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Revisiting the role of behavioral control and entrepreneurial identity in empirical entrepreneurial intention research: a TPB approach

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Abstract

Purpose: The presented paper aims at providing novel evidence on entrepreneurial intention and its antecedence from the perspective of theory of planned behavior and identity in the entrepreneurial university context.

Design/Methodology/Approach: The study is based on a sample of 300 respondents obtained at a German university of applied sciences and consisting of students, scientific and non-scientific staff and alumni. The data was analyzed through IBM SPSS and Smart PLS to test the four hypotheses related to entrepreneurial intention and its antecedents.

Findings: The study provides a critical perspective on the usefulness of the TPB framework extended with identity for predicting the entrepreneurial intention in the entrepreneurial university context. Based on the study results, it is hypothesized that entrepreneurial intention is best explain through a combination of entrepreneurial attitudes, social norms in relation to entrepreneurship and entrepreneurial identity, while excluding behavioral control as the least important predictor with lowest relevance. This has implications both for TPB-based research as well as self-efficacy based research on entrepreneurial intention, as the two are considered to be related concepts.

Research limitations and implications:

Practical implications: Practical implications relate to demonstrating the usefulness of the TPB and identity for evaluating the entrepreneurial intention in terms of broad and diverse range of activities of an entrepreneurial university. Transfer managers, officers in incubators and accelerators can deploy and expand this approach to use it in diverse and mixed settings for comparing and mapping entrepreneurial intention among diverse set of stakeholders.

Originality/value: The article empirically tests the combined theory of planned behavior and identity theory in a sample of diverse respondents, beyond students to include also scientific and non-scientific staff of a university and alumni as important stakeholders in the entrepreneurial university. This is an important empirical and conceptual addition to existing literature with theoretical and practical implications.

1. Introduction

Entrepreneurial intention is one of the most popular theoretical frameworks in entrepreneurship as it is one of the key single predictors of entrepreneurial behavior (Tetteh et al., 2024). It is shown to be relevant both in the pre start-up period as well as in the post start period of the entrepreneurial process, directly converting in the later stages into entrepreneurial performance (Brandstätter, 2011; Gerke et al., 2023). Entrepreneurial intention has therefore been used in previous research as a reliable predictor of entrepreneurial behavior (Hayter et al., 2022; Steinbrink & Ströhle, 2024), especially when researched through the framework of theory of planned behavior (TPB) (Kautonen et al., 2015; Nguyen & Nguyen, 2024). However the research on entrepreneurial intention both inside the university context and outside is almost exclusively focused on the entrepreneurial intention of the university students (Nguyen & Nguyen, 2024; Xu et al., 2023). This represents a large research gap, as little attention has been devoted to understanding entrepreneurial intention in diverse contexts and for evaluating entrepreneurial support measures beyond in-class courses.

Both entrepreneurial behavioral control (also as self-efficacy) and entrepreneurial identity were shown in the previous research to impact the entrepreneurial intention in university students. Both constructs were shown to be relevant mediating variables impacting entrepreneurial intention (Pfeifer et al., 2016), while the impact of entrepreneurial identity on entrepreneurial intention has been confirmed as a predictor beyond the standard TPB model (Obschonka et al., 2015). Similarly, recent research found that general self-efficacy does not impact the entrepreneurial intention while creativity does (Nisula & Olander, 2023). In this context, self-efficacy is said to moderate the relationship between creativity and entrepreneurial intention, rather than exhibit properties of an independent variable. Entrepreneurial identity was found to be a very potent long-term predictor of entrepreneurial ambitions: a longitudinal study found that even after 11 years from enrolling into higher education entrepreneurial program, past entrepreneurial identity aspirations predicted the current ones (Belchior & Castro-Silva, 2023). It is important to that in the TPB considers self-efficacy and controllability to be very similar concepts, where perceived behavioral control as a latent variable needs to incorporate both self-efficacy and controllability items (Ajzen, 2002; Doanh & Bernat, 2019).

Entrepreneurial intention is a widely used theoretical framework for evaluating the entrepreneurial push strategy of entrepreneurial universities (Aliedan et al., 2022; Gorgievski et al., 2018; Wegner et al., 2020). However, the majority of research on entrepreneurial intentions is focused on the higher education students as respondents (Licznarska & Ziemianski, 2022; Lihua, 2022; Lopes et al., 2024). Very rarely have other groups been researched, some of those include random adults with/without sleeping problems (Gunia et al., 2021), current entrepreneurs (Sastre, 2022), current student entrepreneurs (Caniëls & Motylska-Kuźma, 2023; Seebeck & Wolter, 2022) or academic scientists (Wang et al., 2022). The scarcity of entrepreneurial intention studies beyond only students represents a large research gap, exacerbated by a complete lack of studies involving wider and mixed sample populations, especially those relevant for entrepreneurial university- students, academics and alumni. Some previous studies tackle entrepreneurial behavioral control and its mediating impact on entrepreneurial intention from the perspective of organizational and institutional factors at the university (Saeed et al., 2018), as well as those combining TPB and triple helix model (Feola et al., 2019). However, there is a gap in understanding the entrepreneurial intention from the perspective of the entrepreneurial university. Entrepreneurial university perspective is the university that systematically supports entrepreneurship not only among students, but also among staff members, acts as a meeting

point for entrepreneurs and future entrepreneurs, promoting regional development and overall human resource development (Etzkowitz & Zhou, 2007; Paunovic et al., 2022; Pique et al., 2018).

The theory of planned behavior has been used in several studies in relation to entrepreneurial intention in the university context. It has been combined and expanded with other antecedents, like tripple helix (government support, university support, industrial and financial support) (Feola et al., 2019) and university education support (Aliedan et al., 2022; Lavelle, 2021; Su et al., 2021). Having in mind the entrepreneurial university and entrepreneurial ecosystems, several important contributions were made in the previous literature by deploying TPB. Very important and detailed expansion of TPB has been achieved with entrepreneurial (self-) identity as a fourth independent variable in the TPB model of entrepreneurial intention in the university context (Obschonka et al., 2015) and place attachment as an antecedent of both entrepreneurial self-efficacy and entrepreneurial intention of college graduates for back-to-hometown entrepreneurship (Lv et al., 2024).

Self-efficacy and its impact on entrepreneurial intention is an especially useful concept in the context of entrepreneurial education and pedagogy, both inside the TPB, as well as as separate behavioral theory. Self-efficacy is demonstrated to have a direct impact on entrepreneurial intention: positive in practically-oriented courses and negative in theoretically-oriented courses (Piperopoulos & Dimov, 2015). However, we postulate here that while self-efficacy (and behavioral control) is relevant in measuring the short-term behavioral intention in relation to an evaluation of specific course, entrepreneurial identity might be more appropriate instead for measuring a long-term entrepreneurial intention in the context of an entrepreneurial ecosystem around entrepreneurial university.

Having the aforementioned research context in mind, following four research questions were developed, which correspond with the four Hypothesis presented later in the article. Research questions related to entrepreneurial intention at the entrepreneurial university:

RQ1: How do attitude towards entrepreneurship influence entrepreneurial intention in an entrepreneurial university?

RQ2: How do social norms influence entrepreneurial intention in an entrepreneurial university?

RQ3: How does behavioral control (self-efficacy) influence entrepreneurial intention in an entrepreneurial university?

RQ4: How does entrepreneurial (self-) identity influence entrepreneurial intention in an entrepreneurial university?

The article begins by laying out the aim of the study in the context of the existing research gaps in the previous literature and presenting the four research questions. It continues to present the literature review on entrepreneurial intention and TPB research, together with the focus on self-efficacy and identity in entrepreneurship research. Then it continues to review literature on entrepreneurial university, methodology of the study and results. After that, discussion, limitations and future research directions are discussed. The last part provides conclusions and final remarks.

2. Literature review

Entrepreneurial intention

The entrepreneurial intention research very often deploys TPB (Lihua, 2022; Lopes et al., 2024; Rueda Barrios et al., 2022; Steinbrink & Ströhle, 2024), even with a TPB model where self-efficacy is used

instead of perceived behavioral control (Liao et al., 2022; Martínez-Gregorio & Oliver, 2022). Certain studies expand the TPB with other common variables like university support and entrepreneurship education (Sampene et al., 2022), entrepreneurial skills (Sastre, 2022), locus of control and entrepreneurship education (Tseng et al., 2022). Other studies use only parts of TPB and expanding the mediating variables for examining the impact of entrepreneurial attitudes on entrepreneurial intention mediated by passion and creativity (Monica & Anuradha, 2024). There are also entrepreneurial intention studies that go beyond the TPB framework to examine the direct impact of personal values (Ettis, 2022), personality traits and gender (Laouiti et al., 2022), entrepreneurship education (Deng & Wang, 2023; Rakicevic et al., 2023; Ramadani et al., 2022), entrepreneurial motivation (Karan et al., 2024) and entrepreneurial passion (Kyriakopoulos et al., 2024) on entrepreneurial intention. Some also examine the impact of entrepreneurial/scientific identity on academic entrepreneurial intention with the moderating role of university entrepreneurial mission (Wang et al., 2022).

One particular research stream inside entrepreneurial intention research is based on self-efficacy theory (Maddux, 1995; Schunk & DiBenedetto, 2016). This stream of research deals with self-efficacy as a mediating variable for researching the impact of wide range of phenomena on entrepreneurial intention. For example, the mediating effect of self-efficacy in the impact of entrepreneurial ecosystem (Elnadi & Gheith, 2021; Pelegrini & Moraes, 2022), or the impact of entrepreneurial education (Xu et al., 2023) on entrepreneurial intention. Similarly, other research deploys self-efficacy as an independent and/or moderating variable (Nisula & Olander, 2023). As regards other theories apart from the TPB, which is the most common one, several other studies have been used. Some studies in entrepreneurial intention research deploy the entrepreneurial event theory, including perceived feasibility and perceived desirability as antecedents of entrepreneurial intention (Jadmiko et al., 2024; Paunovic & Musial, 2024; Shapero & Sokol, 1982). This theory has its roots in the expectancy theory (Ghatak et al., 2023). Other studies combine TPB with generational cohort theory to uncover entrepreneurial intention in a certain generational cohort, such as generation Z (Hossain et al., 2023) or with curricular and extracurricular knowledge as antecedents of attitudes, social norms and behavioral control (Ignacio et al., 2023). Previous qualitative studies provided grounded theory of green-fielding for explaining the entrepreneurial intention (Green & Binsardi, 2015) and social entrepreneurial intention at the base of pyramid (Claeyé et al., 2022).

There are many quantitative entrepreneurial identity studies (Nguyen & Nguyen, 2024; Steinbrink & Ströhle, 2024) and some qualitative (Arend, 2019; Claeyé et al., 2022; Green & Binsardi, 2015). However, there are much less qualitative studies in the previous literature and they also get less attention. Newer approaches also include configurational studies like those of Laouiti et al. (2022) and Sastre et al. (2022), which use fsQCA for data analysis. There are also several systematic literature reviews (Maheshwari et al., 2022; Pérez-Macías et al., 2022; Tetteh et al., 2024). The most recent literature review confirms the centrality of TPB, self-efficacy and human capital perspective research in the research on entrepreneurial education and intention (Nájera-Sánchez et al., 2023). Only one study with experimental design could be identified, that of Sofiullah et al. (2023), which deals with the impact of entrepreneurial simulation game on entrepreneurial intention.

Previous quantitative studies usually deploy IBM AMOS for conducting SEM (Ramadani et al., 2022; Wang et al., 2022), SmartPLS for conducting SEM (Ettis, 2022; Karan et al., 2024; Pelegrini & Moraes, 2022), R for conducting SEM (Caniëls & Motylska-Kuźma, 2023; Liu et al., 2022), Mplus for conducting SEM (Martínez-Gregorio & Oliver, 2022). Some studies use IBM SPSS for running ANOVA analysis (Gunia et al., 2021), logistic regression analysis (Seebeck & Wolter, 2022) and linear regression analysis (Barrera-Verdugo et al., 2023; Kyriakopoulos et al., 2024). Some studies do not report the software used for analysis (Rueda Barrios et al., 2022). SmartPLS appears to be a very often used software for

conducting SEM, followed by IBM AMOS and IBM SPSS, while fs QCA is the least common approach in TPB for entrepreneurial intention research.

The application of theory of planned behavior in entrepreneurship

The entrepreneurship literature which utilizes the Theory of Planned Behavior (TPB) has grown in the previous decades (Lortie & Castogiovanni, 2015) and is continuing to grow in the recent years (Hossain et al., 2023; Nguyen & Nguyen, 2024; Steinbrink & Ströhle, 2024). Theory of planned behavior has previously been combined with the self-determination theory to analyse the student loyalty of university students, by combining different elements from the two theories as well as excluding certain elements from both theories (Ong et al., 2023). Other studies have also deployed only parts of the original TPB framework to make it simpler and more straightforward. A study in Pakistani students examines the mediating role of attitudes in the relation between perceived creativity disposition and entrepreneurial intention, while considering a perception of university support as a moderating variable (Anjum et al., 2021).

Certain previous studies have confirmed the strongest impact of attitudes and weakest of behavioral control on entrepreneurial intention (Yang, 2013). Other subsequent studies even found no statistically significant impact of behavioral control on entrepreneurial intention (Ajlouni, 2021). Some authors are eager to attribute this to the insignificance of the behavioral control and self-efficacy for the development of entrepreneurial intention (Lortie & Castogiovanni, 2015), while others are inclined to revisit the operationalisation of the constructs in different entrepreneurial ecosystems and contexts (Kolvereid & Isaksen, 2006). Another related stream of literature regards the relationship between the entrepreneurial self-efficacy (also behavioral control as well as perceived feasibility) and entrepreneurial intention as highly context specific, with implications for the application of TPB in entrepreneurship research (Piperopoulos & Dimov, 2015).

Self-efficacy and entrepreneurial identity

The relationship between the entrepreneurial self-efficacy (also behavioral control as well as perceived feasibility) and entrepreneurial intention is highly context specific, with implications for the application of TPB in entrepreneurship research (Piperopoulos & Dimov, 2015). In other EI studies, no direct impact of self-efficacy has been found and instead an impact of creativity on EI of knowledge workers was confirmed, while self-efficacy was shown to moderate this relationship (Nisula & Olander, 2023). In a similar creativity-focused study, the impact of creative self-efficacy on SME innovativeness has been confirmed (Schenkel et al., 2024). In further EI studies outside of TPB framework, entrepreneurial self-efficacy was often deployed as a mediating variable in the impact of entrepreneurial alertness and cognitive flexibility (Jiatong et al., 2021) as well as entrepreneurship education (Xu et al., 2023) on EI, rendering in both cases significant mediating influence on these relationships. Further studies have confirmed the importance and relevance of the self-efficacy and entrepreneurial intention in the gender-sensitive entrepreneurial education (Elliott et al., 2020; Gerke et al., 2023). Regarding the relation between the entrepreneurial self-efficacy and perceived behavioral control, one previous study deploys entrepreneurial self-efficacy as an antecedent of both standard TPB constructs as well as of entrepreneurial intention itself (Doanh & Bernat, 2019). The results of this study confirmed the strongest relationship between entrepreneurial self-efficacy and perceived behavioral control. This confirms the relevance of our approach of considering self-efficacy and perceived behavioral control as interchangeable terms.

Entrepreneurial university

Entrepreneurial university is committed to the development of the whole region that it belongs to, thereby developing into a key factor of regional innovation efforts inside the knowledge society (Vefago et al., 2020). Here, the definition of entrepreneurial university intersects with another related concept falling into the third mission of university activities, namely the notion of regionally engaged university. The entrepreneurial university research needs to acknowledge the heterogeneous nature of the HEIs, thereby differentiating between different types of entrepreneurial university (Sánchez-Barrioluengo et al., 2019). Previous research created a typology of three relatively stable types of universities, which in some situations and contexts also can be combined: entrepreneurial university, engaged university, regional engaged university (Sánchez-Barrioluengo & Benneworth, 2019).

Entrepreneurial university is an economically and socially engaged university that goes beyond the first and second mission of university to fulfill the third, entrepreneurial mission of university (Vefago et al., 2020). Some even praise the university campus to be the key locus of entrepreneurial ecosystems (Fischer et al., 2019; Miller & Acs, 2017). The conceptualization of entrepreneurial university and third mission of university begins with the notion of universities as the central actors in knowledge society, whereas the activities inside the third mission are labeled as entrepreneurial activities, academic entrepreneurship, knowledge transfer, academic engagement as well as knowledge exchange activities (Sánchez-Barrioluengo et al., 2019). Some authors even advocate for the rephrasing of the term from the “entrepreneurial university” to the “university for the entrepreneurial society” (Audretsch, 2014). This shift should demonstrate the further evolution of the university’s purpose and function in the knowledge economy but also in the broader society which is increasingly entrepreneurial. Knowledge-based entrepreneurship is a driving force of knowledge-based entrepreneurship and the entrepreneurial university plays an important role both as knowledge producer as well as a knowledge disseminator (Guerrero & Urbano, 2012). Entrepreneurial universities are also an important part of the national innovation system by involving in the multitude of partnerships, networks and other relationships with both public and private organizations alike, representing effectively a hub for interaction, collaboration and co-operation inside innovation ecosystem (Inzelt, 2004). Entrepreneurial universities play multiple roles in university-pushed, government-pulled and corporate-led innovation inside a triple helix model of innovation (Etzkowitz & Zhou, 2007).

Recent research has identified a gap in the literature regarding the distinction between entrepreneurship and intrapreneurship in entrepreneurial universities (Henry & Lahikainen, 2024). Also, the conceptualization of the role of entrepreneurship department inside the entrepreneurial university is still poorly defined, representing a significant research gap (Pugh et al., 2021). Previous literature has multiple goals of entrepreneurship departments inside entrepreneurial university. These include delivering trainings for regional SMEs, conducting student’s research projects in SMEs, teaching the next generation of entrepreneurs, crafting and maintaining an entrepreneurial culture, holding regional events with various stakeholders, implementing government-financed support programs (Paunovic et al., 2022; Pugh et al., 2021). The entrepreneurial processes at the entrepreneurial university are both formal and informal and they need to be managed on the part of the university in order to build entrepreneurial capital beyond organizational boundaries in co-operation with regional stakeholders (Gianiodis & Meek, 2020).

There is a research gap and consequent need for proper conceptualization of the entrepreneurial university which has to include pluralist approach regarding different types of entrepreneurial universities along with their contexts and which needs to take care not to overemphasize

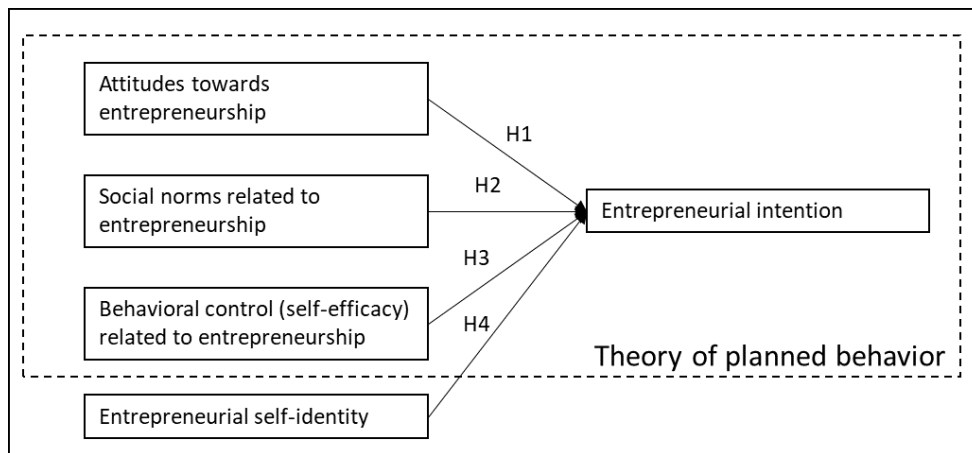
commercialization activities (Wurth et al., 2024). The two main functions of entrepreneurial universities in the knowledge society, that were recently conceptualized, are the exploration and exploitation of knowledge in support of innovation and entrepreneurship (García-Hurtado et al., 2024). These two functions need to form a certain ambidexterity at the entrepreneurial university, the parallel activation of both the exploration and the exploitation activities.

3. Methodology

Having the aforementioned theoretical framework in mind, the data was collected from October to December 2023 at the Bonn-Rhine-Sieg University of Applied Sciences as part of the regular evaluation activities in the project „Start-up Manufaktur“, a start-up center of the university. The link to the online questionnaire was sent via email to all of the students, employees and alumni of the university, returning 317 filled-out questionnaires, out of which 17 had to be excluded due to incompleteness. This gave a full sample of n=300 valid responses. The questionnaire includes students, employees and alumni as it is part of the effort to create an all-encompassing start-up culture at the university inside the third mission of university. That is why it is not focused only on students or only on academics, but on an inclusive and wide set of stakeholders.

In order to check for normality of the data before deciding whether to run the SEM analysis in AMOS (for normally distributed data) or SMART PLS (for non-normally distributed data), a Kolmogorov-Smirnov normality test was conducted in SPSS. The Kolmogorov-Smirnov test of normality was chosen as it is suitable for large samples, e.g. over n=50. The test returned for all variables the Sig. < 0.001, meaning the data are not normally distributed, therefore necessitating the use of Smart PLS, or using the bootstrapping option in IBM AMOS SPSS. We choose SmartPLS due to previous research rendering good results for non-normally distributed data. See for example the applied research of Lopes et al. (2024) or methodologically sound explanation on the advantages of PLS-SEM of Hair et al. (2011). In addition to appropriateness due to non-normality of the primary data collected with limited data set size, PLS-SEM is an appropriate method for theoretically extending existing theory or for exploratory research (Hair et al., 2019).

The graphic below illustrates a conceptual framework based on the Theory of Planned Behavior (TPB), which aims to understand the factors influencing entrepreneurial intention. The model comprises several components. Attitudes Towards Entrepreneurship represent an individual's positive or negative evaluation of becoming an entrepreneur. It's hypothesized (H1) that a favorable attitude towards entrepreneurship will positively influence entrepreneurial intention. Social Norms Related to Entrepreneurship refer to the perceived social pressure to engage or not engage in entrepreneurial activities. The model hypothesizes (H2) that supportive social norms will enhance an individual's entrepreneurial intention. Behavioral Control (Self-Efficacy) Related to Entrepreneurship reflects the individual's belief in their capability to perform entrepreneurial tasks. The hypothesis (H3) suggests that higher perceived behavioral control (or self-efficacy) will lead to stronger entrepreneurial intentions. Entrepreneurial Self-Identity reflects the extent to which an individual identifies themselves as an entrepreneur. The model proposes (H4) that a stronger entrepreneurial self-identity will positively influence entrepreneurial intention. Entrepreneurial Intention is the central dependent variable in the model and represents the intent or willingness of an individual to engage in entrepreneurial activities. The arrows in the model indicate the hypothesized relationships between these factors, with each hypothesis (H1, H2, H3, and H4) representing a proposed pathway through which attitudes, social norms, perceived behavioral control, and self-identity influence entrepreneurial intention. Overall, this model applies the Theory of Planned Behavior to the context of entrepreneurship, suggesting that these four factors collectively shape an individual's intention to pursue entrepreneurial activities.



Statistical description of the variables

The batteries of questions and statistical descriptions in relation to the conditional variables “Attitudes”, “Perceived social norms”, “Perceived behavioral control”, and “Entrepreneurial self-identity”, and outcome variable “Entrepreneurial intention” are presented in the Table below. The 4 of the presented 5 batteries have 3 items per construct. Only the construct “Attitudes” had 4 items organized into opposing pairs: Not interesting-interesting, Not attractive-attractive, Boring-exciting, Waste of time- It pays off to invest as much time as possible. All the questions related to all of the used items in the questionnaire were measured along a 5-point Likert scale. The first two question of the lastly introduced construct in the questionnaire “Behavioral control” were intentionally reversed as to prevent fatigue induced bias regarding the responses.

The study evaluated several factors related to entrepreneurship among participants. The overall entrepreneurial intention was moderate, with a mean score of 2.50 (SD = 1.31). Attitudes toward entrepreneurship were more positive, with a higher mean of 3.75 (SD = 0.98). Perceived social norms, reflecting the influence of peers and society, scored a mean of 2.63 (SD = 1.04). Participants showed a moderate level of confidence in their ability to engage in entrepreneurship, with a mean score of 3.39 (SD = 0.92) for perceived behavioral control. Entrepreneurial identity was also positive, with a mean of 3.55 (SD = 0.97), indicating a general alignment with entrepreneurial self-concept.

	Variable	Mean	SD
Entrepreneurial intention (EI)		2.50	1.31
I intend to get involved in the entrepreneurial activities of starting my own company in the foreseeable future.	v_53	2.53	1.43
In my opinion, there is a high probability that I will take part in entrepreneurial activities in the foreseeable future.	v_54	2.68	1.40
I recently sought information about the options and means of starting my own business.	v_55	2.28	1.44
Attitudes related to Entrepreneurship (ATE)		3.75	0.98
Interesting	v_80	3.75	1.29
Attractive	v_81	3.65	1.20
Exciting	v_82	3.93	1.10
It's worth investing as much time as possible.	v_83	3.67	1.07
Social Norms related to Entrepreneurship (SCE)		2.63	1.04
My friends and family think I should get involved in entrepreneurial activities.	v_85	2.71	1.28

Most of my colleagues whose opinions are important to me believe that I should participate in entrepreneurial activities.	v_86	2.69	1.14
My superiors believe that I should participate in entrepreneurial activities.	v_87	2.48	1.14
<i>Behavioral Control related to entrepreneurship (BCE)</i>		3.39	0.92
I believe that I am up to the demands of participating in entrepreneurial activity.	v_90	3.38	1.09
I am convinced that it would be easy for me to take part in entrepreneurial activities.	v_91	3.13	1.06
If I wanted to participate in entrepreneurial activities, I am confident that I would succeed.	v_92	3.65	1.01
<i>Entrepreneurial self-identity (ESI)</i>		3.55	0.97
The idea of participating in entrepreneurial activities does not fit with my self-image.	v_95INV	3.56	1.21
The idea of participating in entrepreneurial activities is completely foreign to me.	v_96INV	3.72	1.18
The idea of getting involved in entrepreneurial activities fits well with the image I have of myself and my abilities.	v_97	3.35	1.09

4. Results

The demographic data is presented in the table below. The study sample comprised 300 participants, with a nearly even distribution of gender. Women constituted 49.7% of the sample (n=149), slightly outnumbering men, who made up 48.3% (n=145). A small proportion of the participants identified as diverse, representing 2% of the sample (n=6).

In terms of generational cohorts, most participants belonged to Generation Z (born between 1997 and 2010), accounting for 63.3% of the sample (n=190). Generation Y (1981-1996) was the next largest group, comprising 26.7% of the participants (n=80). Generation X (1965-1980) and the Baby Boomer generation (1946-1964) were less represented, with 5.7% (n=17) and 4.3% (n=13) of the sample, respectively.

The professional status of the participants was predominantly that of students, who made up 76% of the sample (n=228). Other professional roles included researchers (8%, n=24), administrative or technical employees (6%, n=18), professors (3%, n=9), alumni (3.3%, n=10), and lecturers (both external and internal) who accounted for 2.7% of the sample (n=8). A small percentage of participants identified with other professional statuses, representing 1% of the sample (n=3).

Sample characteristics	Frequency (n=300)	Percent (100%)
Gender		
Diverse	6	2 %
Man	145	48.3 %
Women	149	49.7 %

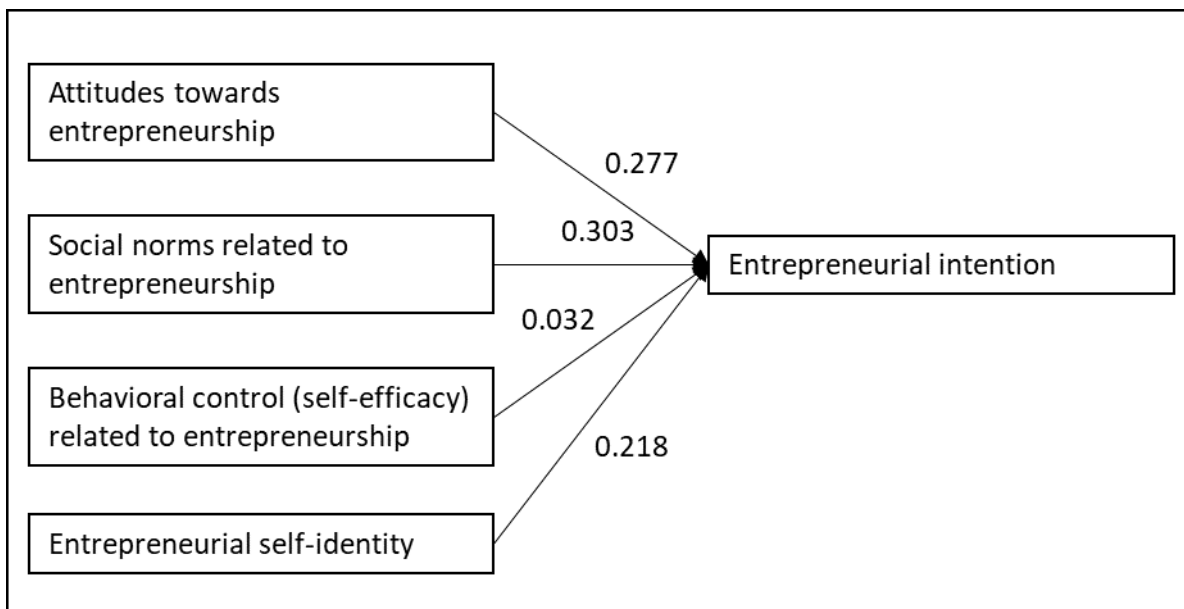
Generational cohort		
1997-2010 (Generation Z)	190	63.3 %
1981-1996 (Generation Y)	80	26.7 %
1965-1980 (Generation X)	17	5.7 %
1946-1964 (Generation BB)	13	4.3 %
Professional status		
Student	228	76 %
Professor	9	3 %
Lecturer (external and internal)	8	2.7 %
Administrative or technical employee	18	6 %
Researcher	24	8 %
Alumni	10	3.3 %
Other	3	1 %

The stop criterion changes demonstrated that the algorithm converged after 5 iterations and therefore no algorithm has actually converged. The summary of the results for the reflective measurement model is presented below in the table. All outer loadings of the reflective constructs ATE, SNE, BCE, ESI and EI were well above the threshold value of 0.708, indicating an adequate level of indicator reliability. The indicator V_95INV demonstrated the lowest level of indicator reliability of 0.64 (0.798²) and the indicator v_86 the highest level of 0.84 (0.915²). The results pertaining to the indicators of composite, convergent and discriminant validity are presented in the annex. All 5 reflective constructs demonstrated composite reliability values higher than the threshold value regarding all three indicators ρ_A ; Cronbach's α ; $\rho_C > 0.7$, thereby indicating a satisfactory level of internal consistency reliability. The convergent validity was also confirmed as the AVE values of all 5 reflective constructs were above the threshold value of 0.5. The discriminant validity, as assessed through Heterotrait-monotrait ratio (HTMT) showed that all value are above the more conservative threshold value of 0.85. A second assessment of discriminant validity was conducted through Fornell-Lacker criterion, where square roots of the AVEs of the reflective constructs Attitudes (0.842), Behavioral Control (0.873), Entrepreneurial intention (0.922), Entrepreneurial Identity (0.831), and Social Norms (0.874) where shown to be higher than the correlations of these constructs with other variables in the path model.

Latent variable	Indicators	Convergent validity			Internal Consistency Reliability			Discriminant Validity
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability ρ_A	Composite reliability ρ_C	HTMT
		> 0.70	> .50	> 0.50	> 0.70	> 0.70	> 0.70	< 0.85
<i>Entrepreneurial intention (EI)</i>	v_53	0.95	0.90	0.85	0.91	0.93	0.94	Yes
	v_54	0.95	0.90					
	v_55	0.87	0.75					
<i>Attitudes related to Entrepreneurship (ATE)</i>	v_80	0.89	0.75	0.71	0.86	0.89	0.91	Yes
	v_81	0.90	0.81					
	v_82	0.81	0.66					
	v_83	0.77	0.59					
<i>Social Norms related to Entrepreneurship (SCE)</i>	v_85	0.87	0.75	0.76	0.85	0.86	0.91	Yes
	v_86	0.92	0.84					
	v_87	0.84	0.70					

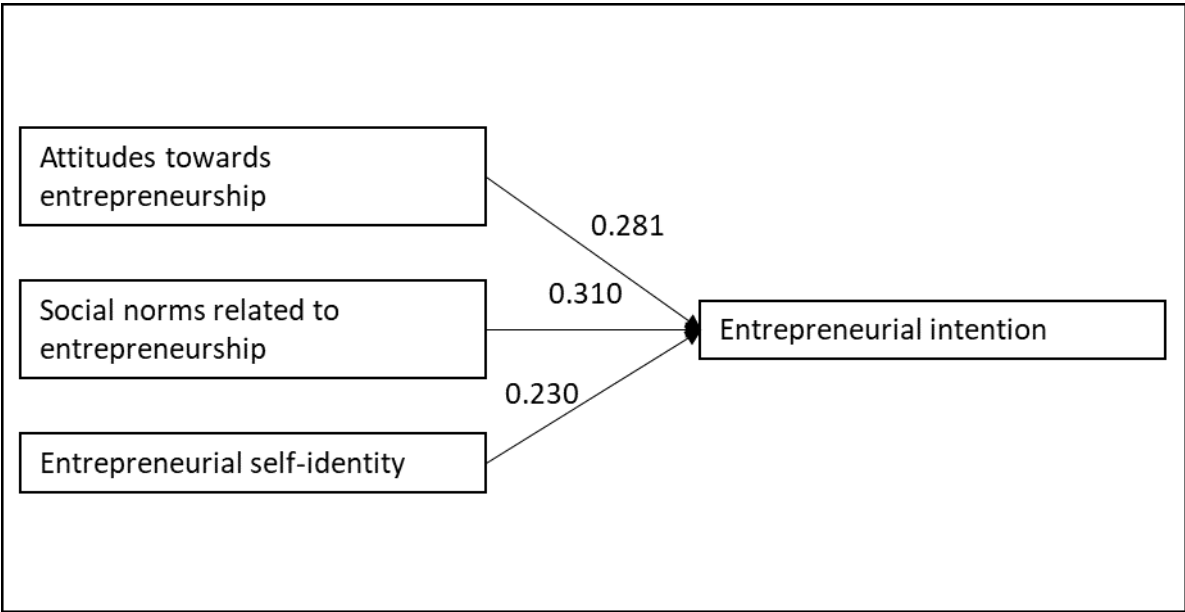
<i>Behavioral Control related to entrepreneurship (BCE)</i>	v_90	0.90	0.82	0.76	0.85	0.85	0.91	Yes
	v_91	0.85	0.73					
	v_92	0.86	0.75					
<i>Entrepreneurial self-identity (ESI)</i>	v_95INV	0.80	0.64	0.70	0.78	0.81	0.87	Yes
	v_96INV	0.86	0.73					
	v_97	0.84	0.70					

Model 1 presented below examined the impact of attitudes toward entrepreneurship, social norms related to entrepreneurship, behavioral control (self-efficacy) related to entrepreneurship, and entrepreneurial self-identity on entrepreneurial intention. The results indicated that attitudes toward entrepreneurship had a positive and significant relationship with entrepreneurial intention, with a path coefficient of 0.277. Social norms related to entrepreneurship exhibited the strongest influence on entrepreneurial intention in this model, with a path coefficient of 0.303. In contrast, behavioral control (self-efficacy) showed a weak and minimal impact on entrepreneurial intention, as reflected by a path coefficient of 0.032, suggesting that it plays a less crucial role in shaping entrepreneurial intention within this context. Entrepreneurial self-identity also contributed positively to entrepreneurial intention, with a path coefficient of 0.218. It is important to note at this point that for sample sizes of up to 1000 observations, path coefficients above 0.2 can be considered statistically significant, while below 0.2 can be considered non-significant (Jr et al., 2016). The model fit of the model 1 is the same for both the saturated as well as the estimated model (SRMS=0.071, NFI= 0.836) and can be considered to partially demonstrate a good fit, because it satisfies one of the two threshold values (SRMR<0.08, NFI>0.90) for good fit.



Model 2 is presented below and it focused on a slightly different set of factors by omitting behavioral control (self-efficacy) due to not being statistically significant in the first model and assessing the impact of the remaining variables. In this model, attitudes toward entrepreneurship continued to show a

significant and positive relationship with entrepreneurial intention, with a slightly higher path coefficient of 0.281. Social norms related to entrepreneurship remained the most influential factor, with a path coefficient of 0.310, indicating a consistent and strong influence across both models. Entrepreneurial self-identity, similar to Model 1, maintained a positive impact on entrepreneurial intention, with a path coefficient of 0.230, underscoring its stable contribution. The model fit of the model 2 is the same for both the saturated as well as the estimated model (SRMS=0.070, NFI= 0.856) and can be considered to partially demonstrate a good fit, because it satisfies fully one of the two threshold values for good fit and is acceptable due to borderline value for another threshold value (SRMR<0.08, NFI>0.90). The model fit of model 2 is an improvement regarding NFI (from NFI=0.836 to NFI=0.856) to a value that is almost a good model fit.



When comparing the two models, it becomes evident that social norms and attitudes toward entrepreneurship are key predictors of entrepreneurial intention in both cases. Entrepreneurial self-identity consistently contributes to entrepreneurial intention, although its influence is slightly lower than that of social norms and attitudes. The minimal impact of behavioral control (self-efficacy) observed in the first model suggests that while it might have a role, it is not as pivotal as the other factors in predicting entrepreneurial intention. Overall, these findings underscore the importance of social influences and personal attitudes in shaping entrepreneurial intentions, with entrepreneurial self-identity also playing an important role. The statistical significance of the impact that entrepreneurial self-identity has on entrepreneurial intention and the better model fit in the model 2 point to the importance of revising adapting the use of classical TPB model in entrepreneurial context. The suggested alteration in the present research is the exclusion of the behavioral control and the inclusion of entrepreneurial (self-) identity.

5. Discussion, limitations and future research directions

Theoretical implications

The present research extends the previous research on TPB based entrepreneurial intention research in the university context (Lopes et al., 2023; Tseng et al., 2022), and especially the sparsely researched TPB based entrepreneurial intention research embedded in knowledge economy of triple helix and entrepreneurial university (Feola et al., 2019). The present research does not research the university support as an object of research, as already researched in the previous studies (Anjum et al., 2021; Saeed et al., 2018), but instead reconceptualizes the study context and sample of the study. The present study therefore contributes to the literature by applying the already tested models of entrepreneurial intention inside the framework of TPB and entrepreneurial identity, see Obschonka et al. (2015), in the new context relevant for the entrepreneurial university: namely the entrepreneurial intention of not only students but also technical and academic employees and alumni. The results of the study question the usefulness of the previous models of entrepreneurial intention for future research in the entrepreneurial university and triple helix context. The results of the present study call for substituting the perceived behavioral control with entrepreneurial self-identity of the respondents in the original TPB model.

The results of the present research didn't confirm the relevance of the impact that behavioral control exerts on entrepreneurial intention, while confirming the relevance of attitudes as strongest single predictors, thereby confirming previous findings of Yang (2013) and Ajlouni (2021). These findings also empirically confirm the notion that self-efficacy (also behavioral control or perceived feasibility) is highly context-specific (Piperopoulos & Dimov, 2015). This issue should therefore be accounted for in the TPB-based entrepreneurial intention research. The present research is quantitative in nature, thereby extending the scarce quantitative research on entrepreneurial identity conducted by Obschonka et al. (2015). This scarcely researched research stream should enhance the understanding of entrepreneurial self-identity a developmental outcome of professional and entrepreneurial socialization and experiences. Contrary to Obschonka (2015), present research results do not support the entrepreneurial identity as a fourth antecedent of entrepreneurial intention, but rather as a third antecedent, replacing the entrepreneurial behavioral control. Also, the results differ from other studies outside the TPB framework, where self-efficacy was an important predictor of entrepreneurial intention, especially in the gendered perspective (Elliott et al., 2020; Gerke et al., 2023). Most importantly, the present results confirm the recent findings inside the TPB framework that perceived behavioral control is a relatively weak predictor of entrepreneurial intention, much weaker than attitudes and social norms (Doanh & Bernat, 2019).

Practical implications

The present study has several practical implications. It provides university administration, technology transfer officers, entrepreneurial incubators and accelerators with a tool to measure and track entrepreneurial intention among a wide array of relevant stakeholders. Moreover, the tool can also be used by industry and government officers inside the triple helix to conduct further data collection at the intersection with entrepreneurial contexts, e.g. in corporate incubators and venture capital or government-led start-up programs, incentives and innovation initiatives. Entrepreneurial behavior can easily be predicted through entrepreneurial intention before starting up and after starting up, and entrepreneurial performance. By using the analytical framework of TPB and its variations, managers and other practitioners can easily get an in-depth understanding of entrepreneurial behavior among their target groups, stakeholders or geographic areas of interest.

Limitations

The limitations of the study mostly relate to the small number of previously used entrepreneurial self-identity predictors, and hence also expected lower indicator reliability and lower internal consistency and reliability of the entrepreneurial self-identity as a latent variable. New, more diverse batteries of questions should be tried in the future research to address these problems. This future advancement will probably also increase the impact entrepreneurial self-identity has on the entrepreneurial intention in the presented model. Additionally, the study did not take into account cultural differences, which might significantly influence the reliability of the study.

Future research directions

Future research on entrepreneurial intention in universities should expand the samples in terms of varying stakeholders inside the entrepreneurial university or triple helix to get more results from varying contexts, which are relevant for entrepreneurial universities. Keeping in mind that the TPB based entrepreneurial intention research is based on a relatively stable theoretical underpinning (Nguyen & Nguyen, 2024; Steinbrink & Ströhle, 2024) and numerous possible extensions are well explored (Ajlouni, 2021; Anjum et al., 2021; Lortie & Castogiovanni, 2015; Yang, 2013), new samples structures and contexts would expand our understanding on the entrepreneurial intention. This would enable better accessing the relevance of the TPB-based frameworks

6. Conclusions

The approach of measuring entrepreneurial intention among various stakeholders at the university fulfills an important role of measuring entrepreneurial intention in diverse context. Therefore it is an increasingly relevant instrument for measuring the advancement toward the entrepreneurial university and establishing an entrepreneurial culture.

Previous research into entrepreneurial intention in the university context almost exclusively takes the stance of entrepreneurship being another course to be thought to university students, often undergraduate (first mission of university) and sometimes engaging with researchers (second mission of university) (Feola et al., 2019). It is mostly a tool for evaluation of entrepreneurial education of students or researchers. This approach creates a significant research gap in conceptualizing the entrepreneurial intention at the university in the context where it theoretically belongs, that is in the third mission of university context, not just in the first or second mission of university. Entrepreneurial intention has the potential to be used for evaluation of compound effects of a wide range of activities present at entrepreneurial university, such are meetings, incentives, hackathons, consulting activities, financing, company visits, practical projects, etc. All these activities contribute to the development of entrepreneurial culture in an entrepreneurial university.

The entrepreneurial intention research beyond entrepreneurial intention of students is an important, yet under researched and promising field of research. By placing our study in the context of entrepreneurial university, the present study was able to provide both novel perspective in the entrepreneurial intention research and test a well-documented evaluation instrument in an under-researched context. The present study therefore provides evidence on the importance of using an adapted TPB model without behavioral self-control (self-efficacy) and with added entrepreneurial self-identity. This is an important novelty directed at measuring entrepreneurial intention in the context of building entrepreneurial culture in the broader context of entrepreneurial university, with an

abundance of offers, formats and stakeholders involved. This is in contrast with the TPB or self-efficacy models predominantly used for evaluating classroom entrepreneurial education activities. We hypothesize based on our findings that using identity along with attitudes and social norms to predict entrepreneurial intention is a better suited analytical framework and instrument in the context of entrepreneurial university, with diverse set of stakeholders and activities inside third mission.

7. References

- Ajlouni, M. I. A. (2021). Predicting entrepreneurial intentions among postgraduate students using the theory of planned behaviour: Jordan case. *International Journal of Entrepreneurship and Small Business*, 44(3), 235. <https://doi.org/10.1504/IJESB.2021.119229>
- Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior 1. *Journal of applied social psychology*, 32(4), 665–683.
- Aliedan, M. M., Elshaer, I. A., Alyahya, M. A., & Sobaih, A. E. E. (2022). Influences of university education support on entrepreneurship orientation and entrepreneurship intention: Application of Theory of Planned Behavior. *Sustainability*, 14(20), 13097.
- Anjum, T., Farrukh, M., Heidler, P., & Tautiva, J. A. D. (2021). Entrepreneurial intention: Creativity, entrepreneurship, and university support. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), 11.
- Arend, R. J. (2019). Entrepreneurial entrepreneurship youth education: Initiating grounded theory. *Entrepreneurship Education*, 2(1), 71–89.
- Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, 39, 313–321.
- Barrera-Verdugo, G., Cadena-Echverría, J., Villarroel-Villarroel, A., & Contreras-Fuenzalida, M. (2023). Influence of students' personality, gender, income and age on their intentions to create new information technology and telecommunications ventures. *PloS One*, 18(7), e0284488.
- Belchior, R. F., & Castro-Silva, H. (2023). The virtuous cycle of entrepreneurial identity and experience—a longitudinal analysis. *International Entrepreneurship and Management Journal*, 19(4), 1739–1770.

- Caniëls, M. C., & Motylska-Kuźma, A. (2023). Entrepreneurial intention and creative performance—the role of distress tolerance. *International Entrepreneurship and Management Journal*, 19(3), 1131–1152.
- Claeyé, F., Boughattas, Y., & Tornikoski, E. T. (2022). Formation of social entrepreneurial intention: A qualitative grounded approach at the base of the pyramid. *Administrative Sciences*, 12(1), 24.
- Deng, W., & Wang, J. (2023). The effect of entrepreneurship education on the entrepreneurial intention of different college students: Gender, household registration, school type, and poverty status. *PLOS ONE*, 18(7), e0288825. <https://doi.org/10.1371/journal.pone.0288825>
- Doanh, D. C., & Bernat, T. (2019). Entrepreneurial self-efficacy and intention among Vietnamese students: A meta-analytic path analysis based on the theory of planned behavior. *Procedia Computer Science*, 159, 2447–2460.
- Elliott, C., Mavriplis, C., & Anis, H. (2020). An entrepreneurship education and peer mentoring program for women in STEM: mentors' experiences and perceptions of entrepreneurial self-efficacy and intent. *International Entrepreneurship and Management Journal*, 16(1), 43–67.
- Elnadi, M., & Gheith, M. H. (2021). Entrepreneurial ecosystem, entrepreneurial self-efficacy, and entrepreneurial intention in higher education: Evidence from Saudi Arabia. *The International Journal of Management Education*, 19(1), 100458.
- Ettis, S. A. (2022). How do personal values help to build generation Y's entrepreneurial intentions? The role of gender differences. *Gender in Management: An International Journal*, 37(1), 108–125.
- Etzkowitz, H., & Zhou, C. (2007). Regional innovation initiator: The entrepreneurial university in various triple helix models. *VI Conference Theme Paper*, 6, 1–25.
- Feola, R., Vesci, M., Botti, A., & Parente, R. (2019). The determinants of entrepreneurial intention of young researchers: Combining the theory of planned behavior with the triple Helix model. *Journal of Small Business Management*, 57(4), 1424–1443.

- Fischer, B. B., Moraes, G. H. S. M. de, & Schaeffer, P. R. (2019). Universities' institutional settings and academic entrepreneurship: Notes from a developing country. *Technological Forecasting and Social Change*, *147*, 243–252. <https://doi.org/10.1016/j.techfore.2019.07.009>
- García-Hurtado, D., Devece, C., Zegarra-Saldaña, P. E., & Crisanto-Pantoja, M. (2024). Ambidexterity in entrepreneurial universities and performance measurement systems. A literature review. *International Entrepreneurship and Management Journal*, *20*(1), 345–366.
- Gerke, A., Ianiro-Dahm, P., Muck, P., Lehmann-Willenbrock, N., & Hell, B. (2023). *How Do Female Entrepreneurs Differ From Male Entrepreneurs? Distinguishing Personality Traits Throughout the Entrepreneurial Journey*. <https://irf.fhnw.ch/handle/11654/38714>
- Ghatak, A., Chatterjee, S., & Bhowmick, B. (2023). Intention towards digital social entrepreneurship: An integrated model. *Journal of Social Entrepreneurship*, *14*(2), 131–151.
- Gianiodis, P. T., & Meek, W. R. (2020). Entrepreneurial education for the entrepreneurial university: A stakeholder perspective. *The Journal of Technology Transfer*, *45*(4), 1167–1195.
- Gorgievski, M. J., Stephan, U., Laguna, M., & Moriano, J. A. (2018). Predicting entrepreneurial career intentions: Values and the theory of planned behavior. *Journal of career assessment*, *26*(3), 457–475.
- Green, J., & Binsardi, B. (2015). Entrepreneurial intentions: A grounded theory of green-fielding. *Sinergie: Italian Journal of Management*, *33*(7), 17–36.
- Guerrero, M., & Urbano, D. (2012). The development of an entrepreneurial university. *The journal of technology transfer*, *37*, 43–74.
- Gunia, B. C., Gish, J. J., & Mensmann, M. (2021). The Weary Founder: Sleep Problems, ADHD-Like Tendencies, and Entrepreneurial Intentions. *Entrepreneurship Theory and Practice*, *45*(1), 175–210. <https://doi.org/10.1177/1042258720940502>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, *19*(2), 139–152.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, *31*(1), 2–24.

- Hayter, C. S., Fischer, B., & Rasmussen, E. (2022). Becoming an academic entrepreneur: How scientists develop an entrepreneurial identity. *Small Business Economics*, 59(4), 1469–1487.
<https://doi.org/10.1007/s11187-021-00585-3>
- Henry, C., & Lahikainen, K. (2024). Exploring intrapreneurial activities in the context of the entrepreneurial university: An analysis of five EU HEIs. *Technovation*, 129, 102893.
- Hossain, M. I., Tabash, M. I., Siow, M. L., Ong, T. S., & Anagreh, S. (2023). Entrepreneurial intentions of Gen Z university students and entrepreneurial constraints in Bangladesh. *Journal of Innovation and Entrepreneurship*, 12(1), 12. <https://doi.org/10.1186/s13731-023-00279-y>
- Ignacio, G. P., Pilar, C. G. M., & Enrique, T. M. (2023). Impact of the sense of initiative and entrepreneurship competence on the entrepreneurial intention. *International Entrepreneurship and Management Journal*, 1–25.
- Inzelt, A. (2004). The evolution of university–industry–government relationships during transition. *Research policy*, 33(6–7), 975–995.
- Jadmiko, P., Azliyanti, E., Wati, L., & Zakiy, M. (2024). Catalysts for Change: Examining Prosocial Motivation’s Role in Fostering Social Entrepreneurial Intentions Among Women in Matrilineal Cultures. *JWEE*, 1–2, 93–114.
- Jiatong, W., Murad, M., Li, C., Gill, S. A., & Ashraf, S. F. (2021). Linking cognitive flexibility to entrepreneurial alertness and entrepreneurial intention among medical students with the moderating role of entrepreneurial self-efficacy: A second-order moderated mediation model. *PloS one*, 16(9), e0256420.
- Jr, D. J. H., Hult, G. T. M., Ringle, D. C. M., & Sarstedt, M. (2016). *A Primer on Partial Least Squares Structural Equation Modeling* (2nd edition). SAGE Publications, Inc.
- Karan, A., Singh, M., & Rana, N. P. (2024). Does entrepreneurial motivation influence entrepreneurial intention? Exploring the moderating role of perceived supportive institutional environment on Indian university students. *International Entrepreneurship and Management Journal*, 20(1), 215–229.

- Kautonen, T., Van Gelderen, M., & Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. *Entrepreneurship theory and practice*, 39(3), 655–674.
- Kolvareid, L., & Isaksen, E. (2006). New business start-up and subsequent entry into self-employment. *Journal of business venturing*, 21(6), 866–885.
- Kyriakopoulos, P., Herbert, K., & Piperopoulos, P. (2024). I am passionate therefore I am: The interplay between entrepreneurial passion, gender, culture and intentions. *Journal of Business Research*, 172, 114409.
- Laouiti, R., Haddoud, M. Y., Nakara, W. A., & Onjewu, A.-K. E. (2022). A gender-based approach to the influence of personality traits on entrepreneurial intention. *Journal of Business Research*, 142, 819–829.
- Lavelle, B. A. (2021). Entrepreneurship education's impact on entrepreneurial intention using the theory of planned behavior: Evidence from Chinese vocational college students. *Entrepreneurship Education and Pedagogy*, 4(1), 30–51.
- Liao, Y.-K., Nguyen, V. H. A., & Caputo, A. (2022). Unveiling the role of entrepreneurial knowledge and cognition as antecedents of entrepreneurial intention: A meta-analytic study. *International Entrepreneurship and Management Journal*, 18(4), 1623–1652.
- Licznerska, M., & Ziemianski, P. (2022). A breath of fresh air—Social cognitive career theory in studying entrepreneurial intentions. *International Journal of Entrepreneurship and Small Business*, 45(2), 126. <https://doi.org/10.1504/IJESB.2022.120976>
- Lihua, D. (2022). An extended model of the theory of planned behavior: An empirical study of entrepreneurial intention and entrepreneurial behavior in college students. *Frontiers in Psychology*, 12, 627818.
- Liu, M., Gorgievski, M. J., Qi, J., & Paas, F. (2022). Perceived university support and entrepreneurial intentions: Do different students benefit differently? *Studies in Educational Evaluation*, 73, 101150.

- Lopes, J. M., Gomes, S., & Pacheco, R. (2024). Unveiling the antecedents of sustainability-oriented entrepreneurial intentions in Angolan universities: Theory planned behavior extension proposal. *Industry and Higher Education*, 38(3), 234–245.
<https://doi.org/10.1177/09504222231189702>
- Lopes, J. M., Suchek, N., & Gomes, S. (2023). The antecedents of sustainability-oriented entrepreneurial intentions: An exploratory study of Angolan higher education students. *Journal of Cleaner Production*, 391, 136236.
- Lortie, J., & Castogiovanni, G. (2015). The theory of planned behavior in entrepreneurship research: What we know and future directions. *International entrepreneurship and management journal*, 11, 935–957.
- Lv, C., Xu, J., Chang, W., Zhi, X., Yang, P., & Wang, X. (2024). Exploring the impact of college graduates' place attachment on entrepreneurial intention upon returning to hometowns: A study based on the theory of planned behavior. *Plos one*, 19(3), e0300312.
- Maddux, J. E. (1995). Self-efficacy theory: An introduction. In *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (S. 3–33). Springer.
- Maheshwari, G., Kha, K. L., & Arokiasamy, A. R. A. (2022). Factors affecting students' entrepreneurial intentions: A systematic review (2005–2022) for future directions in theory and practice. *Management Review Quarterly*. <https://doi.org/10.1007/s11301-022-00289-2>
- Martínez-Gregorio, S., & Oliver, A. (2022). Measuring entrepreneurship intention in secondary education: Validation of the Entrepreneurial Intention Questionnaire. *Journal of Psychoeducational Assessment*, 40(4), 499–513.
- Miller, D. J., & Acs, Z. J. (2017). The campus as entrepreneurial ecosystem: The University of Chicago. *Small Business Economics*, 49, 75–95.
- Monica, J., & Anuradha, P. S. (2024). Entrepreneurial Attitude and Entrepreneurial Intentions of Female Engineering Students: Mediating Roles of Passion and Creativity. *JWEE*, 1–2, 19–39.

- Nájera-Sánchez, J.-J., Pérez-Pérez, C., & González-Torres, T. (2023). Exploring the knowledge structure of entrepreneurship education and entrepreneurial intention. *International Entrepreneurship and Management Journal*, *19*(2), 563–597.
- Nguyen, P. N.-D., & Nguyen, H. H. (2024). Unveiling the link between digital entrepreneurship education and intention among university students in an emerging economy. *Technological Forecasting and Social Change*, *203*, 123330. <https://doi.org/10.1016/j.techfore.2024.123330>
- Nisula, A.-M., & Olander, H. (2023). The role of creativity in knowledge workers' entrepreneurial intentions: The moderating effect of general self-efficacy. *Journal of Small Business Management*, *61*(6), 3228–3254.
- Obschonka, M., Silbereisen, R. K., Cantner, U., & Goethner, M. (2015). Entrepreneurial self-identity: Predictors and effects within the theory of planned behavior framework. *Journal of Business and Psychology*, *30*, 773–794.
- Ong, A. K. S., Prasetyo, Y. T., Dangaran, V. C. C., Gudez, M. A. D., Juanier, J. I. M., Paulite, G. A. D., Yambot, R. X. R., Persada, S. F., Nadlifatin, R., & Ayuwati, I. D. (2023). Determination of loyalty among high school students to retain in the same university for higher education: An integration of Self-Determination Theory and Extended Theory of Planned Behavior. *Plos one*, *18*(11), e0286185.
- Paunovic, I., & Musial, J. (2024). Gender Gap in Entrepreneurial Intention, Reasoning, Self-Efficacy, and Education Preferences Among University Students: An Entrepreneurial Event Theory Perspective. *Journal of Women's Entrepreneurship and Education*.
- Paunovic, I., Müller, C., & Deimel, K. (2022). Building a Culture of Entrepreneurial Initiative in Rural Regions Based on Sustainable Development Goals: A Case Study of University of Applied Sciences–Municipality Innovation Partnership. *Sustainability*, *14*, 12108.
- Pelegrini, G. C., & Moraes, G. H. S. M. de. (2022). Does gender matter? A university ecosystem, self-efficacy and entrepreneurial intention analysis in Brazilian universities. *Gender in Management: An International Journal*, *37*(2), 271–286.

- Pérez-Macías, N., Fernández-Fernández, J.-L., & Vieites, A. R. (2022). Analyzing the past to prepare for the future: A review of literature on factors with influence on entrepreneurial intentions. *Journal of International Entrepreneurship*, 20(1), 52–114.
- Pfeifer, S., Šarlija, N., & Zekić Sušac, M. (2016). Shaping the entrepreneurial mindset: Entrepreneurial intentions of business students in Croatia. *Journal of Small Business Management*, 54(1), 102–117.
- Piperopoulos, P., & Dimov, D. (2015). Burst bubbles or build steam? Entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial intentions. *Journal of small business management*, 53(4), 970–985.
- Pique, J. M., Berbegal-Mirabent, J., & Etzkowitz, H. (2018). Triple Helix and the evolution of ecosystems of innovation: The case of Silicon Valley. *Triple Helix*, 5(1), 1–21.
- Pugh, R., Lamine, W., Jack, S., & Hamilton, E. (2021). The entrepreneurial university and the region: What role for entrepreneurship departments? In *Dislocation: Awkward spatial transitions* (S. 135–155). Routledge.
- Rakicevic, Z., Njegic, K., Cogoljevic, M., & Rakicevic, J. (2023). Mediated Effect of Entrepreneurial Education on Students' Intention to Engage in Social Entrepreneurial Projects. *Sustainability*, 15(5), 4606.
- Ramadani, V., Rahman, Md. M., Salamzadeh, A., Rahaman, Md. S., & Abazi-Alili, H. (2022). Entrepreneurship Education and Graduates' Entrepreneurial Intentions: Does Gender Matter? A Multi-Group Analysis using AMOS. *Technological Forecasting and Social Change*, 180, 121693. <https://doi.org/10.1016/j.techfore.2022.121693>
- Rueda Barrios, G. E., Rodriguez, J. F. R., Plaza, A. V., Vélez Zapata, C. P., & Zuluaga, M. E. G. (2022). Entrepreneurial intentions of university students in Colombia: Exploration based on the theory of planned behavior. *Journal of Education for Business*, 97(3), 176–185.
- Saeed, S., Yousafzai, S., Yani-De-Soriano, M., & Muffatto, M. (2018). The role of perceived university support in the formation of students' entrepreneurial intention. In *Sustainable entrepreneurship* (S. 3–23). Routledge.

<https://www.taylorfrancis.com/chapters/edit/10.4324/9781315611495-1/role-perceived-university-support-formation-students-entrepreneurial-intention-saadat-saeed-shumaila-yousafzai-mirella-yani-de-soriano-moreno-muffatto>

- Sampene, A. K., Li, C., Khan, A., Agyeman, F. O., & Opoku, R. K. (2022). Yes! I want to be an entrepreneur: A study on university students' entrepreneurship intentions through the theory of planned behavior. *Current Psychology*, 1–19.
- Sánchez-Barrioluengo, M., & Benneworth, P. (2019). Is the entrepreneurial university also regionally engaged? Analysing the influence of university's structural configuration on third mission performance. *Technological forecasting and social change*, 141, 206–218.
- Sánchez-Barrioluengo, M., Uyarra, E., & Kitagawa, F. (2019). Understanding the evolution of the entrepreneurial university. The case of English Higher Education institutions. *Higher Education Quarterly*, 73(4), 469–495. <https://doi.org/10.1111/hequ.12230>
- Sastre, C. G. (2022). When intentions turn into action: Pathways to successful firm performance. *International Entrepreneurship and Management Journal*.
- Schenkel, M. T., McDowell, W. C., & Brazeal, D. V. (2024). Business model novelty and small firm innovativeness: The relationship with need for closure and creative self-efficacy. *International Entrepreneurship and Management Journal*, 20(1), 141–162.
- Schunk, D. H., & DiBenedetto, M. K. (2016). Self-efficacy theory in education. In *Handbook of motivation at school* (S. 34–54). Routledge.
- Seebeck, A., & Wolter, R. M. (2022). Financial education of founders, is it important A case study of Jacobs Startup Competition. *International Journal of Entrepreneurial Venturing*, 14(1), 122. <https://doi.org/10.1504/IJEV.2022.122018>
- Shapero, A., & Sokol, L. (1982). The social dimensions of entrepreneurship. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1497759
- Sofiullah, Md., Gomes Vale, E., & Darr, D. (2023). Effectiveness of an interactive start-up simulation to foster entrepreneurial intentions among undergraduate university students: A quasi-

- experimental study. *Entrepreneurship Education*, 6(4), 445–467.
<https://doi.org/10.1007/s41959-023-00108-z>
- Steinbrink, K. M., & Ströhle, C. (2024). The entrepreneurial intention of top athletes—Does resilience lead the way? *International Entrepreneurship and Management Journal*, 20(2), 607–629.
<https://doi.org/10.1007/s11365-023-00860-7>
- Su, Y., Zhu, Z., Chen, J., Jin, Y., Wang, T., Lin, C.-L., & Xu, D. (2021). Factors influencing entrepreneurial intention of university students in China: Integrating the perceived university support and theory of planned behavior. *Sustainability*, 13(8), 4519.
- Tetteh, C., Tasavori, M., Bhattarai, C. R., Zaefarian, R., & Rajwani, T. (2024). How do environmental factors shape entrepreneurial intention? A review and future research. *International Entrepreneurship and Management Journal*, 1–23.
- Tseng, T. H., Wang, Y.-M., Lin, H.-H., Lin, S., Wang, Y.-S., & Tsai, T.-H. (2022). Relationships between locus of control, theory of planned behavior, and cyber entrepreneurial intention: The moderating role of cyber entrepreneurship education. *The International Journal of Management Education*, 20(3), 100682.
- Vefago, Y. B., Trierweiler, A. C., & de Paula, L. B. (2020). The third mission of universities: The entrepreneurial university. *Brazilian Journal of Operations & Production Management*, 17(4), 1–9.
- Wang, M., Soetanto, D., Cai, J., & Munir, H. (2022). Scientist or Entrepreneur? Identity centrality, university entrepreneurial mission, and academic entrepreneurial intention. *The Journal of Technology Transfer*, 47(1), 119–146. <https://doi.org/10.1007/s10961-021-09845-6>
- Wegner, D., Thomas, E., Teixeira, E. K., & Maehler, A. E. (2020). University entrepreneurial push strategy and students' entrepreneurial intention. *International Journal of Entrepreneurial Behavior & Research*, 26(2), 307–325.
- Wurth, B., MacKenzie, N. G., & Howick, S. (2024). Not seeing the forest for the trees? A systems approach to the entrepreneurial university. *Small Business Economics*, 1–24.

Xu, J., Fu, Y., & Zhang, X. (2023). Does entrepreneurship education in China develop entrepreneurial intention? The role of self-efficacy and experience. *PLOS ONE*, *18*(7), e0286090.

<https://doi.org/10.1371/journal.pone.0286090>

Yang, J. (2013). The theory of planned behavior and prediction of entrepreneurial intention among Chinese undergraduates. *Social Behavior and Personality: an international journal*, *41*(3), 367–376.