

## From intentional to nascent student entrepreneurs: The moderating role of university entrepreneurial offerings



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### ABSTRACT

Entrepreneurial intention is typically acknowledged as the foundational antecedent of entrepreneurial behaviour. However, existing conceptual and empirical studies reveal that not all entrepreneurial intentions are ultimately translated into actual behaviour, resulting in an intention–behaviour gap. The current study reviewed the existing literature pertaining to this gap and found that most of the research has examined the contingent role of individual/psychological factors, yet how environmental factors, especially the institutional proximal circles, bridge the intention–behaviour link remains scarce. By employing questionnaire data ( $n = 1820$ ) collected from university students in China, this research examines the effectiveness of university entrepreneurial offerings on student entrepreneurial intention realisation. The results illustrate that, although a high engagement level in university entrepreneurship education and venture creation contexts accelerates student entrepreneurs' intention–behaviour translation, the positive effect of instrumental offerings (start-up support services) is stronger than that of entrepreneurship education offerings (entrepreneurial courses and extra-curricular activities). This research extends the application of the theory of planned behaviour to the start-up process by highlighting the entrepreneurship education and venture creation factors derived from the university milieu students are exposed to in accelerating the conversion from entrepreneurial intention to nascent start-up behaviour. It captures the association amidst the effectiveness of entrepreneurship education in aspiring student entrepreneurs' entrepreneurial learning, intention actualisation, and tangible start-up activities. These findings also draw researchers' attention to explore further the nuances of various entrepreneurial offerings in student venture creation and how to build an effective university entrepreneurial ecosystem.

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### Introduction

Entrepreneurship education (EE) in a university context is considered an essential approach to stimulating students' entrepreneurial awareness and intention (Nabi et al., 2017; Souitaris et al., 2007), self-efficacy (Gieure et al., 2020), and ultimately, their start-up behaviour (Bergmann et al., 2016; Haneberg & Aadland, 2020; Lackéus & Williams-Middleton, 2015). Universities worldwide offer various entrepreneurial courses and extra-curricular programmes (Pittaway & Cope, 2007) with diverse teaching/learning approaches and create entrepreneurial ecosystems for aspiring student entrepreneurs. Scholars and stakeholders have started evaluating these endeavours for student entrepreneurship, often proxying it with the

formation of entrepreneurial intention (Ahmed et al., 2020; Meoli et al., 2020; Nabi et al., 2017).

Although burgeoning theoretical and empirical research has investigated the nature and antecedents of entrepreneurial intentions (e.g., Kautonen et al., 2013; Liñán et al., 2011; Turker & Selcuk, 2009), venture creation is a dynamic, multidimensional phenomenon contingent on multiple internal and external factors (Autio & Acs, 2010; Gartner, 1985). These antecedents range from entrepreneurs' personality traits (Brockhaus & Horwitz, 1986) to psychological backgrounds (Baron, 1999), and the opportunities available to entrepreneurs (Shane & Venkataraman, 2000). More recently, how context affects the entrepreneurial process has drawn scholars' attention (Aaboen et al., 2021; Liao & Welsch, 2005; Welter, 2011). Given the complexity of the venture emergence, students fail to, or do not consistently, enact their intention, materialising an unclear link regarding the relationship between their entrepreneurial intention and

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venture creation realisation (Gieure et al., 2020; Harima et al., 2021; Rauch & Hulsink, 2015; Schlaegel & Koenig, 2014; Van Gelderen et al., 2015, 2018).

To bridge this link, recent studies have investigated the immediate transformation of entrepreneurial intention and behaviour (e.g., Belchior & Lyons, 2021; Kautonen et al., 2013; Rauch & Hulsink, 2015) or how psychological/endogenous factors affect this translation (e.g., Delanoë-Gueguen and Liñán, 2019; González-López et al., 2021; Kautonen, Hatak, Kibler & Wainwright, 2015; Shinnar et al., 2018). Only a handful of studies have examined the moderating role of the macro contextual factors, such as the national cultural dimension (Bogatyreva et al., 2019), regional social capital (Weiss et al., 2019) or the overall organisational entrepreneurial climate (Meoli et al., 2020; Shirokova et al., 2016), in students' actual entrepreneurial realisation. Context has been long acknowledged as a compelling factor in interpreting entrepreneurial activity in entrepreneurship research (Welter, 2011; Welter & Smallbone, 2011). Universities fulfil their role as knowledge-centred organisations by granting students stable access to entrepreneurial and technical resources, such as educational and training programmes and start-up infrastructure (Politis et al., 2012). Moreover, Aaboen et al. (2021) contended that the process of student business start-up results from its interplay with the educational and venture creation contexts. Unfortunately, research on how these education and venture creation microenvironments of students' daily practice influence their entrepreneurial intention–behaviour transition remains inadequate, thus the call for further research (Feola et al., 2019; Harima et al., 2021; Nabi et al., 2017).

University EE and venture creation contexts entail a pool of entrepreneurship-related resources for students – the most common category incorporates entrepreneurial courses, extra-curricular activities, and start-up support (Morris et al., 2017; Shirokova et al., 2018). Previous empirical research has identified the crucial effectiveness of these offerings in student entrepreneurial intention stimulation or behaviour occurrence and development (e.g., Bergmann et al., 2016; Gielnik et al., 2014; Yi, 2021). Nevertheless, it remains unclear whether the effectiveness of these university entrepreneurship education configurations could bridge their intention–behaviour gap. Motivated by these research gaps, this research sets out to examine the effectiveness of the university entrepreneurial contexts in which aspiring student entrepreneurs are embedded and to understand how the institutional conditions reinforce or attenuate the entrepreneurial intention and behaviour transition. Specifically, this current study investigates: To what extent does student entrepreneurial intention predict their nascent start-up behaviour? This is followed by testing the moderating effects of the university entrepreneurial offerings on the translation from entrepreneurial intention to start-up actions. This quantitative research relied on questionnaire data collected from university students and alumni in three Chinese universities to respond to these research questions.

There are several contributions this study makes to the entrepreneurship literature. First, this research enriches the emerging literature regarding nascent student entrepreneurs' intention–behaviour translation (Harima et al., 2021). Thus, it advances our understanding of the student entrepreneurial process. Secondly, this study reveals how the university EE and venture creation contexts (Aaboen et al., 2021) affect the process by which some intentional students (but not others) take action to create a new venture. Thirdly, it sheds light on whether university students can leverage newly acquired business and start-up-related knowledge in the form of skills and competencies into venture creation activities (Gieure et al., 2020), which paves a promising road to EE evaluation research regarding intention–behaviour translation. Finally, this research further contributes to the literature on start-up activity research; for instance, contextual factors of university entrepreneurship can be vital antecedents of entrepreneurial activity on the part of aspirational student entrepreneurs. It is anticipated that these research

findings will provide entrepreneurship educators and policymakers with suggestions on designing entrepreneurship-related programmes and pedagogies to facilitate students' entrepreneurship learning and its realisation of new venture creations.

The paper is structured as follows. The conceptual framework and hypotheses are introduced, followed by the methodology, including a description of the research samples, measured variables, data analysis, and robustness tests. The research findings are interpreted, and the paper concludes with contributions, limitations and possible future research directions.

## Theoretical foundations and hypotheses

### *The entrepreneurial intention–behaviour link*

Entrepreneurship is widely acknowledged as an intentional behaviour (Bird, 1988; Krueger & Carsrud, 1993); the start-up activities occurring during the start-up process are intentional, deriving from motivation and cognition (Kautonen, Van Gelderen & Fink, 2015). Krueger et al. (2000, p. 413) stated that scholars may effectively anticipate intended behaviour such as entrepreneurship “by observing intentions toward that behaviour, not by attitudes, beliefs, personality, or mere demographics”. In line with this statement, many researchers in recent years have adopted intention-based models to interpret the entrepreneurial phenomenon as the formation of an entrepreneurial intention which is perceived as a significant step in the new venture creation period (Bird, 1988; Kautonen et al., 2013; Van Gelderen et al., 2008). A substantial number of cross-disciplinary studies relied upon socio-psychological models (e.g., *the theory of reasoned action*, Ajzen & Fishbein, 1975; *the entrepreneurial event model*, Shapero & Sokol, 1982; or *the theory of planned behaviour* (TPB), Ajzen, 1991, 2001) to examine the constructs of entrepreneurial intention. The TPB is the most frequently applied theoretical framework for understanding and predicting behavioural intentions (Adam & Fayolle, 2016; Kautonen, Van Gelderen & Fink, 2015). The TPB posits that behavioural intention is a function of three conceptually independent factors: attitudes, social norms, and perceived behavioural control, all of which directly influence subsequent behaviour.

The predictive efficacy of this systematic and coherent TPB model has primarily been supported by empirical studies predicting entrepreneurial intention using university student samples (Aparicio et al., 2019; Kautonen, Van Gelderen & Fink, 2015). Some research has fully tested the TPB model and has demonstrated a positive association between entrepreneurial intention and behaviour (e.g., Joensuu-Salo et al., 2020; Kautonen et al., 2013; Kibler et al., 2014; Obschonka et al., 2015). Typically, when adopting the TPB, researchers either apply other theories/models or review related literature to postulate entrepreneurial intention and behaviour links. For example, Meoli et al. (2020) investigated how Italian graduates translate entrepreneurial intention into actual behaviour by utilising the social cognitive career theory (SCCT). Using a sample of 219 German scientists, a longitudinal study by Goethner et al. (2012) found that entrepreneurial intentions do indeed forecast entrepreneurial behaviour, while certain barriers have a diminishing influence on this relationship. Gieure et al. (2020) conjectured that students' entrepreneurial intention directly influences their start-up activity via revisiting relevant literature and verifying it by conducting cross-sectional research with 300 university students.

The preceding description of the theoretical and empirical evidence justifies the argument that entrepreneurial intention significantly predicts start-up behaviour. Thus, this study proposes the following baseline hypothesis:

**H1:** *Student entrepreneurial intention positively predicts their start-up behaviour*

### Previous studies on entrepreneurial intention–behaviour gap

Although intention models have been shown to effectively predict behaviour, evidence of an intention–behaviour gap has also been confirmed in entrepreneurship research (Kautonen et al., 2013; Schlaegel & Koenig, 2014; Van Gelderen et al., 2008). Indeed, previous meta-analytic review studies based on TPB indicate that behavioural intentions, on average, explain 27% (Armitage & Conner, 2001) or 28% (Sheeran, 2002) of variation in a wide variety of human behaviours. Schlaegel and Koenig (2014) conducted a meta-analysis of 98 entrepreneurship studies, revealing that the variance explained by entrepreneurial intention to actual behaviour is estimated to be only 37%. The explanatory power of intention strength on behaviour realisation appears weak, suggesting additional predictors explain the extent of action undertaken (Joensuu-Salo et al., 2020; Van Gelderen et al., 2015). Additionally, Sheeran (2002) advised that intentions predict behaviour far better when the time interval is relatively short; when the desired action is a single and simple activity; and when the predicted behaviour is under strict volitional control. In contrast, venture creation has a long time-lag process in which potential entrepreneurs launch various complex start-up activities in uncertain and risky external conditions (Welter & Kim, 2018). As a result, the intention–action link may be weaker and more intricate in the context of entrepreneurship than in many other domains.

A systematic review positioning the pertinent literature was performed to deepen understanding of how intention translates into behaviour in entrepreneurship research. In total, 28 published empirical papers to date were identified (the detailed description is displayed in Table 1). Specifically, 11 studies, including one qualitative study (Harima et al., 2021), tested the direct entrepreneurial intention–behaviour link. Five papers examined the full model of TPB (Joensuu-Salo et al., 2020; Kautonen et al., 2013; Kautonen, Van Gelderen & Fink, 2015; Obschonka et al., 2015; Rauch & Hulsink, 2015) and one paper (Belchior & Lyons, 2021) employed the SCCT. The remaining four studies investigated the argument on the positive relationship between intention and behaviour by analysing prior empirical studies (Gieure et al., 2020; Goethner et al., 2012; Varamäki et al., 2016; Yi, 2021). Despite the initial application of intentions and TPB in the entrepreneurship context dating back to at least 1993 (Krueger & Carsrud, 1993), the first study to analyse how intentions influence entrepreneurial behaviour was published only in 2012.

Of the initial 28 studies, 17 articles considered moderating factors. Of these 17 studies, only one article still drew on the TPB (Kibler et al., 2014); the remaining 16 papers employed several alternative theories (e.g., action regulation/SCCT/social role theory) or detected the moderators by using an empirical approach. Furthermore, 12 of these 17 studies examined psychological or individual level moderators – for instance, action planning (Gielnik et al., 2014, 2015) and positive fantasies (Gielnik et al., 2014); entrepreneurial competencies (González-López et al., 2021); sex/gender (Shinnar et al., 2018); trait self-control and action-related emotions (Van Gelderen et al., 2015); age-based self-image (Kautonen, Hatak, Kibler & Wainwright, 2015); personal initiative (Johnmark et al., 2016); implementation intention (Van Gelderen et al., 2018); career motivations (Delanoë-Gueguen and Liñán, 2019); proactive personality (Neneh, 2019); or family/friends-based entrepreneurial network (Ruiz-Palomino & Martínez-Cañas, 2021). Interestingly, only 5 of the 17 studies scrutinised how contextual moderators bridge the intention–behaviour gap. In detail, Kibler et al. (2014) and Weiss et al. (2019) investigated the regional-level contextual factors, and how the self-perceived regional social legitimacy of entrepreneurship and regional social capital moderate this gap, respectively. Bogatyreva et al. (2019) focused on the national cultural contexts on entrepreneurial intention–behaviour transition. The most recent study from Meoli et al. (2020) assessed more specific contextual factors (environmental, organisational and relevant others' influences) whilst applying SCCT. In addition to examining

the individual-level moderating impact of age and gender on intentions–behaviour transition in student entrepreneurship, Shirokova et al. (2016), also examined the contextual level moderators: family self-employed background, university entrepreneurial climate, and societal uncertainty avoidance. Given the above description, limited existing research integrating moderating factors primarily examined the contingent role of individual/psychological level in the entrepreneurial intention–behaviour gap, yet evidence of how environmental factors influence intention–behaviour transition remains scarce.

Overall, all of the previously mentioned 28 studies consistently demonstrate a positive relationship between entrepreneurial intention and behaviour, yet the explanatory power of entrepreneurial intention is weak, confirming the existence of potential moderators in this relationship and the possibility of research gaps. Firstly, most research samples (23/28) of the reviewed studies were adopted from Western countries; therefore, more research conducted in other national contexts is needed. Secondly, this review recognises that the literature on understanding the intention–behaviour gap has started to encompass contextual/environmental factors (5/17) from exclusively emphasising the individual level moderators (13/17). The studies included in this literature review sample typically investigated entrepreneurial intention and action gaps amongst samples of university students or within the context of new venture creation (19/28). Despite this focus, Schepers et al. (2021) argued, in their paper, that how students realise their entrepreneurial intentions in a university context remains under-researched and underdeveloped. As such, there is still a need further to examine students' intention–behaviour association from a contextual perspective, especially in the proximal circles or entrepreneurship education and venture creation contexts in which university students daily practise. The following section will elaborate on this proposition further.

### The role of university entrepreneurial offerings in student entrepreneurship

Student entrepreneurship continues to garner attention from policymakers, scholars, and universities since it has been accounted as one potential source of new venture creation. Nonetheless, it is still unknown how the environmental context influences the complex phenomenon of student entrepreneurship. More recently, scholarly discourse on student entrepreneurship has developed that stresses the decisive role of universities' contexts (Bergmann et al., 2016; Haneberg & Aadland, 2020; Morris et al., 2017). Student entrepreneurs may benefit from the university's resources and support framework (Gieure et al., 2020; Politis et al., 2012) and utilise this entrepreneurial system (Longva, 2021) to acquire ideas, resources, social networks and ultimately assist in their venture creations. Those newly created ventures stem from the interaction between university EE and venture creation contexts composed of extra-curricular initiatives and an entrepreneurial ecosystem (Aaboen et al., 2021). Shirokova et al. (2017) articulate that these properly structured and managed contextual offerings can enhance one another in facilitating students' entrepreneurial learning processes. As learning spaces, universities enable students to synthesise entrepreneurial learning gained through the different offerings provided (Williams-Middleton et al., 2020). This study focuses on *entrepreneurial offerings* provided to potential student entrepreneurs through educational courses, extra-curricular activities, and start-up support services available in the university aimed at stimulating entrepreneurial learning and nascent start-up behaviour.

*Entrepreneurial courses/programmes* can be categorised as the formal entrepreneurial learning avenue (Williams-Middleton et al., 2020) and are typically centred on teaching about and for entrepreneurship. They aim to impart theoretical business, management, and entrepreneurial-related knowledge/skills (Piperopoulos & Dimov, 2015) via a traditional lecture or case study approach.

**Table 1**  
Entrepreneurial intention-behaviour research summary.

	Author(s)	DV(s)	IV(s)	Moderators	Samples	Findings
<b>No moderators</b>	Goethner et al. (2012)	EB (binary: participate in founding a firm to commercialise research?)	EI	None	496 Scientists; Cross-sectional (Germany)	EI forecasted EB, while certain barriers have a diminishing influence on this relationship
	Kautonen et al. (2013)	EB (ordinal: not considered starting a business; thinking about it; taking steps; started in the last 3 years)	EI & Antecedents of the TPB	None	117 Working-age population; Longitudinal (Finland)	All the antecedents of TPB were significant predictors of EI; EI and perceived behavioural controls were significant predictors of subsequent EB
	Kautonen, Van Gelderen et al. (2015)	EB (ordinal: the amount of effort, time and money spent for starting a new venture)	EI	None	200 Adult population; Longitudinal (Austria & Finland)	EI significantly predicts subsequent EB
	Obschonka et al. (2015)	EB (binary: started a new venture; otherwise)	Self-identity & EE	None	405 Adult population; Longitudinal (Germany)	Self-identity positively predicts EI, also moderates EI antecedents of the TPB; EI forecasts EB
	Rauch & Hulsink (2015)	EB (measured by the average number of 19 start-up behaviours adopted from PSED & GEM)	EE & EI	None	74 Master students; Longitudinal (Netherlands)	Attending EE positively affects students' EI and EB; EI mediates the relationship between EE and EB
	Varamäki et al. (2016)	Start-up behaviour (binary: started a new venture; otherwise)	EI; Antecedents of the TPB; Gender; Role models	None	272 Graduates; Longitudinal (Finland)	EI, perceived behavioural control measured during studies, and gender positively relate to EB after graduation
	Gieure et al. (2020)	EB (ordinal: a 5-point Likert scale)	Attitudes; EI; Entrepreneurial skills / capacities; Subjective norms	None	300 University students; Cross-sectional (34 countries)	Subjective norms positively influence EI; Entrepreneurial skills positively influence attitudes and subjective norms regarding entrepreneurship; EI positively affects EB
	Joensuu-Salo et al. (2020)	EB (binary: working as an entrepreneur or not)	EI	None	89 Graduates; Longitudinal (Finland)	EI measured during the study significantly explains EB both after 1~3 years and after 6~8 years; Gender and role models are significant factors in predicting EB
	Harima et al. (2021)	EB (procrastination in the EI-EB gap)	EI	None	8 Students & 3 Lecturers; Interview (Germany)	The antecedents for the EI-EB gap; Procrastination as a behavioural response to emerging challenges
	Belchior & Lyons (2021)	Nascent EB: business created (binary: had start-up activity/started intended business or not)	Self-efficacy (ESE); Outcome expectations (EOE); EI	None	1149 college students; Cross-sectional & Longitudinal (Portugal)	ESE and EOE positively predict students' EI; EI explains nascent EB; ESE and EOE do not add to EI's ability to predict nascent EB
	Yi (2021)	Green EB (GEBs) (ordinary: 5 start-up activities from GEM & PSED)	Green EI (GEI)	None	586 university graduates; Cross-sectional (China)	GEI positively impacts GEBs; University entrepreneurial and external support positively mediate GEI and GEBs gap
<b>Individual level moderators</b>	Gielnik et al. (2014)	New venture creation (NVC) (binary: started intended business or not)	EI; Positive fantasies; Action planning	Action planning; Time	96 Entrepreneurs; Longitudinal (Uganda)	EI positively affects NVC; Action planning moderates the effects of EI and positive fantasies on NVC, these effects become weaker over time
	Gielnik et al. (2015)	Entrepreneurial action (binary: put effort into 35 start-up activities or not; currently, the owner of a business or not)	Action-based entrepreneurship training & EI	Entrepreneurial action (EA)	384 T1&T2, 304 at T3 university students; Longitudinal (Uganda)	Training has positive effects on action-regulatory factors, those factors mediate the relationship between training and EA; EA and business opportunity identification mediate training and NVC
	González-López et al. (2021)	Gestation EB (binary: 19 gestation behaviours from Rauch & Hulsink (2015))	EI & Entrepreneurial competencies	Entrepreneurial competencies	227 final year undergraduate students majoring in Business; Longitudinal (Spain)	EI and competencies are positively related to subsequent gestation EB; Entrepreneurial competencies moderate EI and gestation EB transition
	Kautonen, Hatak et al. (2015)	EB (ordinal: the amount of the effort, time, and money spent for starting a new venture)	EI	Age-based self-image	672 Adult population; Longitudinal (Finland)	EI positively predicts EB; An individual's age-based self-image positively moderates the EI-EB link
	Van Gelderen et al. (2015)	Entrepreneurial action taking (ordinal: the amount of effort, time, and money spent for starting a new venture)	EI	Trait self-control; Action-related emotions (doubt/fear/aversion)	161 Random samples; Longitudinal (Finland)	EI positively predicts EB; Self-control positively moderates the relationship between EI and action and countered the rise of action-related fear, doubt, aversion

(continued on next page)



Table 1 (Continued)

	Author(s)	DV(s)	IV(s)	Moderators	Samples	Findings
	Adam & Fayolle (2016)	Entrepreneurial actions (ordinal: the total number of actions done during venture creation)	Goal intention	Implementation intention (II)	18 Undergraduates; Longitudinal (France)	From observations: forming II increases the probability and the speed for intended entrepreneurs to actually become entrepreneurs
	Johnmark et al. (2016)	Entrepreneurial actions (ordinal: 15 action statements)	EE & EI	Personal initiative (proactiveness/ resilience/innovation)	206 Disabled university students; Cross-sectional (Nigeria)	Pedagogy positively influences EI and actions; Personal initiative positively moderates the EI-EB relationship
	Shinnar et al. (2018)	EB (ordinal: 0=doing nothing; 1= taking steps; 2=started a business)	EI	Sex	179 University students; Longitudinal (US)	EI positively affects EB; Sex moderates this effect; Men are more likely to start-up than women
	Van Gelderen et al. (2018)	Entrepreneurial action taking (ordinal: average of weekly time spent and action progress made for business creation)	Goal intention strength	Implementation intention (II)	422 Random samples; Longitudinal (Sweden)	II mediates goal intention and entrepreneurial action; Goal intention strength moderates IIs and entrepreneurial action
	Delanoë-Gueguen and Liñán (2019)	EB (binary: have you been involved in a start-up project /as a member of the management team or not)	EI	Career motivations (promotion/ prevention-related motivations)	155 University students; Longitudinal (France)	Promotion-related motivations positively affect EI and EB; Prevention-related motivations negatively affect EI, also weaken the EI-EB link
	Neneh (2019)	Scope of start-up activities (measured by 10 start-up activities adopted from GEM & PSED)	Trait competitiveness; Entrepreneurial alertness; EI	Proactive personality	533 University students; Cross-sectional (South Africa)	Entrepreneurial alertness and trait competitiveness positively influence EI; EI and proactive personality positively affect EB; Proactive personality positively moderates the EI-EB link
	Ruiz-Palomino & Martínez-Cañas (2021)	Start-up phase (categorical: at what phase is your venture creation idea? 1= never thought about, 5= has decided, will start shortly)	Opportunity recognition & EI	Family-based/ Friends-based entrepreneurial network	616 University students; Cross-sectional (Spain)	EI partially mediates opportunity recognition and the start-up phase; The start-up phase via EI is stronger when someone's family member or friend is operating a business
Contextual level moderators	Kibler et al. (2014)	EB (ordinal: the amount of the effort, time, and money spent for starting a new venture)	EI & Antecedents of the TPB	Regional social legitimacy	984 Working population; Longitudinal (Austria & Finland)	Social legitimacy positively moderates attitude-EI and EI-EB links, negatively moderates perceived behavioural control-EB link
	Bogatyreva et al. (2019)	EB (binary: are you trying to start your own business /to become self-employed" or "are you running your own business?)	EI	Cultural dimensions	1434 University students from GUESSS 2011& 2013/2014; Cross-sectional (7 European countries & Brazil, Singapore)	EI positively relates to EB; Power distance, uncertainty avoidance, long-term orientation, and indulgence negatively moderate the EI-EB transition, masculinity strengthens this transition
	Weiss et al. (2019)	Scope of start-up activities (measured by 10 start-up activities adopted from GEM & PSED)	EI	Regional social capital	663 University students from GUESSS 2013 /2014 & 2016; Cross-sectional (7 European countries)	EI predicts EB; Regional cultural diversity, breadth of associational memberships, and interpersonal trust are positive moderators, and the regional hierarchy values are negative moderators in the EI-EB link
	Meoli et al. (2020)	New venture creation (binary: started intended business or not)	EI	Relevant others'; Environmental/ Organisational influences	20,754 Graduates; Longitudinal (Italy)	EI positively affects EB; Relevant others' & Organisational influences positively moderate; environmental influences negatively moderate this effect
Multiple moderators	Shirokova et al. (2016)	Scope of start-up activities (measured by 10 start-up activities adopted from GEM & PSED)	EI	Family background; Gender; Age; University entrepreneurial climate; Uncertainty avoidance	70,164 University students from GUESSS 2013/2014; Cross-sectional (34 Countries)	EI positively affects EB; Family background, age, and university entrepreneurial climate are positive moderators, gender is a negative moderator for the EI-EB transition

Notes: IV & DV = Independent & dependant variable; EI = Entrepreneurial intention; EE = Entrepreneurship education; EB = Entrepreneurial behaviour; TPB = Theory of Planned Behaviour; PSED = Panel Study of Entrepreneurial Dynamics; GEM = Global Entrepreneurship Monitor; GUESSS = Global University Entrepreneurial Spirit Students' Survey.

Empirical studies examining the learning outcomes of attending entrepreneurial courses/programmes shed light on the effectiveness of these approaches. For example, when examining an entrepreneurial master programme using TPB, Rauch and Hulsink (2015) found positive changes in attendees' entrepreneurial attitudes, perceived behavioural control, and subsequent entrepreneurial behaviour. Entrepreneurship courses could also help students increase awareness about entrepreneurship (Von Graevenitz et al., 2010) or provide the required knowledge and necessary skills for entrepreneurship (Oosterbeek et al., 2010). Gieure et al. (2020) examined the proposition that entrepreneurial skills acquired from courses play a critical role in driving students toward business creation. Overall, it appears that entrepreneurial courses positively contribute to student human capital development and facilitate knowledge accumulation (Volery et al., 2013). These are considered crucial for successful business creation and are frequently assessed through educational levels and entrepreneurial and management abilities (Grichnik et al., 2014). Besides, the knowledge, skills, and experience acquired from attending entrepreneurship-related courses provide students with opportunities to access venture resources. Specific start-up tasks, such as discovering new business opportunities, customer interviews, or business plan writing, may be required to fulfil the entrepreneurship course requirements (Shirokova et al., 2018). These advanced qualifications and skills may facilitate aspiring student entrepreneurs' intention realisation and expansion of their subsequent venture-related activities.

Extra-curricular activities/programmes offer students a practical learning context outside formal courses (Poczek et al., 2022) and complement their provision (Preedy et al., 2020). They commonly include business plan competitions, maker space opportunities, start-up clubs, and guest speaker events. The pedagogy underpinning these endeavours draws predominantly from experiential learning (Fayolle & Gailly, 2015), whereby the student can apply theory and content learned in the classroom (Kolb, 2014). Evidence suggests that students engaging in experiential learning activities attain venture creation and enterprising competencies, skills, and capabilities (Poczek et al., 2022), which lead to greater involvement in early nascent behaviours (González-López et al., 2021). For example, Longva (2021) and Watson et al. (2018) examined business planning competitions. Both studies concluded that these develop participants' social networking skills and are essential in the transformation of business ideas into real ventures (Stuart & Sorenson, 2003). Students can gain hands-on knowledge and foster entrepreneurial activity by engaging in entrepreneurship clubs (Pittaway et al., 2015). Preedy et al. (2020) found that extra-curricular activities provide students with a platform for experiential, social, and self-directed learning, generating values such as skills development, knowledge acquisition, personal growth, and practising entrepreneurial activity. Besides, the above-described learning outcomes could enable students to build their "social capital" reservoir. Davidsson and Honig (2003, p. 309) argued that social capital assists nascent entrepreneurs "by exposing them to new and different ideas, and world views, in effect, providing them with a wider frame of reference both supportive and nurturing to the new potential idea or venture". As such, social capital obtained via participating in extra-curricular activities could potentially contribute to the intention-behaviour transition in student entrepreneurship.

Universities arrange student entrepreneurial learning offerings and start-up support/services incorporating financial (Morris et al., 2017) and structural assistance for facilitating start-up activities (Hasche & Linton, 2021). Financial assistance inspires students to develop entrepreneurial skills, pursue new business ideas and is essential for enabling the new venture creation process (Stuart & Sorenson, 2003), including product design and acquiring equipment. This is partly why universities globally endorse business plan contests (Shirokova et al., 2016) in which successful concepts and entrepreneurs receive financial benefits. Non-financial assistance

primarily encompasses incubation/maker space facilities and mentoring/consulting centres supporting the progression of students' start-up ideas at different phases (Nielsen & Lassen, 2012). Within these variously named and proposed physical spaces, students gain access to technology and equipment, experience entrepreneurship, test prototypes, and develop relevant connections that may provide entrance to critical resources essential for business start-ups (Meoli et al., 2020). The students may also develop "know-how" and "know-why" abilities (Haase & Lautenschläger, 2011) for the precise assessment of the necessary factors for successful start-up accomplishment. Additionally, university mentoring/consulting centres provide students with opportunities to consult/discuss with entrepreneurship educators, mentors, and peers (Pittaway et al., 2015). Those could be role models and provide exposure to diverse networks, professional consulting, information, and legitimacy, which could reinforce students' reflection on particular issues, actions and developmental steps resulting in their venture creation.

In summary, when considering the effectiveness of university entrepreneurial offerings, we suggest that students who are involved in different university EE initiatives and activities and participate in the various venture creation contexts may be more likely to translate their entrepreneurial intention into actual behaviour; this leads to the subsequent hypotheses:

**H2a:** *The positive relationship between student entrepreneurial intention and start-up behaviour will be stronger for aspiring student entrepreneurs with a higher involvement level in university entrepreneurial courses.*

**H2b:** *The positive relationship between student entrepreneurial intention and start-up behaviour will be stronger for aspiring student entrepreneurs with a higher involvement level in university extra-curricular activities.*

**H2c:** *The positive relationship between student entrepreneurial intention and start-up behaviour will be stronger for aspiring student entrepreneurs who received university start-up support than students without such support.*

Fig. 1 outlines the conceptual framework and hypotheses relying upon the hypothetical relationships amongst the research variables discussed earlier. It also features directional relationships as specified by arrows.

## Methods

### Samples

Samples for the present study were selected from three universities situated in southeast China (University A in Guangdong province; Universities B and C in Zhejiang province). These two provinces were chosen because they have favourable entrepreneurial climates and infrastructure for the creation and growth of small-sized businesses, resulting in the highest entrepreneurship rates of Chinese graduates (Zhang, 2018). "Entrepreneurship fundamentals" and "Know your business" courses were mandatory for all first-year students in University A and B, whilst students majoring in "Business and Management" at University C were required to enrol in entrepreneurship-related courses. In particular, all three universities strongly promoted students to participate in entrepreneurial extra-curricular activities and become self-employed. Thus, most of the participants were either enrolled in entrepreneurship-related courses or engaged in extra-curricular activities with high entrepreneurial enthusiasm. This purposefully selected sample composition may have reduced the deviation commonly evident in the majority of samples attending elective entrepreneurship courses and training programmes (Fayolle & Gailly, 2015).

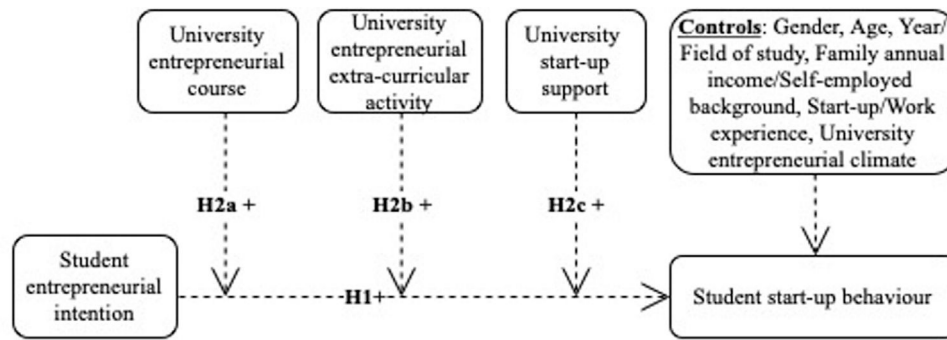


Figure 1. Conceptual framework and hypotheses.

Respondents were either undergraduate students (with first-year students being excluded because of their unfamiliarity with university entrepreneurial offerings) or alumni who had graduated within the last five years (because they were still eligible to exploit start-up resources provided by their universities), regardless of their disciplines or whether they were nascent entrepreneurs. University students and recent graduates were chosen for several reasons. According to prior research, many entrepreneurs develop their intentions and begin business gestation activities during their relatively young life stage, driven by their entrepreneurial attitude towards self-employed career choices (Edelman et al., 2016; Fuller et al., 2018). Furthermore, student-led start-ups are more numerous and of a higher quality than faculty-led spin-offs (Astebro et al., 2012). Nevertheless, there is limited research on student entrepreneurship and its interplay with the university entrepreneurship contexts (Bergmann et al., 2016; Beyhan & Findik, 2018). This led to students being chosen as samples for this study.

In this study, student entrepreneurial intention and nascent start-up behaviour were measured concurrently, similar to previous research (e.g., Gieure et al., 2020; Neneh, 2019; Shirokova et al., 2016; Yi, 2021). Sutton (1998) claims that intentions vary over time and that the distal measure of intentions is less effective in determining behaviour when compared with more proximal measurements. As a result, the longer the time between measuring intention and behaviour, the more likely the emergence of unexpected events that could result in changes in intention (Shirokova et al., 2016). Data were gathered in the timeframe between September 2019 to December 2019. In total, 2350 questionnaires were sent out, and 1920 of them were returned (604, 695, and 621 questionnaires collected from the three institutions), representing an approximate 82% response rate. After diagnosing missing values, the final dataset comprised 1820 valid responses for further analysis.

## Measures

**Dependant variable:** Start-up behaviour is typically defined by an individual's interactions, activities, and achievements when establishing a new business (Gartner et al., 2004). According to entrepreneurial scholars, the formation of any organisational structure involves a series of nascent start-up activities (Carter et al., 1996; Gartner et al., 2004). Therefore, the nascent start-up behaviour scale is constructed by a series of start-up activities that intentional entrepreneurs potentially undertake to create their new ventures. The list of start-up activities is primarily based on the scales of the "Panel Study of Entrepreneurial Dynamics" (PSED, Reynolds & Curtin, 2008) and the "Global University Entrepreneurial Spirit Students' Survey" (GUESSS, Sieger et al., 2014). These two measurements were selected because of their broad range of listed items and extensive usage in the research field (e.g., Edelman et al., 2016; Gimenez-Jimenez et al., 2020; Morris et al., 2017). Some start-up activities from those two

scales were removed due to their irrelevance to the Chinese context (e.g., acquired federal employed identifications; filed initial federal tax return; know that Dun & Bradstreet establishing listing), nascent student entrepreneurs' demographics (e.g., arranged for childcare, household help; joined a trade association), and overlaps with the independent variables (e.g., took classes or workshops; took part in a business plan/start-up competition; used physical space, such as incubation and marker space). As a result, the final questionnaire was composed of 19 items (see Appendix A). Students were asked to identify their start-up status and reflect on the start-up activities they had engaged in throughout their start-up process at the university or within five years of graduation. Drawn from Gielnik et al. (2014) and Shirokova et al. (2016), this variable was determined as the sum of the start-up activities that a student had completed throughout the venture creation phase, divided by the total number of start-up activities on the list.

**Independent variable:** Student entrepreneurial intention was measured using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) adopted from Liñán and Chen, (2009). This examined participants' responses to six statements ("I am ready to do anything to be an entrepreneur"; "My professional goal is to become an entrepreneur"; "I will make every effort to start and run my own firm"; "I am determined to create a firm in the future"; "I have very seriously thought of starting a firm"; "I have the firm intention to start a firm someday"). The Cronbach's alpha of this scale was 0.954; In this multiple-item variable, the results were summed up to generate an average score.

**Moderators:** The university entrepreneurial offerings constitute three components: university entrepreneurial courses, extra-curricular activities, and start-up support. Research findings from Lyu et al. (2021) state that university entrepreneurial courses in Chinese universities place a strong focus on teaching about and for entrepreneurship by conveying theoretical entrepreneurial knowledge and abilities. Participants were instructed to reveal the entrepreneurship-related courses they took throughout their university studies, which included the following: (1) entrepreneurship fundamentals; (2) entrepreneurial venture management; (3) financing entrepreneurial ventures; (4) technology entrepreneurship; (5) social entrepreneurship; (6) entrepreneurial marketing; (7) innovation and idea generation; (8) business planning; (9) entrepreneurship project evaluation; (10) start your business; (11) know your business; (12) entrepreneurial mindset and team build; (13) e-commerce entrepreneurship; (14) laws and regulations on entrepreneurship; (15) other.

University extra-curricular activities are centred on teaching through or in entrepreneurial concepts and experiential learning outside of standard courses (Poczek et al., 2022), involving: (1) seminars/lectures/workshops given by experienced entrepreneurs; (2) business plan competitions; (3) start-up internships; (4) incubator/maker-space/science park entrepreneurship-related activities; (5) mentoring and coaching programmes for student entrepreneurs; (6)

**Table 2**  
Descriptive statistics.

Variable	Mean	SD	Min	Max	Frequencies*	
					Categories	Percent
Dependant variable						
Start-up activities index	0.01	0.13	0	1		
Controls						
Gender	1.54	0.50	1	2	Male / Female	46.3 / 53.7
Age	2.00	0.12	1	4		
Grade	2.03	0.80	1	4	Year 2 / 3 / 4 / Graduates	27.1 / 46.4 / 23.1 / 3.4
Major	2.28	1.00	1	4	Social Science	23.1
					Science & Engineering	43.1
					Agriculture & Forestry	16.8
					Business & Management	17.0
Family annual income	2.56	1.12	1	4		
Family self-employed	0.54	0.50	0	1	Yes / No	54.3 / 45.7
Start-up experience	0.05	0.22	0	1	Yes / No	4.9 / 95.1
Work experience	0.33	0.47	0	1	Yes / No	32.9 / 67.1
Entrepreneurial climate	4.45	1.28	1	7		
Independent variable						
Entrepreneurial intention	3.57	1.46	1	7		
Moderators						
Entrepreneurial course	1.25	1.81	0	15		
Entrepreneurial extra-curricular activity	0.69	1.51	0	13		
Start-up support	0.56	1.47	0	1	Yes / No	18.1 / 81.9

Notes: n=1820. SD=standard deviation. \*Categorical variables only.

speaker series in entrepreneurship clubs; (7) start-up business games and simulations; (8) entrepreneurship and innovation fair week; (9) college student entrepreneurship alliance programme; (10) start-up overseas cooperation projects; (11) career planning competition; (12) entrepreneur alumni forum; (13) other. The sum of the items stated by the students was used to determine the values of both *entrepreneurship courses* and *extra-curricular activities* (Morris et al., 2017; Shirokova et al., 2018).

*University start-up support* encompasses the financial and non-financial help given to aspiring student entrepreneurs to assist them in launching a new business. Start-up support includes equity and non-equity investments; interest-free loans; small grants/awards/subsidies; taxation exemptions; access to the equipment service, such as incubation/science park/maker space; information/legitimacy/trust law consulting centre; flexible length of schooling and start-up leave; application for bachelor's degree with their start-up achievement. *Start-up support* was measured dichotomously and coded as "1" if the student entrepreneurs had received any of the above-mentioned start-up support; otherwise, it was coded as "0". Three interaction terms were generated by multiplying the entrepreneurial intention with each type of university entrepreneurial offering.

**Controls:** To achieve internal validity and avoid confounding the postulated relationships, this study controlled a set of factors established by previous research to possibly predict both independent and dependant variables. Control variables are *gender* (Shinnar et al., 2018) (dummy variable, coded as "1" for male and "2" for female), *age* (Shirokova et al., 2016) (numeric variable ranged from years 18 to 30), *grade* (Marques et al., 2018) (categorical variable, coded sophomore – "1", junior – "2", senior – "3" or graduates within 5 years – "4"), *major* (Sieger et al., 2014) (coded "1", "2", "3", "4" respectively if students majoring in "Social Sciences", "Science and Engineering", "Agriculture and Forestry", "Business and Management"), *family annual income* (Rodriguez et al., 2009) (coded as "1", "2", "3", "4" according to students' self-reported family annual income ranged from less than 50,000 to over 150,000 RMB), *family self-employed* (Edelman et al., 2016; Marques et al., 2018) (dummy variable, coded as "1" if the parents or immediate family members were self-employed or had ever been self-employed, and "0", otherwise), *prior start-up* (Morris et al., 2017) and *work experience* (Grilli, 2011).

Participants were asked: "did you have any *start-up* or *work experience* before you entered the university?" (dummy variable, coded as "1" if the student reported any start-up or work experience prior to completing the questionnaire, and "0" otherwise).

Finally, utilising the items developed from Franke and Lüthje, (2004), a 7-point Likert scale was structured to quantify the *university entrepreneurial environment*. The participants rated how much they agreed with the respective points: "the atmosphere at my university inspires me to develop ideas for new businesses"; "there is a favourable climate for becoming an entrepreneur at my university"; and "at my university, students are encouraged to engage in entrepreneurial activities". Cronbach Alpha for this scale was 0.842. The resulting values for this multiple-item variable were totalled as an average score.

### Statistical analysis

Descriptive statistics (means, standard deviations (SD), and frequencies) and pairwise correlations are displayed in Tables 2 and 3. Of the 1820 participants surveyed in this sample, the majority ( $n = 1358$ , 74.62%) had never performed any business creation activities. A total of 462 (25.38%) students declared to have participated in at least one start-up activity. Out of these 462 participants, 1.52% had completed 10 start-up steps, and 0.43% had completed all 19 start-up activities available. Amongst the respondents, an estimated 98.6% were between the ages of 18 and 25, with 53.7% female. Students were mainly in their second, third and fourth years of undergraduate studies (96.6%), with a small number of alumni (3.4%). The field of study the students majored in varied (23.3% 'Social Science', 43.1% 'Science and Engineering', 16.8% 'Agriculture and Forestry', and 17.0% 'Business and Management'). Approximately 54.3% of the students came from a family with a business background; 32.9% possessed work experience, while only 4.9% had acquired prior start-up experience. Regarding university entrepreneurial activities, 57.4% of the students enrolled in at least one entrepreneurship course and 28.6% partook in a minimum of one extra-curricular initiative. Approximately 18.1% of the participants received one or more types of start-up assistance throughout their businesses' inception and development stages.

To detect possible bias before evaluating the hypotheses, multicollinearity and common method bias (CMB) were addressed initially.



**Table 3**  
Correlation matrix.

N	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Start-up activities index	1.000													
2	Gender	-0.051*	1.000												
3	Age	.097**	-0.050*	1.000											
4	Grade	-0.053*	-0.182**	.060*	1.000										
5	Major	.063**	-0.025	0.025	-0.154**	1.000									
6	Family annual income	.071**	.067**	.079**	0.018	-0.107**	1.000								
7	Family self-employed	.149**	0.038	-0.003	-0.097**	-0.030	.169**	1.000							
8	Start-up experience	.321**	-0.045	.092**	-0.018	-0.004	.052*	.116**	1.000						
9	Work experience	.125**	0.019	.046*	-0.047*	-0.005	-0.017	.091**	.204**	1.000					
10	Entrepreneurial climate	.106**	0.013	.059*	-0.009	0.014	0.019	.074**	.065**	0.043	1.000				
11	Entrepreneurial intention	.279**	-0.151**	0.039	0.005	0.013	.068**	.145**	.163**	.104**	.394**	1.000			
12	Entrepreneurial course	.382**	-0.017	.073**	-0.127**	.277**	0.026	.099**	.228**	.072**	.076**	.166**	1.000		
13	Entrepreneurial extra-curricular activity	.479**	.049*	.054*	-0.168**	.149**	.064**	.138**	.304**	.105**	.145**	.221**	.389**	1.000	
14	Start-up support	.377**	0.029	0.023	-0.088**	.144**	0.026	.110**	.205**	.115**	.096**	.154**	.336**	.487**	1.000

Notes:  $n=1820$ . \* $p<.05$ , \*\* $p<.01$ . All reported significance levels at 2 tails.

Amongst the analysed constructs, the strongest correlation was detected at 0.487 between university entrepreneurial extra-curricular activities and start-up support (see Table 3). This value is significantly lower than the cut-off value of 0.80 (Tabachnick et al., 2007) and represents only 23.72% of the shared variance. Furthermore, the variance inflation factor (VIF) estimates for the regression model with main effects were within the specified range (average VIF = 1.462, maximum VIF = 2.238), eliminating any concerns regarding potential multicollinearity. The relationship results between variables delivered by self-reported measurements are generally determined to be exaggerated because of the CMB (Chang et al., 2010; Conway & Lance, 2010). As the collected constructs in this study are similarly reliant on self-reported measurements from the participants, the study results may also be tainted by CMB. Consequently, this possible bias was statistically evaluated. Exploratory Factor Analysis (EFA) in STATA 15 was used to employ Harman's statistical (single-factor) test. EFA identified four factors with eigenvalues of more than one, with 28.55% (<50%) component variance described by the first factor (Podsakoff & Organ, 1986). Additionally, Confirmatory Factor Analysis (CFA) was performed by implementing all components into one measurement model; the model fit indices mostly fail to fulfil the good fit criteria. As a result, it is determined that CMB does not appear to skew the research findings in this study.

A hierarchical Ordinary Least Square (OLS) regression was specified, employing the STATA 15 application to examine the hypothetical model. To eliminate potential collinearity, variables associated with the interaction terms were mean-centred by subtracting the mean from each value before completing the regression (Aiken & West, 1991). In the first step of the hierarchical OLS analysis, only the control variables (Model I) were included; in the second step, student entrepreneurial intention was introduced as an independent measure (Model II); in the third step, university entrepreneurial courses, extra-curricular activities, and start-up support were measured as moderators (Model III); and lastly, interaction terms generated by three moderating variables and entrepreneurial intention were incorporated sequentially in Model IV~Model VI. The OLS regression results are presented in Table 4.

## Results

### Main analytical results

The impact of the control variables on nascent start-up activities is displayed in the result pattern of Model I (Table 4). Gender shows a negative relationship with start-up activities ( $b = -0.017$ ,  $p < 0.01$ ), suggesting that more start-up activities are embarked on by male nascent student entrepreneurs than their female counterparts. In the

following models, the findings were similar but statistically insignificant. The age coefficient was 0.063 ( $p < 0.01$ ), suggesting that age positively predicts venture creation actions. These results were replicated in the following models. The coefficient of the students' grades was -0.003, but it is not statistically significant. 'Social Sciences' was set as the reference category. The students majoring in this category showed a lower rate of initiating start-up activities than students from 'Business and Management'. However, they demonstrated a wider range of start-up activities than students majoring in the other two categories, 'Science and Engineering' and 'Agriculture and Forestry', even though the coefficients are not always statistically significant. Students' family annual income was unconnected to the start-up actions. Family entrepreneurial background ( $b = 0.024$ ,  $p < 0.001$ ) and previous start-up experience ( $b = 0.167$ ,  $p < 0.001$ ) showed a positive relationship to their start-up activities. Throughout all models, these findings remained statistically significant. The coefficient for work experience was 0.014 ( $p < 0.01$ ), which shows that students with prior work experience are more inclined to start a business; however, this relationship turned statistically insignificant after adjusting for moderators and interaction terms. University entrepreneurial climate showed a positive connection with student start-up activities ( $b = 0.006$ ,  $p < .001$ ); however, this association became non-significant and negative in the subsequent models.

The main effect of students' entrepreneurial intention examined in Model II exhibited a statistically expected relationship with their start-up activities ( $b = 0.019$ ,  $p < 0.001$ ), suggesting that the higher entrepreneurial intention students possessed, the more start-up activities were launched. This finding was kept steady in all the other models. **Hypothesis 1** was thus accepted. The intention to create a new venture was positively correlated with start-up activities, as displayed in the correlation matrix in Table 3 ( $r = 0.279$ ,  $p < 0.01$ ), which also implies that **Hypothesis 1** was supported. However, the explained variance of entrepreneurial intention's effect in start-up activities was 7.784%, representing possible moderating predictors that remain to strengthen or hamper the intention-behaviour translation in potential student entrepreneurs. Consequently, the following regression models verified the moderating effects of university entrepreneurial offerings on student entrepreneurial intention and start-up behaviour conversion.

As revealed in Model III, the number of university entrepreneurial courses positively predicts student start-up activities ( $b = 0.013$ ,  $p < 0.001$ ), suggesting that the more the students enrolled in entrepreneurship-related courses, the broader the scope of start-up activities index they undertook was. Similarly, university entrepreneurial extra-curricular activities had a statistically significant and positive relationship ( $b = 0.023$ ,  $p < 0.001$ ) with the start-up activities of nascent student entrepreneurs. This suggests that the higher the

**Table 4**  
Regression models on student start-up activities.

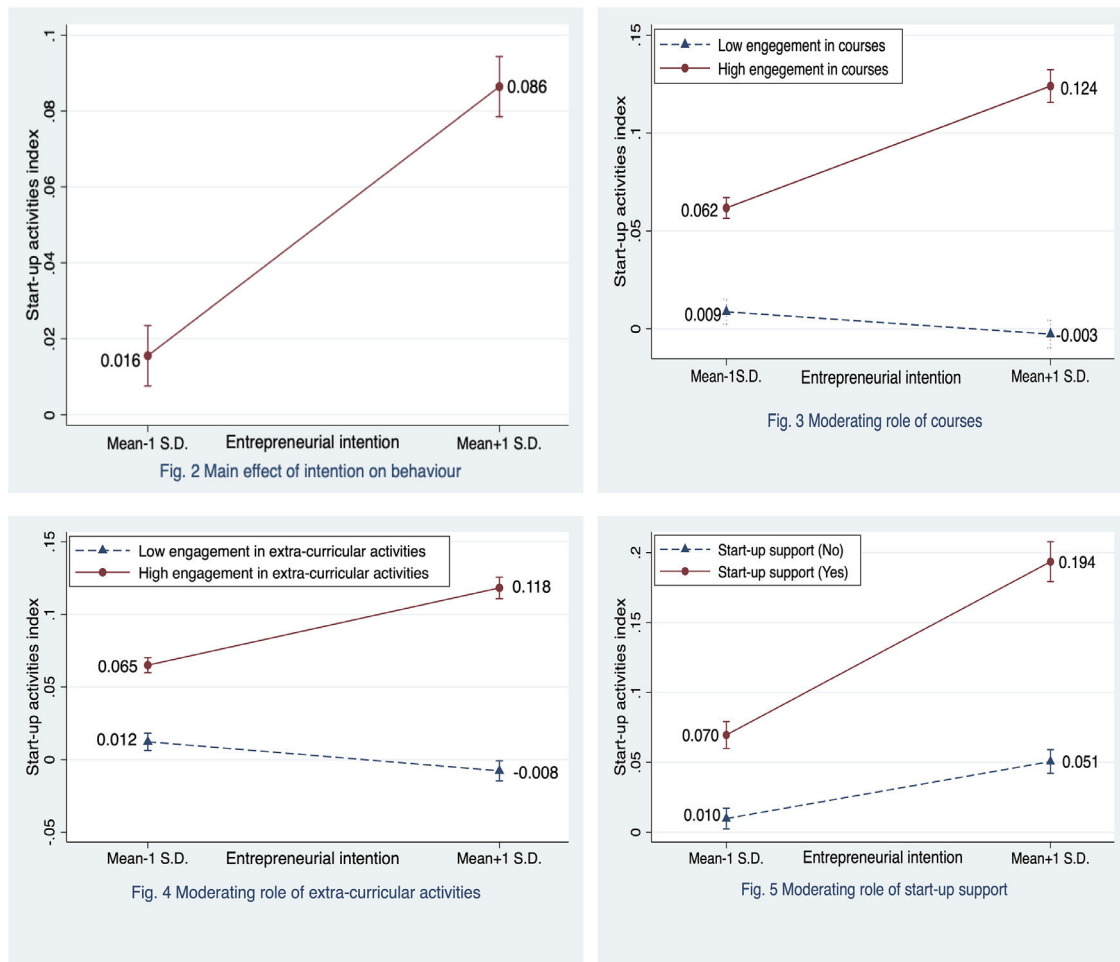
Variables Dependant variable	Model I	Model II	Model III OLS regression on start-up activities index	Model IV	Model V	Model VI	Model VII OLS full model	Model VIII Logit (binary outcomes)
<i>Controls</i>								
Gender (Female)	-0.017** (0.006)	-0.009 (0.006)	-0.012* (0.005)	-0.010 (0.005)	-0.011* (0.005)	-0.012* (0.005)	-0.010 (0.005)	.094 (0.145)
Age	.063** (0.024)	.065** (0.023)	.049* (0.021)	.044* (0.021)	.050* (0.021)	.048* (0.021)	.045* (0.021)	-0.305 (0.583)
Grade	-0.003 (0.004)	-0.003 (0.004)	.004 (0.003)	.003 (0.003)	.004 (0.003)	.004 (0.003)	.003 (0.003)	-0.248** (0.089)
Major								
Science & Engineering	-0.009 (0.008)	-0.012 (0.008)	-0.015* (0.007)	-0.013* (0.007)	-0.014* (0.007)	-0.015* (0.007)	-0.013* (0.007)	-0.073 (0.189)
Agriculture & Forestry	-0.012 (0.009)	-0.011 (0.009)	-0.023** (0.008)	-0.022** (0.008)	-0.023** (0.008)	-0.024** (0.008)	-0.022** (0.008)	.151 (0.222)
Business & Management	.029** (0.009)	.026* (0.009)	-0.015 (0.008)	-0.013 (0.008)	-0.012 (0.008)	-0.015 (0.008)	-0.012 (0.008)	.296 (0.210)
Family annual income	.004 (0.003)	.003 (0.003)	.001 (0.002)	.001 (0.002)	.001 (0.002)	.001 (0.002)	.001 (0.002)	.061 (0.061)
Family self-employed (Y)	.024*** (0.006)	.019*** (0.006)	.010* (0.005)	.010* (0.005)	.010* (0.005)	.010* (0.005)	.010* (0.005)	.282* (0.137)
Start-up experience (Y)	.167*** (0.013)	.153*** (0.013)	.078*** (0.012)	.071*** (0.012)	.073*** (0.012)	.075*** (0.012)	.070*** (0.012)	.886** (0.315)
Work experience (Y)	.014* (0.006)	.010 (0.006)	.006 (0.005)	.008 (0.005)	.007 (0.005)	.007 (0.005)	.008 (0.005)	.318* (0.139)
Entrepreneurial climate	.006** (0.002)	-0.002 (0.002)	-0.004 (0.002)	-0.004* (0.002)	-0.004 (0.002)	-0.004* (0.002)	-0.005* (0.002)	-0.063 (0.058)
<i>Independent variable</i>								
Entrepreneurial intention (EI)		.019*** (0.002)	.012*** (0.002)	.013*** (0.002)	.013*** (0.002)	.010*** (0.002)	.012*** (0.002)	.393*** (0.060)
<i>Moderators</i>								
Entrepreneurial course			.013*** (0.002)	.010*** (0.002)	.013*** (0.002)	.013*** (0.002)	.011*** (0.002)	.239*** (0.040)
Entrepreneurial extra-curricular activity			.023*** (0.002)	.021*** (0.002)	.018*** (0.002)	.022*** (0.002)	.019*** (0.002)	.367*** (0.060)
Start-up support (Y)			.044*** (0.007)	.046*** (0.007)	.046*** (0.007)	.041*** (0.007)	.045*** (0.007)	1.337*** (0.168)
<i>Interactions</i>								
EI*Entrepreneurial course				.006*** (0.001)			.005*** (0.001)	-0.014 (0.027)
EI*Entrepreneurial extra-curricular activity					.004*** (0.001)		.002 (0.001)	-0.016 (0.038)
EI*Start-up support						.014** (0.004)	.006 (0.005)	-0.073 (0.112)
Constant	-0.095 (0.049)	-0.094* (0.048)	-0.060 (0.043)	-0.051 (0.042)	-0.064 (0.043)	-0.057 (0.043)	-0.053 (0.042)	-1.043 (1.191)
F	27.76 (11, 1808)***	33.41 (12, 1807)***	63.48 (15, 1804)***	62.60 (16, 1803)***	60.68 (16, 1803)***	60.51 (16, 1803)***	55.97 (18, 1801)***	
Pseudo R <sup>2</sup>	0.145	0.182	0.346	0.357	0.350	0.349	0.359	.282

Notes: n=1820. Regression coefficients are reported (standard errors are in parentheses).  
Prob>F=0.000 for all models, all models are statistically significant; \*p<.05, \*\*p<.01, \*\*\*p<.001.  
In Model I~Model VI, Independent variable and Moderators are mean-centred.

number of university entrepreneurial extra-curricular activities student entrepreneurs participated in, the greater the scope of their start-up activities was. University start-up support was also positively associated with student start-up activities ( $b = 0.044$ ,  $p < 0.001$ ). These results were essentially stable across subsequent model specifications (Models II~VI). Model IV~VI tested **Hypotheses 2a~c** sequentially. Results show that engaging in university entrepreneurial courses undoubtedly moderates the positive effect of entrepreneurial intention in student start-up activities ( $b = 0.006$ ,  $p < 0.001$ ). Likewise, taking part in university entrepreneurial extra-curricular activities can facilitate students' entrepreneurial intention and start-up behaviour transition ( $b = 0.004$ ,  $p < .001$ ). Finally, the interaction effect between receiving start-up support and entrepreneurial intention positively and statistically significantly affects start-up activities ( $b = 0.014$ ,  $p < 0.01$ ). Accordingly, **Hypotheses 2a~c** were confirmed. Noticeably, the Pseudo R<sup>2</sup> increased substantially in Model II~VI (up to 35.70%) upon the baseline model I (14.50%) by

including main and interaction terms, denoting an effectively explained variance of moderating factors on start-up behaviour other than entrepreneurial intention. In other words, what students learn from engaging in university entrepreneurial offerings can accelerate the transformation of their entrepreneurial intention to actual start-up behaviour.

To further interpret the significant outcomes (at  $p < 0.05$  or greater), the marginal effect of entrepreneurial intention and university entrepreneurial offerings on the start-up activities index was calculated and plotted using one standard deviation above and below the mean to achieve high and low levels of the independent and moderating variables (Aiken & West, 1991). For graphing the moderating effect of start-up support, the slopes based on two situations were plotted, either duality = 1 (nascent student entrepreneurs received university start-up support) or duality = 0 (did not receive this support during the process of their start-up); All the plots are portrayed in the Figs. 2~5 below.



**Figure 2-5.** Main effect and interactions between entrepreneurial offerings and entrepreneurial intention.

Notes: Plots of the predicted values for Model II~VI presented 95% confidence intervals, all other variables kept at their means.

Fig. 2 delineated the predicted value of the start-up activities index at a high (one SD above the mean) and low (one SD below the mean) level of entrepreneurial intention. The simple slope analysis indicates that the effectiveness of entrepreneurial intention on start-up actions was always positive and statistically significant and increased as intention level increased when all other variables were at their means. Furthermore, the marginal effect of student entrepreneurial intention on their start-up activities index surged more than five times from 0.016 (with a low intention value) to 0.086 (with a high intention value). Fig. 3 depicts entrepreneurial intention's impact on start-up activities for high and low engagement in university entrepreneurial courses. This graph reflects that the effect of high-level course attendance (from 0.062 to 0.124) was statistically positive and stronger than that of low attendance (from -0.003 to 0.009). Fig. 4 exhibits the moderating effect of participating in university entrepreneurial extra-curricular activities: when students take on a high number of extra-curricular activities, the index of embarking on start-up activities increases from 0.065 to 0.118; when the extra-curricular activity-taking level is low, the index improves only from -0.008 to 0.012. Both Figs. 3 and 4 imply that student entrepreneurial intention is less translated into venture creation for a low level of course and extra-curricular activity involvement. Finally, Fig. 5 displays that the simple slope is much steeper if students received university start-up support during their venture creation; their start-up activities index improved substantially from 0.070 to 0.194. Otherwise, the predicted value of start-up support only changes from 0.010 to 0.051. This means that intentional student entrepreneurs' entrepreneurial intention is more likely to convert to

actual start-up behaviour when students receive start-up support from their universities.

#### Robustness checks and supplemental analysis

A series of robustness tests with alternative regression models, structures of dependant variables, and additional analyses were conducted to affirm the sensitivity and reliability of the research findings. First, a full OLS regression model (Model VII in Table 4) was performed by including all interactions simultaneously. The result was that only university entrepreneurial courses ( $b = 0.005$ ,  $p < 0.001$ ) remained a statistically significant moderator in intention and behaviour transition, while the other two interactions became insignificant but positive. The full model was then replicated using a Logit regression to predict the binary outcome (started engaging in business start-up process or not) on Model VIII in Table 4. The results contradict the main results reported in Results section, indicating that three university entrepreneurial offerings negatively moderate student entrepreneurial intention-behaviour translation but are not statistically significant. Thus, these findings support the robust evidence regarding the positive moderating impact of attending entrepreneurial courses on student entrepreneurial intention to behaviour realisation.

Second, diverse dependant variable structures were allocated and submitted to the estimation. In this study, the dependant variable contains 19 dichotomous start-up activities (as addressed in Measures). This connection of independent and distinct start-up activities will subsequently result in the creation of a new business. Thus, it is

conceived as a formative construct rather than a latent variable. The scope of domain coverage and the correspondence with other constructs in an expected manner represent ways to assess the validity of this formative construct (Diamantopoulos & Sigauw, 2006). Accordingly, these start-up activities were categorised into: two factors of 'discovery' and 'exploitation' (Shane & Venkataraman, 2000); three categories: 'business planning', 'financing the firm', and 'interaction with external environment' (Alsos & Kolvereid, 1998); start-up activities based on well-known entrepreneurial research and reputed academics' opinions. The last group of the start-up behaviour structure is comprised of 10 items (numbers 2,3,5,8,11,13,14,15,16,18 as shown in Appendix A), which prior researchers widely employed (e.g., Edelman et al., 2016; Neneh, 2019; Weiss et al., 2019). The dependant variable structures of all the groups mentioned above were calculated by counting the total number of start-up activities that a student had undertaken during their start-up process and analysed using Poisson estimations (count outcomes) in STATA 15. This calculation was justified by the consensus that the broader the scope of completed start-up activities, the closer an entrepreneur is to creating a new firm (Alsos & Kolvereid, 1998; Carter et al., 1996). The findings (see Model I–VI in Appendix B) are virtually identical to the results reported in Results section.

Third, 462 nascent student entrepreneurs had already initiated start-up activities or were small business owners amongst the current research respondents. These samples were then selected to examine the research hypotheses. In this analysis, the dependant variable was a set of 19 start-up activities, the same as the main analysis. This outcome variable was still calculated by counting the number of start-up activities that nascent student entrepreneurs carried out during their entrepreneurial process as the Model I–VI in Appendix B. Again, the Poisson regression results (see Model VII in Appendix B) are equal to the findings obtained from the main analysis, resulting in a conclusion that the results described in the main regression analysis are robust.

Finally, a structural moderated-mediation analysis (Hayes, 2015) in Mplus 8 was specified to control for the degree of effect of the three selected moderations on both entrepreneurial intention and behaviour. In this analysis, three boundary conditions simultaneously predicted entrepreneurial intention and moderated the link between business intention and start-up creation. The results show that the conditional, indirect effects of being involved in university entrepreneurial courses and extra-curricular activities, not start-up support, on start-up activities were partially mediated by entrepreneurial intention. These significant indirect effects tended to zero and thus were deemed negligible ( $b = 0.013$ ,  $b = 0.025$ , respectively,  $p < 0.001$ ). Furthermore, the partially mediating effect of entrepreneurial intention on engaging in extra-curricular activities and nascent start-up behaviour was slightly moderated by entrepreneurial course attendance ( $b = 0.020$ ,  $p < 0.05$ ). Standard errors were bootstrapped 10,000 times (detailed results available upon request).

## Discussion

Drawing on prior research pertaining to entrepreneurial intention–behaviour link and the entrepreneurship education effectiveness, the underlying premise of this study argues that strong entrepreneurial intentions enable aspiring student entrepreneurs to effectively exploit knowledge/competencies/resources acquired from participating in the university EE and venture creation contexts which, in turn, can accelerate their propensity to embark upon start-up activities. The results from 1820 students from three Chinese universities support this proposition. Student behavioural tendencies to enact entrepreneurial intention are positively attributed to their engagement level in university entrepreneurship education and venture creation contexts, corroborating the indispensable roles of EE (Ahmed et al., 2020; Astebro et al., 2012; Rauch & Hulsink, 2015;

Souitaris et al., 2007) and the university entrepreneurial context (Bergmann et al., 2016; Bogatyreva et al., 2019; Meoli et al., 2020; Weiss et al., 2019) in nurturing student start-up activity.

### *The positive moderating role of university entrepreneurial offerings*

These research findings are consistent with those of prior studies where student entrepreneurial intention was a direct predictor of start-up behaviour (e.g., Adam & Fayolle, 2016; Kautonen et al., 2013; Van Gelderen et al., 2015, 2018). Translating entrepreneurial intention to actual behaviour requires individuals to possess entrepreneurial capacities. Gieure et al. (2020) proposed that students gain entrepreneurial skills and capacities when surrounded by supportive environment factors, which bring intention to fruition. This research further supports the above argument by confirming that **Hypotheses 2a–c** and the plots of the interaction patterns align with these hypotheses. They illustrate that students who have high-level entrepreneurial intention and engagement in university entrepreneurial courses, extra-curricular activities, or start-up support are more likely to create a new venture. In contrast, lower-level intention scarcely translates into action when there is a low level of involvement in those offerings. Overall, these results indicate that differences in students' level of engagement in university entrepreneurial offerings and intention shape the emergence and development of their nascent start-up behaviour.

The positive moderating effect described above essentially reflects four streams of previous related empirical research. First, it is in accord with the results from *EE effectiveness* research, which either demonstrates that university entrepreneurial courses/programmes (e.g., Gielnik et al., 2015; Rauch & Hulsink, 2015; Souitaris et al., 2007), extra-curricular activities (e.g., Hasche & Linton, 2021; Pittaway et al., 2015; Pocek et al., 2022), financial or incubator centres (e.g., Haneberg & Aadland, 2020; Morris et al., 2017) play a crucial role in developing students' entrepreneurial skills, attitudes, and ultimately their start-up behaviour. Secondly, this research further concurs with the opinion that the *university entrepreneurial ecosystem* could promote students' venture creation by enabling them to access start-up knowledge, training, and resources (e.g., Longva, 2021; Williams-Middleton et al., 2020; Wright et al., 2017). Thirdly, there is alignment with the significance of *context* on students' start-up activities and the meaningful role context plays in translating intention to behaviour (e.g., Aaboien et al., 2021; Bergmann et al., 2016). Finally, this research echoes the findings of extant research regarding university EE's impact on students' *intention–behaviour transition* (Gieure et al., 2020; Johnmark et al., 2016; Meoli et al., 2020; Rauch & Hulsink, 2015; Shirokova et al., 2016). In addition to corroborating existing research, more importantly, the current findings offer the opportunity for a more nuanced understanding of the critical context role in linking entrepreneurial intention and behaviour.

Similar to previously described research (Gieure et al., 2020; Johnmark et al., 2016; Meoli et al., 2020; Rauch & Hulsink, 2015; Shirokova et al., 2016), the current study sought to understand the role of the environment in the intention–behaviour transition by taking into account the role of university context in students' start-up process. Notably, only two of these five studies examined the moderating role of the university entrepreneurial environment as a larger context in student entrepreneurial intention–behaviour transition (Meoli et al., 2020; Shirokova et al., 2016). By contrast, the present research assessed specific elements, such as entrepreneurial courses/programmes, skills, and pedagogy, similar to the approach taken by the remaining studies (Gieure et al., 2020; Johnmark et al., 2016; Rauch & Hulsink, 2015). However, each of these three studies treated EE elements as independent variables that proxy their contributions to intention formation with actual behaviour, notably, the *current research conceived university entrepreneurial offerings as moderators*.



One possible explanation could be that some participants entered university with entrepreneurial intentions and gained entrepreneurial abilities through participating in entrepreneurial offerings, leading to intention realisation. Another explanation could be that a group of respondents stimulated their entrepreneurial intentions by attending compulsory entrepreneurship courses/programmes. This intention became weaker over time (Harima et al., 2021); those students then enhanced their intention and skills via undertaking advanced courses or extra-curricular activities, which resulted in their venture creations. Williams-Middleton et al. (2020) advocate that students' formal (e.g., courses) and informal entrepreneurial learning (e.g., extra-curricular activities) generate different outcomes, both contributing to their entrepreneurial competence development. In the same vein, Longva (2021) remarked that the interplay between curricular and co-/extra-curricular activities is crucial for student venture creation. Moreover, entrepreneurial learning (Cope, 2003; Minniti & Bygrave, 2001; Neck & Greene, 2011) and the start-up process (Fayolle, 2007; Gartner, 1985) are nonlinear and dynamic. Aligned with these standpoints, other explanations could be that some participants stimulated their start-up intentions via taking courses/extra-curricular activities, participated in extra-curricular activities/courses to reinforce their entrepreneurial competencies, and ultimately initiated start-up activities; or that embarking on start-up activities could trigger entrepreneurial learning, and then the same processes mentioned before are iterated. Unfortunately, the obtained cross-sectional data cannot verify the above scenarios, suggesting future research clues for interested researchers.

#### Contributions to theory and practice

The current research findings offer several theoretical contributions to the entrepreneurship field in general and the entrepreneurship education (EE) literature in particular. First and foremost, this study offers a substantial contribution to the growing body of literature exploring *entrepreneurial intention-behaviour transition* (Kautonen et al., 2013; Meoli et al., 2020; Schlaegel & Koenig, 2014; Van Gelderen et al., 2015) by emphasising the effectiveness of university EE and venture creation contexts in potential student entrepreneurs' actual start-up behaviour realisation. Previous empirical research on students' entrepreneurial intention-behaviour gaps has encompassed a variety of moderators ranging from individual-level to a larger contextual level, as articulated in *Theoretical Foundations and Hypotheses*. This research highlights the importance of the university entrepreneurship milieu for budding student entrepreneurs. The results demonstrate that high-level engagement in the university entrepreneurial courses, extra-curricular activities, or start-up support services represents valuable "contextual venture capital" contingencies for aspiring student entrepreneurs. Students could leverage these resources in the process of shifting their entrepreneurial intention to new venture creations.

Additionally, the research findings expand the *theory of planned behaviour* (TPB) by highlighting contextual factors to understand the intention-behaviour relationship. TPB was extensively exploited in prior research to describe entrepreneurial intention formation with its three socio-psychological constructs; or to predict entrepreneurial behaviour by testing this full model. The current research questions the value of exclusively focusing on intentions constructed by attitudes, social norms, and perceived behavioural control and reveals that the process from intention to behaviour is conditional on the level of operating external contextual offerings. Bird (2015) argued that the interaction of personal and social context with rational and intuitive thinking determines how intentional entrepreneurial behaviour is created. In line with this reasoning, this study claims that, besides the socio-psychological factors, the involvement in university EE and venture creation contexts could accelerate

entrepreneurial intention formation and actual behaviour actualisation in student entrepreneurship.

Second, the research provides deeper insights into *start-up activity antecedent* research from a contextual perspective. Previous studies have paid considerable attention to venture creation antecedents (Shane & Venkataraman, 2000). Fayolle (2007, p. 34) noted that functional (why someone became an entrepreneur) and individual approaches (entrepreneurs' psychological and personality traits) have been primarily adopted to understand the complexity of entrepreneurship. The research direction has gradually switched to how entrepreneurs' entrepreneurial process proceeds, especially the importance of context in this process (Bergmann et al., 2016; Weiss et al., 2019; Welter, 2011; Welter & Smallbone, 2011). This study looked at context through the lens of university EE and venture creation settings and found that these contextual configurations shape students' start-up processes and stimulate their start-up activities. This research also responds to a recent call by Matricano (2020) that researchers should strive to investigate the factors which are influencing the antecedents, dynamics, and potential results of entrepreneurial behaviour.

Third, the findings on the positive moderating effect of university entrepreneurial offerings in closing students' entrepreneurial intention-behaviour gap shed light on *entrepreneurship education assessment* research. Abundant prior research has frequently recognised EE as an independent variable or an intervention tool. As argued in *Introduction*, researchers generally examine these EE outcomes proxying with entrepreneurial intention, and few of them focus on actual start-up behaviour (Aparicio et al., 2019; Nabi et al., 2017). By comparison, this research perceives EE offerings as moderators between students' entrepreneurial intention and behaviour and recognises that these moderating offerings are indeed effective. Future researchers could follow this line to continue developing EE assessment directions.

Lastly, this study contributes to the emerging literature on *student entrepreneurship*. Previous research has typically focused on how student entrepreneurship reinforces education, business success, and the establishment of entrepreneurial ecosystems at universities (Gabrielsson et al., 2020; Wright et al., 2017) while largely neglecting students' actual venture creation. This study reinforces the discussion that students may benefit from their participation in the university community by utilising the available resources and support system for their entrepreneurial endeavours (Gieure et al., 2020; Harima et al., 2021; Politis et al., 2012). Thus, university EE and venture creation contexts could facilitate and nurture the student venture process.

The results generated in this study also have some practical implications. First, they corroborate the view that the initial step of the venture creation process is to trigger entrepreneurial intention (Gielnik et al., 2014; Krueger et al., 2000). Therefore, establishing a favourable national and institutional entrepreneurial climate aiming to nurture individuals' awareness and intention of entrepreneurship should create great interest to *entrepreneurship policymakers and educators*. Second, the research results further confirm the positive moderating effect of engaging in university entrepreneurial offerings in facilitating students' intention-behaviour conversion. As a result, *policymakers* may consider how a holistic university entrepreneurship ecosystem (Morris et al., 2017; Theodoraki et al., 2018) would enable more individuals to be exposed to this context. *Entrepreneurship educators* should design relevant courses and extra-curricular activities for students to learn "what to do" (action knowledge) as well as "how to take action" (action planning). In their research, Gielnik et al. (2015) demonstrated that incorporating both diminishes the intention-action gap. The findings highlight the importance of funding university start-up support services and infrastructure, alongside traditional courses and teaching, to truly promote and foster student entrepreneurship. Finally, based on the current findings, we would recommend that *aspiring student entrepreneurs* develop entrepreneurial capacities by participating in university

entrepreneurial offerings, which are likely to further enhance the probability of accomplishment in their intention–behaviour transition.

### Limitations and future research directions

This research has several limitations that open avenues for further exploration. First, the cross-sectional design collected concurrent data, which only applies to a short-term and static intention–behaviour translation phenomenon. Consequently, time deviation and reverse causality of intention–behaviour transition may distort the research findings. Numerous scholars acknowledge that venture creation is a dynamic process that develops over time; time lag exists in the intention–action translation (Gartner, 1985; Kautonen, Van Gelderen & Fink, 2015; Meoli et al., 2020; Shinnar et al., 2018; Shirokova et al., 2016). Furthermore, university entrepreneurship programmes require time to exhibit noticeable effects on the entrepreneurial process (Gielnik et al., 2015; Morris et al., 2017). In the same vein, Aaboen et al. (2021) contend that time is a critical factor that shapes start-up skills development. Considering the time lag, this study employs participants from year two to graduates within five years of graduation and strives to understand the effectiveness of university EE and student entrepreneurial intention realisation in a broader time interval. With respect to the reverse causality issue, an argument could propose that start-up actions may affect entrepreneurial intention if both were captured simultaneously. Shirokova et al. (2016) argued that start-up action is intentional behaviour; the possibility of spontaneous start-up activities resulting in *post hoc* intention occurrence remains intuitively unlikely. Given the above explanations, it calls for longer evaluation periods for the effectiveness of university EE in students' entrepreneurial intention–behaviour transition. Future studies could focus on the temporal dynamics of the hypothesised effects in this study to monitor individuals' intention stability (prior to starting the course, after university EE participation, or years after graduation) and the emergence and development of their venture creation actions by adopting a longitudinal or experimental design.

Second, there are additional lines of investigation concerning some variables measured in this study. A series of gestational start-up activities as the measurement of a dependant variable is operationalised on its index number without distinguishing its nature. A further consideration for future researchers might be a precise estimation of probable outcome behaviours that university EE may shift the student's entrepreneurial intention. These could be a specific group of gestational start-up activities or different types of ventures (Delanoe-Gueguen and Liñán, 2019; Kautonen et al., 2013). It could also be the business performance/ success of student entrepreneurs a number of years after graduation, examined with a longitudinal study. As moderators, university entrepreneurial offerings in this study were classified into three broad categories and calculated as aggregate or binary. However, the format, structure, content, and pedagogical approach substantially vary between these moderators, and it would be worthwhile to disentangle the relation between a specific course/extra-curricular activity and intention–behaviour conversion (Rauch & Hulsink, 2015; Williams-Middleton et al., 2020). Additionally, two issues about research variables are particularly worthy of exploring. It would be interesting to test other moderators derived from the university entrepreneurship context, such as educators'/instructors' teaching styles. The other direction is to extend the conceptual argument by integrating other factors into a hierarchical multilevel framework, for instance, how higher-level (national culture) or individual-level factors (such as start-up/family background, personality, commitment) may affect the process found in this study within a larger-scaled population and nations.

Third, when simultaneously performing all university entrepreneurial offering dimensions as moderators in the intention

–behaviour association, only entrepreneurial courses remain a robust result. The reason for this might be an undeniable overlap, that is, the interdependence between courses and extra-curricular activities. As presented in *Theoretical Foundations and Hypotheses*, students' participation in entrepreneurship courses and extra-curricular activities affects the formation or strengthening of their entrepreneurial intention, entrepreneurial capacity, and, ultimately, start-up behaviour. Besides this, courses and extra-curricular activities underpin different pedagogies; the effectiveness of both offerings may vary (Piperopoulos & Dimov, 2015). On this basis, it might diminish or drop the moderating effect when including all moderators concurrently in a full model because of more complicated underlying moderated mediation relations. This calls for future research to scrutinise whether, and to what extent, this is the case. One avenue for future studies could be the examination of moderated mediated effects (Hayes, 2015) of entrepreneurial courses and extra-curricular activities in both start-up intention and behaviour. Explicitly, future researchers could conjecture that students' entrepreneurial intention mediates the impact of entrepreneurial courses and extra-curricular activities on their subsequent start-up behaviour realisation. In turn, attending courses or extra-curricular activities accelerates this realisation. Alternatively, scholars could also investigate and compare the immediate effect of university entrepreneurial offerings on aspiring student entrepreneurs' start-up behaviour rather than perceive them only as moderators.

The participants of this study were students from three Chinese universities. Most of them did not undertake any start-up activities, and only a few were novice student entrepreneurs, which inevitably led to samples and context-specific bias. Botha et al. (2019) argued that the weak explanation power of entrepreneurial intention in behaviour in previous empirical studies might be that students, non-entrepreneurs and potential entrepreneurs are not the appropriate samples. Thus, it would be interesting to employ surrogate samples, for instance, existing student entrepreneurs who graduated years ago, or small business owners. A potential research direction would be to delve deeper into the extent of how university EE influences different levels of entrepreneurial intention samples to proceed with their start-up actions. As for the contextual perspective (Bogatyreva et al., 2019; Shinnar et al., 2018; Weiss et al., 2019), students in China are nested in a nation with different cultural values than other Asian or Western countries. Future research could duplicate this research, or use a qualitative comparative design in other nations, to maintain the external validity of the reported findings.

Finally, the current quantitative research results fail to interpret the mechanism of how university entrepreneurship context and student entrepreneurial intention promote consequent start-up behaviour. A follow-up qualitative study exploring this enquiry presents a critical path for future research. Thus, an in-depth analysis of how business/start-up-related knowledge in the form of skills, capacities, and competencies (Gieure et al., 2020) attained from engaging in different types of entrepreneurial offerings concretely facilitates students' actual behaviour execution is demanded. For example, future researchers could conduct interviews or observations with selected cases during and after their entrepreneurship education involvement to capture a panoramic picture. Despite the above-demonstrated limitations, this study paves the way for further empirical research into the significance of university EE and venture creation contexts on the intention–behaviour gap in student entrepreneurship.

### Conclusion

While it is acknowledged that entrepreneurial activity results from intention implementation, it cannot be ubiquitously assumed to be so. Actions do not always, nor do they consistently follow intentions. Limited research to date has examined the contingent role of individual/psychological level or relatively larger, contextual, environmental moderating factors in the entrepreneurial intention

–behaviour gap employing samples of university students. Little focus has been given to the university entrepreneurship education and venture creation contexts of students' daily practice. The current study attempts to contribute to this specific research gap by unravelling the link between students' engagement in university entrepreneurial offerings and their entrepreneurial intention–behaviour shift. The research results demonstrate that entrepreneurial intention is a core driver for start-up behaviour for nascent student entrepreneurs; engagement in university entrepreneurial offerings accelerates students' entrepreneurial intention–behaviour conversion. This research highlights the indispensable role of university entrepreneurial offerings and start-up services in facilitating ambitious and nascent student entrepreneurs' venture creation processes. In conclusion, this research suggests that the potential association between aspiring student entrepreneurs' entrepreneurial learning, entrepreneurship-related knowledge acquisition/creation/leverage, and new venture creation deserves additional investigation.

## Appendices

### Appendix. A list of start-up activities the current study employed

- Start-up activities
1. Spent a lot of time seriously thinking about starting business. (PSED)
  2. Collected information about markets or competitors. (GUESSS)
  3. Wrote a business plan (Any form). (PSED & GUESSS)
  4. Organized start-up team and selected business name. (PSED)
  5. Purchased material, equipment, or machinery for the business. (PSED & GUESSS)
  6. Purchased or leased major items like equipment, facilities, or property. (PSED)
  7. Devoted full time to business/ took start-up leave. (PSED)
  8. Started product/service development. (GUESSS)
  9. Saved money to invest in business. (PSED)
  10. Invested own money in business. (PSED)
  11. Attempted to obtain external funding from family/university/investor/bank. (PSED & GUESSS)
  12. Opened bank account exclusively for this business. (PSED)
  13. Started marketing or promotion efforts. (PSED & GUESSS)
  14. Discussed product or business idea with potential customers. (GUESSS)
  15. Applied for a patent, copyright, or trademark. (PSED & GUESSS)
  16. Registered the company. (GUESSS)
  17. Hired employees or managers. (PSED)
  18. Sold product or service. (GUESSS)
  19. Received money, income, or fees from sale of goods or services. (PSED)

Notes: PSED=Panel Study of Entrepreneurial Dynamics, GUESSS=Global University Entrepreneurial Spirit Students' Survey.

### Appendix B. Poisson regression on alternative structures of the dependant variable

Variables Dependant variable (Scope of start-up activities)	Model I Discovery	Model II Exploitation	Model III Planning	Model IV Financing	Model V Interaction	Model VI 10 start-up activities	Model VII 19 start-up activities
<b>Controls</b>							
Gender (Female)	-0.071 (0.076)	-0.126* (0.072)	-0.035 (0.072)	-0.175 (0.111)	-0.119 (0.099)	-0.032 (0.068)	-0.087* (0.051)
Age	.353* (0.209)	.279* (0.157)	.392** (0.185)	.44 (0.278)	.085 (0.204)	.218 (0.167)	.303** (0.123)
Grade	-0.14*** (0.049)	-0.014 (0.044)	-0.107** (0.046)	-0.127* (0.071)	.076 (0.059)	-0.037 (0.043)	-0.059* (0.032)
<b>Majors</b>							
Science & Engineering	-0.027 (0.102)	-0.319*** (0.087)	-0.137 (0.093)	-0.082 (0.144)	-0.342*** (0.119)	-0.169* (0.087)	-0.187*** (0.065)
Agriculture & Forestry	-0.119 (0.135)	-0.883*** (0.139)	-0.408*** (0.131)	-0.193 (0.193)	-1.126*** (0.206)	-0.597*** (0.131)	-0.532*** (0.095)
Business & Management	.178* (0.106)	-0.328*** (0.096)	.045 (0.098)	-0.14 (0.157)	-0.32** (0.13)	.006 (0.092)	-0.095 (0.07)
Family annual income	.025 (0.034)	.01 (0.032)	-0.007 (0.032)	.065 (0.049)	.019 (0.044)	.01 (0.03)	.016 (0.023)
Family self-employed (Y)	.203** (0.082)	.315*** (0.081)	.23*** (0.078)	.214* (0.121)	.499*** (0.118)	.322*** (0.077)	.29*** (0.057)
Start-up experience (Y)	.141 (0.109)	.404*** (0.089)	.248** (0.098)	.272* (0.152)	.466*** (0.118)	.261*** (0.09)	.324*** (0.068)
Work experience (Y)	.241*** (0.074)	.228*** (0.07)	.249*** (0.07)	.152 (0.109)	.248** (0.097)	.244*** (0.067)	.228*** (0.05)
Entrepreneurial climate	-0.064** (0.032)	-0.118*** (0.03)	-0.078*** (0.03)	-0.105** (0.046)	-0.116*** (0.041)	-0.071** (0.029)	-0.096*** (0.022)
<b>Independent variable</b>							
Entrepreneurial intention (EI)	.404*** (0.038)	.464*** (0.038)	.426*** (0.036)	.446*** (0.058)	.472*** (0.055)	.448*** (0.036)	.441*** (0.027)
<b>Moderators</b>							
Entrepreneurial course	.105*** (0.018)	.138*** (0.017)	.107*** (0.018)	.126*** (0.025)	.139*** (0.023)	.113*** (0.016)	.119*** (0.012)
Entrepreneurial extra-curricular activity	.165*** (0.027)	.196*** (0.025)	.195*** (0.025)	.135*** (0.039)	.241*** (0.032)	.218*** (0.023)	.196*** (0.018)
Start-up support (Y)	.931*** (0.101)	1.038*** (0.101)	.761*** (0.098)	1.214*** (0.15)	1.111*** (0.139)	1.036*** (0.092)	.949*** (0.07)
<b>Interactions</b>							
EI*Entrepreneurial course	-0.002 (0.011)	.009 (0.009)	.006 (0.01)	-0.001 (0.015)	.008 (0.012)	.008 (0.009)	.006 (0.007)
EI*Entrepreneurial extra-curricular activity	-0.042*** (0.013)	-0.058*** (0.011)	-0.051*** (0.012)	-0.044** (0.019)	-0.075*** (0.015)	-0.062*** (0.011)	-0.056*** (0.008)
EI*Start-up support	-0.167*** (0.059)	-0.168*** (0.056)	-0.139** (0.056)	-0.189** (0.087)	-0.186** (0.078)	-0.213*** (0.053)	-0.163*** (0.04)
<b>Constant</b>							
	-2.116*** (0.428)	-1.984*** (0.327)	-1.979*** (0.379)	-3.15*** (0.574)	-2.652*** (0.433)	-1.892*** (0.347)	-1.335*** (0.255)
<b>Log Likelihood</b>							
Pseudo R <sup>2</sup>	.244	.315	.262	.229	.322	.309	.328

Notes: n=1820. Poisson regression coefficients are reported (standard errors are in parentheses).

Prob>chi2=0.000 for all models, all models are statistically significant; \*p<.05, \*\*p<.01, \*\*\*p<.001.

In Model I~Model VI, Independent variable and Moderators are mean-centred.

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