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Exploring the intention-behavior link in student entrepreneurship: Moderating effects of individual and environmental characteristics

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ABSTRACT

Entrepreneurial intentions lie at the foundation of entrepreneurial process. Yet the available evidence suggests that not every entrepreneurial intention is eventually transformed into actual behavior – starting and operating a new venture. Although studies in other research domains suggest high level of intention-behavior correlation, the studies of intention-behavior relationship in entrepreneurship are scarce. Using the data from the 2013/2014 Global University Entrepreneurial Spirit Students' Survey, we scrutinize the intention-action gap among student entrepreneurs, attributing it to the contextual factors, i.e., individual (family entrepreneurial background, age, gender) and environmental characteristics (university environment, uncertainty avoidance), affecting the translation of entrepreneurial intentions into entrepreneurial actions.

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1. Introduction

Organizational emergence is usually considered as a key outcome of entrepreneurship (Aldrich, 1999; Gartner, 1985; Katz & Gartner, 1988; Shane & Delmar, 2004). Entrepreneurship scholars agree that organizational emergence is a process made up of multiple start-up activities (Carter, Shaver, & Gartner, 1996; Liao, Welsch, & Tan, 2005; Newbert, 2005). Given the central role of actions in entrepreneurship, previous studies have argued and shown that the entrepreneurial process occurs because people are motivated to pursue and exploit perceived opportunities (e.g., Osiyevskyy & Dewald, 2015). This view is rooted in the theory that entrepreneurial action is intentional, resulting from motivation and cognition (Frese, 2009; Kautonen, Van Gelderen, & Tornikoski, 2013; Kolvereid & Isaksen, 2006; Krueger, 2005). The starting point of an action is the formation of a goal intention (Bird, 1988; Locke & Latham, 2002). Social psychology scholars define

intentions as cognitive states immediately prior to the decision to act (Theory of Planned Behavior: Ajzen, 1991; Theory of reasoned action: Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; see also Krueger, 2005 in application to entrepreneurship). Across a wide range of different behaviors, behavioral intentions have been identified as the most immediate predictor of actual behaviors (see the meta-analyses of Armitage & Conner, 2001; Sheeran, 2002).

Yet not all intentions are translated into actions. Conceptual and empirical analyses of the intention-behavior relationship have revealed that the 'gap' between intention and action can mainly be attributed to persons who intend to act, but fail to realize their intentions (Orbell & Sheeran, 1998; Sheeran, 2002; Sniehotta, Scholz, Schwarzer, & Schüz 2005). Although there is abundant evidence from other research domains on high level of intention-behavior correlation (Ajzen, Czasch, & Flood, 2009; Armitage & Conner, 2001), there are few studies done on the intention-behavior relationship in entrepreneurship (Kautonen et al., 2013). This sets the motivation for the current study.

In several studies on intention-behavior link in entrepreneurship, intentions are measured several months or even years prior to the measurement of behavior (Gielnik et al., 2014; Kautonen et al., 2013). There is literally a 'time gap' between intentions and behavior. Yet, as Sutton (1998) claims, "If intentions change over time and this change is differential (i.e., different individuals

Abbreviations: GUESSS, Global University Entrepreneurial Spirit Students' Survey; GEM, Global Entrepreneurship Monitor; PSED, Panel Study of Entrepreneurial Dynamics.

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change by different amounts), a distal measure of intention (i.e., distal with respect to the behavior) will be poorer predictor of behavior than will a proximal measure of intention" (Sutton, 1998: 1326). Thus the longer the interval between the measurement of intention and behavior, the greater the likelihood that unforeseen events will occur leading to changes in intention. Thus, in the current study we concentrate on other, additional moderators of intentions-actions translation (individual and contextual), beyond the showed before temporal aspect.

Entrepreneurship becomes more and more attractive for people who are about to make their career choice, as this perspective allows participation in the labor market while keeping personal freedom (Martinez, Mora, & Vila, 2007).¹ The available evidence suggests that a rather large segment of the population intends to pursue an entrepreneurial career while they are relatively young. Therefore, student entrepreneurship is an important direction of entrepreneurship research, as at this stage of life entrepreneurial conscience and attitude towards entrepreneurial career are formed. Student entrepreneurship is defined as any attempt to launch a new venture undertaken by one or several students (Reynolds, 2005). Students' involvement in entrepreneurial activity depends on their career plans and attitude toward self-employment, which are contingent on various factors.

Therefore, in this article we examine the intention-behavior link using a sample of university students. We focus on the role of entrepreneurial intentions as drivers of the start-up activities, particularly scrutinizing the moderating effects of individual characteristics and environmental peculiarities on the intentions-actions translation. To examine the relationship between intentions and start-up activities of students empirically, we use the 2013/2014 "Global University Entrepreneurial Spirit Students' Survey" (GUESSS) dataset. We demonstrate that intention plays a critical role in university students' entrepreneurial activity. However, the effect of intention on the scope of start-up activities may be contingent on students' individual background and the environment in which they operate. Hence, we focus on students' age, gender, family entrepreneurial background, university entrepreneurial environment, and the overall level of societal uncertainty avoidance, positing that these peculiarities moderate the relationship between entrepreneurial intentions and intensity of actual actions.

Our study provides a number of contributions. First, the study contributes to the overall entrepreneurship literature by increasing our understanding of how different individual and environmental characteristics influence the relationship between entrepreneurial intentions and start-up activities of student entrepreneurs.

Second, our study extends the Theory of Planned Behavior (Ajzen, 1991) in entrepreneurship context, suggesting that the transformation of intentions into actions may be dependent on certain contingencies that should be taken into account while studying the intention-action gap, particularly in entrepreneurship.

The paper proceeds as follows. We start by presenting our conceptual framework and hypotheses, rooted in the studies of social psychology and entrepreneurial cognition. We then move to a description of our sample, methodology, and present our empirical insights. Next we discuss our findings and then conclude with the implications and limitations of our research.

¹ According to a recent "Global Entrepreneurship Monitor" (GEM, 2014) report, entrepreneurial intentions most frequently emerge among individuals aged 25–35 years old. This is consistent with Lévesque and Minniti (2006; 2011), who found that the majority of people who start a business fall into this age interval. Among those who plan to launch a business in the nearest 3 years, young individuals aged 18–24 years old account for 21.3%.

2. Theory and research hypotheses

2.1. Intention-behavior link in entrepreneurship

Entrepreneurial intentions are defined as the commitment to start a new business (Krueger, 1993), and they serve as key antecedents of entrepreneurial behavior. Based on the seminal framework of Shane and Venkataraman (2000), entrepreneurship behavior can be defined as the 'discovery, evaluation and exploitation of an opportunity.' Any type of behavior is comprised of a range of actions made by individuals in conjunction with personal preferences and external conditions. In line with the underlying Theory of Planned Behavior, Van Gelderen et al. (2008) demonstrated that entrepreneurial intentions of students and, as a consequence, their entrepreneurial behavior, are shaped by their attitude towards entrepreneurship. In other words, actions aimed at starting a new business are intentional – rather than spontaneous – and are determined by students' attitudes, which arise as the results of multiple influences, such as personal traits and situational factors (Ajzen, 1991; Krueger, Reilly, & Carsrud, 2000).

In the Theory of Planned Behavior (TPB) (Ajzen, 1991) framework, intention is a function of three antecedents: a favorable or unfavorable evaluation of the behavior (attitude), perceived social pressure to perform or not perform the behavior (subjective norm), and the perceived ease or difficulty of performing the behavior (Perceived Behavioral Control, PBC) (Ajzen, 1991). Similarly to its predecessor, the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the TPB further posits that intention provides a cognitive link between the three antecedents and subsequent behavior (Kautonen et al., 2013). The strength of intention captures motivational factors influencing people's behavior, and reflects the amounts of effort people are willing to invest (Bird, 1988; Gielnik et al., 2014). Prior empirical studies in different research domains, including entrepreneurship, support the predictive power of intentions on the subsequent behavior. In meta-analytic review of studies using the Theory of Planned Behavior, Armitage and Conner (2001) find that behavioral intentions explain 27% of the variance in behavior. The meta-analysis of meta-analyses by Sheeran (2002) reveals that across a variety of domains, intentions predict on average 28% of variance in subsequent behavior. More recently, Kautonen, Van Gelderen and Fink (2013) demonstrated the robustness and relevance of the TPB in the prediction of business start-up intentions and subsequent behavior based on longitudinal survey data. Consequently, based on the theoretical arguments of the TPB and the available empirical evidence, we propose that the cognitive variable, entrepreneurial intentions, has a significant positive impact on the level of engagement in start-up behaviors:

Hypothesis 1. Entrepreneurial intention is positively related to the scope of start-up activities undertaken by student entrepreneurs.

Yet the above cited studies of the TPB find that the intentions-actions link is far from perfect (correlations reported in entrepreneurship context rarely exceed 30%, suggesting around 10% of the shared variance between intentions and actions). This justifies the key focus of the current study – the contextual factors underpinning the intentions-actions gap with respect to start-up process. Theoretically, we suggest that the correlation between entrepreneurial intentions and entrepreneurial behaviors is substantively affected by individual and environmental moderators.

2.2. Individual background differences as moderators

The readiness to shift from entrepreneurial intentions to real

actions to a large extent depends on an entrepreneur's individual characteristics (Jain & Ali, 2013). Among those, entrepreneurial family background (Mueller, 2006), age (Álvarez-Herranz, Valencia-De-Lara, & Martínez-Ruiz, 2011; Lévesque & Minniti, 2006), and gender (Joensuu, Viljamaa, Varamäki, & Tornikoski, 2013; Sexton & Bowman-Upton, 1990; Zhao, Seibert, & Hills, 2005) are considered to affect the way entrepreneurial process unleashes. Therefore, in this study, we focus our attention on the abovementioned students' individual attributes.

2.2.1. Entrepreneurial family background

Entrepreneurial family background refers to those people whose parents or family members are involved in self-employment (Bae, Qian, Miao, & Fiet, 2014). As noted by Kolvereid (1996), entrepreneurial family background may impact vocational choice to pursue an entrepreneurial career through formation of attitudes, subjective norms, and perceived behavioral control. There are several pieces of evidence in student entrepreneurship literature suggesting that students with family business background stem from a particular familial context that may influence their future career intentions (Laspita, Breugst, Heblich, & Patzelt, 2012; Zellweger, Sieger, & Halter, 2011) and strengthen their proclivity to transform these intentions into actual behaviors. A number of empirical studies have suggested the importance of parental experience, revealing its significant impact on children's entrepreneurial intentions and behavior (Bowen & Hirsch, 1986; Carr & Sequeira, 2007; Dubini, 1989; Scott & Twomey, 1988; Van Auken, Fry, & Stephens, 2006).

Prior entrepreneurial exposure, such as having self-employed parents, is considered to be a key predictor of self-employment (Dunn & Holtz–Eakin, 2000; Hout & Rosen, 2000; Krueger, 1993). For example, parents, as business owners, can influence their children's entrepreneurial career choices by providing social capital, including contacts with suppliers, business partners, customers, etc.; in other words, the aspiring student entrepreneurs may benefit from parents' network when trying to establish a new business (Laspita et al., 2012; Sørensen, 2007), which gives them a head start in terms of moving from intentions to actions as compared to their counterparts who also exhibit desire to become entrepreneurs but do not benefit from a variety of resources that stem from having a family business background. Growing up in an entrepreneurial environment offers an opportunity to learn from self-employed parents, who serve as role models (Aldrich, Renzulli, & Langton, 1998; Chlosta, Patzelt, Klein, & Dormann, 2012) creating in this way positive beliefs about an entrepreneurial career and a favorable attitude towards engaging into entrepreneurial activities, which in turn may make children not only want to become entrepreneurs but also motivate them to let no grass grow under their feet, i.e. not to put off their start-up initiatives indefinitely. Moreover, family business background provides insights into entrepreneurial activity and decision-making process (Mueller, 2006), which makes it easier to shift from entrepreneurial intentions to actions as individuals bearing such knowledge will be less afraid of a possible failure. Very often, parents assist their children by transferring financial capital (Dunn & Holtz–Eakin, 2000) and providing a chance to acquire human capital (Lentz & Laband, 1990). As a result, having additional resources provided by family, aspiring student entrepreneurs might feel more confident in terms of their perceived behavioral control as the resources and opportunities at hand to a certain extent define the probability of a successful behavioral achievement as well as individual's perception of his or her chances to succeed (Ajzen, 2002). This is especially important given that the TPB assumes that perceived behavioral

control together with behavioral intention can directly predict behavioral achievement, suggesting that, keeping intention constant, the likelihood of successful action initiation and completion increases with PBC (Ajzen, 1991), the latter being presumably higher in case of students coming from entrepreneurial families.

In addition to assistance with various resources, families that own a business are likely to emotionally support children's entrepreneurial initiatives creating in this way positive subjective norm, i.e., approving their children's vocational choice. Evidence suggests that individuals perceiving support from their relatives and social contacts are more likely to convert their entrepreneurial intentions into start-up activities (Zanakis, Renko, & Bullough, 2012). A personal network of supportive strong ties together with high entrepreneurial self-efficacy, which also may result from family business experience, increases the likelihood of both entrepreneurial intentions and start-up behavior (Sequeira, Mueller, & McGee, 2007). Therefore, we hypothesize:

Hypothesis 2. The positive relationship between entrepreneurial intentions and the scope of start-up activities will be stronger for student entrepreneurs with family entrepreneurial background than for student entrepreneurs without such a background.

2.2.2. Gender

In addition to having different career transition patterns in general (Maxwell & Broadbridge, 2014), it is commonly accepted that men have stronger predisposition to engage into entrepreneurial activity than women (de Bruin, Brush, & Welter, 2007; Chen, Greene, & Crick, 1998; Gupta, Turban, Wasti, & Sikdar, 2009; Scherer, Brodzinski, & Wiebe, 1990; Zhao et al., 2005). Although some scholars argue that there are little or no gender differences in entrepreneurship, other scholars point out at some differences still in existence, such as cognitive perspectives (Brush, 1992), psychological traits (Sexton & Bowman-Upton, 1990), and driving forces toward entrepreneurship (Maes, Leroy, & Sels, 2014). In particular, Maes et al. (2014) using a sample of business students found that women's proclivity to engage into entrepreneurial activity evolves mostly due to motives to balance between work and family which are less prominent in predicting personal attitude as compared to need for achievement that was found to drive men towards entrepreneurship. Moreover, women as opposed to men demonstrate weaker internal feelings of control which are a stronger predictor of perceived behavioral control, the latter being capable, alongside with entrepreneurial intentions, to trigger an actual involvement into start-up activities (Ajzen, 1991). The meta-analysis of Haus, Steinmetz, Isidor, and Kabst (2013) suggests that, in general, women tend to exhibit lower average attitude towards entrepreneurship, perceived behavioral control, and subjective norm as compared to men. Furthermore, Joensuu et al. (2013) have demonstrated in a longitudinal study of students that women have lower intentions to start business, and moreover, their intentions decrease more intensively during their studies. As a result, "women less frequently turn intention into implementation" (Haus et al., 2013, p. 145). In support of this idea, empirical evidence indicates that – in spite of the growth in female entrepreneurship – there are still almost twice as many male entrepreneurs (Bosma & Levie, 2009; Shinnar, Giacomini, & Janssen, 2012). Cultural values shape societal roles and stereotypes in terms of the occupations considered appropriate for men or women (De Vita, Mari, & Poggesi, 2014). In general, women are more prone to comply with social norms as compared to men (Maes et al., 2014). According to social role theory (Eagly, 1987), gender-based expectation leads both men and women to pursue gender-stereotype occupations, which is also

consistent with the perceived lack of necessary skills by women (Bandura, 1992) which might weaken perception of control over targeted behavior when it comes to entrepreneurship. Consequently, even if they exhibit promising levels of entrepreneurial intentions, women are more likely to allow the whole thing to fade away eventually. In general, attitude towards entrepreneurship is more positive among men than women (Karimi, Biemans, Lans, Chizari, & Mulder, 2014). As a result, women tend to select different activities, choosing less frequently those that are viewed as entrepreneurial by both genders (Verheul, van den Bosch, & Ball, 2005). Moreover, there is evidence that women experience more difficulties in obtaining financial resources from banks which may result into perception of the environment as a hostile one affecting in this way subjective norm (Coleman, 2000; Shneor, Camgoz, & Karapinar, 2013). Subsequently, this may hamper the process of transforming entrepreneurial intentions into corresponding behavior in case of women.

Taking into consideration the abovementioned argument, it is reasonable to expect the existence of gender differences in the process of translation of entrepreneurial intentions into actual behaviors. In other words, the same level of intentions among males and females might result in different levels of engagement in start-up activities. Women particularly, despite the fact that they may feel as capable of performing start-up activities as men do, may perceive the environment as more difficult and less rewarding (Zhang, Duysters, & Cloodt, 2014) which, in turn, may undermine their perceived behavioral control and make them give up on pursuing the intended behavior. Moreover, 'women tend to perceive themselves and their business environment in a less favorable light compared to men' (Langowitz & Minniti, 2007: 356) which might also undermine their entrepreneurial aspirations. Ergo, we expect that:

Hypothesis 3. The positive relationship between entrepreneurial intentions and scope of start-up activities will be stronger for male student entrepreneurs than for female student entrepreneurs.

2.2.3. Age

The willingness to transform entrepreneurial intentions into real actions is contingent on the individual's age (Lévesque & Minniti, 2006). On the one hand, younger people might be more prone to get involved into entrepreneurial process as they are more dynamic, energetic, enthusiastic, and eager to realize their ambitions (Álvarez-Herranz et al., 2011). Young individuals may boldly rush into entrepreneurial initiatives employing effectual strategies and bootstrapping mechanisms (Hulsink & Koek, 2014). As correctly noticed by Lévesque and Minniti (2006), since entrepreneurial activity does not yield returns immediately, the younger individuals may be more entrepreneurially inclined, for they have lower opportunity cost of time and higher present value of future income streams. Yet this negative impact of age is more likely to be directed towards formation of entrepreneurial intentions rather than towards the process of translating them into behaviors.²

With respect to the translation of existing intentions into entrepreneurial behavior, however, older people may be more resolved to complete the entrepreneurial initiatives they have started. Evidence from the Panel Study of Income Dynamics suggests that the share of entrepreneurs among young individuals is rather low and escalates with age, while the number of older individuals running their own business is higher than that of wage

laborers (Mondragon-Velez, 2009) suggesting that older people are more determined when it comes to conversion of entrepreneurial intentions into start-up behavior. Older people tend to have more experience, which makes it easier to proceed with start-up activities turning entrepreneurial intentions into actions (Álvarez-Herranz et al., 2011). Experienced individuals are more likely to make a transition from intentions to an operating business, as they have developed sufficient individual human capital that helps better identify entrepreneurial opportunities and efficiently exploit them (Davidsson & Honig, 2003; Zanakis et al., 2012). Prior experience provides individuals with valuable contextual knowledge that may help bridge the entrepreneurial intention-action gap (Dimov, 2010). This may be particularly important when it comes to formation of perceived behavioral control which may also serve as an important direct driver of behavior together with entrepreneurial intentions (Ajzen, 1991) for experience and relevant knowledge are crucial in determining the perception of ease or difficulty to perform targeted behavior making older and more proficient people prominent in terms of entrepreneurial intentions implementation.

Moreover, older individuals tend to have larger network of social contacts, which is particularly useful when it comes to acquiring resources (Liao & Welsch, 2003) and leveraging uncertainties during the early stage of venture development (Sullivan & Ford, 2014) providing a solid ground for successful transformation of entrepreneurial intentions into start-up activities. Moreover, support from a large social network might be able to strengthen an intention to pursue targeted behavior through a positive perception of social norm which may eventually come out taking shape of actual steps towards venture creation. As a result of the abovementioned advantages, older individuals may be more determined to transform their entrepreneurial intentions into an operating venture. Basing on these premises, we suggest the following hypothesis:

Hypothesis 4. The positive relationship between entrepreneurial intentions and the scope of start-up activities will be stronger for older student entrepreneurs.

2.3. Environmental characteristics as moderators

Although we have to recognize the important role of the personality traits in a person's real entrepreneurial behaviors, there are other, higher-order variables that might affect business start-up activities. In addition to personality traits, environmental factors impact the entrepreneurial intentions of individuals and subsequent behavior (Sesen, 2013). Previous research has found that significant environmental antecedents of entrepreneurial intentions include access to capital (Lüthje & Franke, 2003; Schwarz, Wdowiak, Almer-Jarz, & Breitenacker, 2009), regional context (Dohse & Walter, 2012), formal and informal country-level institutions (Engle et al., 2011), and entrepreneurship education (Liñán, 2008; Martin, McNally, & Kay, 2013; Zhang et al., 2014). However, as some scholars claim, there is a strong need to examine the different aspects of the context that may influence entrepreneurial intentions and behaviors (Fayolle & Liñán, 2014; Fini, Grimaldi, Marzocchi, & Sobrero, 2012; Welter, 2011; Zahra & Wright, 2011). The level of economic development, financial capital availability, and government regulations are among those factors. Also, local context, including physical infrastructure (Niosi & Bas, 2001), entrepreneurial support services (Foo, Wong, & Ong, 2005), and specific university-support mechanisms, such as technology transfer offices and university incubators (Mian, 1997) have been shown to be crucial in fostering the entrepreneurial process. Research also suggests that cultural context can shape

² The presented in this article empirical analysis corroborates the former proposition: see the negative correlation of age and entrepreneurial intentions in Table 2.

entrepreneurial attitudes and behavior (Mitchell et al., 2002; Shinnar et al., 2012). Hence, we can assume that because each culture might have specific values and norms regarding new venture creation, the strength of the relationship between entrepreneurial intentions and entrepreneurial behavior may be contingent on – or moderated by – cultural values.

In this study we focus on two environmental characteristics that may affect the intention-behavior link in student entrepreneurship: the university entrepreneurial environment and perceived level of uncertainty avoidance in the society. As students are exposed to a university milieu on a day-to-day basis, its peculiarities may shape their attitudes towards an entrepreneurial career and subsequently their behavior on this matter (e.g., Dey, 1997; Hastie, 2007; Politis, Winborg, & Dahlstrand, 2012). As for the level of the perceived societal uncertainty avoidance, it is recognized to be one of the facets of risk aversion (Wennekers, Thurik, van Stel, & Noorderhaven, 2007), which may heavily impact the gap between entrepreneurial intentions and actions.

2.3.1. University entrepreneurial environment

According to an emerging stream of literature, there is relationship between university context and intended entrepreneurial action unfolded by students (Bae et al., 2014; Kraaijenbrink & Wijnhoven, 2008; Liñán, Urbano, & Guerrero, 2011; Saeed & Muffatto, 2012; Sesen, 2013; Turker & Selcuk, 2009; Zhang et al., 2014). The spirit of the educational place and its shared values and norms can affect entrepreneurial intentions. Universities are nowadays playing active roles in entrepreneurial activity development as partners in the commercialization of university knowledge (Politis, Winborg, & Dahlstrand, 2012) and as promoters of regional development and economic growth (Rothaermel, Agung, & Jiang, 2007). Examples of such promotion activities may include offering entrepreneurship education to enhance entrepreneurial intentions among students (Klofsten, 2000), providing incubators facilities (Hughes, Ireland, & Morgan, 2007), and mentoring programs and networks platforms (Nielsen & Lassen, 2012). As a result, the role of universities has been increasing as they have contributed to the nation's start-up infrastructure emergence by training new generations of entrepreneurs (Torrans et al., 2013). The university context may include university governance and leadership (Sotirakou, 2004), its organizational culture and infrastructure, and its approach to commercialization of research and technology (Etzkowitz, 2003; Poole & Robertson, 2003), and different types of entrepreneurial resources. All in all, the university initiatives, aimed to enhance entrepreneurial spirit, facilitate the formation of positive beliefs about entrepreneurial career among students and encourage an attitude that would be conducive to entrepreneurial intentions development and their further realization. In addition, active implementation of practices oriented to promote entrepreneurship at the university creates a supportive atmosphere in terms of entrepreneurial intentions drivers related to subjective norm which may also create a favorable milieu for intentions-actions transformation as students will be constantly encouraged to proceed with venture creation by members of the university society.

University context can provide a pool of resources for students, and can influence students' entrepreneurial behavior and help them to develop viable new ventures. Student entrepreneurs have a chance to benefit from utilizing resources offered by their universities. The provision of entrepreneurial courses, which increase students' knowledge and skills, the access to business contacts, and networks and financial resources, are critical to the ability to recognize opportunities (Shane, 2000; Zhao et al., 2005) and realize them effectively (Robinson & Sexton, 1994). In that, university encourages the development of perceived behavioral control

increasing students' competencies and skills needed to launch a viable venture. Additionally, there is evidence suggesting that the provision of university funded business assistance programs increases the probability of students actually taking action (Parker & Belghitar, 2006). Therefore, we hypothesize,

Hypothesis 5. The relationship between entrepreneurial intentions and the scope of start-up activities will be positively moderated by the favorable university entrepreneurial environment.

2.3.2. The level of societal uncertainty avoidance

Intention-action transition may also depend on the peculiarities of the macro environment and cultural contingencies. In general, involvement into entrepreneurial initiatives tends to be more consonant with some cultures than others (Lee & Peterson, 2000). Therefore, entrepreneurial intention-behavior link may be tighter among individuals operating in societies characterized by cultural peculiarities conducive to entrepreneurship. According to Hofstede (2001), one of the distinct cultural dimensions is uncertainty avoidance, which is defined as 'the extent to which the members of a culture feel threatened by uncertain or unknown situations' (Hofstede, 1991: 113). This notion is closely related to the inherent feature of entrepreneurs – readiness to take risks (Wennekers et al., 2007), a high level of which guides individuals from entrepreneurial intentions towards venture emergence (Van Gelderen, 2010).

In cultures ranking high on uncertainty avoidance, individuals are likely to feel uncomfortable in unstructured situations (Shinnar et al., 2012). Entrepreneurial attitudes to a certain extent are subject to evolve as a result of risk and uncertainty tolerance (Kautonen, Luoto, & Tornikoski, 2010; Yordanova & Tarrazon, 2010). As high uncertainty avoidance is associated with strong fear of failure and tendency to avoid competition, it may serve a significant impediment to unfolding entrepreneurial career and start-up activities (Baughn & Neupert, 2003). For instance, Shane (1993) found a negative relationship between uncertainty avoidance and innovation, and Kreiser, Marino, Dickson, and Weaver (2010) revealed a negative relationship between societal uncertainty avoidance and individual risk-taking. Thus, in societies characterized by high uncertainty avoidance level, individual beliefs about a career of an entrepreneur and general attitudes toward this vocational choice may be rather negative which hampers entrepreneurial intentions emergence affecting in this way further potential actions in this direction. Another hurdle is social norms attributed to various cultures (Engle, Schlaegel, Delanoe, 2011), as in such societies individuals might perceive implicit or explicit pressure not to perform entrepreneurial behavior. In contrast, evidence suggests that societies with low uncertainty avoidance are supportive to entrepreneurial entries (Autio, Pathak, & Wennberg, 2013), as in such societies individual entrepreneurial predispositions, nurtured by favorable cultural conditions, may facilitate the intention-action transformation. Therefore, we suggest that,

Hypothesis 6. The relationship between entrepreneurial intentions and scope of start-up activities will be negatively moderated by the level of the societal uncertainty avoidance.

The overall theoretical model of this article is presented in Fig. 1.

3. Method

3.1. Sample

In this study we rely upon the data collected in the course of the

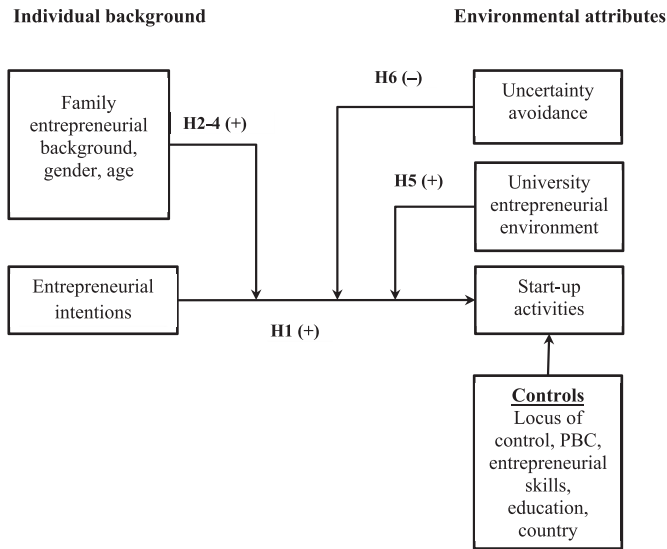


Fig. 1. Theoretical model.

Global University Entrepreneurial Spirit Students' Survey (GUESSS) carried out in 2013–2014.³ This project was launched in 2003 at the Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen, and has been held every two years ever since. Building upon the Theory of Planned Behavior (Ajzen, 1987), the survey aims at gaining an understanding on the drivers and peculiarities of students' entrepreneurial intentions and activities across different countries, with particular foci on students' individual characteristics, the university environment, and the roles played by family and socio-cultural context.

In 2013–2014, students from 34 countries and 759 universities took part in the study. The questionnaire was distributed among 1 959 229 students, and 109 026 responded back (response rate of 5.6%). For the purpose of our study, the responses from exchange students, post-docs and faculty members were excluded from the sample. We also excluded the observations with missing values for any item of the dependent and independent variables. This left us with the sample of 70 164 answers, used in all further analyses.

3.2. Measures

3.2.1. Dependent variable

Entrepreneurial behavior refers to individual ability to turn ideas into actions that result in new venture creation. The venture creating process is 'the process that takes place between the intention to start a business and making the first sales' (Gatewood, Shaver, & Gartner, 1995: 380). Entrepreneurship scholars agree that the emergence of any organizational form is a process made up of multiple start-up activities (Carter, Gartner, & Reynolds, 1996; Gartner, Carter, & Reynolds, 2004). Researchers assume that the more activities are done, the closer an entrepreneur is to a new venture creation (Alsos & Kolvereid, 1998; Carter et al., 1996), for 'the more time and efforts one devotes toward accomplishing a task, the more likely it is that the achievement of this task will occur' (Gatewood et al., 1995: 373). Thus, the major task for research on early stage entrepreneurship has been to identify the factors that promote engagement in the start-up process prior to firm birth (Farmer, Yao, & Kung-Mcintyre, 2011).

Therefore, the dependent variable in our study represents the

index reflecting the scope of start-up activities that a student has already carried out on his or her way to the new venture creation. Basing on the approaches used in previous research (e.g., see Kautonen, Van Gelderen, & Fink, 2015), the list of start-up activities was adopted from Global Entrepreneurship Monitor (GEM) and Panel Study of Entrepreneurial Dynamics (PSED), and includes the following items: "Discussed product or business idea with potential customers", "Collected information about markets or competitors", "Written a business plan", "Started product/service development", "Started marketing or promotion efforts", "Purchased material, equipment or machinery for the business", "Attempted to obtain external funding", "Applied for a patent, copyright or trademark", "Registered the company", "Sold product or service". The scope of start-up activities variable was calculated as a summative index of the number of start-up activities that a student has undertaken, divided by the overall number of start-up activities on the list. Usage of equal weights for individual items of the summative index is justified by sufficient inter-correlation between them (Cronbach Alpha statistics for the 10-item scale is 0.810). By design, the index is measured on a scale from 0 (no activities) to 1 (full engagement in all listed start-up activities). In our sample, the average for this variable is 0.025, standard deviation is 0.095, skewness is 4.796, and kurtosis is 30.662, suggesting that the distribution is positively skewed (most observations are grouped along low values, which is a predictable result in a large sample of students, of whom only a minor part are likely to become entrepreneurs). We took into account the predicted non-normality of the dependent variable by using the heteroskedasticity-robust standard errors estimation in the OLS regression models reported below.

3.2.2. Independent variables

Students' entrepreneurial intentions are operationalized with a 7-point Likert scale adopted from Liñán and Chen (2009). The students were offered to assess the following 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 strong intention to start a firm someday". Cronbach Alpha statistics for this variable is 0.960; the resulting values of the multiple-item variable are calculated as an average score on all the items.

3.2.2.1. Moderators. Family background is a dummy variable taking value of 1 if at least one of the student's parents is an entrepreneur and 0 otherwise. Student's gender is a dummy variable coded as 0 if a student is male and 1 if a student is female. The variable Age reflects student's age in years.

University entrepreneurial environment is measured subjectively (from a student perspective) using a 7-point Likert scale adopted from Franke and Lüthje (2004). Students were offered to assess the following items: "The atmosphere at my university inspires me to develop ideas for new businesses", "There is a favorable climate for becoming an entrepreneur at my university", "At my university students are encouraged to engage in entrepreneurial activities". Cronbach Alpha statistics for this variable is 0.884; the resulting values of the multiple-item variable are calculated as an average score on all the items.

Uncertainty avoidance is operationalized using a 7-point Likert scale derived from the GLOBE research project. The following items were evaluated by respondents: "In my society, orderliness and consistency are stressed, even at the expense of experimentation and innovation", "In my society, most people lead highly structured lives with few unexpected events", "In my society, societal requirements and instructions are spelled out in detail so citizens know what they are expected to do". Thus, this variable captures respondents' individual

³ <http://www.guesssurvey.org>.

perception of the uncertainty avoidance level in the society. Cronbach Alpha statistics for this variable is 0.748; the resulting values of the multiple-item variable are calculated as an average score on all the items.

To assess the moderating effects, the abovementioned variables were examined in interaction with entrepreneurial intentions. The nature of moderators does not imply reverse causality (neither entrepreneurial intentions nor actions can impact students' family background, age, or gender; the reverse-causal impact of actions on the assessment of the university entrepreneurial infrastructure and the level of uncertainty avoidance is also highly unlikely), which is of particular importance given the cross-sectional nature of the data.

3.2.3. Control variables

To ensure sufficient internal validity, in our analysis we employed a number of control variables that provide alternative explanations of the scope of start-up activities variable.

Apart from intentions, among the TPB elements, *perceived behavioral control* may serve as a direct predictor of behaviors (Ajzen, 1991; Armitage & Conner, 2001). Therefore, we included the PBC as a control variable. In addition to PBC, which is situational and behavior-specific in nature, we included the related dispositional psychological trait of *internal locus of control*, which can also be crucial in explaining entrepreneurial behavior (Ajzen, 1991; Jain & Ali, 2013). Internal locus of control is operationalized with a 7-point Likert scale developed by Levenson (1973), with Cronbach Alpha of 0.735 in our sample. Perceived behavioral control is measured with a 7-point Likert scale adopted from Soutaris, Zerbinati and Al-Laham (2007), demonstrating the Alpha of 0.883. These variables are included into the model as average scores on all the items.

Student's educational background may also heavily influence his or her entrepreneurial intentions and the readiness to get involved into actual entrepreneurial activities (Kolvereid & Moen, 1997). Therefore, we control for *student's enrollment into an educational program in entrepreneurship*. Perceived *competence in performing entrepreneurial skills* is also closely related to intentions emergence (Fernández-Pérez, Alonso-Galicia, Rodríguez-Ariza, & del Mar Fuentes-Fuentes, 2015; Liñán, 2008), and may potentially drive entrepreneurial actions. This variable is operationalized with a 7-point Likert scale based on the items proposed in Zhao et al. (2005), Chen et al. (1998), George and Zhou (2001), Liñán (2008), DeNoble, Jung, and Ehrlich (1999), Kickul, Gundry, Barbosa, and Whitcanack (2009) [Cronbach Alpha = 0.912]. The list of skills includes: identifying new business opportunities, creating new products and services, applying personal creativity, managing innovation within a firm, being a leader and communicator, building up a professional network, commercializing a new idea or development, successfully managing a business. This variable is included into the model as an average score on all the items.

Finally, to account for possible national specificities between the countries we included 34 country dummy variables.

3.2.4. Descriptives and correlations

Descriptive statistics and the correlation matrix are presented in Tables 1 and 2.

The largest correlation coefficient between the studied constructs is 0.548 (between PBC and entrepreneurial skills), implying only 35% of the shared variance. This removes concerns about possible multicollinearity in the study.

3.3. Measurement model appropriateness

To validate the measurement model for the scales employed, the

confirmatory factor analysis was performed.

Two basic tests to assure the *convergent validity of the employed measures* (Hair, Black, Babin, & Anderson, 2010) were used. First, for latent constructs with multiple indicators, all hypothesized factor loadings were significant at 0.05 level. Second, all Composite Reliability (CR) indices and Cronbach Alpha statistics turned out to be well above the stipulated cut-off point of 0.7. This confirmed satisfactory convergent validity of the composite constructs in the obtained sample.

Discriminant validity was tested in three different ways. First, we examined the correlations of research constructs (see Table 2). Discriminant validity is implied if all of the correlation estimates are significantly different from 1 (Bagozzi & Yi, 1988). The performed bootstrapping analysis (1000 resamples) of correlation coefficients between composite constructs revealed that none of them included 1 in the 95-percent confidence interval. In the *second* method, discriminant validity is achieved if the square root of the AVE (Average Variance Extracted) statistics for all composite constructs in the study is larger than the correlation coefficients between them (Fornell & Larcker, 1981). This criterion was met for all pairs of correlations between composite constructs. In the *third* method, the correlation between each of the two composite constructs in the study was freely estimated in the first model (i.e., a two-factor model) but set to 1 in the second model (i.e., a one-factor model). A chi-square difference was examined between the two models to determine whether the two constructs are significantly different. Results indicated that all pairs of constructs had significant difference at $p < 0.001$. Taking these findings together, it is reasonable to conclude that acceptable discriminant validity was achieved.

Since we relied on self-report measures from the same respondents for obtaining all constructs, the study results potentially could be distorted by *common method variance bias* (Podsakoff, MacKenzie, & Podsakoff, 2012). We statistically tested for this bias. Firstly, the Harman's statistical test did not reveal a single factor simultaneously affecting all studied constructs: the exploratory principal component analysis extracted 8 principal components with eigenvalues greater than 1. Similarly, in CFA (measurement model) linking each indicator to a single construct (factor capturing the potential common method variance) rather than separate ones resulted in a major drop in the model's fit. Therefore, we conclude that common method variance is unlikely to represent the problem in the current study.

3.4. Results

The empirical analysis of the theoretical framework was performed using hierarchical OLS regression. To control for possible heteroskedasticity in OLS estimation (caused by skewness of the dependent variable) and potential correlated errors across observations (resulting from the non-independence of observations collected from the same university), we employed the heteroskedasticity-robust standard errors adjusted for university clusters. The clustering technique, widely used in econometric studies (Cameron & Miller, 2015), allows explicit specification of the regression models with possible non-independence of observations nested within clusters (i.e., having correlated errors), as it is usually the case with observations nested within higher-order groups. In our case, the idiosyncratic characteristics of individual universities where the data were collected might make the observations within each of them non-independent. This non-independence of observations within clusters will overstate the effects of the standard OLS estimation, leading to type I errors; the employed in our analysis cluster-robust inference eliminates this threat.

Table 1
Descriptive statistics.

Variable	Mean	S.D.	Median	Chronbach Alpha
Start-up activities	0.025	0.095	0	0.810
Entrepreneurial intentions	3.618	1.838	3.500	0.960
Family entrepreneurial background	0.307	0.462	0	–
Gender	0.599	0.490	1	–
Age	22.861	4.104	22	–
University environment	3.989	1.513	4	0.884
Uncertainty avoidance	4.400	1.226	4.333	0.748
Locus of control	5.097	1.076	5.333	0.735
Perceived behavioral control	4.097	1.392	4	0.883
Entrepreneurial skills	4.626	1.197	4.750	0.912
Entrepreneurship education	0.067	0.250	0	–

Note. N = 70 164.

Table 2
Correlation matrix.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Start-up activities	1										
2. Entrepreneurial intentions	0.314***	1									
3. Family entrepreneurial background	0.042***	0.102***	1								
4. Gender	-0.100***	-0.141***	-0.009*	1							
5. Age	0.054***	-0.050***	-0.056***	-0.063***	1						
6. University environment	0.072***	0.279***	0.027***	-0.021***	-0.097***	1					
7. Uncertainty avoidance	0.028***	0.091***	-0.004	-0.041***	-0.027***	0.101***	1				
8. Locus of control	0.118***	0.279***	0.046***	0.003	0.011*	0.213**	0.156***	1			
9. Perceived behavioral control	0.203***	0.581***	0.076***	-0.086***	-0.039***	0.247***	0.129***	0.508***	1		
10. Entrepreneurial skills	0.206***	0.548***	0.087***	-0.076***	-0.004	0.316***	0.139***	0.474***	0.593***	1	
11. Entrepreneurship Education	0.115***	0.162***	0.012**	-0.003	-0.025***	0.131***	0.036***	0.079***	0.142***	0.116***	1

Note. N = 70 164. ***p < 0.001; **p < 0.01, *p < 0.05. All reported significance levels are two-tailed.

The VIF indices for regression model with main effects were in the stipulated range: average VIF = 1.35; max VIF = 2.04, eliminating the possible multicollinearity concerns.

The results of the hypotheses testing using OLS regression analysis are presented in Table 3. The testing was performed in three steps: all controls (Model 1), main effects (Model 2), and

interactions (Model 3).

Hypothesis 1, regarding the positive main impact of entrepreneurial intentions on the scope of start-up activities, was tested in Model 2, finding strong empirical support ($b = 0.014$, $p < 0.001$) suggesting that a one standard deviation increase in intentions increases action index by 0.271 standard deviations. This

Table 3
OLS regression results for the scope of start-up activities index.

Variables	Model 1	Model 2	Model 3
Control variables			
Locus of control	-0.001†	0.002***	0.001**
Perceived behavioral control	0.007***	-0.001*	-0.001
Entrepreneurial skills	0.011***	0.004***	0.005***
Entrepreneurship education	0.025***	0.019***	0.018***
Country effects	Yes	Yes	Yes
Main effects			
Entrepreneurial intentions		0.014***	0.018***
Family entrepreneurial background		0.004***	-0.008***
Gender		-0.012***	0.022***
Age		0.001***	-0.001***
University environment		-0.002***	-0.007***
Uncertainty avoidance		-0.001*	-0.0009
Interaction effects			
Intentions × Family entrepreneurial background			0.003***
Intentions × Gender			-0.009***
Intentions × Age			0.001***
Intentions × University environment			0.001**
Intentions × Uncertainty avoidance			4.36e-06
Constant			
F	0.067	0.052	0.026
F	160.870 (37, 70126)***	240.270 (43, 70120)***	242.270 (48, 70115)***
R ²	0.078	0.128	0.142
R ² difference	–	0.050***	0.014***

Note. N = 70 164. Number of universities: 700.

***p < 0.001; **p < 0.01, *p < 0.05, †p < 0.1. All reported significance levels are two-tailed.

Dependent variable is the scope of start-up activities index. Heteroskedasticity-robust standard errors clustered at the university level. In Models 2 and 3 the variables "age", "university environment", and "uncertainty avoidance" are mean-centered.

corroborates the appropriateness of the Theory of Planned Behavior for explaining entrepreneurial actions, with intentions-behaviors correlation of 0.314. Yet the main effect of entrepreneurial intentions explains only 9.9% of variance in start-up activities – a result suggesting the possibility of moderators, which would reinforce or attenuate this relationship. Additionally, age and family entrepreneurial background are positively related to the intensity of students' involvement into the founding process ($b = 0.001$, $p < 0.001$; $b = 0.004$, $p < 0.001$, respectively). Uncertainty avoidance and university entrepreneurial environment revealed negative main effects ($b = -0.001$, $p < 0.05$; $b = -0.002$, $p < 0.001$, respectively), the latter being rather unexpected. Gender has also revealed a negative effect ($b = -0.012$, $p < 0.001$), indicating that *ceteris paribus* females are less active in the process of launching a venture. As for the control variables, internal locus of control, perceived competence in entrepreneurial skills, and involvement into educational program in entrepreneurship exhibited a positive relation to the scope of start-up activities ($b = 0.002$, $p < 0.001$; $b = 0.004$, $p < 0.001$; $b = 0.019$, $p < 0.001$, respectively), while perceived behavioral control surprisingly revealed a negative effect ($b = -0.001$, $p < 0.05$; the impact becomes insignificant in the Model 3).

The moderating hypotheses 2, 3, 4, 5, 6 were tested in Model 3. The results suggest that the impact of entrepreneurial intentions on the scope of start-up activities is contingent upon the family entrepreneurial background ($b = 0.003$, $p < 0.001$), such that the positive association strengthens for students having such a background, providing support for Hypothesis 2. In particular, whereas for student entrepreneurs without family entrepreneurial background a one standard deviation increase in entrepreneurial intentions increases the outcome by 0.348 standard deviations, for those with such a background the increase is larger – 0.406 standard deviations. As for gender, male entrepreneurs are more likely to transform intentions into actions compared to females ($b = -0.009$, $p < 0.001$), as suggested by Hypothesis 3. We find that for male student entrepreneurs a one standard deviation increase in intentions increases the outcome by 0.348 standard deviations, whereas for female entrepreneurs the increase is only 0.174 standard deviations. Student's age also strengthens the relationship between entrepreneurial intentions and actions ($b = 0.001$, $p < 0.001$) supporting in this way Hypothesis 4. Particularly, if for the individuals with age variable at the level of “mean minus one standard deviation” (18.8 years) a one standard deviation increase in entrepreneurial intentions provokes an increase in start-up activities scope by 0.586 standard deviations, but when the age takes the value of “mean plus one standard deviation” (27.0 years), a one standard deviation increase in intentions increases the outcome by 0.658 standard deviations.

As for the environmental moderators, the effect of intentions on start-up activities scope is contingent on the university milieu ($b = 0.001$, $p < 0.01$), providing support for Hypothesis 5. The detected interaction effect suggests that if the score assessing the university environment takes the minimal scale value (1), a one standard deviation increase in students' entrepreneurial intentions results into an outcome increase by 0.476 standard deviations. At the same time, if university environment takes the maximal scale value (7), a one standard deviation increase in intentions increases the outcome by 0.545 standard deviations. As for uncertainty avoidance, the coefficient on the interaction term appeared to be insignificant, therefore Hypothesis 6 found no support.

The obtained in Model 3 interactions are presented on charts in Fig. 2.

The list of possible entrepreneurial actions that provided a basis for the dependent variable calculation contains start-up activities that require different levels of commitment to the venture

development process. Apparently, discussing a business idea or doing information search and having the first sale accomplished are at the opposite edges of the venture creation continuum. Therefore, the intention-behavior link and possible moderating effects of individual and environmental characteristics may vary depending on the level of actual commitment and effort that a certain action requires. Basing on these premises, we tested our results for robustness excluding three start-up activities, namely “Discussed product or business idea with potential customers”, “Collected information about markets or competitors”, “Written a business plan”, from the actions summative index. These activities were dropped as they do not necessarily demand substantial investment of time and resources; having them performed still allows student entrepreneurs quit all attempts to launch a venture without bearing heavy losses. The results of robustness check are provided in Table 4. Again, the testing was performed in three steps: all controls (Model 4), main effects (Model 5), and interactions (Model 6).

The main effect of entrepreneurial intentions holds significant in the Model 5 ($b = 0.008$, $p < 0.001$). Additionally, age and family entrepreneurial background remain positively related to the students' involvement into more advanced start-up activities ($b = 0.001$, $p < 0.001$; $b = 0.003$, $p < 0.001$, respectively). University entrepreneurial environment revealed negative main effect ($b = -0.001$, $p < 0.001$) as well as gender ($b = -0.007$, $p < 0.001$), indicating that *ceteris paribus* females are less active performing transition from entrepreneurial intentions to actions. Uncertainty avoidance did not demonstrate statistically significant relation to students' involvement into more prominent stages of the venture creation process. As for the control variables, internal locus of control, perceived competence in entrepreneurial skills, and involvement into educational program in entrepreneurship exhibited a positive relation to the students' involvement into founding process ($b = 0.0005$, $p < 0.001$; $b = 0.002$, $p < 0.001$; $b = 0.001$, $p < 0.001$, respectively).

Model 6 contains both main and interaction effects regressed on the scope of advanced start-up activities. The results are similar to those obtained in the main analysis. Family entrepreneurial background, student's age and the university environment positively moderate the effect of intentions on involvement into more intensive start-up activities ($b = 0.002$, $p < 0.001$; $b = 0.001$, $p < 0.001$; $b = 0.001$, $p < 0.001$, respectively). As for gender, male student entrepreneurs keep to be more likely to transform intentions into actions compared to females ($b = -0.005$, $p < 0.001$). As for uncertainty avoidance, the coefficient on the interaction term appeared to be insignificant as it was in Model 3. Therefore, we conclude that the results are quite robust to possible differences in the commitment level that certain start up activities presume.

4. Discussion

4.1. Summary

Our study is rooted in the view that entrepreneurial behavior is volitional, driven by cognitive mechanisms (Kautonen et al., 2013; Krueger, 2005) and explained by the Theory of Planned Behavior. In line with this view, the starting point of entrepreneurial actions is the formation of entrepreneurial intentions (Krueger et al., 2000). Considering the individual entrepreneurial actions thorough the intentionality lens allows their rigorous structural analysis, as “intentionality brings order to the perception of behavior in that it allows the perceiver to detect structure – intentions and actions – in humans' complex stream of movement” (Malle, Moses, & Baldwin, 2001:1).

However, the available evidence indicates that not all entrepreneurial intentions are translated into actions (Kautonen et al.,

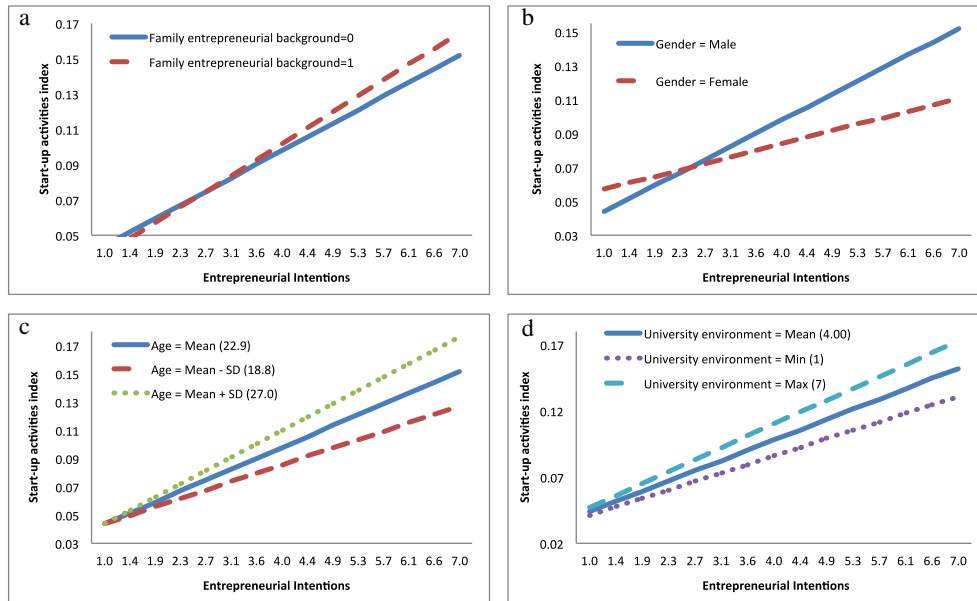


Fig. 2. Interactions Analyses: the impact of contextual factors on the association between entrepreneurial intentions and start-up activities.

Table 4

Robustness check: OLS regression results for the scope of start-up activities index (activities that do not require much commitment excluded).

Variables	Model 4	Model 5	Model 6
Control variables			
Locus of control	-0.001*	0.0005***	0.0002
Perceived behavioral control	0.004***	-0.0001	-0.0001
Entrepreneurial skills	0.006***	0.002***	0.003***
Entrepreneurship education	0.013***	0.001***	0.009***
Country effects	Yes	Yes	Yes
Main effects			
Entrepreneurial intentions		0.008***	0.010***
Family entrepreneurial background		0.003***	-0.006***
Gender		-0.007***	0.013***
Age		0.001***	-0.001***
University environment		-0.001***	-0.004***
Uncertainty avoidance		-0.004	-0.0002
Interaction effects			
Intentions × Family entrepreneurial background			0.002***
Intentions × Gender			-0.005***
Intentions × Age			0.001***
Intentions × University environment			0.001***
Intentions × Uncertainty avoidance			-0.00005
Constant			
F	0.050	0.042	0.027
	93.550 (37, 70126)***	127.090 (43, 70120)***	128.330 (48, 70115)***
R ²	0.047	0.072	0.081
R ² difference	-	0.025***	0.009***

Note. N = 70 164. Number of universities: 700.

***p < 0.001; **p < 0.01, *p < 0.05. All reported significance levels are two-tailed.

Dependent variable is the scope of start-up activities index. Heteroskedasticity-robust standard errors clustered at the university level. In Models 2 and 3 the variables “age”, “university environment”, and “uncertainty avoidance” are mean-centered.

2013), revealing the “intentions-actions gap” phenomenon, which could be found in all domains of human behavior (Armitage & Conner, 2001; Sheeran, 2002). Analyzing the factors that reinforce or attenuate the intentions-behaviors association in the entrepreneurial start-up process is the primary purpose of the current study. In particular, we examine the intention-behavior link using a sample of university students.

Our findings demonstrate that although there is a significant positive association between entrepreneurial intentions and the scope of start-up activities the student entrepreneurs are engaged in ($r = 0.314, p < 0.001$), this association is reinforced or weakened by a set of factors, such as entrepreneur’s family entrepreneurial

background (reinforcing), age (reinforcing), gender (link for males is stronger), university entrepreneurial environment (reinforcing) and general country uncertainty avoidance (weakening) [see Fig. 2].

4.2. Theoretical contributions and future research directions

The present study contributes to two major streams of literature. First, we contribute to the entrepreneurial cognition literature by providing a nuanced understanding of the mechanism of translation of entrepreneurial intentions into start-up activities of student entrepreneurs. Our insights set the boundary condition for the application of the TPB framework in explaining the

entrepreneurial process as volitional behavior, which is essential for entrepreneurship literature (Fayolle & Liñán, 2014). By this means, we examine the phenomenon from the individual (entrepreneur), environmental and start-up process perspectives (Rotefoss & Kolvereid, 2005). On the individual level, we focus on the role of essential personal characteristics, such as family entrepreneurial background, gender, and age in the process of intentional entrepreneurship. The environmental perspective is taken into account by examining the role of the university context and cultural characteristics in the start-up process of student entrepreneurs. Finally, we scrutinize the process perspective of entrepreneurship by focusing on gestation activities undertaken by student entrepreneurs.

Second, our study provides a more nuanced understanding of the Theory of Planned Behavior in the context of entrepreneurship, revealing the necessary conditions for the transformation of intentions into actions. Detailed analysis of this link becomes a logical follow-up to existing broad literature of entrepreneurial intentions. Whereas the prior studies provide a clear understanding of the drivers of entrepreneurial intentions (most notably, Fini et al., 2012; Krueger et al., 2000), our study shows when and how these intentions might become actions. Although recently the entrepreneurship scholars draw attention to the intention-behavior gap in the start-up processes (e.g., Kautonen et al., 2013) to the best of our knowledge we are the first to provide a comprehensive study of the essential moderators in this research stream.

The reported theoretical argument and empirical findings open a promising set of *new research directions*.

First and most obvious, the discussed in the current paper set of moderators is by no means exhaustive, limited to some degree by available data in the GUESSS survey. The further studies should test additional theoretically justified moderators of translation of intentions into entrepreneurial actions, on individual or environmental levels. These future results would allow setting more rigorous boundary conditions of the TPB predictions in entrepreneurship. A particularly promising research agenda implies moving beyond the traditional individually-focused psychological theorizing to the level of social context, considering the influence of broader (social, historic, ideological, cultural) contingencies on both the formation of entrepreneurial intentions and the subsequent translating them into actions. An agenda-setting research in this stream could be the work of Fayolle, Liñán, and Moriano (2014), arguing for the need to consider the socially-determined personal and cultural values, as well as individual motivations as drivers of entrepreneurship processes, complementary (or even alternative) to intentions.

A second promising future research avenue is in expanding the ideas of TPB and intention-action moderators to the group level (e.g., founding team), with generalizing the insights about group intentions, their drivers (individual and group-level), and consequences. Although the underlying TPB cognitive mechanisms are individual in nature, the start-up process usually happens in teams, warranting the need to investigate the group processes. The theme of generalizing the individual-level constructs (such as private mental states, intentions, and private behaviors) to the group level (group intentions; group behaviors) is echoed in the calls in the social psychology literature (Malle et al., 2001).

Finally, an important direction for further research is moving beyond the cognitive mechanisms (formation of intentions and translating them into actions, explained by TPB), to include the affective mechanisms influencing start-up activities. This would allow the researchers and practitioners to understanding the role of emotions (fear, threat) and passions – in addition to cognitive intentions – in explaining the entrepreneurship process.

4.3. Practical implications

The results reported in this study have direct implications for practicing and aspiring entrepreneurs, entrepreneurship educators, and public policy makers responsible for developing and supporting entrepreneurial ecosystems. First and most important, we corroborate the view that entrepreneurial process starts with the intentions; therefore, fostering and nurturing the entrepreneurial intentions is a cornerstone of entrepreneurship development process (Klofsten, 2000). In addition, *for entrepreneurs*, our study shows the factors that are necessary for moving from the original intentions to start a venture to actual start-up behaviors. Although some factors are beyond the individual control (gender, age, and family background) the others are possible to influence (university environment and the country's level of uncertainty avoidance). For *entrepreneurship educators and public policy makers* willing to stimulate start-up activities of students, the paper provides insights regarding the profile of students most likely to translate entrepreneurial intentions into actions. This allows either pre-selecting most promising aspiring entrepreneurs, or making sure that entrepreneurs with unfavorable profile characteristics get the necessary support in translating their intentions into behaviors.

4.4. Limitations

This article proposes a moderation model explaining translation of entrepreneurial intentions into start-up behaviors of student entrepreneurs. This approach has some shortcomings that we recommend be addressed in the future studies.

First, the cross-sectional design of our study allows detecting the short-term association between intentions and actions. This design can be challenged from the reverse causality perspective, and does not allow controlling for the temporal aspect of intentions-actions translation. From the reverse causality point of view, an argument can suggest that when the intentions and actions are captured at the same point in time, the latter might influence the former: i.e., those students who are already engaged in entrepreneurial actions are developing the intentions after the fact, and because of the actions. Yet, we argue that the threat of reverse causality is actually low in our settings. The underlying psychological theory behind our framework – the Theory of Planned Behavior (and its predecessors, such as the theory of reasoned action) – strongly and unambiguously suggest the causality going from intentions to actions, not the other way around. Moreover, in the entrepreneurship context, the reverse causality is intuitively highly unlikely: people start businesses because they intend to, not start intending to start a business because of being already engaged in start-up activities. In other words, entrepreneurship is an intentional act, with low possibility of spontaneous actions leading to *post-hoc* emergence of intentions. With respect to temporal dimension of the intentions-actions translation, we acknowledge that the time between measurement of intentions and actions is obviously a moderator of the intentions-action gap (not available in our research design). In our study we concentrate on other moderators of intentions-actions translation; for this, we kept the time moderator at its lowest level, zero. As such, our results provide the evaluation of the upper boundary for this relationship. However, measuring intentions and actions at the same point in time may cause inability to capture all possible situations that might emerge in some rare cases: e.g., our cross-sectional model does not allow accounting for those students who, even though having reported entrepreneurial intentions, have not initiated any start-up activities yet, but may do so later, or students who at the moment of survey did not have any entrepreneurial intentions but may develop those later as well as

transform them into entrepreneurial actions. Considering this, particularly promising avenue for further research is the analysis of temporal dynamics of the focal process, with long-term impact of moderators in a longitudinal study, analyzing both emergence of entrepreneurial intentions and their implementation into actions.

Second, the main construct of our study (entrepreneurial intentions) is cognitive in nature, and hence can be accurately captured using self-reported measure only. Therefore, the presented analysis is based on a single method – self-report survey measures obtained from a single informant – potentially vulnerable to a set of biases. Even though we conducted a set of tests and robustness checks, we would encourage replication of the study using other methods of capturing other, non-cognitive variables (e.g., observation of the actual behavior).

Third, when designing the study we relied on the entrepreneurial intentions and actions scales that were previously validated in prior works: the cross-cultural entrepreneurial intentions scale of Liñán and Chen (2009) and the GEM/PSED actions scale. Yet, the spirit of the Theory of Planned Behavior suggests different possible levels of specificity of capturing intentions and actions: at the level of behavioral category itself (“starting a business”), or at the level of individual actions within the category (the individual gestation actions, as presented in this study), see the discussion in Kautonen et al. (2015). We encourage future studies to investigate alternative approaches towards operationalizing the intentions and actions.

Finally, the reported research was based on a sample from a single coherent group of subjects, university students. Obviously, the study would benefit from replication using different samples, improving, by this means, the study’s external validity.

5. Conclusion

Entrepreneurial intentions lie at the foundation of entrepreneurial process. Yet the available evidence suggests that not every entrepreneurial intention is eventually transformed into actual behavior – starting and operating a new venture. Our research contributes to a growing body of literature that details the important factors that limit and bind the effective translation of entrepreneurial intentions into actions.

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