was accomplished by engaging in innovative, proactive, and risky behaviors.

The remaining domains have been operationalized through concepts used in the existing literature. Entrepreneurial risk-taking propensity was operationalized using the scale by Gomez-Mejia and Balkin (1989), entrepreneurial self-efficacy was taken from Bandura (1997), technical skills from Gupta and Govindarajan (2000), managerial skills from Roberts and Fusfeld (1981), and perceived environmental support from Fini et al. (2009). To check for convergent validity, we assessed the composite reliability of all latent variables (Werts et al., 1974). All composite reliabilities were higher than the .60 threshold, and all items were statistically significant (Bagozzi and Yi, 1988). Thus, convergent validity was established. Table 4 summarizes the latent variables and their criterion measures.

Insert Table 4 about here

Common Method Bias

Common method bias was handled with both procedural and statistical methods (Podsakoff et al., 2003). For the former, we carefully designed the questionnaire, separating the predictor and criterion variables and using different scale formats (e.g., Likert-like scales, semantic differential scales, and negatively worded items). For some individual-level variables, when applicable, the consistency of the primary data gathered was checked, assessing the correlation with other sources. For individual skills, we used the information gathered through both the questionnaires and the secondary sources (i.e., CV and internet search), constructing two indicators: technical and managerial profiles.[9] Both indicators recorded positive and significant correlations with the corresponding latent factors ($r_{tech} = .18$, $p < .05$; $r_{man} = .19$, $p < .05$). For

[9] For each individual, we accounted for his/her previous employment, assigning a value equal to 1 if he/she had held a specific position, and 0 otherwise. The technical indicator resulted as the sum of the assigned values: production engineer, design engineer, academic researcher, and researcher in a private firm (indicator ranges from 0 to 4). The managerial profile resulted from the sum of the CEO position and consultant/self-employed (indicator ranges from 0 to 2).

firm-level dimensions, perceived government support was correlated with the amount of public funds received by each firm. Results showed a positive and significant correlation (r_{gov} = .21, p < .05). Moreover, information on turnover, equity, and corporate roles was gathered from the Italian Companies House.

We also dealt with method bias from a statistical standpoint. Confirmatory factor analysis was used to test four alternative measurement models. First, a null model was tested assuming that no latent variables underlie the data and that correlations between measures could be explained by random error only (Model 1 - Null). Second, a full model was computed, as part of which the six traits and a random error underlay the data (Model 2 - Trait). Then, a model with a single method factor plus random error was specified, assuming that all variation could be explained by method and error only (Model 3 - Method). Finally, a fully specified model, including the six traits, the single-method factor, and random error, was tested (Model 4 - Trait–Method). Table 5 reports the results.

To assess the trait effect, we compared Models 2 vs. 1 (Trait vs. Null) ($\Delta\chi^2$ (38) = 1309.86, p < .001) and Models 4 vs. 3 (Trait–Method vs. Method) ($\Delta\chi^2$ (40) = 589.98, p < .001), both revealing significant trait effects. Then, method bias was checked assessing the differences between Method and Null models and Trait–Method and Trait models. Both comparisons between Models 3 vs. 1 ($\Delta\chi^2$ (25) = 811.07, p < .001), and between Models 4 vs. 2 ($\Delta\chi^2$ (27) = 91.19, p < .001) revealed that the method effect was significant. Therefore, the variance in the entrepreneurs' responses can be explained by the simultaneous effects of traits, method, and random error. The highly unsatisfactory fit of Model 3 (Method) and the small gain in fit achieved by Model 4 (Trait–Method) support the idea that common method bias accounts for a small variance in the data. Table 6 reports the comparisons[10]. Finally, the total variance was deconstructed in trait (.44), method (.06), and error (.50) effects. The impact of

[10] An analysis performed on the full sample (155 entrepreneurs) conveyed very similar results. Data are available upon request.

method bias, therefore, was quite low, accounting for just 6% of the overall variance (e.g., benchmarks by Williams et al. (1989); trait: .50, method: .27, and error: .23).

Insert Tables 5 and 6 about here

Analyses

Multiple Sample Analyses

First, entrepreneurs were compared under a set of observable characteristics. Academic and non-academic entrepreneurs did not differ in terms of gender and age; they all worked in their companies, and had undertaken similar executive roles. Yet academic entrepreneurs had better educational profiles and more patents. Conversely, academic entrepreneurs had less entrepreneurial experience with fewer companies established (see Table 7).

To check whether academic entrepreneurs were all exposed to a similar, equally strong, academic logic, the availability of technology-transfer support mechanisms was assessed. In 2006, all universities had the full set of mechanisms in place (i.e., spin-off, patent, external collaboration policies, and TTOs). Then, systematic differences in academic entrepreneurs' perceptions of institutional support for entrepreneurship (both within and between regional universities) were assessed. For each individual, we averaged the four items related to perception of academic support (i.e., the university invests in equity, grants access to academic laboratories and equipment for business purposes, owns a university incubator, and is extensively involved in technology-transfer activities), computing ANOVA tests. No differences emerged[11]. Then, we assessed the extent to which non-academic entrepreneurs had been exposed to academic logics, calculating the frequency of interaction between private firms and universities, in terms of both commercial and technological collaborations. The average interaction of a private start-up with both the closest university and all of the remaining ones was significantly smaller when compared with the average interactions of

[11] Data are available upon request.

academic start-ups. Relying on both primary and secondary data, we have also coded both current and past exposures to other institutions. With the academic logic as the only exception, exposure to other institutions (e.g., medical and legal) was nonexistent and/or randomly distributed.

As for entrepreneurs' unobservable characteristics, the results (unreported) showed that the intentions of the two groups did not differ significantly. Academic entrepreneurs' propensity toward risk was lower than that of non-academic entrepreneurs whereas no statistically significant differences were registered in terms of entrepreneurial self-efficacy. The two samples did not differ in terms of technical skills, but did differ in managerial skills (academic entrepreneurs had greater skill). Finally, in terms of contextual dimensions, government support was perceived to be significantly higher by academic as opposed to non-academic entrepreneurs.[12]

Insert Table 7 about here

Regression Models

Because of the limited number of observations we could not test the proposed hypotheses through multi-group comparison with structural equation modeling (SEM) (for SEM please refer to the sensitivity analysis section). Thus, to assess the differences in intentional paths, both predictors and dependent variables were specified as first-order latent factors. Intention was then regressed on the obtained set of covariates. Independent variables, as proposed by Aiken and West (1991), were centered. Table 8 reports the specified hierarchical regression models for both the paired (52 vs. 52) and full (92 vs. 63) samples. Models 1 and 4 include the control variables: namely, the entrepreneur's age and the natural logarithm of equity share [in 2006]). Models 2 and 5 introduce the controls, the five explanatory variables, and the dummy variable representing the individuals' exposure to academic logics (i.e., whether the individual

[12] Data are available upon request.

was an academic or a non-academic entrepreneur); Models 3 and 6 test the fully specified model and the proposed set of hypotheses (models including further controls convey identical results and are available upon request). As for Model 3, the interaction between entrepreneurial risk-taking propensity and exposure to academic logics was not significant (β = .215; n.s.); this did not support Hypothesis 1. Conversely, the interaction term representing the relationship between entrepreneurial self-efficacy and exposure to academic logics was negative and significant (β = -.034; p < .05). Simple slope results indicated that, for academic entrepreneurs, self-efficacy was significantly related to CEI (β= .017; p<.1), as well as for non-academic entrepreneurs (β= .051; p < .001). Hypothesis 2 was, therefore, supported.

The results also supported Hypothesis 3, which predicted that the effect of technical skills on intentions would be positively moderated by the exposure to the academic logic. Indeed the interaction was positive and significant (β = .284; p < .01); simple slope coefficients showed that, for academic entrepreneurs (β=.124; p<.1) technical skill was related to CEI, as it was for non-academic entrepreneurs (β= -.16; p < .01). Results also corroborated Hypothesis 4. In particular, interaction between managerial skills and exposure to PRI logics was negative and significant (β = -.380; p < .05). Simple slope results showed that, for academic entrepreneurs, managerial skill was not significantly related to CEI (β= .004; n.s.), but it was for non-academic entrepreneurs (β = .384; p < .01). Finally, the interaction between government support and exposure to academic logics was not significant (β = -.174; n.s.). This resulted in no differences between academic and non-academic entrepreneurs in the impact of perceived government support on CEI. Hypothesis 5 was therefore not supported. In examining the variance inflation factors (all ranging between 1.26 and 5.83) no evidence of multicollinearity was recorded. Interaction results for Model 6, full sample, convey similar results and are available upon request.

Insert Tables 8 and 9 about here

Sensitivity Analysis

To check the stability of the results, all OLS specifications were re-run using SEM on two bootstrapped samples of academic and non-academic entrepreneurs (Fan, 2003). The patterns within the two samples were confirmed and more evident as the bootstrapped sample sizes increased. Sample differences were consistent with the results obtained in the OLS models. The impact of entrepreneurial risk-taking propensity became significant and stronger for academic entrepreneurs ($p < .01$, as sample size increases) whereas entrepreneurial self-efficacy became weaker ($p < .01$). Similarly, the impact of technical skills was stronger for academic entrepreneurs ($p < .01$) whereas the influence of managerial skills was weaker ($p < .01$) as sample size increased. No differences were recorded in terms of perception of government support[13].

Conclusions

By exploring how exposure to a strong institutional environment affects the implementation of corporate entrepreneurial intentions, this research contributes to the conversation on how cognitive and contextual dimensions influence the enactment of entrepreneurship in newly established firms. We first recognized that an exclusive focus on cognitive dimensions would produce a skewed, biased understanding of the phenomenon. As argued by Short et al. (2008), entrepreneurship research should search beyond the "mono-causal" effects of cognition on entrepreneurship by adopting a holistic approach to consider the relationships among context, strategy, and individual behavior. Therefore, being able to conceptually explain and empirically test the impact of multidimensional cross-domains on entrepreneurship is timely and needed. In this article, we join and contribute to this conversation. In particular, we lay out a model of the cognitive foundation of intentions, and we test for heterogeneity in their

[13] A summary of path differences is available upon request.

determinants, comparing entrepreneurs who have been exposed to academic logics with those who have not. Results show that: (a) cognitive and institutional domains are tightly interrelated, and (b) the latter domain sets the context for the former to unfold and foster value-creation in newly established firms. Academic entrepreneurial action is mainly predicted by technical skills whereas non-academic entrepreneurs are strongly influenced by entrepreneurial self-efficacy and managerial skills. This result reinforces the idea that non-academic entrepreneurship originates in individuals' abilities to leverage more "generalist" skills. On the other hand, field-specific, cutting-edge, technical knowledge (Lazear, 2004) is critical for entrepreneurship that originates inside research institutions. Moreover, the impact of entrepreneurial risk-taking propensity becomes substantially stronger for academic entrepreneurs. Finally, no differences were recorded in the effect of perceived government support. This last result may be explained by the fact that, in Emilia Romagna (i.e., our empirical setting), the whole external environment is extremely supportive, and thus universities' efforts to specifically support public research commercialization might be less efficient if compared with environments with less effective support (Fini et al., 2011).

This article offers contributions to both theory and practice. For the former, by contributing to the institutional logic literature, our findings corroborate the idea that entrepreneurs approach the creation of newly established firms by emphasizing different dimensions, depending on the institutional context to which they have been exposed. As predicted, academic entrepreneurs leverage those dimensions that align with their academic persona and the academic logic. Furthermore, by adopting a configurational approach, this article takes a step further, shedding light on how the interaction between cognitive and institutional dimensions influences the enactment of entrepreneurship in new firms (Grant and Perren, 2002). Indeed, the existing literature has focused on the individual domain to explain how managers and entrepreneurs enact entrepreneurial behaviors using "micro-procedures" (Dew et al., 2009; D'Este and Perkmann, 2011). However, a multidimensional perspective that

considers how “macro-dimensions” (e.g., institutional logics) impact the cognitive foundation of entrepreneurship has been disregarded. By showing that entrepreneurship is not only predicted by the personality but also by the interconnectedness between domains, this research represents an initial step in this direction.

The article also complements the literature on organizational blueprints (Ferriani et al., 2012). This approach suggests that spin-off firms inherit genetic characteristics of their parental organization. In sharing this view, the existing literature has documented the existence of some differences in growth patterns and resource reconfiguration between academic and private start-ups (e.g., Colombo and Piva, 2012). Switching from a macro- to a micro-level approach, this article assesses how institutional forces impinge on entrepreneurs’ cognition, which leads to variations in intentions and behaviors. Differences between academic and private start-ups can thus be seen as dependent not only on organizational blueprints but also on cognitive differences among the individuals who lead them.

The results also have useful implications for management practice. As discussed, entrepreneurs’ characteristics include idiosyncratic features that entrepreneurs develop as a result of institutional affiliations. This partly explains the varied modes of engagement of academic and non-academic entrepreneurs (Lacetera, 2009). Moreover, the literature has shown that a good balance of human capital characteristics positively impacts organizational performance (Forbes et al., 2006). Knowing that individuals approach entrepreneurial actions differently may be useful for optimizing entrepreneurial teams (Foo et al., 2006).

Finally, this research has some limitations that can suggest interesting lines for future research. First, in addition to the selected domains, other factors, such as social capital (Baron and Markman, 2003), should be considered as determinants of entrepreneurship. Indeed, a large body of literature shows that founders’ socio-cognitive characteristics are closely linked to their firms’ performances, especially in newly-established firms (Mosey and Wright, 2007). More research can clarify this. Second, we see entrepreneurial risk-taking propensity as a

situational, psychological characteristic. Other scholars may see it as predispositional feature, as suggested by the "big-five personality-traits" theory, which considers risk propensity as a facet of extraversion (Mount and Barrick, 1995). Third, the data were subjective, and correlations between latent variables—even if treated with common-method-variance procedures—might have inflated the results. Future research should employ both qualitative and quantitative methods in an attempt to overcome such a bias. Fourth, generalizability may be limited because the sample comprised NTBFs established in the same region. Future research should replicate our work in a much broader context to account for both institutional and environmental variance. Finally, it could be worth designing some longitudinal studies to assess the impact of intentions on behaviors and firm performance over time (Wright and Marlow, 2012).

All this notwithstanding, by contributing to the research stream that sees individual and institutional dimensions, as well as their interrelations, as key to explaining organizational performance, this study advances our understanding of entrepreneurship from both conceptual and empirical points of view, opening several avenues for future research on this topic.

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Exhibits

Table 1. Multiple Sample Analysis Firms' Operational Characteristics at 2006

Variable	Mean Academic Start-ups (*N* = 52)	Mean Private Start-ups (*N* = 52)
Top Management team (presence/absence) (other than the entrepreneurial one)	.11 (.32)	.11 (.32)
Patent assigned		
Italian Patent Office	.25 (.92)	.23 (1.02)
European Patent Office	.15 (.69)	.19 (.99)
United States Patent Office	.02 (.13)	.15 (.97)
Employees	5.28 (5.04)	14.13 (41.72)
Turnover (€)	214,411 (444,847)	601,200 (735,744)
Business model (% turnover)		
Product	34.48 (37.08)	31.4 (35.45)
Service and Consultancy	60.9 (39.88)	58.6 (37.09)
Royalties from technology	4.62 (15.99)	10 (25.23)
Customers (% turnover)		
National	87.22 (25.44)	87.55 (24.38)
International	12.78 (25.44)	12.45 (24.38)
Interaction with (1-7 Likert-like scale)		
University of origin/closest one	5.21 (2.36)	1.78 (2.38)
Other universities	2.48 (1.93)	1.25 (1.96)

Standard deviations in parentheses

Table 2. Propensity Score Matching Procedure

Respondents per Firm	Matching Procedure	Size of Paired Samples	Pairs Mean Difference (%)	Standard Deviation	Caliper Radius
Multiple	One-to-one with replacement	92 vs. 92	1.1	.026	.15
Multiple	One-to-one without replacement	63 vs. 63	4.01	.061	.36
Single	One-to-one without replacement	52 vs. 52	6.79	.107	.39

Matching procedures are performed on the two samples of 92 academic entrepreneurs and 63 non-academic entrepreneurs

Table 3. Matched-Pairs Comparison: Pre-Treatment Observables

Observables	Mean Academic Entrepreneurs (*N* = 52)	Mean Non-Academic Entrepreneurs (*N* = 52)	Difference	*t*-test
Firm level				
Year of establishment	2003.19	2003.31	-.12	-.27
	(.31)	(.29)	(.42)	
Localization: North-east	.15	.13	.02	.28
	(.05)	(.05)	(.07)	
Localization: South-east	.06	.06	.00	.00
	(.03)	(.03)	(.05)	
Localization: North-west	.13	.17	-.04	-.54
	(.05)	(.05)	(.07)	
Sector: Environment	.27	.19	.08	.93
	(.06)	(.06)	(.08)	
Sector: Biomedical	.17	.13	.04	.54
	(.05)	(.05)	(.07)	
Sector: Material	.27	.29	-.02	-.22
	(.06)	(.06)	(.09)	
Sector: Advanced services	.04	.02	.02	.58
	(.03)	(.02)	(.03)	
Private firm among founders	.19	.15	.38	.34
	(.05)	(.10)	(.11)	
Individual level				
Male	.85	.92	-.08	-1.22
	(.05)	(.04)	(.06)	
Age	57.69	57.12	.58	.26
	(1.62)	(1.56)	(2.25)	

Standard errors in parentheses. Localization categories are organized as follows: South-West (including Bologna and Modena), North-East (including Ferrara), South-East (including Forlì-Cesena and Ravenna), and North-West (including Reggio Emilia, Parma, and Piacenza). Sectorial categories are organized as follows: Electronics (including aerospace, computers, electronic components, internet and telecommunication services, and software), Environment (including environment-related services and energy), Biomedical (including biochemistry, biotechnology, medical, and pharmaceuticals), Material (including mechanical equipment, optical equipment, advanced mechanics, and automation), and Advanced Services (including architectural, civil engineering, and statistical services).
*** $p < .01$; ** $p < .05$; * $p < .1$

Table 4. Predictor and Criterion Measures

Domain and Predictor	Item	Scale Format	Research Reference	CR
Dependent variable				
Corporate Entrepreneurial Intention (CEI)	9	1 to 7 scale	Covin and Slevin, 1989	.88
Psychological characteristics				
Entrepreneurial risk-taking propensity	4	1 to 7 Likert-like scale	Gomez-Mejia and Balkin, 1989	.85
Entrepreneurial self-efficacy	2	0 to 7 scale	Bandura, 1997	.92
Individual skills				
Technical skills	3	1 to 7 scale	Gupta and Govindarajan, 2000	.80
Managerial skills	5	1 to 7 Likert-like scale	Roberts and Fusfeld, 1981	.89
Environmental influences				
Perceived government support	2	1 to 7 Likert-like scale	Fini, Grimaldi and Sobrero, 2009	.73

N = 104. CR = Composite Reliability

Table 5. Common Method Bias - Nested Models Goodness-of-Fit Statistics

Model	X^2	Df	*P*	RMSEA	CFI	NFI
M1 Null	1689.92	300	< .001	.212	.37	.31
M2 Trait	380.06	262	< .001	.066	.89	.75
M3 Method	878.85	275	< .001	.146	.61	.52
M4 Trait-method	288.87	235	< .001	.047	.93	.80

N = 104. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; NFI = Normed Fit Index.

Table 6. Common Method Bias - Nested Models χ^2 Differences

Effect	Δ Model	$\Delta\chi^2$	Δdf	*p*
Trait	M2 – M1	1309.86	38	< .001
	M4 – M3	589.98	40	< .001
Method	M3 – M1	811.07	25	< .001
	M4 – M2	91.19	27	< .001

N = 104

Table 7. Multiple Sample Analysis Individual Observable Characteristics

Variable	Mean Academic Entrepreneurs (*N* = 52)	Mean Non-Academic Entrepreneurs (*N* = 52)	Difference	*t*-test
Education				
Years of higher education	11.69	8.31	3.38	7.13***
	(.21)	(.42)	(.47)	
Level of engagement in the business				
Full-time (vs. part-time)	.69	.82	-.13	-1.61
	(.06)	(.05)	(.08)	
Patenting activity				
Number of patents issued (IPO) [a]	1.27	.12	1.15	2.60*
	(.44)	(.05)	(.44)	
Number of patents issued (EPO)	1.04	.06	.98	2.35*
	(.41)	(.03)	(.42)	
Number of patents issued (USPTO)	.94	.04	.90	2.27*
	(.39)	(.02)	(.40)	
Entrepreneurial activity				
Number of other firms established	.31	.98	-.67	-2.93**
	(.07)	(.21)	(.23)	

Standard errors in parentheses. [a] IPO = Italian Patent Office; EPO = European Patent Office; USPTO = United States Patent and Trademark Office. *** $p < .001$; ** $p < .01$; * $p < .05$

Table 8. Linear Probability OLS Models

	DV: Corporate Entrepreneurial Intention (CEI)					
	Paired sample (52 vs. 52)			**Full sample (92 vs. 63)**		
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Age	0.003	-0.004	-0.001	0.004	-0.003	-0.001
	(0.008)	(0.006)	(0.006)	(0.007)	(0.006)	(0.005)
Entrepreneur's equity (2006) (ln)	0.080	0.031	0.017	0.078+	0.003	0.001
	(0.049)	(0.041)	(0.044)	(0.046)	(0.041)	(0.039)
Entrepreneurial risk-taking propensity		0.086	-0.078		0.125+	0.051
		(0.066)	(0.130)		(0.064)	(0.109)
Entrepreneurial self-efficacy		0.036***	0.051***		0.033***	0.045***
		(0.007)	(0.011)		(0.007)	(0.010)
Technical skills		-0.039	-0.160**		-0.018	-0.135**
		(0.045)	(0.054)		(0.043)	(0.051)
Managerial skills		0.196*	0.384**		0.070	0.267**
		(0.082)	(0.121)		(0.073)	(0.099)
Perceived government support		0.124*	0.272*		0.085*	0.126
		(0.051)	(0.108)		(0.041)	(0.101)
Academic logic (Exposure to)		-0.400*	-0.558**		-0.346*	-0.407*
		(0.174)	(0.197)		(0.137)	(0.192)
Entrepreneurial risk-taking propensity X Academic logic			0.215			0.115
			(0.145)			(0.130)
Entrepreneurial self-efficacy X Academic logic			-0.034*			-0.027*
			(0.014)			(0.014)
Technical skills X Academic logic			0.284**			0.238**
			(0.088)			(0.075)
Managerial skills X Academic logic			-0.380*			-0.431**
			(0.166)			(0.135)
Perceived government support X Academic logic			-0.174			-0.045
			(0.120)			(0.111)
Constant	5.354***	5.564***	5.823***	5.297***	5.494***	5.645***
	(0.082)	(0.118)	(0.172)	(0.066)	(0.107)	(0.177)
Observations	104	104	104	155	155	155
R-squared	0.021	0.352	0.446	0.018	0.261	0.346
F test	1.35	7.61	7.04	1.46	5.36	5.26
Prob>F	0.26	0	0	0.23	0	0

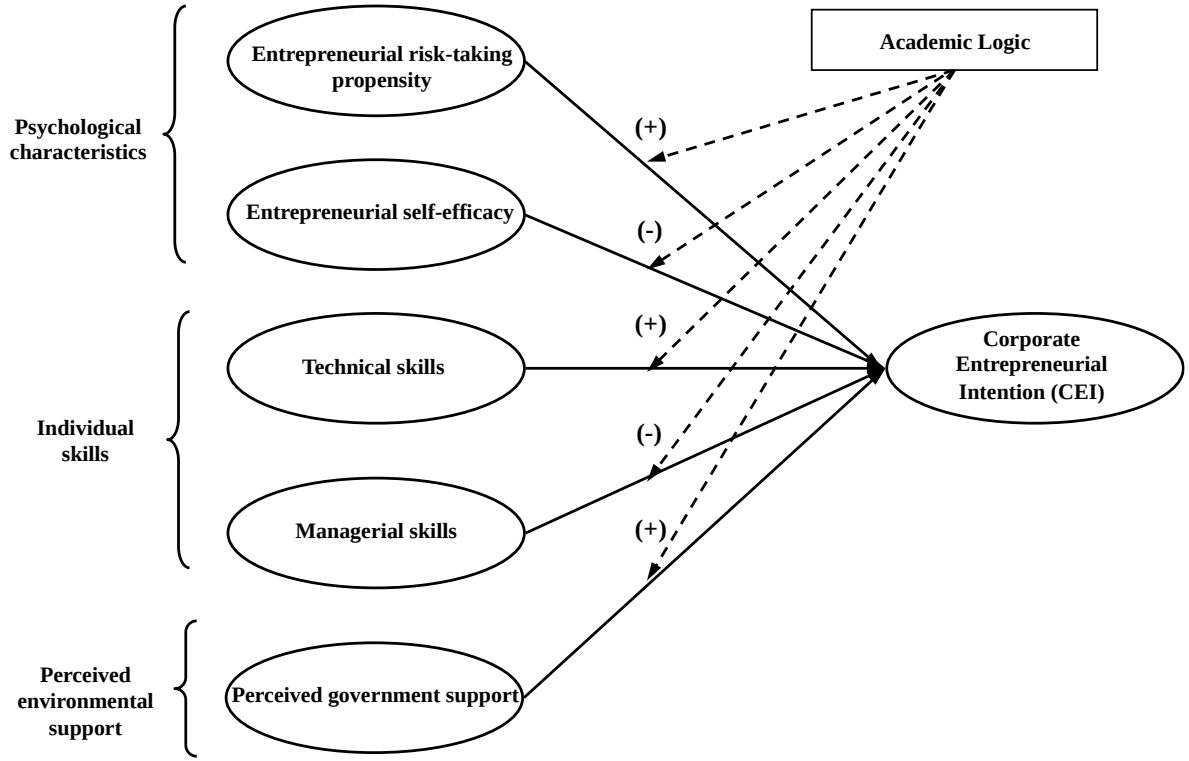
Robust standard errors between parentheses. *** $p < .001$; ** $p < .01$; * $p < .05$; + $p < .1$
Results are robust to different specifications, including Individual-level control variables (i.e. gender) as well as Firm-level control variables (i.e., Year of incorporation and Industrial sectors), and are available upon request.

Table 9. Correlation Table

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. CEI	5.35	.83														
2. Male	.88	.32	0.01													
3. Age	57.4	11.4	0.00	-0.11												
4. Entr. equity (2006) (ln)	8.52	1.56	0.14	0.05	-0.28**											
5. Year of establishment	2,003.2	2.15	0.10	-0.10	0.21*	-0.18										
6. Industry: Environment	.23	.42	-0.12	0.05	0.15	-0.08	-0.16									
7. Industry: Biotech	.15	.36	0.24*	-0.18	-0.14	0.05	-0.04	-0.23*								
8. Industry: Material	.27	.45	0.08	-0.04	-0.18	-0.04	0.09	-0.34***	-0.26**							
9. Industry: Advanced services	.02	.16	-0.10	0.06	0.14	0.02	0.01	-0.09	-0.07	-0.11						
10. Entrepr. risk-taking propensity	5.66	1.15	0.29**	0.05	-0.01	0.23*	-0.13	-0.03	0.11	-0.16	-0.02					
11. Entrepr. self-efficacy	5.29	1.11	0.47***	-0.01	0.19*	0.00	0.29**	-0.18	0.14	0.07	0.02	0.17				
12. Technical skills	4.35	1.51	0.08	0.13	0.02	0.01	0.02	-0.03	0.22*	-0.19	-0.21*	0.02	0.15			
13. Managerial skills	5.55	.88	0.21*	0.20*	-0.10	-0.11	-0.12	-0.13	0.20*	-0.18	0.02	0.09	0.13	0.37***		
14. Perc. Gov. support	2.46	1.7	0.15	-0.08	-0.04	-0.13	-0.10	0.02	0.15	0.01	-0.10	-0.10	0.13	0.09	0.09	
15. Exposure to Academic logic	.50	.50	-0.09	-0.12	0.03	-0.34**	-0.03	0.09	0.05	-0.02	0.06	-0.31**	0.08	0.00	0.28**	0.52***

$N = 104$
SD = Standard Deviation
*** $p < .001$
** $p < .01$
* $p < .05$

Figure 1. Conceptual Model of the Determinants of Corporate Entrepreneurial Intention



Appendix (not to be published)

Table A1. Linear Probability OLS Models

	Academic entrepreneurs			Non-Academic entrepreneurs		
		CEI			CEI	
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Male	0.341+	0.243		-0.182	-0.306	
	(0.182)	(0.199)		(0.562)	(0.353)	
Age	0.021*	0.010		-0.004	-0.006	
	(0.010)	(0.008)		(0.013)	(0.010)	
Entrepreneur's equity (2006) (ln)	0.050	0.005		0.080	0.033	
	(0.073)	(0.062)		(0.084)	(0.063)	
Year of establishment	-0.006	-0.037		0.089	0.087	
	(0.046)	(0.042)		(0.060)	(0.061)	
Entrepreneurial risk-taking propensity		0.125+	0.140*		-0.002	-0.073
		(0.065)	(0.065)		(0.147)	(0.130)
Entrepreneurial self-efficacy		0.146+	0.149+		0.376**	0.465***
		(0.079)	(0.077)		(0.120)	(0.093)
Technical skills		0.112	0.127+		-0.129+	-0.163**
		(0.083)	(0.067)		(0.067)	(0.055)
Managerial skills		0.030	0.002		0.435**	0.386**
		(0.109)	(0.110)		(0.126)	(0.117)
Perceived government support		0.073	0.099+		0.286**	0.274*
		(0.053)	(0.053)		(0.090)	(0.106)
Constant	5.304***	5.265***	5.256***	5.390***	5.810***	5.833***
	(0.102)	(0.105)	(0.089)	(0.137)	(0.160)	(0.167)
Observations	52	52	52	52	52	52
R-squared	0.221	0.462	0.367	0.180	0.540	0.480

Robust standard errors between parentheses.
Industry dummies included in all specifications
*** $p <$. 001 ** $p < .01$ * $p < .05$ +$p < .1$

Table A2. Correlation Table Academic Entrepreneurs

	Mean	**SD**	1	2	3	4	5
1. CEI	5.28	.70					
2. Entrepreneurial risk-taking propensity	5.29	1.22	.33*				
3. Entrepreneurial self-efficacy	5.38	1.12	.38**	.13			
4. Technical skills	4.36	1.57	.35*	.04	.24		
5. Managerial skills	5.8	.82	.25	.15	.06	.48***	
6. Perceived government support	3.35	1.73	.28*	.00	.17	.20	.11

N = 52. SD = Standard Deviation
*** *p* <. 001
** *p* < .01
* *p* < .05

Table A3. Correlation Table Non-Academic Entrepreneurs

	Mean	**SD**	**1**	**2**	**3**	**4**	**5**
1. CEI	5.42	.95					
2. Entrepreneurial risk-taking propensity	6.02	.97	.25				
3. Entrepreneurial self-efficacy	5.20	1.11	.57***	.30*			
4. Technical skills	4.35	1.48	-.13	.01	.05		
5. Managerial skills	5.30	.89	.24	.25	.16	.30*	
6. Perceived government support	1.56	1.12	.20	.23	.01	-.05	-.33*

N = 52. SD = Standard Deviation
*** *p* <. 001
** *p* < .01
* *p* < .05

Table A4. Summary of Means and Standard Deviations for Gamma in SEM

Path Specification	Bootstrap (BS = 250) Means: Academic Entrepr. *n* = 199	Bootstrap (BS = 250) Means: Non-Academic Entrepr. *n* = 164	*t*-test	Bootstrap (BS = 500) Means: Academic Entrepr. *n* = 395	Bootstrap (BS = 500) Means: Non-Academic Entrepr. *n* = 334	*t*-test	Bootstrap (BS = 1000) Means: Academic Entrepr. *n* = 801	Bootstrap (BS = 1000) Means: Non-Academic Entrepr. *n* = 668	*t*-test	Bootstrap (BS = 2000) Means: Academic Entrepr. *n* = 1574	Bootstrap (BS = 2000) Means: Non-Academic Entrepr. *n* = 1348	*t*-test
Entrepr. risk-taking propensity → CEI	.334	-.18	2.33*	.314	-.39	4.7***	.324	-.616	8.8***	.329	-.58	12.74***
	(1.066)	(2.878)		(1.146)	(2.7)		(1.136)	(2.752)		(1.182)	(2.524)	
Entrepreneurial self-efficacy → CEI	.038	.809	-5.29***	.085	.814	-9.25***	.117	.824	-15.99***	.129	.796	-25.6***
	(1.814)	(.473)		(1.317)	(.632)		(1.011)	(.583)		(.825)	(.523)	
Technical skills → CEI	.805	-.158	6.94***	.813	-.165	10.18***	.774	-.216	15.39***	.771	-.215	21.82***
	(1.427)	(1.165)		(1.242)	(1.347)		(1.19)	(1.271)		(1.326)	(1.077)	
Managerial skills → CEI	-.402	.457	-2.24*	-.528	.602	-4.99***	-.597	.851	-10.09***	-.546	.854	-15.12***
	(3.738)	(3.485)		(2.843)	(3.263)		(2.364)	(3.126)		(2.281)	(2.723)	
Perceived government support → CEI	.964	.478	1.24	.989	.715	1.05	1.02	.949	.4	1.017	.931	.71
	(2.917)	(4.449)		(2.225)	(4.538)		(2.271)	(4.287)		(2.455)	(4.002)	

Standard deviations in parentheses. Bootstrap samples, both for Academic and non-Academic entrepreneurs, are of the same size (N = 52) of the two original samples; BS = number of bootstrapped samples; n = number of bootstrapped samples that converge to a solution. SEM = Structural Equation Modeling
*** p < . 001 ** p < .01 * p < .05

Table A5. Summary of the Path Differences in OLS and SEM

Hp	Path Specification	OLS (β_{diff}) Path Diff.	OLS (β_{diff}) Sig.	SEM (γ_{diff}) BS = 250 Path Dif.	SEM (γ_{diff}) BS = 250 Sig.	SEM (γ_{diff}) BS = 500 Path Dif.	SEM (γ_{diff}) BS = 500 Sig.	SEM (γ_{diff}) BS = 1000 Path Dif.	SEM (γ_{diff}) BS = 1000 Sig.	SEM (γ_{diff}) BS = 2000 Path Dif.	SEM (γ_{diff}) BS = 2000 Sig.
H1	Entrepreneurial risk-taking propensity → CEI	.159	-	.514	*	.70	***	.94	***	.909	***
H2	Entrepreneurial self-efficacy → CEI	-.276	*	-.771	***	-.73	***	-.71	***	-.667	***
H3	Technical skills → CEI	.252	**	.963	***	.98	***	.99	***	.986	***
H4	Managerial skills → CEI	-.36	*	-.859	*	-1.13	***	-1.45	***	-1.4	***
H5	Perceived government support → CEI	-.19	-	.486	-	.27	-	.07	-	.086	-

Path differences are computed for OLS as β(Academic)-β(non-Academic (i.e. difference of the simple slopes of the interaction effects) and for SEM as γ(Academic) - γ(non-Academic). SEM = Structural Equation Modeling. *** p < . 001 ** p < .01 * p < .05

Figure A1. Effects of interaction between entrepreneurial self-efficacy and exposure to academic logic on corporate entrepreneurial intention

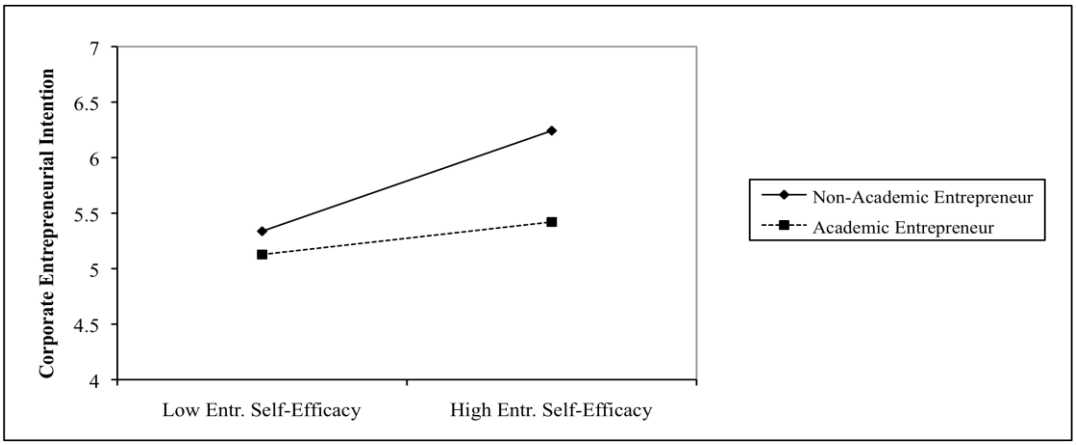


Figure A2. Effects of interaction between technical skills and exposure to academic logic on corporate entrepreneurial intention

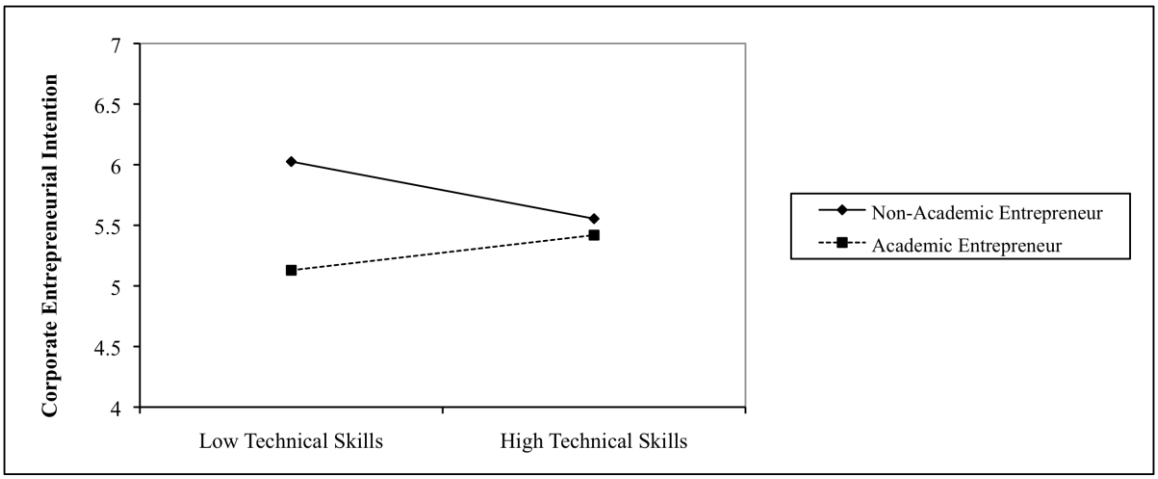


Figure A3. Effects of interaction between managerial skills and exposure to academic logic on corporate entrepreneurial intention