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Narrowing the gender gap in youth entrepreneurship in Russia: the role of university education and environment

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Abstract

Purpose – Although entrepreneurship represents one of the main driving forces of socio-economic development of any nation, women continue to be underrepresented in this domain. The aim of this paper is to examine the role that relevant university education and environment play in narrowing the gender gap in youth entrepreneurship.
Design/methodology/approach – Drawing on the GUESSS 2021 dataset, the final sample includes 4,813 student-respondents from 21 higher education institutions located in Russia. Our hypotheses were tested using Hierarchical linear modeling (HLM) regression analyses with the help of Stata 14.2 software.
Findings – Our results indicate that in Russia there is a substantial imbalance between male and female students regarding their level of involvement in entrepreneurial activities. University entrepreneurship education reduces this gap by boosting young women's engagement into entrepreneurship, while the effect of university environment is not significant.
Originality/value – This research draws on both the social roles' theory and the university embeddedness perspective to provide a contextualized evidence on factors that may reduce the entrepreneurial gender gap of youth in an emerging market setting.

Keywords Entrepreneurial gender gap, Entrepreneurship education, Entrepreneurial university environment, Youth entrepreneurship, Russia

Paper type Research paper

Introduction

In recent decades, the issue of gender equality has become one of the key aspects in discussions of socio-economic development (Foss *et al.*, 2019). This is particularly relevant in the context of entrepreneurship, where equal opportunities for women and men can become a major factor of sustainable growth and prosperity (Weiss *et al.*, 2023). As a driving force of national wealth creation, entrepreneurship plays a critical role in the socio-economic development of any country (Bodolica and Spraggon, 2021). A larger number of new ventures can reduce unemployment, contribute to the introduction of innovations, energize different sectors of the economy and stimulate the overall growth (Barringer and Ireland, 2019). This is the reason why governments are seeking to promote a vibrant startup culture that would inspire young people to launch their own businesses. For the positive effect of entrepreneurship to successfully materialize on a broader scale, it is necessary to support the entry of diverse types of entrepreneurs into the market. Yet, worth asking is whether women really have an equal chance to engage in entrepreneurship. Despite representing a significant pool of talent worldwide, their participation in this field remains extremely low (Elliott *et al.*, 2021; Strawser *et al.*, 2021). Underscoring the need to identify the barriers women face and to find ways to create a more inclusive business environment, the International Labor Organization (2020) called for proactive measures that would increase women's participation in the labor force.

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The entrepreneurial gender gap, which aims to examine the reasons behind the disproportionate levels of engagement in entrepreneurship between men and women, started to attract substantial scholarly attention (Feldmann *et al.*, 2020). One of the major reasons could be rooted in social roles' distribution that assigns different functions to different genders, namely home and family responsibilities to women, and work and earning money to men. In Russia, the entrepreneurial gender gap has deep roots in the Soviet Union legacy where the image of the "working mother" has for many years shaped women's identity based on the double burden of domestic duties and employment (Gradskova, 2007). As a result, even in the modern world young people still feel the influence of these gender stereotypes. Research shows that Russian women often accept the gendered distribution of household responsibilities as a given, which limits their opportunities in business. Women can play an important role in the family, but face barriers to professional growth and participation in entrepreneurship (Eagly and Mitchell, 2004). Thus, historical and social factors have a particularly acute impact on the gender gap among young Russian entrepreneurs. In recent years, the pressing needs for reviving stagnant economies have placed the question of entrepreneurial gender gap at the forefront of both regulators' and researchers' agenda. Therefore, our main research question is: *What is the relationship between gender and engagement in entrepreneurial activities of young people in Russia?*

One of the main contexts in which youth develops is the university, which combines educational curriculum and extra-curricular activities. Because students are particularly prone to starting their own business, higher education institutions can play a vital role in preparing the future generation of entrepreneurs (Bodolica *et al.*, 2021). Education allows not only to develop the competencies needed for further development as a business owner, but also creates a favorable environment that forms entrepreneurial intentions (Shirokova *et al.*, 2017, 2018). This is why we suggest that the university environment, as well as the availability of relevant business courses, can help young women overcome the challenges they face on the road of launching their ventures, and, as a result, increase their engagement in entrepreneurship. Hence, we seek to answer another research question: *How does the university entrepreneurship education and university entrepreneurial environment influence the entrepreneurial gender gap of youth in Russia?*

To develop our research model, we drew on both the social roles theory (Eagly, 1987), which explains how society distributes roles and functions among people based on their gender, and the university embeddedness perspective (Anderson *et al.*, 2012), which highlights the importance of university context in the entrepreneurial behavior formation. The empirical data for the study were extracted from the Global University Entrepreneurial Spirit Students' Survey (GUESSS) project that was carried out in 2021 in Russia. Our final sample includes data on 4,813 students from 21 Russian universities.

We intend to make two key contributions to the field. First, we show that young women in Russia are less inclined to involve in entrepreneurial actions than young men. We extend prior research by shedding light on less-explored factors that may help in narrowing the gender gap in youth entrepreneurship, especially in emerging markets where institutional voids in capital markets and legal systems prevent the development of entrepreneurial ecosystems (Manolova *et al.*, 2019). Our study finds that adding courses to the university curriculum that relate to the development of entrepreneurial mindset and behavior significantly boosts young women's engagement in entrepreneurial activities. Second, we contribute to the literature on female student entrepreneurship that is rapidly expanding due to the changing role of women in business and society by demonstrating that a supportive university environment nurtures entrepreneurial engagement among female youth. Our findings are particularly important in Russia, which lacks a multigenerational tradition of entrepreneurship and has ascribed gender roles, by underscoring the need for a favorable context that would eradicate gender bias and provide equal opportunities for women to access the entrepreneurial field (Weiss *et al.*, 2023).

Theory and hypotheses development

Entrepreneurial gender gap

The significant difference between the number of men and women engaged in entrepreneurial endeavors have long been documented in the entrepreneurship literature. Researchers have proven that women are less likely to enter entrepreneurship, confirming the existence of gender gap among various categories of population, such as immigrants (Brieger and Gielnik, 2021) and recent STEM graduates (Piva and Rovelli, 2021). Although the problem of lower entrepreneurial engagement of women compared to men is ubiquitous, the main causes do not ensue from biological differences, but rather from the social and cultural ones. According to Greene *et al.* (2013), gendered social norms can have a significant impact on female entrepreneurial activity because society's ideas about how men should behave differ from general ideas about women. Aiming to uncover the factors that could narrow the entrepreneurial gender gap, Feldmann *et al.* (2020) demonstrate that having at least one entrepreneurial parent in the family increases the level of participation of women in this domain. Moreover, the behavioral model of a female boss-entrepreneur can have a positive effect on a woman's desire to start her own business (Rocha and Van Praag, 2020), while internships reduce female engagement in entrepreneurial activities (Piva and Rovelli, 2021). It was also found that women's participation in political and economic initiatives can narrow the entrepreneurial gender gap (Pathak *et al.*, 2013).

The key reason discussed in prior studies that precludes women from launching their own entities is the limited access to different types of capital, such as financial, social and human (Krieger *et al.*, 2022; Piva and Rovelli, 2021). Most scholars considered the scarcity of capital among women as a given, without attempting to dissect the root of the problem to understand what caused its uneven distribution compared to men. However, in some studies, researchers delved deeper into the factors that influence the choice of a woman's occupation relying on the assumptions of the theory of gender roles and social roles (Markussen and Røed, 2017; Pathak *et al.*, 2013; Rocha and Van Praag, 2020). In most cases, these studies were conducted using samples of students and recent graduates, because these social groups are critical to successful economic development and, therefore, need a more careful consideration. Additionally, researchers also drew on datasets extracted from international projects, such as GUESSS (Gimenez-Jimenez *et al.*, 2020; Weiss *et al.*, 2023) and Global Entrepreneurship Monitor [1] (GEM) (Pathak *et al.*, 2013; Vracheva and Stoyneva, 2020).

In sum, despite the recent proliferation of empirical inquiries into the topic, only a few factors that may encourage women's engagement in entrepreneurship were identified to date. In our study, we focus more specifically on the role that university environment plays in reducing the entrepreneurial gender gap.

Theoretical framework

To develop our hypotheses, we rely on the social roles' theory (Eagly, 1987) and the university embeddedness perspective (Anderson *et al.*, 2012). Social roles' theory suggests that women and men tend to adopt the gender roles that are accepted in society, where it is common for men to be more dominant and for women to be more affiliative. By prescribing prevalent characteristics to different genders, society forms certain beliefs and behavioral expectations (Gupta *et al.*, 2009). For example, some types of physical work are considered traditional for men, as they require "muscular" strength and qualities (Heilman, 2001). Thus, the sphere of business and entrepreneurship in society was commonly called the "male world", because it required determination and fortitude, and these characteristics were ascribed to men rather than women.

As far as the university embeddedness perspective (Anderson *et al.*, 2012) is concerned, it focuses on understanding how the university environment influences human action. Embeddedness itself highlights the impact of specific contextual conditions in shaping entrepreneurial behaviors. Universities can affect the process of startup launch by providing

students with different types of capital: for example, by offering courses focused on entrepreneurship, as well as, more generally, by nurturing an environment that can be considered an "entrepreneurial ecosystem" that inspires students (Morris *et al.*, 2017). This may be particularly relevant to female students because they experience a lack of resources that hinders their propensity of engaging in new venture creation (Morris *et al.*, 2006). Therefore, a propitious university environment along with relevant university education can help increase the engagement of young women in the process of launching a new business.

Hypotheses development

According to the social roles' theory (Eagly and Mitchell, 2004), from early childhood men and women follow different stereotypes of behavior corresponding to their gender. It is typical for women to put family issues above their work-related concerns. Thus, social roles in society create barriers for young women who want to start their own businesses. They feel the influence of entrenched stereotypes that have existed for centuries: men are traditionally viewed as leaders and risk-takers, while women are more often perceived as caring and responsible (Eagly, 1987). Sex-role stereotyping occurs when women are assigned specific traits, such as being compassionate and communal, rather than dominating and independent, and role incongruence arises when female actions are not aligned with prescribed behaviors (Bullough *et al.*, 2022). This leads to females being less inclined to take risks and initiate business projects, aspects which are particularly marked for young women (Edelman *et al.*, 2020).

Gender differences in youth startup involvement may be more pronounced in Russia (vis-à-vis Western countries), due to its brief history of entrepreneurship and where innovative thinking and entrepreneurial traditions are yet to be crystalized into the nation's socio-economic fabric (Bodolica *et al.*, 2024). Because entrepreneurship remains an unchartered territory for many Russians (Shirokova *et al.*, 2016), young women feel less comfortable to venture themselves into the unknown by launching new businesses. Moreover, despite signs of cultural change with a paradoxical coexistence of contradictory norms and beliefs (Chimenson *et al.*, 2022), most people in post-Communist Russia continue to adhere to conservative cultural values and traditional perceptions of gender roles. Tabachnikova and Vinokurova (2024) uncover a prevalent conservatism in Russian students' career choices, where entrepreneurial employment fields are perceived as "typically male".

The specific gender role expectations embedded in traditional societies (Bullough *et al.*, 2022) put young women in a disadvantageous position relative to men, because they have fewer social networks, possess less diversified resources and face more barriers to progress in a business world (Weiss *et al.*, 2023). Gender stereotypes not only undermine women self-confidence, but also limit their access to important resources, such as funding and mentoring, which are essential for young people to start a new venture (Shaw *et al.*, 2009). As a result, many young women commonly see entrepreneurship as a less suitable path for themselves, which exacerbates the gender gap in youth entrepreneurship.

Extant empirical evidence on international samples suggests that male students exhibit a significantly higher inclination to deploy entrepreneurial efforts and actions than their female counterparts (Shirokova *et al.*, 2018, 2022; Weiss *et al.*, 2019, 2023). The predominantly conservative characterization of Russian culture norms, where self-employment options are seen as incompatible for female careers, implies that the probability of engagement in entrepreneurial activity in the country may be lower for young women relative to that of young men. Therefore, we formulate the following hypothesis.

H1. There is a negative association between gender and entrepreneurial engagement of youth in Russia.

According to Edelman *et al.* (2020), students are embedded in certain social contexts and networks, thanks to which they can draw the resources necessary for engagement in entrepreneurship. For young people, a critical role is played by a social institution, such as the

university, which can both facilitate and restrain youth's behavior and actions (Gimenez-Jimenez *et al.*, 2020). Traditionally, university entrepreneurship education includes specialized courses, workshops and training programs that aim to familiarize students with fundamental principles of creating and launching a new venture (Haneberg *et al.*, 2022). In the process of learning, students acquire theoretical knowledge in the field of entrepreneurship that is needed for understanding how the business environment operates (Piperopoulos and Dimov, 2015). A wealth of empirical studies drawing on GUESSS data demonstrates that entrepreneurship-focused instructional programs that universities offer significantly influence new venture gestation processes and the scope of startup activities that nascent entrepreneurs engage in (Bodolica *et al.*, 2024; Laspita *et al.*, 2023; Leiva *et al.*, 2023; Shirokova *et al.*, 2017, 2018).

Additionally, entrepreneurship education allows youth to develop several competencies that are required for successful entrepreneurial activity, such as business planning, market research, financing and strategic management (Barringer and Ireland, 2019). University curricula represent a rich source of up-to-date knowledge and information that can equip students with valuable skills, such as analyzing, evaluating, networking and experimenting, that can positively influence their future startup endeavors (Morris *et al.*, 2013, 2017). However, many universities in Russia still do not offer specialized courses or programs in entrepreneurship and remain less inclined to teaching entrepreneurial skills (Tabachnikova and Vinokurova, 2024). In 2023, almost 58% of students in the country did not take any entrepreneurship-related course during their university years, while less than 14% of students had a compulsory entrepreneurship course as part of their study program (Shirokova *et al.*, 2024). The entrepreneurial program learning in Russian universities has the potential to contribute to an increased understanding of entrepreneurs' motivations and specific actions that are needed to start a new business (Bodolica *et al.*, 2024).

Mastering such courses allows inexperienced young women to feel more confident in a traditionally male-dominated field, which can positively impact their level of entrepreneurial activity (Bodolica and Spraggon, 2021). This, in turn, can help overcome gender stereotypes and create a more equal business environment. Indeed, Alshibani *et al*. (2023) have recently shown that being exposed to entrepreneurship education positively influences new venture gestation activities undertaken by female students in Saudi Arabia, a country which is known for its conservative culture and patriarchal gender roles. By improving their knowledge and skills, female youth is empowered to demonstrate increased motivation and new venture intentions that ensue from a lower fear of failure (Souitaris *et al.*, 2007). Thus, entrepreneurship education not only promotes the personal development and professional growth of young women, but also plays an important role in changing cultural norms and stereotypes related to gender in entrepreneurship (Weiss *et al.*, 2023), leading to higher entrepreneurial activity. On this basis, we propose our second hypothesis.

H2. University entrepreneurship education positively moderates the gender gap in youth entrepreneurship in Russia, by increasing the probability of young women engagement in entrepreneurial activity relative to that of young men.

Young people's engagement in entrepreneurial endeavors is often determined by several contextual factors (Leiva *et al.*, 2023; Shirokova *et al.*, 2018). Many authors discussed the importance of "entrepreneurial infrastructure", which creates a propitious startup environment and contributes to the development of personal inclinations to launch a new business (Tan *et al.*, 2000). As far as students are concerned, the university represents the key object of social infrastructure that fosters the emergence of potential entrepreneurs, creating a supportive and inclusive environment (Bodolica *et al.*, 2021; Laspita *et al.*, 2023; Shirokova *et al.*, 2017). University entrepreneurial environment includes startup labs, business incubators and accelerators, special seminars, workshops and consulting clubs (Pittaway and Cope, 2007), as well as student and alumni associations through which one can expand social ties and maintain active network interactions (Bastian *et al.*, 2023). This infrastructure and activities allow

students to acquire the needed skills, assimilate the accepted norms and observe the behavioral patterns of people engaged in entrepreneurial undertakings (Zuckerman *et al.*, 1977).

A favorable university environment for the development of entrepreneurial engagement of young women is particularly important in Russia, where the entrepreneurship culture is yet to be fully developed (Shirokova *et al.*, 2024). This is due to the Soviet legacy characterized by state ownership and centrally planned economy, where entrepreneurial self-employment was not even an option. Nowadays, salary earning continues to be perceived by Russians as a stable and less uncertain income stream, which is aligned with the socio-cultural norms ascribed to women (Chimenson *et al.*, 2022). Yet, recent empirical studies demonstrate that in universities with perceived positive entrepreneurial climate and subjective norms students are more likely to choose a career as a startup founder rather than employee (Laspita *et al.*, 2023). Moreover, a stimulating university environment may significantly enhance the entrepreneurial self-efficacy of female students, including in Latin American countries which are known for their gendered cultures (Cascante-Gatgens *et al.*, 2023).

Hence, we maintain that university initiatives provide young women with access to resources, such as mentoring, training and funding, enabling them to not only develop their ideas but also enter the startup domain with confidence (Edelman *et al.*, 2020). In addition, the network of like-minded people and the opportunity to share experiences with other female entrepreneurs contribute to the creation of a positive image of a successful woman in business. Therefore, a supportive university context can act as a catalyst for change, promoting the participation of a larger number of female youth in entrepreneurship and creating a more equal business environment (Weiss *et al.*, 2023). A vibrant entrepreneurial environment in university settings may also contribute to the eradication of gender-related stereotypes, allowing young women to get an equal opportunity to access available resources and develop a future generation of female entrepreneurs in the field. This leads to the following hypothesis.

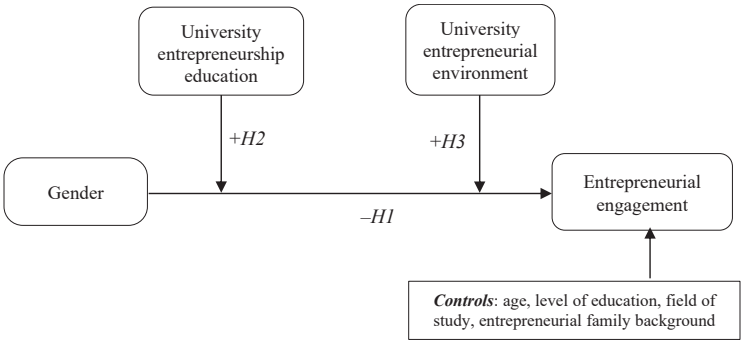
H3. University entrepreneurial environment positively moderates the gender gap in youth entrepreneurship in Russia, by increasing the probability of young women's engagement in entrepreneurial activity relative to that of young men.

Our theoretical model is illustrated in Figure 1.

Method

Data and sample

To perform our research, we accessed data from the international GUESSS project which was launched in 2003 at the University of St Gallen. It is a survey that collects information



Source(s): Authors' own work

Figure 1. Theoretical model

biannually about students from universities around the globe and records their entrepreneurial intentions and activities. As an international study that focuses on students worldwide, GUESSS offers insight into the entrepreneurial environment in participating universities [2]. The survey seeks to measure students' attitudes and patterns of behavior, as well as understand the factors that influence students' decisions to become entrepreneurs (Sieger *et al.*, 2014). Respondents in this survey are clustered into three main categories: students who do not have intentions to open their own business; those who have such intentions (nascent entrepreneurs) and those who are already engaged in entrepreneurial activities (active entrepreneurs).

Our data were extracted from the 2021 GUESSS edition that was administered by the local team in Russia. The survey was conducted between February and June 2021 and contained a total of 5,407 participants from 21 Russian institutions of higher education. Our sample consists of respondents from two categories that are represented by nascent and active student entrepreneurs. According to Bergmann and Stephan (2013), nascent entrepreneurs display at least the slightest interest in the topic of entrepreneurship and consider it as a way to develop their career path, while Delmar and Davidsson (2000) define this category as individuals acting with the aim of creating an independent business.

Following some changes due to missing values and restrictions on erroneous answers related to the human factor, our final sample size includes 4,813 students from Russia. To test our research hypotheses, we used a comparative analysis of models divided by gender; and in order to identify relationships, hierarchical regression analyses were performed, according to which variables are added to the model step by step, starting with control ones.

Measures

Dependent variable. Entrepreneurial engagement was measured as a dichotomous variable, which corresponds to 0, if the student did not exhibit any entrepreneurial intention, and 1 – if the student has taken some action that reflects entrepreneurial behavior. Valid approaches to measuring the degree of individuals' engagement in entrepreneurial activity have already been outlined by Bogatyreva *et al.* (2019). In particular, this variable takes the value of 1, if the respondent answered "yes" to any of the two following questions: "Are you currently trying to start your own business/become self-employed?", or "Are you already running your own business/are you already self-employed?"

Independent variable. Gender was coded as a dummy variable, where 0 corresponds to a male respondent, and 1 – to a female one. Dummy coding allows capturing and analyzing specific differences in outcomes between two groups.

Moderators. The first moderator – university entrepreneurship education – considers university initiatives for the development of human capital and knowledge acquisition. Students were asked to rate their attendance of entrepreneurship-related courses, as follows: (1) I have not attended a course on entrepreneurship so far; (2) I have attended at least one entrepreneurship course as an elective; (3) I have attended at least one entrepreneurship course as a compulsory part of my studies; (4) I am studying in a specific program on entrepreneurship and (5) I chose to study at this university mainly because of its strong entrepreneurial reputation. The responses of those students who had not previously attended such courses were coded as 0, and in all other cases as 1.

The second moderator – university entrepreneurial environment – was measured on a 7-point Likert-type scale adopted from Lüthje and Franke (2004), which was already used in prior studies. The variable was assessed on the three following statements: (1) The atmosphere at my university inspires me to develop ideas for a new business; (2) My university has a favorable climate for becoming an entrepreneur and (3) At my university, students are advised to engage in entrepreneurial activity. To confirm the absence of hidden variables explaining the structure of correlations within the set of observed variables, we refer to exploratory factor analysis (EFA). EFA is a statistical procedure used to investigate structures in the dataset that are unobserved and identify hidden or latent variables that impact the relationship among

measured variables. The internal consistency of a construct can be established via Cronbach's alpha and composite reliability (CR), which are deemed acceptable if their value is 0.7 or above (Hair *et al*., 2019). As reported in Table 1, all the constructs satisfy these criteria (i.e. Cronbach's $\alpha = 0.8785$; CR = 0.8072).

Controls. We included a variety of control variables in our research to isolate the influence of other factors that may affect the level of students' engagement in entrepreneurial activity. This helps to ensure that any observed changes or differences are due to the specific independent variable being tested, and not to external factors that were not controlled. According to Laspita *et al*. (2012), some socio-demographic parameters measured at the individual level, such as age, may have an impact on the scale of business creation activities or attitudes toward entrepreneurship. Because we expect older students to be more experienced and knowledgeable, thereby increasing their engagement in entrepreneurship, we controlled for respondents' age.

Further, students with a lower level of education may not have the required knowledge or skills for launching a new business. The level of education is a binary variable, coded as 1 – if the student is an undergraduate, and 0 – otherwise. The entrepreneurial engagement may also vary depending on specialization (Laspita *et al*., 2012), as students' education in business and management field forms a special attitude towards entrepreneurship. The field of study is a binary variable, where 1 is assigned to "business and management", and 0 – otherwise. The presence of entrepreneurial experience through a family member is a strong predictor of entrepreneurial actions (Shirokova *et al*., 2016). Moreover, Sieger *et al*. (2011) argue that children tend to imitate the behavior of their parents and adapt their behavior model. Our last control variable is the family entrepreneurial background, which corresponds to 1, if at least one the parents was self-employed, and 0 – otherwise.

Descriptive statistics and correlations

About 89% of our sample is composed of 18–25 years old students, and almost 76% are aged between 19 and 22 (which is the average age among undergraduate students in Russia). Regarding gender distribution, almost 70% of respondents are women, while 30% are men. Over 80.7% of students are undergraduates, the rest have adhered to the system of continuing education to pursuer a master's or doctorate degree. Only 25.4% of respondents studied business and economics, and 26.3% of students have at least one self-employed parent. All our variables were checked for normality of distribution; we removed any missing data and identified outliers. The descriptive statistics of our variables and pairwise correlations are reported in Table 2. Pairwise correlations assist in making predictions about the future value of variables in the model and to identify variables that can be excluded from the model.

The highest correlation coefficient (−0.3002) is between student's age and level of education. Because our variables are not highly correlated, we avoid the problem of

Table 1. Constructs, measurement items and reliability and validity tests

Variable	Factor loadings
University entrepreneurial environment (Lüthje and Franke, 2004): $\alpha = 0.8785$; CR = 0.8072; KMO = 0.708	
To which extent you agree with the following statements, . . . (1 = not at all, 7 = very much)	
1. The atmosphere at my university inspires me to develop ideas for new businesses	0.8928***
2. There is a favorable climate for becoming an entrepreneur at my university	0.9334***
3. At my university, students are encouraged to engage in entrepreneurial activities	0.8679***

Note(s): α = Cronbach alpha; CR = composite reliability; KMO = Kaiser–Meyer–Olkin measure of sampling adequacy; ***$p < 0.001$

Source(s): Authors' own work

Table 2. Descriptive statistics and pairwise correlations

N	Mean	SD	Min	Max	1	2	3	4	5	6	7	8
1	0.11	0.31	0	1	1.0000							
2	0.70	0.46	0	1	−0.0769**	1.0000						
3	4.56	0.07	4.236171	4.572658	0.0790**	−0.0138	1.0000					
4	0.50	0.50	0	1	−0.0206	−0.0018	−0.0209	1.0000				
5	21.23	3.24	17	57	0.0579**	−0.0653**	0.0530**	−0.0220	1.0000			
6	0.81	0.40	0	1	−0.0112	0.0105	−0.0016	0.0175	−0.3002**	1.0000		
7	0.25	0.44	0	1	0.0319*	0.0322*	0.2212**	0.0319*	0.0378**	0.0971**	1.0000	
8	0.27	0.44	0	1	0.1163**	−0.0379**	0.0696**	0.0339*	−0.0379**	0.0185	0.0486**	1.0000

Note(s): *$p < 0.05$; **$p < 0.01$; $N = 4{,}813$; SD: standard deviation. (1) Entrepreneurial engagement; (2) Gender; (3) University entrepreneurship education; (4) University entrepreneurial environment; (5) Age; (6) Level of education; (7) Field of study; (8) Entrepreneurial family background
Source(s): Authors' own work

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multicollinearity, which could prevent us from interpreting our regression analysis correctly from the standpoint of linear relationships. A negative (−0.0769) and statistically significant coefficient ($p < 0.05$) between the dependent and independent variables supports our first hypothesis. University entrepreneurship education positively (0.0790) and significantly ($p < 0.01$) correlates with students' entrepreneurial engagement. Since the respondent's age (0.0579) and the entrepreneurial family background (0.1163) are both significantly ($p < 0.01$) correlated with the level of engagement in entrepreneurship, we consider these variables when constructing our regression model.

Results

Statistical analysis

Our hypotheses were tested using Hierarchical Linear Modeling (HLM) regression-based analyses with the help of Stata 14.2 software (StataCorp, 2017). Table 3 reports the results. To assess the validity of our baseline hypothesis (H1), we employed a stepwise regression method to showcase the reliability of our estimates regarding the gender gap in entrepreneurship. The regression analysis confirms the hypothesis that the likelihood of entrepreneurial engagement of young women is lower compared to young men, as independent variable coefficients vary from −0.052 to −0.028 at a statistically significant level ($p < 0.05$ or $p < 0.005$). Model 1 reports the influence of control variables on students' entrepreneurial engagement. Age ($b = 0.006$,

Table 3. Estimation results for university entrepreneurial environment moderation of the entrepreneurial gender gap

	Model 1 *Controls*	Model 2 *Main Effects*	Model 3 *Main Effects*	Model 4 *Interactions*	Model 5
H1: Gender	−0.052 (0.010)***	−0.050 (0.010)***	−0.050 (0.010)***	−0.028 (0.014)*	−0.060 (0.678)
Controls					
Age	0.006 (0.001)***	0.005 (0.001)***	0.005 (0.001)***	0.005 (0.001)***	0.005 (0.001)***
Level of education	0.004 (0.012)	0.004 (0.012)	0.004 (0.012)	0.004 (0.012)	0.004 (0.012)
Field of study	0.020 (0.010)*	0.008 (0.010)	0.009 (0.010)	0.009 (0.010)	0.009 (0.010)
Entrepreneurial family background	0.076 (0.010)***	0.073 (0.010)***	0.074 (0.010)***	0.074 (0.010)***	0.074 (0.010)***
Moderation					
University entrepreneurship education		0.041 (0.009)***	0.041 (0.009)***	0.072 (0.016)***	0.072 (0.016)***
University entrepreneurial environment			−0.113 (0.068)	−0.113 (0.068)	−0.117 (0.125)
H2: Gender*University entrepreneurship education				−0.046 (0.019)*	−0.046 (0.019)*
H3: Gender*University entrepreneurial environment					0.007 (0.149)
_cons	−0.010 (0.037)	−0.020 (0.037)	0.497 (0.311)	0.479 (0.311)	0.501 (0.569)
N	4,813	4,758	4,753	4,753	4,753
R^2	0.023	0.027	0.028	0.029	0.029
F	22.61	22.18	19.44	17.74	15.76

Note(s): *t*-statistic in parentheses; *$p < 0.05$, **$p < 0.01$, ***$p < 0.005$
Source(s): Authors' own work

$p < 0.005$), field of study ($b = 0.020$, $p < 0.05$) and entrepreneurial family background ($b = 0.076$, $p < 0.005$) increase respondents' engagement in entrepreneurship. Model 2, which includes the university entrepreneurship education, demonstrates that this variable ($b = 0.041$, $p < 0.005$) exerts a significantly positive effect on entrepreneurial engagement.

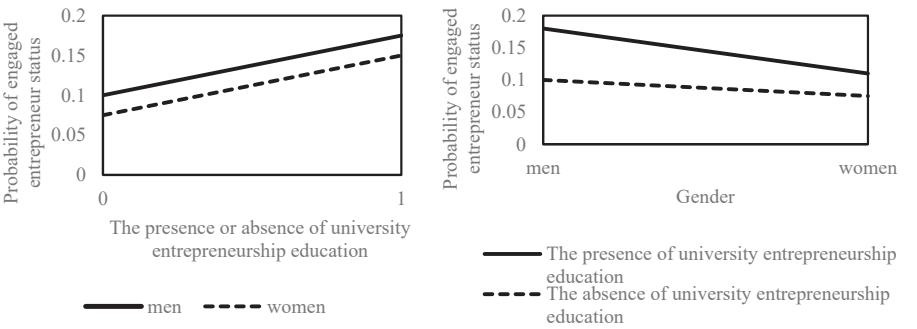
Model 3 adds the university entrepreneurial environment to the regression to unveil a negative ($b = -0.113$) but statistically insignificant impact on entrepreneurial engagement. Models 4 and 5 include the interaction terms to uncover the effect of moderation on the dependent variable. Our Model 4 demonstrates an increase in gender coefficient to -0.028 ($p < 0.05$), narrowing the gender gap. This can be attributed to the negative and significant interaction ($b = -0.046$, $p < 0.05$) between the independent variable and the university entrepreneurship education moderator. Finally, Model 5 includes the moderation of the university entrepreneurial environment, which worsens the gender gap to -0.060 and makes this linear relationship insignificant.

As shown in Table 3, the main effect in Model 3 is aligned with the expected outcome ($b = -0.050$, $p < 0.005$), suggesting that young women are less likely to engage in entrepreneurial activities than young men. This finding is consistent with H1. With the addition of university entrepreneurship education moderator in Model 4, we obtain a reduction in the gender gap by 0.022, which corroborates H2. However, because the interaction coefficient between gender and university entrepreneurial environment in Model 5 is statistically insignificant, our H3 is rejected.

Based on the *F*-test value of 17.74 (Model 4) compared to 15.76 (Model 5), we can conclude that adding a second moderation decreases the model's ability to predict the dependent variable. To avoid errors of first and second types, we conducted the Breusch-Pagan/Cook-Weisberg test of our model. Since the *p* values of our variables, except for the level of education, fall below the significance level, the null hypothesis of constant variance is rejected, allowing us to conclude that there are no signs of heteroscedasticity in the model. Based on the analysis of average variance inflation factors (VIF), it appears that collinearity issues are unlikely to be present as all the checks indicate values below the conservative cut-off threshold of 5 (Studenmund and Cassidy, 1992; De Clercq *et al.*, 2014). The reported mean VIF coefficient in the model is 1.88. Values exceeding 2.5 or 3 may indicate a minor multicollinearity problem. Only one variable has a coefficient of 3.39 (i.e. university entrepreneurship education), which is why these relationships were tested by graphical reliability tests.

Since the magnitude, signs and significance of interaction effects in nonlinear models can vary depending on observations, this can make the interpretation difficult (Hoetker, 2007). Thus, we used graphical analysis to better understand the interaction effects in Model 4. We plotted the predicted values of entrepreneurial engagement interacting with the high and low levels of the first moderator – university entrepreneurship education (see Figure 2). This graph shows the gender-predicted probabilities of obtaining the status of a nascent entrepreneur in the presence of university entrepreneurship education and in its absence, which once again corroborates our H2.

Since our H3 was not confirmed, we checked graphically that there are no other reasons explaining the deviation. Graphs on the left side of Figure 3 describe the impact of the moderation of university entrepreneurship education, while the right-side ones show the relationship with university entrepreneurial environment. For both women and men, university entrepreneurship education has a significantly positive effect on entrepreneurial engagement, which is not the case for university entrepreneurial environment. The main result is that women (dotted line) and men (solid line) are located closer to the left edge of the graph, without university entrepreneurship education; but on the right edge, among those who have this education, the difference is noticeable. Although males are more engaged in entrepreneurship than females, the availability of appropriate education significantly increases the number of women with entrepreneurial orientations. However, the bottom right-side graph does not depict any difference in terms of entrepreneurial engagement



Note(s): Plots of the adjusted predicted values for Model 4 presented 95% confidence intervals, all other variables kept at theirmeans

Source(s): Authors' own work

Figure 2. Main effect and interactions between gender and university entrepreneurship education

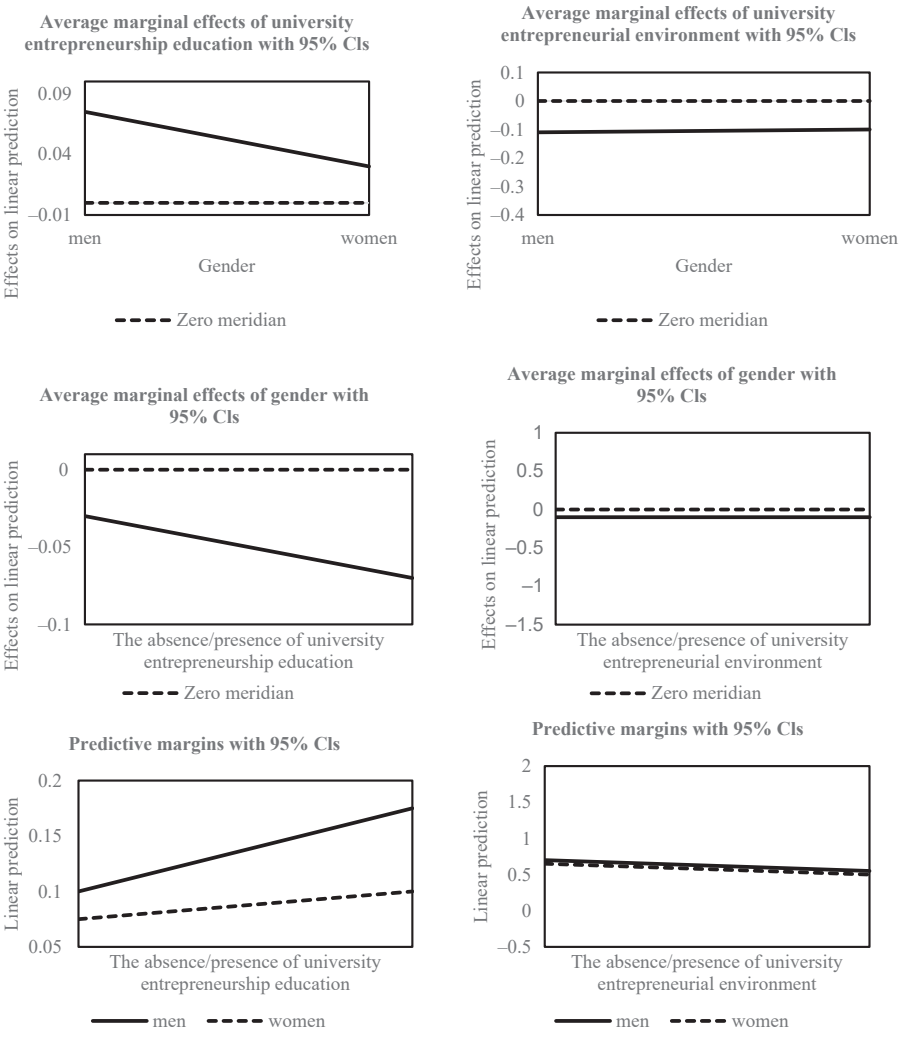
between men and women, neither in the presence nor in the absence of university entrepreneurial environment.

Robustness checks

Besides our main analysis, we conducted numerous alternative specifications to the empirical model to establish the resilience of our findings. We aimed to confirm the reliability and validity of our results through a rigorous approach of robustness checking (see Table 4). Thus, we conducted additional analyses to determine how sensitive our regression model outcomes are to changes in a certain parameter to investigate the robustness of H2 and H3 findings. First, we performed a complete Ordinary Least Squares (OLS) regression of Model 1, including all the interactions simultaneously. The coefficient for gender is still significantly negative ($b = -0.028$, $p < 0.05$), and the signs and significance levels of other variables stayed the same as before. Model 2 measures OLS robust, where it is assumed that the errors are distributed normally with an average value of zero. Compared to Model 1, no obvious changes can be observed except for a slight modification in the coefficients of field of study, university entrepreneurship education and entrepreneurial family background.

Second, we used an alternative operationalization of our dependent variable (i.e. entrepreneurial engagement) and duplicated our empirical tests of hypotheses H1 and H2. The variable labelled EE 1 in Model 3 was assessed as an evolved phase of nascent entrepreneurial engagement. It is a binary variable coded as 1, if any action was taken to start entrepreneurial activities (measured by 10 startup activities adopted from GEM [3] and PSED [4]) and 0, if no action has been taken (Shirokova *et al*., 2016). The coefficients for gender and university entrepreneurship education are still significantly negative ($b = -0.066$) and positive ($b = 0.101$), respectively. The EE 1 variable was constructed to find out whether our main results for H1 and H2 are valid in situations where a student's nascent entrepreneurial activity coincides with active entrepreneurship, and the results are fair.

Model 4 includes yet another way of interpreting the dependent variable, marked as EE 2. Shinnar *et al*. (2018) measured this variable by dividing the values by three based on the three levels of entrepreneurial behavior. Respondents who have started their own business before were coded as 2, those who had a plan to start a business and who indicated that they took at least one of the listed actions were marked as 1, and 0 was assigned in case of inaction. As before, the negative ($b = -0.128$) and positive ($b = 0.163$) coefficients for gender and university entrepreneurship education, respectively, are statically significant ($p < 0.05$).



Note(s): Plots of the predicted values for Model 4 presented 95% confidence intervals, all other variables kept at their means
Source(s): Authors' own work

Figure 3. Main effect and interactions between gender and university entrepreneurship education vs gender and university entrepreneurial environment

Third, we replicate our main analysis by dividing the sample into two different groups, namely women (Model 5) and men (Model 6). There is a significantly ($p < 0.005$) positive effect on entrepreneurial engagement for both women ($b = 0.093$) and men ($b = 0.145$). In support of the main findings of H2, our results indicate that university entrepreneurship education is significant ($p < 0.005$) for both subgroups, though the coefficient is lower for women ($b = 0.029$) than for men ($b = 0.069$). Yet, the coefficients of the university entrepreneurial environment variable for both subgroups remained insignificant. Overall, the results indicate that university entrepreneurship education is important for both genders, thus

Table 4. Robustness checks

	Model 1 (OLS)	Model 2 (OLS robust)	Model 3 (EE 1)	Model 4 (EE 2)	Model 5 (women)	Model 6 (men)
H1: Gender	−0.028 (0.014)*	−0.028 (0.013)*	−0.066 (0.041)*	−0.128 (0.054)*	0.093 (0.005)***	0.145 (0.009)***
Controls						
Age	0.005 (0.001)***	0.005 (0.002)***	0.006 (0.005)	0.032 (0.006)***	0.005 (0.002)***	0.006 (0.003)*
Level of education	0.004 (0.012)	0.004 (0.012)	−0.063 (0.035)	−0.047 (0.045)	−0.004 (0.013)	0.023 (0.025)
Field of study	0.008 (0.010)	0.009 (0.010)	0.042 (0.029)	0.047 (0.038)	0.004 (0.011)	0.020 (0.023)
Entrepreneurial family background	0.072 (0.016)***	0.074 (0.011)***	0.042 (0.027)	0.154 (0.035)***	0.061 (0.011)***	0.102 (0.020)***
Moderation						
University entrepreneurship education	0.073 (0.016)***	0.072 (0.018)***	0.101 (0.047)*	0.163 (0.059)**	0.029 (0.010)***	0.069 (0.019)***
University entrepreneurial environment	−0.113 (0.068)	−0.113 (0.074)	−0.456 (0.203)	−0.634 (0.248)	−0.103 (0.075)	−0.124 (0.143)
H2: Gender*University entrepreneurship education	−0.046 (0.019)*	−0.046 (0.020)*	−0.005 (0.056)	−0.089 (0.071)		
H3: Gender*University entrepreneurial environment	0.007 (0.149)	0.007 (0.149)	−0.192 (0.420)	−0.865 (0.513)		
Mean VIF	1.88	1.88	1.95	1.90	1.05	1.05
_cons	0.479 (0.311)	0.478 (0.339)	2.551 (0.929)**	3.160 (1.142)**	0.417 (0.347)	0.502 (0.653)
N	4,753	4,753	1,487	2,010	3,326	1,427
R^2	0.029	0.029	0.026	0.052	0.016	0.035
F	17.74	13.17	5.01	13.59	8.89	8.47

Note(s): *t*-statistic in parentheses; *$p < 0.05$, **$p < 0.01$, ***$p < 0.005$
Source(s): Authors' own work

increasing the level of women's participation in entrepreneurship. We conclude that these additional checks confirm the robustness of our research method and results.

Discussion

In this paper, we examined the gender gap in youth entrepreneurship in Russia and the role played by both university education and environment in narrowing this gap, based on the social roles' theory (Eagly, 1987) and the university embeddedness perspective (Anderson *et al.*, 2012). Consistent with the results of prior studies, our analysis revealed that female students are much less likely to become entrepreneurs than their male counterparts (Feldmann *et al.*, 2020; Piva and Rovelli, 2021; Rocha and Van Praag, 2020). Thus, we confirmed the negative relationship between gender and engagement in entrepreneurship on a sample of young students in Russia, once again proving that the traditional patterns of behavior laid down in society have a strong influence on people's choice of profession and type of activity. Young women continue to be wary of the business environment, preferring employment in other

entities or the role of non-working housewife. However, an important question arises: do women really have equal opportunities to engage in entrepreneurship? To achieve equality in this area, it is necessary to review established social attitudes and create enabling conditions that eradicate gender bias and promote women's active participation in entrepreneurship.

Our finding that university entrepreneurship education increases young women's engagement in entrepreneurial activities in Russia is aligned with extant literature in the field (Bodolica *et al.*, 2021; Shirokova *et al.*, 2016). Students who receive such education develop their human capital by acquiring higher levels of knowledge and skills that are relevant for entrepreneurial activity. Thanks to entrepreneurship education, female students increase the subconscious desirability of new venture creation and reinforce the understanding that entrepreneurship is one of the most important options to consider when choosing a career path (Krueger and Brazeal, 1994). Entrepreneurship-oriented training builds students' analytical skills, introduces them to the tools they need to run a successful business and makes them more competent in the business planning process. Entrepreneurship and management knowledge acquired during the university years boosts the confidence of young female students, provoking them to venture into their own business creation. Prior studies have shown that entrepreneurship is an activity that can be learned with the help of competent professors (Haneberg *et al.*, 2022; Morris *et al.*, 2017). That is why women with a well-developed human capital in this domain can be successfully engaged in business activities on an equal basis with men. Universities in emerging markets should continue to include entrepreneurial mindset and innovation courses in the curricula of various educational programs, with the purpose of encouraging female students to launch their own companies (Bodolica and Spraggon, 2021; Meeralam and Adeinat, 2022).

Contrary to our expectations, our study reveals that the university entrepreneurial environment in Russia negatively impacts young women's engagement in entrepreneurial activities, although this effect is insignificant. The possibility of such an influence has been suggested in earlier research on the topic (Hastie, 2007; Politis *et al.*, 2012). This relationship can be caused by the fact that actions and intentions of people are formed under the influence of various social factors, because each person is built into a particular social context. According to Edelman *et al.* (2020), the university entrepreneurial environment provides mainly the social capital that is critically important for youth. Being in a network of relationships, it is possible to not only obtain useful information and receive emotional support, but also access other types of resources necessary for entrepreneurial endeavors. However, prior studies have drawn attention to the fact that from early childhood women and men enter social connections differently, which affects their networking behavior in the future (Gilligan, 1982). Women, who need more intimacy, reciprocity and emotionality, tend to use family ties to find the resources they need (Carter *et al.*, 2003). In contrast, men try to avoid using personal family connections in the process of creating a business (Aldrich *et al.*, 1989).

As a result, a favorable university environment does not represent a major source of resources for female youth in Russia, which is why it does not have a significant impact on their level of engagement in entrepreneurial activities. Moreover, only a small number of sample universities have managed to create a viable entrepreneurial university infrastructure dedicated to heightening the entrepreneurial intentions among students. Indeed, Russian universities have an underdeveloped entrepreneurial environment, which affects the formation of necessary skills and attitudes for successful business management in students (Tabachnikova and Vinokurova, 2024). This can be explained by several factors. First, the Russian educational system is dominated by a traditional approach, which rarely provides an opportunity to implement students' ideas in practice. Second, there are no sufficient support programs, as a result of which financial and legal barriers arise that prevent the launch of relevant initiatives, such as accelerators, incubators or mentoring programs.

In addition, there is a lack of interest for the development of entrepreneurial spirit among students in Russian universities (Bodolica *et al.*, 2024; Bogatyreva *et al.*, 2019; Shirokova *et al.*, 2024). A weak entrepreneurial infrastructure or inviting inexperienced professionals

may form a negative attitude of young people towards the entrepreneurial career and, thus, scare them away. Universities should pay more attention and dedicate more funding to the creation of entrepreneurial activities, such as consulting clubs, business accelerators, guest speaker events, industry mentorship sessions and practical workshops. These initiatives would increase students' awareness of this activity, allowing them to develop the required skills and build a solid network of relationships. Students who are actively involved in startup projects at their university, who are embedded in a vibrant entrepreneurial culture and who are inspired and supported, will be more likely to get engaged in entrepreneurial activities.

Theoretical and practical implications

The main theoretical contribution of our research consists in the adoption of the social roles' theory and the university embeddedness perspective for furthering the study of women's entrepreneurial orientation in the context of higher education institutions. Our results aim to advance the literature on female entrepreneurship, which is timely considering the changing role of women in today's business world. Our study provides a renewed understanding of different factors that may potentially narrow the entrepreneurial gender gap that remain pervasive, particularly in emerging market settings (Pelegrini and Moraes, 2022). We have theorized and empirically demonstrated that university entrepreneurship education plays a considerable role in enhancing the entrepreneurial activity among young women.

Our research findings may offer important practical implications for the developers of educational programs at universities. Because the knowledge and skills acquired in the process of entrepreneurship education are important for female youth, program developers need to place more emphasis on entrepreneurship-related courses in the design and preparation of university curriculum. By incorporating additional business and management courses, and equipping students with the basic knowledge of creating and running new ventures, higher education institutions can make a sizeable difference in women's entrepreneurial engagement. The profession of entrepreneur should be presented as a notable career path for women, despite the widespread existence of established gender stereotypes.

Limitations and future research

It is worth noting that our research is not without limitations. Since we have only considered a sample of Russian students, the obtained results may not be extended to other countries due to some differences in cultural and institutional characteristics. Future inquiries in the field should consider testing the hypothesized relationships on large data samples drawn from culturally diverse regions of the world. Further, we employed cross-sectional data that did not allow tracking changes in respondents' behavior over time. The next generation of studies on the topic may find appropriate to use longitudinal data that would cover a longer period to determine causal relationships. Finally, because our study is relevant only for students for whom the university is the main social institution, we are unable to extrapolate the results to other social groups. Future investigations could continue looking into other factors that may narrow the gender gap in entrepreneurship by employing data on other categories of the general population.

Conclusion

Drawing on a large sample of students in Russia, we examined the moderating effect of both university entrepreneurship education and entrepreneurial environment on the entrepreneurial gender gap of youth. Our study makes an important step towards an enhanced understanding of the role that different factors may play in encouraging young women to enter the entrepreneurship domain. We are hopeful that our findings will stimulate a renewed wave of gender-based research into the entrepreneurial phenomenon, especially in emerging markets where institutional voids continue to obstruct the development of entrepreneurship (Manolova *et al.*, 2019).

Notes

1. https://www.gemconsortium.org/
2. More information about GUESSS project can be found at http://www.guesssurvey.org
3. Global Entrepreneurship Monitor: https://www.gemconsortium.org/
4. Panel Study of Entrepreneurial Dynamics: https://www.psed.isr.umich.edu/

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