THE IMPACT OF ENTREPRENEURIAL OVERCONFIDENCE ON INCUBATOR EFFECTIVENESS

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Statements and Declarations

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Abstract

The low utilization of incubator resources has been subject to much academic attention within entrepreneurship research. This study explores how entrepreneurs' overconfidence impacts the utilization of incubator resources and influences incubation performance. Based on interviews with 8 incubators and questionnaires from 184 entrepreneurs, the findings show a negative relationship between entrepreneurs' overconfidence and the incubation performance of start-ups. This finding emerges in the context of incubation management through the fully mediating role of entrepreneurial learning. As a moderator, the contract control of the incubator weakens the negative relationship between entrepreneurs' overconfidence and entrepreneurial learning. The microcosm of the incubator context allows the researchers to examine the internal agent interaction. This paper explores the related literature, presents the research study, discusses the findings and provides avenues for future scholarly research on this topic.

Keywords

Overconfidence; Incubation performance; Entrepreneurial learning; Incubator governance

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1. Introduction

Incubators have become a growing and popular vehicle for stimulating regional and national entrepreneurship, innovation, and economic growth in many parts of the world (Phan et al., 2005, 2016; Xiao and North, 2017; Mian et al., 2016; Wright et al., 2017). Incubators provide new ventures with a broad range of resources and services, such as office space, mentorship, networking, specialized skills, and investment; resources deemed critical to the survival and development of new ventures (Aerts et al., 2007; Blank, 2021). Although incubators are widely viewed as an effective instrument to support start-ups (Ferguson and Olofsson, 2004; Patton and Marlow, 2011), literature questions the effectiveness of the incubator on the success of start-ups (Schwartz, 2009, 2013; Tavoletti, 2013; Ratinho and Henriques, 2010) and argues that start-ups are not making full use of the resources in incubators due to the gap between their perceived own resource base and the actual resources offered by the incubator (Weele et al., 2017).

Incubated entrepreneurs utilize the resources of the incubator for learning activities in turn accelerating potential successful business creation (Sullivan et al., 2021). However, their myopic evaluation of the incubator's potential contribution could hinder their incubation process (Patton, 2013). Studies show that venture tenants can be unwilling to spend time participating in lectures and training activities held by incubators (Patton, 2013; Rice, 2002), or disregard the social network that incubators provide (Schwartz and Hornych, 2010; Bruneel et al., 2012). Although a qualitative study traced the cognitive driver of this "resistance" (Weele

et al., 2017) and concluded the short-sightedness to incubated resources stem from the underestimation of resource gaps to the importance of business knowledge, to date, how cognitive differences affect the incubation process remains largely unexplored.

In the entrepreneurial cognition/decision-making literature, one of the most fruitful research areas is the study of bias (Zhang & Cueto, 2017). Bias refers to the systematic deviation of the rational choice theory (Baron, 2007) when individuals choose actions and estimate probabilities, which can lead to incorrect information processing methods and inaccurate judgments (Tversky & Kahneman, 1974). So far, extensive research has focused on how cognitive biases penetrate the venture decision-making process. Entrepreneurs usually have a higher level of cognitive bias than other groups to confront the high uncertainty of the entrepreneurial context (Hayward, Shepherd, & Griffin, 2006). Overconfidence is considered the most common and harmful (Costa et al., 2017).

Venture tenants perceived disconnect between the quality of resources offered by the incubator and their resource needs may stem from their cognitive bias (Weele, 2017), especially overconfidence. Confidence and, indeed, overconfidence is widely regarded as typical cognitive bias held by entrepreneurs (Cooper et al., 1988; Busenitz et al., 1997; Forbes, 2005; Rose, 2008; Simon et al., 2000; Chen et al., 2018). Although the concept of overconfidence varies in the literature, it is usually used to reflect the “mis-calibrated and inflated beliefs” of entrepreneurs in their entrepreneurial ability (Szerb & Vörös, 2021). Overconfidence prompts

market-entry decisions in uncertain, complex, and unfamiliar environments (Walsh and Elorriaga-Rubio, 2019; Baron, 1998; Camerer and Lovallo, 1999; Hayward et al., 2006). While overconfidence has positive implications for entrepreneurial action, it can hinder objectivity resulting in erroneous inferences or assumptions (Forbes, 2005), further hinder business success (Hmieleski & Baron, 2009). In addition, the main cognitive mechanism related to overconfidence is attribution bias. That is, people tend to attribute success to their own abilities and attribute their failure to external factors (Everett & Fairchild, 2015), such as overestimating their own experience and knowledge reserves, and believe they have a comprehensive understanding of how to complete various tasks. In the process of incubation management, these perceptions may cause tenants to be less willing to learn new business skills (Gu & Lin, 2020).

Surprisingly, although studies have confirmed the cognitive differences between tenants and incubator managers (Weele, 2017), we rarely see empirical literature focusing on how tenants' cognitive biases impact the incubation process of start-ups, and how incubators can conduct what type and level of intervention to maintain the incubation effectiveness. Furthermore, existing literature does not fully explore the relationship between overconfidence and firm performance (Busenitz and Barney, 1997; Gudmundsson and Lechner, 2013) in the incubator context. The context-based research of overconfidence is important because contextual factors could influence how overconfidence works in the entrepreneurial domain (Navis et al., 2017). To fill these research gaps, our study examines these issues further. It addresses the following

question: How does entrepreneurs' overconfidence influence their ventures' incubation performance, and what can incubators do to assist entrepreneurs in overcoming this bias? Specifically, drawing on theories of overconfidence, we verified how tenants' overconfidence impact their incubation performance by the mediating role of learning in the incubator. The moderating role of incubator governance (contract control and embeddedness) in the relationship between overconfidence and learning.

This research provides new evidence on the contextual incubation factors that negatively impact venture tenants' performance. This study has practical relevance for incubator managers keen to maximize the outputs from the resources they provide. The study begins with a review of the literature and an introduction to the key components and hypotheses, after which primary research is detailed. Interviews were conducted with incubator managers from 8 incubators in Chengdu, China, and 184 entrepreneurs in receipt of incubation services completed questionnaires. The paper details these data, articulates the research methodology, tests the proposed hypotheses, and culminates with a discussion of the findings and concluding remarks.

2. Theory

2.1 Entrepreneurial Overconfidence

Entrepreneurs "often rely on non-objectively optimal decision-making processes" in complex contexts fraught with uncertainty, particularly when compared with managers in large organizations (Gilbert-Saad, Siedlok, and McNaughton, 2018, p. 75). Entrepreneurial processes

are awash with changing environments and uncertainty; thus, entrepreneurs are prone to unintentionally simplifying their information processing to diminish stress and ambiguity (Cooper et al., 1988; Schwenk, 1984). Entrepreneurs are likely to have a greater degree of cognitive bias. Such biases prominently affect their perception of resources and opportunities (Burmeister and Schade, 2007; Forbes, 2005), consequently influencing the quality of their decision-making.

Overconfidence occurs when over-estimation and over-precision of one's own ability, knowledge, and judgment (Chen et al., 2018). According to cognitive researchers, entrepreneurs are predisposed to biases and overconfidence is one of the most prevalent biases this cohort faces (Szerb and Vörös, 2021; Robinson and Marino, 2015; Cooper et al., 1988). Entrepreneurs' overconfidence is key to venture formation (Rose, 2008; Robinson and Marino, 2015), entrepreneurial failure (Artinger and Powell, 2016; Invernizzi et al., 2017) and survival (Gudmundsson and Lechner, 2013), in addition to entrepreneurial entry and exit (Chen et al., 2018). Overconfidence can be dispositional or situational (Griffin and Varey, 1996). Given this research focuses on individual entrepreneurs, a dispositional perspective on overconfidence is taken (Gudmundsson and Lechner, 2013). In other words, entrepreneurs' overconfidence in this paper refers to overestimating the probability of being right (Busenitz and Barney, 1997). In the incubator context, overconfidence may affect entrepreneurs' judgment and appraisal of resources. It may also negatively impact their attitude toward engaging in entrepreneurial

learning inside the incubator (Brixy et al., 2013), which affects the incubating process's efficiency.

Existing empirical studies on entrepreneur's overconfidence mainly focus on how it influences their desire to start a new venture from a risk-taking perspective (Simon and Houghton, 2000; Trevelyan, 2008), or examines the antecedents of entrepreneur's biases such as age (Forbes, 2005), entrepreneurial experience (Fraser and Greene, 2006) and environmental dynamism (Hmieleski and Baron, 2009). Research findings indicate that entrepreneurs' overconfidence affects different stages of entrepreneurship. Entrepreneurs usually make an erroneous estimation of risks in the start-up phase, leading to blind entrepreneurial propensity (Busenitz and Barney, 1997; Koellinger et al., 2005; Townsend et al., 2010; Keh et al., 2002). When entrepreneurs recruit their entrepreneurial team, they are prone to selecting people with similar values rather than focusing on the abilities required (Pinto, 2014).

In the process of opportunity identification and development, overconfident entrepreneurs may over-or under-estimate the real value of different types of resources according to their own preferences, which eventually results in inadequate utilization of entrepreneurial resources (Brixy et al., 2013). Overconfident entrepreneurs tend to set unrealistic goals and are assured that they can achieve these goals (Forbes, 2005), such expectations may lead them to focus on resources that match with their ideas while neglecting others to their detriment. Thus, while amongst entrepreneurs can be adaptive, prompting action under uncertainty, there is a critical

point, after which a further increase in optimism will negatively influence performance (Hmieleski and Baron, 2009; Lowe and Ziedonis, 2006).

2.2. Incubator Impact

The services and resources provided by incubators promote the survival and development of new ventures and reduce the negative impact of "liability of newness" (Mian et al., 2016). Incubators provide a mixed range of supports according to the needs of individual start-ups and their industry environment factors, such as infrastructure, entrepreneurial mentoring, social networking, and investing, which are deemed to be critical factors to the survival and development of new ventures (Aerts et al., 2007; McAdam, 2008). Firms that spend time within an incubator show better innovation performance than other start-ups. Furthermore, incubators can enhance a start-up's internal capabilities, particularly via technical capabilities, where innovation performance is concerned (Sedita et al., 2018). Incubators add value to venture tenants along with three factors – growth, innovation, and risk management (Hitt and Brynjolfsson, 1996). Building on existing work, this study uses the innovation incubation performance of start-ups (growth, innovation, and risk management) as an indicator of incubation outcome/success.

Despite many studies lauding the positive impact incubators generate for venture tenants, some academics remain skeptical of their value. Schwartz (2010, 2013) argues that incubators do not enhance new venture tenants' survival rate and performance. Furthermore, Van Weele (2017)

believes that the low usage of incubating resources amongst venture tenants is mainly due to insufficient awareness of the resource gap, a reluctance to move out of one's comfort zone, and start-ups' short-termism. For example, when incubators organize training and tutoring programs for entrepreneurs to instill fundamental business knowledge, entrepreneurs' participation rate is low (Patton, 2013). Incubators are well-positioned to build social networks to promote collaboration between entrepreneurs and external stakeholders (such as investors), yet entrepreneurs are unwilling to partake (Schwartz and Hornych, 2010). These findings show that entrepreneurs and incubator managers have varying perceptions of the importance of resources provided by the incubator. While in incubators may provide some resources that individual start-ups simply do not need (Ratinho and Henriques, 2010), it is also the case that some entrepreneurs cannot identify the value of incubator resources. This is largely due to the cognitive bias of the entrepreneur, which inhibits them from using resources and engaging in entrepreneurial learning through incubator programs and may eventually result in diminished incubating efficiency (Brixy et al., 2013). Overconfidence influences ones' estimation of accuracy in information and resource utilization. This, in turn, is likely to affect their judgment and utilization of incubators' resources, ultimately impinging upon the positive impact of incubators on the outcome of the venture tenant.

Hypothesis 1: Incubated entrepreneurs' level of overconfidence is negatively related to the incubation performance of their new ventures.

2.3 Mediating Role of Entrepreneurial Learning

Overconfidence may influence judgmental decision-making (Camerer and Lovallo, 1999) and personal narratives about negative outcomes, impacting learning (Navis and Ozbek, 2016). Entrepreneurship is a dynamic, feedback-learning process and entrepreneurs need pre-and post-entry learning to make entry and exit decisions based on what they have learned (Cheng et al., 2018). Entrepreneurial learning is a key part of entrepreneurship and continuous learning in practice is indispensable to the entrepreneurship process (Walsh and Cunningham, 2017; Cope, 2003; 2005; 2011). Learning is accompanied by continuous improvement of the dynamic capabilities of enterprises. Daft (1984) divides organizational learning into experiential, cognitive and practical. In this study, entrepreneurial learning is defined as a process in which entrepreneurial teams undertake knowledge management and improve their dynamic capabilities through experiential, cognitive, and practical learning. As mentioned above, entrepreneurs' perception and utilization of incubation resources may be influenced by their cognitive biases. Yet, effective use of the resources provided by the incubator is a critical part of the entrepreneurial learning process (Harrison and Leitch, 2005). Entrepreneurs can avoid 'error-amplifying decision traps' (Schulman, 1989) through learning from the experiences of seasoned mentors and experts brought by the incubator and turning these experiences into implicit knowledge of their new ventures.

Incubators assist venture tenants in gaining access to expert external networks to obtain networking resources and knowledge for enhancing their survival rate (Ayatse et al., 2017).

However, when entrepreneurs overestimate their ability, they underestimate the learning potential emerging from the incubator. The main cognitive mechanism that related to overconfidence is attribution bias; that is, people tend to attribute success to their own abilities and attribute their failure to external factors (Everett & Fairchild, 2015), such as overestimating their own experience and knowledge reserves and believing they have a comprehensive understanding of how to complete various tasks. In the process of incubation management, these perceptions may cause tenants to be less willing to learn new business skills (Gu & Lin, 2020). Thus, it is concluded that entrepreneurs' overconfidence will affect the efficiency of entrepreneurs' learning activities from the incubator. In addition, previous studies have proven that entrepreneurial learning can significantly enhance the innovation performance of venture tenants. In other words, the high usage of incubator resources to conduct entrepreneurial learning can enhance the positive effect of the incubator on the innovation performance of venture tenants (Wang and Chugh, 2014; Sedita et al., 2018). Based on the above discussions, the proposed hypothesis states that entrepreneurs' overconfidence will influence the innovation incubation performance of their new venture by means of acting on the mechanism of entrepreneurial learning from the incubator.

Hypothesis 2. The relationship between entrepreneurs' level of overconfidence and incubation performance of their new ventures is fully mediated by entrepreneurial learning.

2.4 Moderating Role of Incubator Governance

Environmental dynamics have been regarded as a significant factor influencing entrepreneurial overconfidence. For example, when faced with a sophisticated environment, the negative effects of biases will be exacerbated. Hmieleski and Baron (2009) take environmental dynamism as a moderator to explore the relationship between an entrepreneur's dispositional optimism and new venture performance. Environmental dynamism is mainly used to study the link between one's perception of external environment complexity and one's biased decision-making. Few studies discuss whether regulations and norms can reduce the negative outcomes of overconfidence. Venture tenants use resources provided by the incubator; they integrate, develop, and utilize these differentiated resources to align with their needs (McAdam, 2008).

Behaviors are also adapted as the entrepreneurial learning process unfolds through connecting with the incubating network (Baraldi and Havenvid, 2016). Bergek and Norrman (2008) detail two models of incubation management "strong intervention" or "laissez-faire," with most incubators falling into one of the two categories. Incubators that strongly intervene provide support and hold relatively high power control over tenants. A strong-intervention incubator tends to have a specialized incubation team on hand at each stage of new venture development. Such a model requires tenants to submit periodic review reports, follow the management by objectives (MBO) model to speed up growth and complete a rigorous evaluation system.

Additionally, incubators get involved in the recruitment of the entrepreneurial team, assisting tenants in selecting talent (Clarysse et al., 2005). On the contrary, “laissez-faire” incubators follow the demand-driven management mode. They offer basic services and assist tenants in solving problems as needs arise. This type of incubator does not intervene a lot in the incubation process, playing more of a support role. Research indicates that incubator governance can effectively reduce mistrust between internal subjects and clarify the rights and responsibilities of both sides. This ultimately improves the use efficiency of resources from the incubation network. The control-power of the incubator may be a source of competitive advantage through expanding the resource stock and heterogeneity within the incubator (Brush et al., 2001). Uzzi (1997) and Dyer (1998) propose that control in venture tenants can be divided into two types: *contract control and embeddedness*. Contract control by the incubator occurs when guidelines are set concerning resource sharing and technical preference through a standard and strict contract, promoting the use of incubation resources to fill resource gaps (Becker and Gassmann, 2008). However, excessive contract control may result in entrepreneurs’ loss of vitality and enthusiasm (Park and Wilding, 2014; Elfring and Hulsink, 2003), ultimately inducing other types of cognitive bias that curb entrepreneurs’ innovative activities. In the Chinese cultural context, people respect to age, hierarchy, and authority (Zapalska and Edwards, 2001).

Besides, Chinese people are long-term oriented, collectivistic, and accept power distance in Hofstede’s cultural dimensions. The incubation contract allows the incubator to hold the authority to direct and supervise venture behavior. At the same time, the incubator shoulders

responsibility for fostering ventures to grow through organizing collective activities such as training, seminars, and offering incubation resources. Ventures often reside in the incubator for three years. Venture entrepreneurs care about the relationship with the incubator, and they reserve respect for incubator managers regardless of overconfidence. The intervention of incubator managers in entrepreneurs' learning pushes entrepreneurs to participate in training programs seminars and learn peers' entrepreneurship experience, technological and marketing knowledge, gain access to valuable resources, and finally strengthen dynamic enterprise capability. High-level contract control entrepreneurial learning mitigates the negative effect of entrepreneurs' level of overconfidence on entrepreneurial learning.

Hypothesis 3. Incubator contract control moderates the relationship between the entrepreneurs' level of overconfidence and entrepreneurial learning.

The embeddedness of the incubator can effectively create the entrepreneurial atmosphere, maintain the level of cooperation, save on costs (e.g., IT, HR), reduce the probability of irrational decision making within tenant ventures, and provide favorable supports for the rational selection of resources within their start-ups (Bergek and Norrman, 2008); it is an effective means of resource utilization. The high-level incubator embeddedness shortens the power distance between ventures and incubator management, favoring the good connection between ventures and the host incubator. A good connection makes them know each other well and trust each other. Those ventures with a high-level of incubator embeddedness are more

likely to correct their cognitive bias toward their own capabilities and resources. This is because they are more willing to interact with the host incubator and accept the advice given by the incubator. Standing outside the ventures, the incubator holds a more objective attitude to assess the capabilities and resources of ventures. The incubator can suggest whether the ventures need to learn something, what they need to learn and how to learn.

Hypothesis 4. Incubator embeddedness moderates the relationship between the entrepreneurs' level of overconfidence and entrepreneurial learning.

The relationship is more negative for those leading their firms with a low-level of incubator embeddedness. Figure 1 displays the relationships proposed within the set of hypotheses. The incubator provides a nurturing environment that protects new firms to a certain degree, but outside factors also permeate and punctuate the incubator environment. Due to many factors, the entrepreneurs' confidence level is a disposition formed over time. It can be contained inside the incubator, but it is also shaped by experiences beyond the control of the incubator environment. Entrepreneurial learning is a mediating variable and is key to success within an incubator – taking advantage of the resources and expertise available within the protected environment is a valuable learning opportunity for venture tenants. Incubator governance is the moderating variable. Managing entrepreneurs' expectations, providing them with the appropriate resources, and facilitating their needs impact entrepreneurial learning, affecting incubation performance. However, incubation performance also lays somewhat outside of the

protected environment of the incubator as outside factors also influence incubation performance.

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3. Data and Methods

3.1 Sample

This study is set in Chengdu, China. China is the world's leading country in the incubation industry, with nationally registered 3065 business incubators and 73 specific maker spaces by the end of 2019. Chengdu, an innovation hub and S&T center in Southwest China with 231 technology-based incubators and maker spaces is ranked 1st in the Southwest with the highest number of registered technology-based small and medium-sized enterprises and high-tech firms. The fast development of the incubation industry in Chengdu helped the city position 5th in China Regional Innovation Index Report 2019. It was awarded one of the "Top 10 Cities to Start-Up Business in China" by Fortune.

The study focuses on new start-ups (operating < 6 years) - while incubators usually foster tenant growth within 36 months, some high-performing tenants stay within incubators beyond three years even though they have met the graduation criterion. The first data collection phase involved semi-structured interviews with top management team members at eight incubators between April 2018 and July 2018. Here are the reasons why we targeted eight incubators: Firstly, science parks, technology business incubators (TBIs), innovation parks, accelerators, and non-profit and for-profit models are all prevailing business models of incubators in the

world and keep continuously evolving (Tang et al., 2019, 2021). These selected incubators well represent the mainstream types of incubators in China and in the world: university science park (National Science Park of University of Electronic Science and Technology of China), non-university sponsorship technology business incubator (the other seven incubators), international technology business incubator (Chengdu-Israel Incubator), maker space (Chengdu Maker Space, Chengdu Chuangke Fang), specific technology business incubator (Chengdu-Israel Incubator, Youju+, Tianfu Life Science Park), general technology business incubator (the other five incubators), non-for-profit technology business incubator (Tianfu Life Science Park, Chengdu Entrepreneurship Institute, National Science Park of University of Electronic Science and Technology of China) and for-profit technology business incubator (the other five incubators). Secondly, these eight incubators were recommended by Chengdu Technology Business Incubator Association because they well represent the incubation industry in Chengdu. Thirdly, the authors undertook a research project financed by the local S&T bureau, which offered access to first-hand data collection. Fourthly, the selection of these eight incubators is in line with the principles of case studies such as representativeness (Miles and Huberman,1994), a reflection of real-life context (Yin, 2017), usefulness for theory building (Eisenhardt and Graebner 2007), and examination of complex topics with rich detail (Miles et al., 1994; Yin, 2017; Cunningham et al., 2017). Table 1 provides an overview of the incubators in this study. Interviews lasted on average 90 minutes, they were recorded, transcribed, and analyzed, and notes were taken throughout. Topics covered include the availability of incubation resources, the selection of tenants, incubation management procedures, and

incubation performance. Results indicated a perceived resource gap between tenants and incubators.

---Insert Table 1 here ---

The insights gained from the interviews guided the focus of the study, and following the literature review, the study's hypotheses were developed, and the questionnaire was designed. Random sampling is used in incubator studies to collect tenant ventures data (Wu et al., 2020). Wu and his colleagues selected 264 new ventures randomly in 14 of Tianjin's business incubators and finally got 205 valid questionnaires. We adopted the same sampling method in our study. In the second phase of data collection, the questionnaires were sent out to the eight interviewed incubator managers, who in turn distributed the questionnaires through random sampling to their 208 venture tenants. The questionnaires were distributed to selected ventures when managers met them. After one month later, a total of 184 valid questionnaires were returned. The high valid return rate of 88.5% is partially due to the willingness of tenants to fill out the questionnaires and partially due to the common efforts made by the researchers and managers. We kept close contact with the eight incubator managers, and every two weeks, we called the managers to check the advancement of questionnaires. The managers kept reminding respondents to complete the questionnaire. The characteristics of venture tenants are exhibited in Table 2. According to Armstrong and Overton's (1977) methods, a variance test was conducted on the valid and invalid questionnaires. The results show that there is no obvious non-response bias.

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3.2 Measures

Entrepreneurial overconfidence, a dependent variable, refers to entrepreneurs' ability to estimate the accuracy of their own decision-making when starting their new ventures, their knowledge about the hosting incubators, and their judgment of venture performance results. A similar procedure is widely used to measure overconfidence (Busenitz and Barney, 1997) and specifically entrepreneurial overconfidence (Forbes, 2005). The procedure records subjects' responses to a series of general knowledge questions representing a moderate to the high difficulty level. In this study, following the suggestions of Forbes (2005), the subjects are asked three subject-specific questions which minimize the influence of variations in the underlying knowledge bases of the subjects: (1) "Which city is closer to Beijing: Paris or Sydney?" (2) "Which city has a higher altitude, Chengdu or Xi'an?" (3) "Which fruit contains more Vitamin C, a pear or an apple?" Two figures were calculated for each respondent: (1) the mean of the confidence levels indicated for all three questions above, and (2) the percentage of their correct answers. Then the measures of overconfidence were obtained by subtracting the percentage of the correct answers from the average confidence level. The potential ranges of the numerical scores obtained are -50 to 100; positive scores indicate overconfidence, while negative scores indicate under-confidence (Forbes, 2005). For example, when a person's confidence level is 83% on average and answers 33% correctly, they are assigned an overconfidence score of 50. A score of 0 is interpreted as showing that the person's confidence level is completely calibrated with their knowledge base.

Entrepreneurial learning, the mediating variable, refers to the learning process of entrepreneurs to acquire, assimilate, generate, and manage knowledge. In the entrepreneurial context, entrepreneurial learning emphasizes acquisition learning and experimental learning (Kreiser, 2011) or vicarious learning and experimental learning (Holcomb et al., 2009). Acquisition learning or vicarious learning results from acquiring, assimilating, and organizing existing knowledge *outside* the venture. Experimental learning results from accumulating, transforming, and exploiting new knowledge *inside* the venture (Holcomb et al., 2009; Kreiser, 2011). Further, cognitive learning influences the ability of entrepreneurs to seize and exploit business opportunities through task reasoning, problem-solving, and planning (Corbett, 2005). Wang's (2017) 8-items Likert 5-point scale is employed to measure entrepreneurial learning. Wang's (2017) scale measures entrepreneurial, experimental learning, acquisition learning, and cognitive learning, and it is suitable for the entrepreneurial context in China. The items on the scale and the results demonstrate comparatively strong internal consistency when tested (Cronbach α=0.804).

Incubator governance, the moderating variable, refers to the influence of the incubator on economic action and the willingness of tenants to cooperate with the host incubator during the incubation process. As an incubation process needs the cooperation between host incubators and tenants, this paper employs Dyer and Singh's (1998) categorization of governance for alliance partners to measure how incubators govern tenants, namely legal contracts and trust/embeddedness. This governance categorization has been used more recently to measure

the effect of incubator control on innovative incubation performance (Hu et al., 2017). New ventures sign formal contracts on with their host incubator on entry; this legal contract forms the basis for how the incubator monitors and guides the behaviors of venture tenants. Furthermore, as the incubator is positioned at the center of the incubation network, it establishes social ties with the tenants. It facilitates networking so tenants can access the external resources required. These interactions signify tenant embeddedness. According to Uzzi (1997), economic action is embedded in ongoing social ties. The embeddedness of tenants influences the information, value, and resource exchanges with the host incubator and finally influences the economic action of tenants. For this study, the measure of Hu et al. (2017) is used to assess the governance of incubators. This measure integrates the concepts of Dyer and Singh (1998) and Uzzi (1997). Both contract control (Cronbach α=0.820) and embeddedness (Cronbach α=0.789) show comparatively high internal consistency.

Incubation Performance, the dependent variable, refers to the incubation performance result of venture tenants**.** New venture growth and the introduction of new products and services are widely used to measure incubation performance (Barbero et al., 2012; Westhead, 1997). New ventures face a lot of uncertainty, and risk management is an important component of success; as such, scholars combine risk management with venture growth and new product development, speed, and quantity, to measure innovation incubation performance of venture tenants (Tang, 2014; Hu et al., 2017). This study adopts Tang's (2014) method to measure incubation performance; it includes: 1) The growth of ventures has been accelerated after incubation; 2)

The speed and quantity of new product development have increased after incubation; 3) New ventures forecast risks and take actions to deal with risks after incubation. The 5-point Likert scale (1 = “strongly disagree” and 5= “strongly agree”) analysis result shows Cronbach α=0.709, comparatively high reliability.

Control Variables: *Individual* factors that may influence this model are controlled for the entrepreneur’s gender (male=1, female=0), age, educational background, and entrepreneurial experience (yes=1, no=0). Further, venture characteristics are also controlled, including the type of industry, venture age, number of employees, annual sales, and executive team members. Finally, two factors of the incubator level are included: whether the incubator is a new venture residing in a national-level incubator (yes=1, no=0) or/and a specific incubator (yes=1, no=0) (compared with a general one). The mean, standard deviation, and correlation coefficient of each variable are exhibited in Table 3.

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3.3 Statistic Methods

The coefficient of internal consistency of each scale is above 0.7; the result indicates that all the scales possess good reliability, according to Podsakoff’s (2003) recommendation, confirmatory factor analysis on all scales to measure the discrimination validity of constructs. As shown in Table 4, all the fit indices of the four-factor model significantly excel those of the other models (χ2=310.463, df=13, p<0.01; RMSEA=0.062; CFI=0.896; RMR=0.052), this

shows that the original model M0 has discriminative validity. Since all the scales are self-reported by entrepreneurs, the Harman single-factor test (Podsakoff and Organ, 1986) analyzes all the questionnaire items together. Results show that the load of the first principal component is 30.23% before we rotate the factor. This percentage falls below 40% and is in the acceptable zone (Podsakoff and Organ, 1986); there is no obvious common method bias in the study's variables.

---Insert Table 4 here ---

The hierarchical regression models were used for testing the main, mediating, and moderating effect of variables in the study. This section will explain the results in relation to the proposed research hypotheses. Stepwise regression tests the mediate and moderate roles in building seven models. In M1, M2, M3, and M4, entrepreneurial learning is the outcome variable. M1 contained only control variables; M2 added independent variable (i.e., overconfidence); two moderators are added in M3 (i.e., contract control and embeddedness); then, in M4, the interaction effect variables were included (i.e., OC×CC, OC×E). Simultaneously, M5, M6, and M7 have incubation performance as the outcome variable. The control variables alone were added in M5, and then the independent variable (i.e., overconfidence) was included in M6, while the mediator (i.e., entrepreneurial learning) was added in M7.

4. Results

Table 5 provides the results.

---Insert Table 5 here ---

As shown in M6, the relationship between entrepreneurs' overconfidence and incubation performance is significant and negative (β=-0.006, p<0.001). Therefore, the results support Hypothesis 1, which proposed that the overconfidence level of the entrepreneur has a negative impact on the incubation performance of a new venture. M2 shows a significant negative relationship between the level of overconfidence and entrepreneurial learning (β=-0.009, p<0.001). But when taking both variables as independent variables to influence incubation performance (see M7), the effect of overconfidence is found to be non-significant (p>0.05). In contrast, entrepreneurial learning is significantly positively related to incubation performance (β=0.740, p<0.001). This confirms that entrepreneurial learning fully mediates the relationship between entrepreneurs' overconfidence and incubation performance. These results support Hypothesis 2, which proposed that the relationship between entrepreneurs' overconfidence level and the incubation performance of their new ventures is fully mediated by their entrepreneurial learning. The bootstrap test (Preacher, 2008) is further used to validate the indirect effect in our model (LL 95% CI=-0.0088, UL 95% CI=-0.0043).

To avoid the collinearity problem arising from the high correlation between the independent variable and the interaction item, the independent variable and moderators are centralized based on the suggestion of Toothaker (1994), which posits to transfer means of such variables to 0, and then calculate the interaction item. Then drawing from M3 and M4 that OC×CC (the interaction item of overconfidence and contract control), it is clear that there is a significant positive impact on entrepreneurial learning (β=0.003, p<0.01), however coefficient of OC×E

(the interaction item of overconfidence and embeddedness) is non-significant ($p>0.05$). The standardized coefficient of variables is used in M4 to illustrate Figure 2 on moderating roles. Combining Table 5 (M1, M3, M4) and Figure 2, one can conclude that contract control of the incubator moderates the relationship between entrepreneurs' overconfidence and entrepreneurial learning. The relationship is less negative for those leading their firms within an incubator of high-level contract control. In contrast, embeddedness within the incubator does not have a significant effect, supporting Hypothesis 3, which suggested that contract control moderates the relationship between the entrepreneurs' overconfidence and entrepreneurial learning. However, we did not find strong evidence to support Hypothesis 4, which focused on the moderation role of embeddedness.

--- Insert Figure 2 here ---

5. Discussion

Incubators are effective instruments to support start-ups because they provide resources, complementing the existing resource base of the start-up facilitating their survival and growth (van Weele et al., 2017; Blank, 2021). Yet the role of incubators is more complex than resource provision or business support. Incubators play a pivotal, intermediary role in new venture development. Not only do incubators supply critical resources, over time, but they also build up fundamental experience in the start-up process and the entrepreneurial skills more conducive to success. While overconfidence is one of the most prevalent biases amongst entrepreneurs, it

can be a useful bias for this cohort as it encourages action in the face of uncertainty – this is critical for business venturing. However, once the entrepreneur has started their firm, overconfidence can be harmful in that it disrupts their uptake of incubator resources.

This study found that increased entrepreneurial overconfidence leads to decreased incubation performance. Likewise, Hmieleski and Baron (2004) came up with the inverted U-shaped curve charting the relationship between over-optimism amongst entrepreneurs and the performance of their start-ups. They believe that excessive optimism, to a certain extent, belongs to the category of overconfidence, which is proven to have a negative impact on new venture performance.

To address such a bias, incubators can interrupt problematic overconfidence and reduce their negative impact on venture performance. This research also found that entrepreneurial learning mediating between entrepreneurial overconfidence and incubator efficiency. Incubators and accelerators can provide opportunities to speed up the learning process amongst tenant entrepreneurs (Del Sarto et al., 2020; Mansoori et al., 2019). This finding enriches the empirical literature on the role of the incubator and its impact on start-ups and the mediating role of the relationship between entrepreneurs' cognitive biases and the powerful performance of their ventures. This finding aligns with Weele's (2017) view, who uses a multi-case study to explore the possible reasons for the low utilization of internal resources from the incubator and proposes that entrepreneurs' cognition affects their identification and use of these resources.

5.1 Implications for theory

This study explores the interaction between entrepreneurs' overconfidence and the management protocols of incubators. The aim of examining entrepreneurs' overconfidence through this aperture is to assess the possibility that incubators' control can effectively reduce the negative repercussions of entrepreneurs' overconfidence. The impact of incubator control on tenant entrepreneurs' overconfidence is a critical environmental factor and exploring it enriches our understanding of entrepreneurial behavior and the role of incubators. Previous studies have mainly examined the direct relationship between entrepreneurial cognitive bias and entrepreneurial output. Nevertheless, few studies have focused on its specific impact mechanism (mediating role).

This research expands the empirical scope of the research field on entrepreneurs' dispositional traits in the context of new venture incubation performance. It is found that overconfidence weakens entrepreneurs' abilities to fully identify and take advantage of incubation resources to engage in entrepreneurial learning; this is a verification and expansion of van Weele's (2017) assertion. However, incubators can impact entrepreneurial learning amongst tenant entrepreneurs in contract control – stronger contract control by the incubator significantly reduces overconfidence amongst entrepreneurs. Existing literature has explored the effects of environmental factors (such as environmental dynamics) and individual factors (such as entrepreneurial experience and educational background) on the relationship between cognitive bias and venture performance. Literature rarely discusses whether incubator intervention could

exert a certain influence (Hausberg and Korreck, 2020). The findings confirm that contract control is useful in reducing the negative effect of overconfidence - meaning incubators have a certain managing right in the process of new venture incubation. Such a defined structure may be more effective in assisting start-ups in understanding the reality of current risks and product innovation, ultimately lessening the possibility of entrepreneurs' arbitrary persistence resulting from overconfidence.

Considering the embeddedness of the start-up within the incubator as a moderator in the model, we did not find strong evidence to verify this effect. Essentially, the embeddedness of the incubator cannot effectively relieve the negative effect of overconfidence. A possible explanation for this finding may be that social control is usually "soft control", which in principle means the influence of incubators on venture tenants depends on the willingness of ventures and doesn't imply direct involvement in the venture decision-making process. Although embeddedness itself can improve the incubator's effect on the performance of a new venture (supported by the data), entrepreneurs' cognitive biases are relatively stable traits if there is no measure such as contract control. "Soft Control" alone is incapable of having a significant effect. Besides, this study shows that contract control ($\beta=0.08$, $p<0.05$) and embeddedness ($\beta=0.281$, $p<0.001$) of incubators both have a positive impact on entrepreneurial learning, this would be an interesting direction for future research as it is a relatively unexplored phenomenon.

5.2 Implications for practice

Existing literature recognizes a mismatch in the perceived resource need between the entrepreneur and the incubator in the process of incubation management (Weele et al., 2017; Blank, 2021). This study examines how incubation managers can better support businesses and, in particular, assist overconfident entrepreneurs in growing and learning without stifling their confidence levels. Confidence is an important dispositional trait for entrepreneurs. In certain periods of the entrepreneurship journey, even overconfidence is positive (e.g., triggering entrepreneurial action), yet overconfidence is a cognitive bias that can hinder venture performance within incubators. However, incubator managers can counteract or rebalance this bias through adequate contract controls that enable and support entrepreneurial learning amongst tenant entrepreneurs.

Citizens and businesses widely accept legalism in western countries. This philosophy supports incubator managers to guide and supervise the behaviors of resident ventures. Moreover, the signed contracts between the host incubator and ventures provide incubator managers a legitimate right to intervene in the entrepreneurial learning process of resident ventures. Confucianism is a prevailing philosophy in eastern countries. The respect for hierarchy and authority supports the intervention of incubator managers in the entrepreneurial learning process of ventures. Besides, globalization promotes management practices across organizations, institutions, and geographies (Filatotchev et al., 2020; Hausberg and Korreck, 2020). The respect for rules, regulations, and laws are more important in guiding citizens and

businesses' behaviors in the east. The involvement of the incubator is viewed as the most important value-adding process of the incubation process's four phases (selection, structuring, involvement, and exit) (Gassmann and Beck, 2006). Thus, our research provides generic implications for incubation practitioners in the East and those in the West.

5.3 Implications for policy

Compared with managers in existing firms, entrepreneurs of new ventures typically face higher barriers in accessing resources, predicting, and reducing business uncertainty (Patzelt et al., 2008). Incubators are viewed as a policy tool to be created for breaking the bottleneck of resources by providing new ventures physical workplace and value-added incubation service both in the East and the West. However, government policies should note the role incubators play in supporting and harnessing the innovative potential of entrepreneurs. Incubators are not merely resourced providers; they assist in managing the entrepreneurial process within start-ups.

Through valid contract control mechanisms, incubator management can disrupt the negative effects of entrepreneurial overconfidence. Government policy should recognize this role by establishing and developing a start-up policy that supports a variety of contract structures and agreements (e.g., recognized contract templates within the nation's legal framework) between long-standing recognized incubators and emerging start-ups (Guerrero and Urbano, 2019). To some degree, these legal contracts reflect the government decisions and regulations that are

relevant to entrepreneurs' businesses to reduce uncertainty. For example, green innovation, health care, big data, cloud computing, and artificial intelligence are highly appreciated globally. Government policy should guide incubators to host new ventures directed by entrepreneurs whose businesses are linked to the most encouraging sectors, as well as motivate incubators to mitigate entrepreneurs' overconfidence when entrepreneurs estimate their resources and capabilities inappropriately to handle the business uncertainty.

5.4 Limitation and future research

Although we made the contributions mentioned above, there are still some limitations.

First, all our samples are from Chengdu, China, which are not representative samples of the whole country. Studies have shown national and regional differences in the management mode of incubators (Tang et al., 2013; Xiao and North, 2017). Chengdu is an innovation hub and technology center in Southwest China. The type and level of incubator resources may have some unique characteristics, impacting the broad applicability of the conclusions. We recommend future studies choose samples that can fully cover all provinces and cities in China and even other countries in the world.

Second, we only considered the role of tenants' overconfidence in start-ups' incubation and learning process. Zhang & Cueto (2017) classified the types of entrepreneurial cognitive biases into "make-happy" and "sketchy-attribute". This study was focused on tenants' overconfidence, which is caused by the influence of desires or beliefs (make happy). Still, it did not explore the "sketchy-attribute" bias, which describes the behaviors of attending to one attribute when other

attributes are more relevant, such as the law of small number and the illusion of control (Baron, 2007), which may also influence incubation process. Future research can consider comprehensive cognitive biases and emotions in the context of incubation management (Aly et al., 2021).

6. Conclusion

Existing studies on cognitive biases and entrepreneurial output have focused on the direct effects and rarely take note of these two variables; Furthermore, whether external intervention can reduce the negative impact caused by entrepreneurs' cognitive bias has not received due attention. This study explored all of these factors within the context of the incubator industry in China. Specifically, the study is based on in-depth interviews with incubator managers and 184 venture tenant questionnaires from a diverse cross-section of eight China-based incubators. The paper has theoretically discussed and empirically tested the specific mechanism of how entrepreneurs' overconfidence influences incubation performance in the context of incubator management. The moderating role of incubator contract control on the relationship between entrepreneurs' overconfidence and entrepreneurial learning is also explored. Ultimately this study enriches the theoretical scope of entrepreneurs' cognitive biases and details implications (and potential remedies) for incubation management practice.

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Incubator Details	Background
Name: Chengdu-Israel Incubator **Employees:** 6; **Ventures:** 40+ **Industry:** Intelligent Agriculture and bio-technology	It is a joint venture, created in December 2015. It aims to help ventures get needed financial resources and cooperate with firms from Israel.
Name: Chengdu Maker Space **Employees:** 6; **Ventures:** 60+ **Industry:** Open source hardware innovation	Created in January 2012 as the first Maker Space in Chengdu. The founder of the incubator is keen on robotic technology and aims to promote open-source hardware innovation. It is a private and technology-based incubator. Before 2015, it operated for survival and not for profit. After 2015, it started to think about the business model for profit.
Name: Youju+ **Employees:** 5; **Ventures:** 4 **Industry:** Mobile games; entertainment	A private incubator and created in 2016. The original foundation purpose of the incubator was to provide reciprocal help among game developers. It operates as an accelerator and promotes more than three years old ventures to grow quickly. It also trains managers to manage sub-incubators.
Name: Tianfu New Valley **Employees:** 10-20; **Ventures:** 700+ **Industry:** Software; Digital media telecommunication	The first private national technology-based incubator in China was created in 1994. It is located in the well-developed area of Chengdu, occupying 400000m2. It has been transforming from a general incubator to a specialized incubator. 70% of tenant ventures are technology-based start-ups engaging in IT-related industries. It aims to build a full incubation value chain from maker space, nursey, an incubator to the accelerator. It has formed a community where entrepreneurs enjoy entrepreneurship, work, life, entertainment, and relaxation.
Name: Tianfu Life Science Park **Employees:** 19; **Ventures:** 117 **Industry:** Biotechnology	It was created in December 2010 as a public and specialized incubator, occupying 220000m2. The park cooperates with multiple organizations, such as the Sichuan University, Hua Xi Hospital of Sichuan University, Chinese Academy of Sciences Chengdu Branch, other national research laboratories, and Chengdu government institutes focusing on biopharmaceutical R&D, as well as fostering biotechnological development start-up growth. It aims to become the gateway of the life science industry in the West of China.
Name: Chengdu Entrepreneurship Institute **Employees:** 7; **Ventures:** 30 **Industry:** Internet-technology	Supported by Chengdu Vocational Education College, Chengdu local government (e.g., Bureau of Education, Bureau of Human Resources and Social Security Bureau, Youth League of Municipal Party Committee) and firms, Chengdu Entrepreneurship Institute, also called Chengdu Software Institute, was founded in July 2013 as a public incubator of 8000m2 area. The institute provides entrepreneurial training, practical skills, and incubation services for college students. It aims to create an eco-entrepreneurial environment for young entrepreneurs to become a complex service center.
Name: Chengdu Chuangye Chang **Employees:** 7; **Ventures:** 1200+ **Industry:** Mobile games; new media; electronic information	Positioned as a new mobile internet-based incubator, it was sponsored by a state-owned company and created in 2007 and quickly became a leader in Chengdu's mobile internet incubation industry with 35000m2. By 2015, it was awarded the title “National Maker Space” by the Ministry of Science and Technology. In 2016, it was appraised as “the Best Welcome Incubator” by the Magazine named China Entrepreneur.
Name: National Science Park of Uni. of Electronic Science & Technology of China **Employees:** 85; **Ventures**: 300+ **Industry:** Electronics	It was created in 2001 as a public and national university science park with 600000m2. The park aims to commercialize university research findings and build an eco-entrepreneurial system from nursey, incubator, accelerator to industry.

Table 1 Incubator Overview

Source: Authors

Characteristic	Classification	Frequency	Proportion	Characteristic	Classification	Frequency	Proportion
Gender	male	100	54.3%	Education background	High school or below	11	6.0%
	female	84	45.7%		College degree	124	67.4%
Age	≤25 years old	125	67.9%		Bachelor's degree	32	17.4%
	25-35 years old	46	25.0%		Master's degree or above	17	9.2%
	35-45 years old	9	4.9%	Entrepreneurial	Yes	70	38%
	>45 years old	4	2.2%	experience	No	114	62%
Industry	Traditional manufacturing	23	12.5%	Firm age	≤1 year	101	54.9%
	High-tech	47	25.5%		1-2 years	43	23.4%
	Traditional services	49	26.6%		3-5 years	28	15.2%
	E-Commerce	19	10.3%		>5 years	12	6.5%
	others	46	25.0%	Annual sales	≤1 million RMB	106	57.6%
Number of staff	1-5	73	39.7%		1-3 million RMB	41	22.3%
	6-10	61	33.2%		3-5 million RMB	12	6.5%
	11-20	21	11.4%		5-10 million RMB	6	3.3%
	21-50	12	6.5%		>10 million RMB	19	10.3%
	>50	17	9.2%				
Incubated in a national-	Yes	78	42.4%	Incubated in the	Yes	70	38%
level incubator	No	106	57.6%	professional incubator	No	114	62%

Table 2 The Characteristics of Entrepreneur Tenant

Source: Authors

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Gender†	0.543	0.499	-													
Age	1.413	0.688	-0.053	-												
Education	2.298	0.719	-0.151*	0.556**	-											
Entrepreneurial experience	0.423	0.605	0.065	0.365**	0.084	-										
Firm age	1.739	0.962	-0.022	0.560**	0.342**	0.200**	-									
Annual sales	1.864	1.300	-0.113	0.350**	0.313*	0.088	0.561**	-								
Number of staff	2.125	1.263	-0.117	0.361**	0.344*	0.030	0.647**	0.702**	-							
National incubator †	0.423	0.496	0.080	-0.036	-0.051	-0.038	0.073	0.098	0.098	-						
Professional incubator	0.380	0.487	-0.113	0.246**	0.173*	0.080	0.341**	0.281**	0.313**	-0.129	-					
Level of overconfidence	32.936	36.077	-0.030	-0.129	-0.066	0.141	-0.089	-0.083	-0.152*	0.024	-0.259**	-				
Entrepreneurial learning	3.820	0.583	-0.082	0.093	0.113	-0.032	-0.015	0.004	0.033	-0.108	0.088	-0.527**	0.804			
Contract control	3.540	0.871	-0.117	-0.003	0.107	-0.010	0.009	0.019	0.050	-0.012	-0.088	0.080	0.271**	0.820		
Social control	3.828	0.616	-0.054	0.015	0.069	0.030	0.053	0.053	0.082	0.036	-0.143	-0.044	0.432**	0.513**	0.789	
Incubation performance	3.601	0.765	0.050	-0.028	0.003	-0.074	-0.036	-0.014	0.008	-0.056	-0.124	-0.252**	0.535**	0.392**	0.496**	0.709

n=184. †=dummy variable. The numeric value on the diagonal line is Cronbach's Alpha of variables. *p<0.05，**p<0.01

Table 3 Descriptive Statistic

Source: Authors

Model	χ2	df	Δχ2	Δdf	AIC	TLI	CFI	RMR	RMSEA
M0 (Four-factor model)	310.463	183	-	-	406.463	0.881	0.896	0.052	0.062
M1 (Three-factor model) E+IIP	357.656	186	47.193	3	447.656	0.842	0.860	0.058	0.071
M7 (Two-factor model) EL+IIP CC+E	458.855	188	148.392	5	544.855	0.753	0.779	0.074	0.089
M14 (singe-factor model) EL+CC+E+IIP	616.649	189	306.186	6	700.649	0.612	0.651	0.093	0.111

EL=entrepreneurial learning; CC=contract control; E=embeddedness; IIP=innovation incubation performance

Table 4 Results of Confirmatory Factor Analysis

Source: Author

Variables	Mediating variable: Entrepreneurial Learning				Dependent variable: Incubation Performance		
	M1	M 2	M 3	M4	M 5	M 6	M7
Independent variable							
Level of overconfidence		-0.009(0.001)***	-0.009(0.001)***	-0.008(0.001)***		-0.006(0.002)***	-0.000(0.002)
Mediator							
Entrepreneurial learning							0.740 (0.099) ***
Moderator							
Contract control			0.085(0.043)	0.107*(0.045)			
Embeddedness			0.334(0.062)***	0.282(0.063)***			
Interaction							
OC×CC				0.003(0.001) **			
OC×E				0.000(0.002)			
Individual control variables							
Gender	-0.056(0.089)	-0.111(0.076)	-0.066(0.066)	-0.071(0.065)	0.087(0.117)	0.048(0.113)	0.130(0.099)
Age	0.102(0.092)	0.001(0.079)	0.036(0.069)	0.030(0.067)	0.015(0.121)	-0.057(0.118)	-0.058(0.102)
Education	0.051(0.075)	0.078(0.064)	0.041(0.056)	0.049(0.054)	0.013(0.099)	0.032(0.095)	-0.025(0.083)
Entrepreneurial experience	-0.058(0.079)	0.059(0.068)	0.032(0.059)	0.011(0.058)	-0.091(0.103)	-0.008(0.102)	-0.052(0.089)
Firm control variables							
Firm age	-0.077(0.068)	-0.038(0.058)	-0.055(0.051)	-0.050(0.049)	-0.022(0.090)	0.006(0.087)	0.034(0.076)
Annual sales	-0.019(0.048)	-0.006(0.041)	-0.004(0.035)	0.005(0.034)	-0.002(0.063)	0.007(0.061)	0.011(0.053)
Number of staff	0.028(0.055)	-0.009 (0.047)	-0.027(0.040)	-0.036(0.039)	0.050(0.072)	0.023(0.069)	0.030(0.060)
Incubator control variables							
National incubator or not	-0.097(0.090)	-0.095(0.076)	-0.094(0.066)	-0.096(0.064)	-0.134(0.119)	-0.132(0.114)	-0.062(0.100)
Professional incubator or not	0.088(0.098)	-0.081(0.085)	0.032(0.076)	0.029(0.073)	-0.225(0.128)	-0.345(0.127)	-0.285(0.111)*
R2	0.043	0.313	0.489	0.526	0.032	0.112	0.331

ΔR2	-	0.281	0.446	0.483	-	0.08	0.299
F	0.870	7.898***	13.610***	13.413***	0.643	2.175*	7.731***

Non-standardized coefficients listed in the table and SE are reported in parentheses

OC= level of overconfidence; CC= contact control. E= embeddedness; *p<0.05, **p<0.01, ***p<0.001

Table 5 Results of Hierarchical Regression

Source: Authors

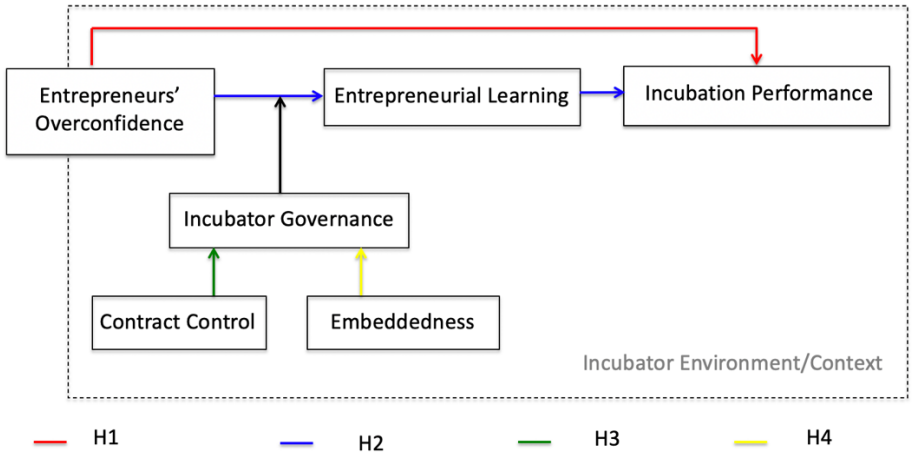

Figure 1 Proposed Research Model

Source: Authors

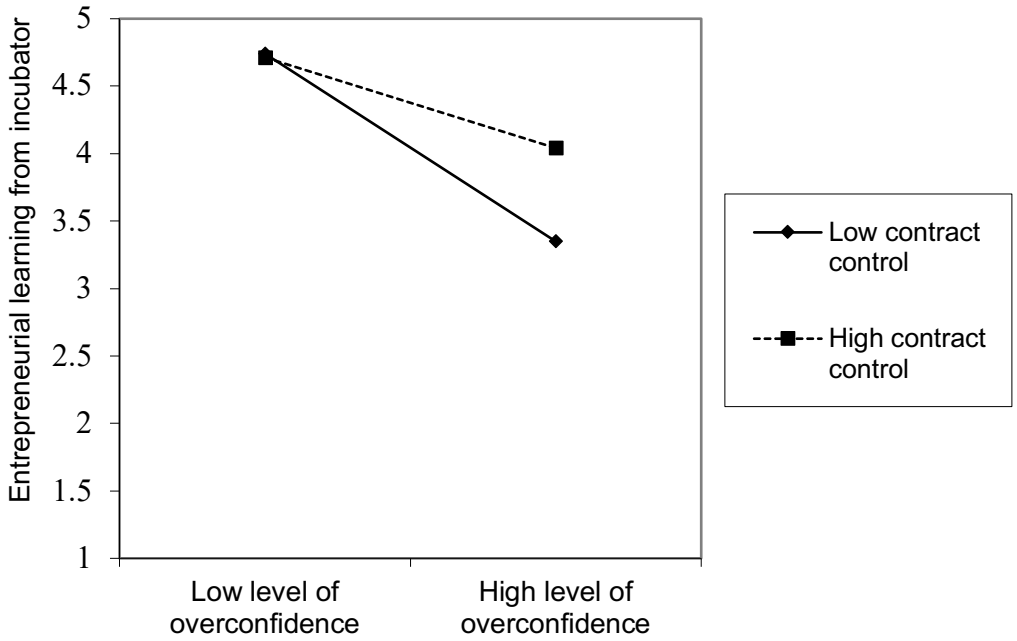

Figure 2 Moderating Effect of Contract Control of Incubator on the Relationship between Entrepreneurs' level of Overconfidence and Entrepreneurial Learning from Incubator

Source: Authors