

The Education Impact on the Innovativeness of Female Entrepreneurship: a Systematic Literature Review

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Abstract: The women's education and its potential impact on entrepreneurship and innovation represent a growing interest in socioeconomic academic research (Paoloni and Manzo, 2023; Pereira, 2020; Bishu and Alkandry, 2017). The present paper makes a systematic literature review based on the topic of Gendered Education and Innovation in female entrepreneurship, considering the evolution over almost the last two decades and the current state of the art. The study is based on the Scopus database. It examines articles, books, and indexed conference proceedings that have focused on the influence of women's education on their entrepreneurial journey and innovative capabilities. The studies having in Abstract, Title, or Keywords "education " AND " innovation " AND " entrepreneur* " OR "enterprise*" AND "gender" are 257. Source types, year of publication, field of research, source title, keywords, country/territory, and language classify studies. After this, the most cited studies were analyzed to answer the RQs. The studies reviewed show a positive correlation between women's level of education and the likelihood of engaging in entrepreneurial activities. Education provides technical and managerial skills, boosts self-confidence and expands networking, facilitating access to resources and opportunities (de las Mercedes Barrachina Fernández et al., 2021; Gupta et al., 2009). From a theoretical point of view, the research contributes to gender studies about female entrepreneurship, focusing on the relationship between education and innovation. Analyzing how education influences women's entrepreneurship can help identify and address educational and socio-cultural barriers that limit women's access to entrepreneurship and active participation in innovation. From a managerial perspective, the results of such research can inform public policy, guiding government and organizational efforts in promoting specific educational programs that encourage women's entrepreneurship and innovativeness. Promoting women's innovativeness and entrepreneurship can contribute to overall economic development, as greater inclusion of women in the business landscape can lead to increased diversity, competitiveness and innovation (Minniti and Nardone, 2007; Morton et al., 2016; Pereira, 2019; Pereira and Salaris, 2019;).

Keywords: Innovation, Female Entrepreneurship, Gender, Education, Gender gap

1. Introduction

Research on disparities based on gender began in the early 1900s, witnessing a significant surge in the 1970s (Oaxaca, 1973), and saw an even greater expansion in recent years (Atena and Tiron-Tudor, 2019). In any work environment, the gender gap manifests as differences between women and men in aspects like job market presence, job participation, unemployment, disparities, among others (Pereira and Salaris, 2019). Historically, women have encountered various challenges in the job market, often perceived as having a less strong commitment to their work, accompanied by higher rates of absence and job change (Kiros and Abebe, 2020). In the past hundred years, particularly in recent decades, most developed countries have seen a reduction in the gender gap. The growing prominence of women in labor markets has led to significant shifts in developed economies. However, disparities in areas like wages, promotion opportunities, and employment continue to exist (Pereira, 2019). Women's entrepreneurship is crucial for economic growth, especially in developing economies, and for promoting social inclusion and combating poverty and discrimination. They significantly contribute to entrepreneurial activity, job creation, GDP increase, reduction of poverty and social exclusion (Cardella et al., 2020). However, the proportion of women pursuing entrepreneurial careers is lower than that of men, with a more significant disparity in more developed countries (Modaffari and Manzo, 2019; Pereira 2019).

Cultural stereotypes and social roles assigned to men and women can explain the gap between male and female entrepreneurship. Stereotyped, male-centred visions of business discourage women from engaging in entrepreneurial activities and create societal barriers. Men and women face different challenges in accessing various forms of capital, such as institutional, family, and financial support (Modaffari et al., 2023). In particular, literature suggests that women's enterprises (WEs) are less attractive to investors due to structural characteristics (Alesina et al., 2013), personal decisions (Heilman, 2001), and stricter credit policies (Cesaroni and Sentuti, 2016). These businesses are typically smaller, newer, and have less capital (Cesaroni and Sentuti,

2014). Fear of failure and self-efficacy are further significant barriers for women in pursuing entrepreneurial careers (Dohmen and Falk, 2011). Their limited debt is also attributed to poor financial literacy (Sena et al., 2012), a preference for small businesses (Morris et al., 2006), or work-life balance (Cliff, 1998). Banks favour larger, established companies for loans, leading to WEs relying more on personal financing (Bellucci et al., 2010; Coleman and Robb, 2009;). Despite these challenges, women are adept at creating value through new ideas (Burgess and Tharenou, 2002) and collaboration (Kuhn and Villeval, 2015), building strong networks (Paoloni et al., 2022), which enhances market awareness and innovation (Jia et al., 2020). Previous research recognized that the gender gap in entrepreneurship is largely influenced by a significant educational disparity (Paoloni and Manzo, 2022), affecting not just women's entrepreneurial ambitions, but also their business performance (Kuschel et al., 2020) and their innovativeness (Modaffari and Manzo, 2022).

The present study aims to deepen the relationship between the education received by women and the innovativeness of female-led enterprises. With this aim, the present analysis wants to answer the following Research Questions (RQs):

RQ1: According to the existing literature, what are the trend topics concerning women's education and entrepreneurial innovation?

RQ2: Can the education received by women affect female entrepreneurship in terms of innovation?

RQ3: What thriving future research areas is possible to identify?

The research is based on a systematic literature review (Papaioannou et al., 2016; Petticrew and Roberts, 2008; Tranfiel et al., 2003) focused on the topic of Gendered Education and Innovation in female entrepreneurship and carried out through Scopus database. The final sample, involving research having in Abstract, Title, or Keywords "education " AND " innovation " AND " entrepreneur* " OR "enterprise*" AND "gender", is composed of 257 documents.

The work is structured as it follows. Section 2 defines the literary background from which our analysis is carried out. Section 3 defines the methodology. Section 4 exposes the results of the SLR, answering RQ1. Section 5 discusses their answering RQ2. Section 6 summarizes conclusions and future research, answering RQ3.

2. Educational Impact on the Innovativeness of Female Entrepreneurship: Introductory Framework

Entrepreneurs, regardless of gender, generally possess a higher level of education compared to non-entrepreneurs (Dolinsky et al., 1993). However, the comparative educational levels between female and male entrepreneurs are not definitively established. For example, Cowling and Taylor (2001) observed that in the United Kingdom, female entrepreneurs typically have a higher educational background than their male counterparts. Conversely, male entrepreneurs tend to attain higher levels of postsecondary education compared to female entrepreneurs. Meanwhile, several other studies, including those by Brush (1992), and Burke et al., (2002), indicate no significant correlation between education levels and the likelihood of becoming self-employed.

The first studies focusing on the educational impact on the innovativeness of female entrepreneurship was published 1996, when Crant (1996) revealed that the desire to start a business correlates with factors such as gender, educational background, having an entrepreneurial family member, and especially a proactive personality (Crant, 1996). From that year, even the subsequent literature collectively suggests that education plays a crucial role in enhancing the innovativeness of female entrepreneurship by providing interdisciplinary knowledge, fostering entrepreneurial attitudes, valuing diversity (Harris and Gibson, 2008), adapting to global trends, and offering practical skills and training (Meyer et al., 2007). Research on women entrepreneurship has significantly expanded during the two first decades of 21st century. This field is interdisciplinary, addressing the importance of entrepreneurial education, social entrepreneurship, and socio-cultural contexts as tools to overcome gender gaps.

3. Data Base and Methodology

The present paper applies a systematic literature review according to Papaioannou et al. (2016), Petticrew and Roberts (2008) and Tranfiel et al. (2003) based on the topic of Gendered Education and Innovation in female entrepreneurship, considering the evolution over almost the last two decades and the current state of the art. The study is based on the Scopus database, from 1996 to 2023. It examines articles, books, and indexed

conference proceedings that have focused on the influence of women's education on their entrepreneurial journey and innovative capabilities. It considers the studies having in Abstract, Title, or Keywords "education " AND " innovation " AND " entrepreneur* " OR "enterprise*" AND "gender", and according to this search resulted in 257 publications. The last extraction was made on 22nd November 2023. Source types, year of publication, field of research, source title, keywords, country/territory, and language classify studies. Following this process, the principal factors influencing the Gender Gap in the marketplace were examined based on the findings of the reviewed literature, and the most cited studies were analyzed to answer to the four proposed RQs:

RQ1: According to the existing literature, what are the trend topics concerning women's education and entrepreneurial innovation?

RQ2: Can the education received by women affect female entrepreneurship in terms of innovation?

RQ3: What thriving future research areas is possible to identify?

4. Women’s Innovation and Education: Systematic Literature Review

The period under analysis, in the Scopus database, using the search about the education impact on the innovativeness of female entrepreneurship found a total of 257 publications. Most of these publications are articles in journals (161), conference papers (32), book chapters (25), conference reviews (23), 1 editorial, and 1 retracted.

Figure 1 shows the trend of literature focusing on the educational impact on the innovativeness of female entrepreneurship. The trend was stable from 1996 until 2008, then it met two increasing phases, from 2009 to 2012, and from 2014 to 2022. Between 2012 and 2014, instead, the annual publications on this topic slightly decreased.

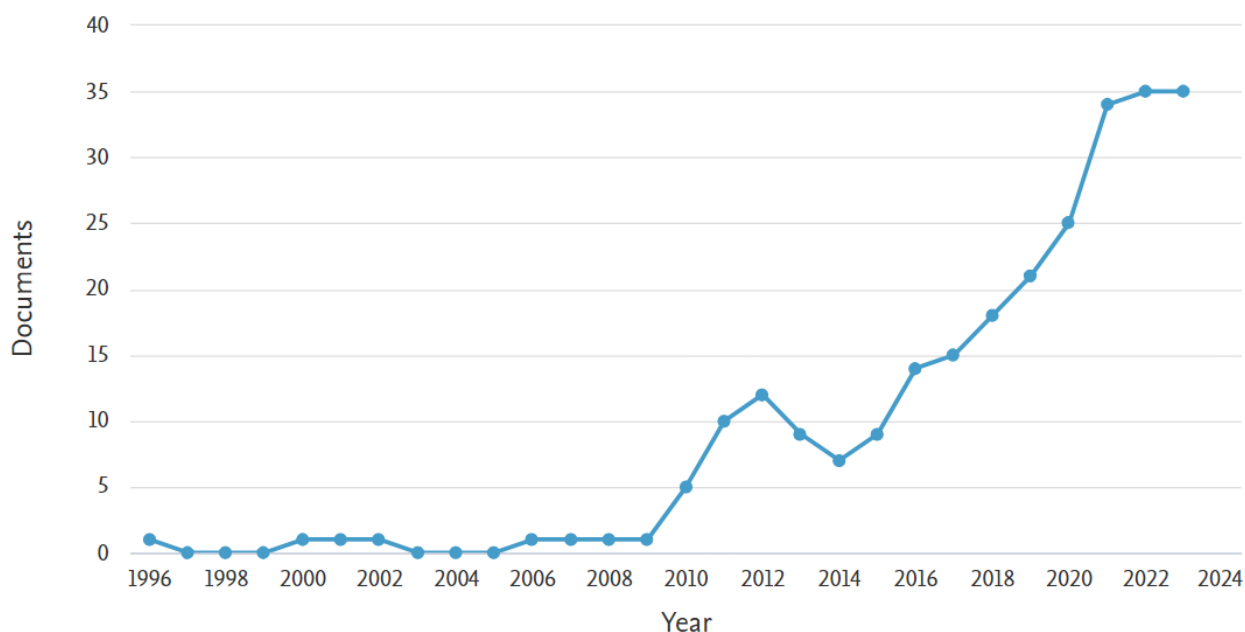


Figure 1: Number of publications between 1996 and 2023 (Scopus Database)

According to the field of research, most of the publications were in the field of Business, Management and Accounting (116); Social Sciences (114); Economics, Econometrics and Finance (64); Computer Sciences (46); and Engineering (44) (Table 1).

Table 1: Number of publications by field of studies (Scopus database)

Field of Studies	Number of Publications
Business, Management and Accounting	116
Social Sciences	114
Economics, Econometrics and Finance	64
Computer Science	46
Engineering	44

Field of Studies	Number of Publications
Environmental Science	22
Decision Sciences	19
Psychology	14
Energy	14
Medicine	6
Agricultural and Biological Sciences	6
Arts and Humanities	4
Earth and Planetary Sciences	3
Biochemistry, Genetics and Molecular Biology	3
Mathematics	2
Pharmacology	1
Neuroscience	1
Multidisciplinary	1
Material Sciences	1
Immunology and Microbiology	1
Health professions	1

According to the source title, the Journals with more publications were: Sustainability Switzerland (11); Frontiers in Psychology (9); Education and Training (5); International Journal Of Gender And Entrepreneurship (5); Ciriec Espana Revista De Economia Publica Social Y Cooperativa (4); African Journal Of Science Technology Innovation And Development (4); Journal Of Industrial Engineering And Engineering Management (3).

About the keywords that are more common in the publications under the topics in analysis, these are Gender (49), Entrepreneurship (45), Innovation (43), Education (33), Engineering Education (22), Students (18), Entrepreneur (17).

The authors' affiliation countries/territories with more publications are: United States (with 57 publications), China (26), Spain (26), United Kingdom (15), India (11), Portugal (10), Mexico (9), Australia (6). After that, Italy, Germany and Canada, each with 7 publications; South Africa, Malaysia, France each with 6 publications; United Arab Emirates, Czech Republic, Brazil (5); Taiwan, Romania, Pakistan, Nigeria, Indonesia, Hong Kong, Finland (4); Uganda, South Korea, Serbia, Netherlands, Iran, Denmark, Colombia (3).

About the language of publications, most of the publications were published in English (247 publications), Spanish (9), Chinese (3), French (1).

In terms of the topics mainly covered, in the extracted sample of research analyzing the intersection between the two variables "innovation" and "education," it is possible to see that the authors often consider subcategories of either variable. Those most often treated are summarized in Table 2.

Table 2: Summary of main subject studies about Educational impact on female enterprises innovativeness (Authors elaboration)

Subject of Study	Content	Some Authors
Type of Innovation		
Technological Innovation	Studies involved in this category focus on the implementation of new digital technologies and/or involve areas of computer science or STEM.	Ge et al., 2022; Liani et al., 2023; Pallissery, 2022; Serrano et al., 2023;
Social Innovation	Social innovations may include new business models, organizational processes, products, or services that focus on sustainable solutions that have a positive impact on society.	Kim, 2023; León-Pozo et al., 2021; Sahni et al., 2023; Suseno and Abbot, 2021.
Entrepreneurial intention	These studies consider the innovative drive that leads men and women to choose to pursue entrepreneurship	Bijedić et al., 2021; Elliott et al., 2021; Guelich, 2022; Sánchez Cañizares and Fuentes García, 2010.
Generic Innovation	These researches refer generically to the concept of innovation in the context of a business organization, without specifying its type, source, or mode of implementation	Exposito et al., 2023; Gaies et al., 2023; Mickey and Smith-Doerr, 2022.
Type of Education		
Specific entrepreneurial training	These studies investigate the impact on innovation of specific training courses delivered in-house by companies or other organizations	Harris and Gibson (2008); Portuguese Castro and Gómez Zermeño, 2020; Tortia et al., 2022.
Higher education	This level of education includes various types of programs and institutions, such as universities, colleges, technical institutes, and vocational schools.	Erić-Nielsen et al., 2019; Gaies et al., 2023; Vázquez-Parra, et al., 2021.
Culture	These studies consider the cultural aspect of education, thus the education that, voluntarily or involuntarily, comes from families, society, and institutions	Crant (1996); Exposito et al., 2023; Zhang and Du, 2023.

5. The Relationship Between Education and Female Entrepreneurship Innovation

The accumulated research highlights the complex influence of education on female entrepreneurship, particularly in fostering innovation and entrepreneurial drive. Bijedić et al. (2021) examine how gender disparities, career trajectories, and human capital aspects impact the flow of innovations, noting that women tend to produce fewer inventions, possibly due to gaps in educational or systemic support for female innovators. Further research, like Liani et al. (2023) shed light on women's obstacles, including limited resource access and prevalent gender stereotypes, often discouraging them from entrepreneurial endeavors. Historically, female entrepreneurs have been shown to secure less funding than their male counterparts (Brush et al., 2009) and are more inclined to use personal finances for startup ventures (Coleman and Robb, 2009). This financial gap contributes to an increase the gender gap when considering entrepreneurial intention. This underrepresentation of women is even more pronounced in high-tech sectors, due to the fewer number of women earning STEM doctorates compared to men (Blume-Kohout, 2014; Serrano et al., 2023), and is further compounded by the reluctance of technologically skilled women to take up leadership roles in IT due to the sector's inherent challenges (Pallissery et al., 2022). Pallissery et al. (2022), in their study on Indian companies, identify key factors that deter women's engagement in entrepreneurial innovation in high-tech sectors, emphasizing the cultural factors that exacerbate the gender gap in entrepreneurship, especially in technologically advanced companies. They point out that traditional family structures and patriarchal norms in India limit women's professional opportunities, as family duties often hinder their ability to take on significant roles like IT company board management. The study also notes that women with modern views and strong qualifications are frequently overlooked by male IT executives who are reluctant to accept female leadership. Additionally, it observes that training programs in IT companies need to be revised to prepare women for leadership roles, and stringent share qualification criteria for directorships in publicly traded companies are substantial hurdles for aspiring women leaders (Pallissery et al., 2022). These insights underscore the necessity for educational strategies that impart entrepreneurial skills and tackle the broader social and cultural barriers women face. For example, fear of failure has been identified as a significant deterrent for women initiating entrepreneurial activities (Cañizares and García, 2010). Entrepreneurship education can mitigate this fear, fostering more innovative entrepreneurial activities, positively influencing entrepreneurial intent, and helping bridge the gender gap in entrepreneurial identity (Elliott et al., 2021; Guelich, 2022). Studies also suggest that implementing regulations against gender discrimination in both public and private sectors could foster an environment conducive to entrepreneurial culture among women (Ge et al., 2022).

In the context of global disparities and social injustices exacerbated by globalization, social innovation emerges as a critical mechanism for addressing inequities and empowering communities (León-Pozo et al., 2021). León-Pozo et al. (2021) analyze the social innovation level in women's enterprises, considering variables like the entrepreneur's life profile, collaborative capacity, originality of the initiative, and social impact. They find that women entrepreneurs' educational level and socioeconomic status significantly influence their potential for social innovation. Nonetheless, individual cases show that ethics, values, and a genuine desire for social change can drive women to innovate, regardless of their socioeconomic status.

Hechavarría et al. (2017) investigate gender dynamics in social entrepreneurship. They find that women increasingly participate in social entrepreneurship, driven by societal needs and personal values. This participation often reflects a desire to address specific social issues disproportionately affecting women. Shaw and Carter (2007) explore motivations behind women's engagement in social entrepreneurship. Their study reveals that women often enter social enterprises to pursue economic and social goals, frequently driven by personal experiences or recognition of unmet social needs. Women's participation in this field is often driven by personal experiences, societal needs, and the desire to address specific social challenges. Educational programs, supportive policies, and inclusive environments are crucial in empowering women to engage in and contribute to social innovation fully. As such, understanding and addressing the barriers while leveraging the unique strengths of female entrepreneurs is critical to fostering a more equitable and socially innovative entrepreneurial landscape. Studies by Ahl (2006) suggest that education and gender-specific training programs can significantly enhance women's entrepreneurial skills and their propensity to engage in social innovation. These programs can even help overcome barriers like fear of failure and lack of technical know-how (; Portuguez Castro and Gómez Zermeño, 2020; Tortia et al., 2022).

6. Conclusions and Future Research

Previous studies have recognized education as a relevant source of the entrepreneurial gender gap (Bijedić et al., 2021; Modaffari and Manzo, 2022). This study, based on a systematic literature review, aimed to observe how the relationship between education and innovation has been addressed in the literature. To answer RQ1, from the research, it is possible to decompose the two macro variables of innovation and education. Based on the object or purpose of the innovative process, the main foci emerging from the literature are the intention to start a business, the desire to innovate the organization, technological innovation, and social innovation (Hechavarría et al., 2017; Liani et al., 2023;). On the other hand, depending on the context in which it is generated, education may involve high levels of education, specific training courses, or general cultural education. As for the relationship between these two variables (RQ2), what emerges is that education plays a pivotal role in female entrepreneurship and innovation (Elliott et al., 2021; Guelich, 2022). Educational strategies focusing on entrepreneurial skills can help mitigate female entrepreneurs' barriers, fostering innovation and bridging the gender gap in entrepreneurial identity. Supportive policies and training programs tailored to women's needs are crucial for their full engagement in entrepreneurial and social innovation activities (Ge et al., 2022; Pallisery et al., 2022).

Answering RQ3, based on the present analysis, some future areas of research that seem interesting are:

1. Deepening how educational policies influence women's entrepreneurship, particularly in STEM areas. This could include studying the effect of mentoring initiatives, women-specific scholarships, and entrepreneurship skills development programs.
2. Exploring how education in emerging technologies (such as artificial intelligence, blockchain, etc.) can be structured to attract and support more women.
3. Delve into the topic of social innovation to see if commonalities can be identified in the educational paths of entrepreneurs and women entrepreneurs pursuing various sustainability goals.

The study's primary limitation arises from the sampling phase, as the results are confined to the data obtained from the SCOPUS database; however, it is improbable that using a different database would lead to significant changes in the outcomes. Additionally, despite being methodically and carefully executed to maintain uniformity across all components, the coding process might still need some oversights and coding inaccuracies. Executed to maintain uniformity across all components, might still contain some oversights and coding inaccuracies.

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