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Understanding institutional dimensions in high-impact female entrepreneurship

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Abstract

Female entrepreneurs remain a minority, particularly in high-tech and high-impact ventures. Given their role in job creation and economic growth, understanding the institutional environment shaping their entrepreneurial journey is crucial. This paper addresses the research question: *How do institutional dimensions (regulative, normative, and cultural-cognitive) influence high-impact female entrepreneurship?* We identify the most relevant institutions and explore how different stakeholders can support them. Methodologically, we employ a mixed-methods approach, combining moderated mediation and fuzzy-set qualitative comparative analysis (fsQCA). Our findings show that institutional dimensions significantly shape high-impact female entrepreneurship across different contexts. Specifically, from fsQCA, we found that the interactions among regulative, normative, and cultural-cognitive dimensions are necessary conditions for employment and high-tech outcomes. Based on these findings, we offer practical insights for governments and policymakers, highlighting the need for targeted policy initiatives that align with female entrepreneurs' challenges. Specifically, some recommendations include agile regulations for high-impact sectors, venture capital programs for women, and educational programs that promote women's participation in science, technology, and engineering. We also emphasize the importance of supportive normative environments, where family funding becomes crucial as female entrepreneurs demonstrate success. By addressing these institutional dimensions collectively, our study suggests a holistic approach can enhance employment and strengthen women's role in innovative entrepreneurship.

Keywords Institutional dimensions · High-impact female entrepreneurship · Mixed methods · fsQCA

JEL classification L26 · J16 · P48 · M13

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1 Introduction

Female entrepreneurs constitute a small percentage of high-impact technology firms (Hampton et al. 2009). Despite their increasing presence in entrepreneurial ecosystems (Mayer2008; Venkatesh et al. 2017), structural and cultural barriers persist, limiting their access to resources and opportunities. The persistence of male-dominated work cultures in high-tech sectors often results in additional challenges for women, such as biased treatment during capital-raising rounds and improper behaviors, including sexual harassment (Ozkazanc-Pan and Clark 2018). For example, Kanze et al. (2018) found that investors tend to ask female entrepreneurs prevention-focused questions, in contrast to the promotion-focused questions posed to male entrepreneurs, creating an additional barrier to raising capital.

Although they encounter important barriers to starting new businesses, women are called upon to enhance their entrepreneurial engagement. In addition, their importance has been demonstrated through the advantages they have by leading high-impact (Devine et al. 2019) and digital high-tech new ventures (Le Loarne–Lemair et al., 2024). Enhancing women's participation in high-impact entrepreneurship is not only a matter of equity but also a key driver of economic growth, employment generation, and innovation. For instance, Audretsch et al. (2022) highlight the critical role of institutional contexts in the performance and growth of women-led firms, particularly in international markets. It emphasizes the need for institutional environments that actively support female entrepreneurs, enabling them to scale their businesses and contribute to economic development. A recent systematic literature review by Hussain et al. (2024) shows growing scholarly attention to the role of gender diversity and female leadership in firm performance. However, most studies still focus on board-level dynamics, overlooking entrepreneurship as a parallel avenue for impactful female leadership—a gap this study aims to address. Garcia-Blandon et al. (2025) further show that increasing female representation in executive teams does not guarantee better performance without addressing deeper institutional and cultural barriers, stressing the need for structural changes that enable meaningful participation.

This study focuses on high-impact female entrepreneurs, defined as those who operate innovative, growth-oriented firms with increasing revenue and job creation (Aidis and Weeks 2016). High-impact entrepreneurship, as defined by Acs (2010), involves responding to opportunities by bringing inventions to market that create wealth and growth, distinguishing these entrepreneurs from those who merely replicate existing businesses.

Most research on the influence of institutional conditions on entrepreneurial activity focuses on the differences in entrepreneurship rates between countries and the determinants of those differences (Urbano and Alvarez 2014; Saeed et al. 2015; Urbano et al. 2019). While there is growing evidence that institutions and a favorable context play a critical role in shaping specific types of new ventures (Stenholm et al. 2013), including digital entrepreneurship (Galindo-Martín et al. 2023), female necessity and opportunity entrepreneurship (Deng et al. 2024), research on this area remains limited. Some studies have explored how formal and informal institutions influence female entrepreneurship in different contexts (Terjesen and Amorós 2010;

Noguera et al. 2015; Giménez, Gabaldón and Seierstad, 2017; Xie et al. 2021), specifically, the normative context for women's participation in entrepreneurial activity (Baughn et al. 2006). Recent studies show how formal and informal institutions influence women's entrepreneurship in digital platforms (Bose et al. 2024) and their performance (Zhao and Yang 2021; Bose et al. 2024).

Previous studies have applied the institutional dimensions approach (regulative, normative and cultural-cognitive dimensions) to analyze women's entrepreneurship and women's entrepreneurial leadership (Yousafzai et al. 2015; Xie et al. 2021). Still, they do not consider the specific high-impact female entrepreneurs. For instance, Gough, Yankson, Owusu and Osei (2015) and Amine and Staub (2009) show that favorable regulative, normative, and cultural-cognitive institutions promote female entrepreneurial activity. However, these studies also highlight insufficient institutional support for sustained growth and survival.

Consequently, research on how institutional dimensions influence and determine high-impact female entrepreneurship is necessary because of their contributions to innovation, growth, and employment generation. By reducing institutional barriers and fostering a supportive environment, societies can leverage the full potential of female entrepreneurs, driving broader economic and social benefits. Moreover, women can lead and manage high-impact new firms differently and effectively because of the experience from all the roles they play in their lives, giving them practice at multitasking and opportunities to improve interpersonal and leadership skills (Ruderman et al. 2002; Devine et al. 2019). For this reason, it is crucial to understand what and how the institutional environment influences the process of creating this type of business to support its growth and survival over time and generate strategies that incentivize high-impact female entrepreneurship in different contexts. Accordingly, this research seeks to answer the following question: *How do institutional dimensions (regulative, normative, and cultural-cognitive) influence high-impact female entrepreneurship?*

Methodologically, we employ a mixed-methods strategy involving panel data and mediation analysis of high-impact female entrepreneurs and Fuzzy Qualitative Comparative Analysis (fsQCA) based on the case comparison of specific new ventures in both developed and developing economies.

This paper makes significant contributions to theory and practice. The first contribution is made to the scarce empirical literature understanding the institutional dimensions as determinants of high-impact female entrepreneurship (Wang et al. 2019). The second one is determining the primary institutional configurations driving high-impact female entrepreneurship in two specific contexts; we find no differences between Barcelona and Medellín regarding the challenges that high-impact female entrepreneurs face. By implementing a mixed-methods approach, we advance in understanding the relationships, inquiring into the internal configurations, particularly institutional dimensions' complementarity and substitution effects that usually remained black-boxed with typical statistical approaches (Fiss 2011). Third, we contribute to practice by suggesting recommendations for designing policy initiatives to meet female entrepreneurs' needs, such as specific and agile regulations for high-impact sectors and venture capital programs for women. Naturally, those strategies related to the regulative dimension must interact with the other two dimen-

sions. Regarding the cultural-cognitive dimension, it is necessary to develop specific education for women, showing them a place in science, technology, and engineering. Regarding the normative dimension, we identify that in both contexts, entrepreneurship is recognized but not in the first stages; the women in the study need to demonstrate results to receive their family support; at the beginning, most of them are traditional and prefer that the entrepreneur get a job. Those institutional dimensions' interactions will help to increase employment by encouraging women with innovative ideas to participate in entrepreneurship. Ultimately, fostering institutional conditions that enable high-impact female entrepreneurship can lead to more inclusive, innovative, and resilient economies. Finally, the mixed methods approach also responds to balancing the research between positivism and humanism to advance the research field and triangulate the results (Liñán and Fayolle 2015; McDonald et al. 2015).

2 Theoretical framework

2.1 Institutional dimensions and high-impact female entrepreneurship

As mentioned earlier, in this study, we consider institutional dimensions (Scott 1995) applied to entrepreneurial activity (Busenitz et al. 2000; Amine and Staub 2009; Urbano and Alvarez 2014) to analyze high-impact female entrepreneurship. Scott (1995) identified three institutional dimensions: regulatory, normative, and cultural-cognitive. Those dimensions influence entrepreneurial intentions (Bağış et al. 2024), entrepreneurial activity (Stenholm et al. 2013; Alvarez et al. 2014) in different stages of the entrepreneurial process (Alvarez et al. 2025), including high-impact female entrepreneurship since 'they set boundaries, both implicit and explicit, for individual actions' (Welter 2012).

The concept of high-impact entrepreneurship is broad (Acs 2010). According to literature, high-impact female entrepreneurship includes female entrepreneurial activity in high-technology and STEM sectors (science, technology, engineering, and mathematics) (Bendell et al. 2019), creative industries (Mylonas and Petridou 2018), market-expanding, high-growth, export-oriented, and innovative business (Aidis and Weeks 2016). We integrate all the previous concepts of high-impact entrepreneurship to build our institutional dimensions theoretical framework.

The regulative dimension refers to rules monitored and enforced through laws and government policies that promote or restrict society's behavior (Scott 1995). Some examples of the regulative dimension applied to entrepreneurship are property rights, the rule of law, and tax policies (Estrin et al. 2013; Chowdhury et al. 2019). We identify in prior literature how this dimension constrains and enables high-impact female entrepreneurship. Women have lower levels of expectation for the growth of their firms (Brush et al. 2004). Some explanations for this are related to the sectors in which women traditionally initiate their entrepreneurial activity and are usually less innovative (Ozkazanc-Pan and Clark 2018). The lack of training programs compounds this problem in developing the potential of female entrepreneurs. In this regard, Braun (2010) calls for improving women entrepreneurs' essential digital and

strategic skills to participate in the knowledge economy. Part of this reality is that the incentives in female entrepreneurship's regulatory dimension have not remained favorable, especially in developing countries (Terjesen and Amorós 2010; Langevang et al. 2018; Belitski and Desai 2021). Another problem for female entrepreneurs at the regulative level is access to venture capital, which decreases their performance (Xie and Lv 2016). Demartini (2018) shows that innovative female businesses have more difficulty raising financial resources than men. Therefore, we found that literature suggests a positive relationship between high-impact female entrepreneurship and a favorable regulative dimension, such as adequate levels of investment freedom, access to venture capital, less time and procedures to start a new business (Demartini 2018; Langevang et al. 2018).

The normative dimension involves the values that dictate what behavior is desirable in society, the goals and objectives, and how to achieve them. This pillar includes values and norms (Scott 1995). The values and norms that differentiate men from women entrepreneurs differ in each group's roles throughout history. Some behaviors and careers are stereotyped as masculine or feminine (Williams and Best 1982). Therefore, specific jobs have been considered more appropriate for each gender (Williams et al. 1999). Entrepreneurship is historically considered a male activity, and especially in more traditional cultures where women are often ascribed to a primary role as homemakers and children's caregivers, the societal values indirectly interpret women's entrepreneurship as less desirable and, as a result, provide lower normative support, which leads to lower opportunity recognition by women (Brush et al. 2009). Those stereotypes also affect women's ability to pursue entrepreneurial careers and grow their businesses (Baughn et al. 2006; Langevang et al. 2015). Alakaleek and Cooper (2018) found that Jordanian female founders of technology-based firms access venture capital differently than their Western counterparts in the same sector. They use formal business networks in an early stage, establishing connections through formal events. In this study, networking platforms and events are essential for this type of entrepreneur. In some cultures, society does not support female entrepreneurial activity (Alakaleek and Cooper 2018; Shukla, Chauhan and Saumya, 2018), and those women need to find creative ways to find resources based on the opportunities in the market. Social norms mainly influence this lack of support (Baughn et al. 2006). Property traditions allow a woman to own property, but it tends to be her husband or father who manages it. Then, it is more difficult for them to access loans (Shukla, Chauhan and Saumya, 2018). Consequently, the literature review suggests a direct relationship between the social normative support towards women growing their businesses and female entrepreneurs (Baughn et al. 2006; Yousafzai et al. 2015; Zhao and Yang 2021; Bose et al. 2024). The extent to which entrepreneurship is encouraged for women would be expected to lead to a higher level of high-impact female entrepreneurship.

The Cultural-cognitive dimension refers to the interaction between the individual and society's external belief systems, which is the individual construction of reality based on shared conceptions about different behaviors (Scott 1995). In female entrepreneurship research, this dimension is related to the woman's self-confidence, skills, and competencies and how she adapts the information she receives from the regulative and normative institutions and creates her reality. Recent research found

that "when women identify good entrepreneurial opportunities and have a certain entrepreneurial capability and risk tolerance, they will engage in entrepreneurial activities even if the regulative and normative institutions are unfavourable" (Chen et al. 2023, p. 661). Mitchelmore et al. (2014) identify several key factors common among high-growth SMEs led by women. The authors find that female entrepreneurs who achieve significant business growth tend to prioritize specific competencies that set them apart from their low-growth counterparts. These competencies include a proactive approach to business, a strong focus on strategic planning and execution to capitalize on opportunities, the ability to secure necessary financial resources, and a willingness to take calculated risks. Significantly, these competencies are influenced by the broader contextual environment and are closely related to the cultural-cognitive dimension, which shapes how these entrepreneurs perceive and respond to opportunities and challenges within their specific contexts. Similarly, Turkina and Thai (2015) argue that high-impact entrepreneurship is influenced by the reward for an application, which refers to the thinking that personal effort and knowledge help overcome difficulties. The definition of reward for application is related to the cultural-cognitive dimension. In this sense, we infer that when females have higher levels of reward for application, the probability that she is in high-impact entrepreneurship increases. Furthermore, Bendell et al. (2019) show how male and female entrepreneurs immersed in high-technology firms have differences regarding their self-goal-setting and self-cueing behaviors, which have implications for developing their new ventures. For their part, Martin, Wright, Beaven, and Matlay (2015) found that women adapt to male-dominated contexts as they are new companies in science, engineering, and technology. In this adaptation, female entrepreneurs need to make allowances to behave as an "honorary man," unquestioningly the norms imposed by their counterparts. Moreover, female entrepreneurs have to earn a space based on the demonstration of their hard work and expertise, while men are accepted as entrepreneurs with the necessary skills. However, the specific factors that facilitate this adaptation are not established, and female entrepreneurs affirm that they did not suffer overt discrimination but need to adapt to the context. The hard work and expertise referred to by Martin et al. (2015) are related to education, previous experience, and individual abilities connected to the cultural-cognitive dimension in prior literature. As we discussed, the cultural-cognitive dimension is a frame to understand how female entrepreneurs face the difficulties immersed in high-impact entrepreneurship. Therefore, prior literature suggests a positive relationship between high-impact female entrepreneurship and the cultural-cognitive dimension, measured as good perceptions to overcome barriers, knowledge, and skills.

2.2 Institutional dimensions interplay and moderated mediation effects on high-impact female entrepreneurship

While the direct relationships between each institutional dimension—or their commonly used proxies—and female entrepreneurship have been widely examined (see Appendix A), research exploring the interaction effects among these dimensions remains scarce. Our study contributes to this gap by focusing specifically on high-impact female entrepreneurship and proposing a moderated mediation model that

captures both linear and configurational effects, offering a richer understanding of how institutional forces influence this phenomenon. Institutions are not static, isolated entities but rather interdependent systems that often reinforce or constrain one another (Scott 1995; Busenitz et al. 2000). Therefore, examining their combined influence is crucial to fully understand the complexity of entrepreneurial activity in context.

We consider the regulatory context as a potential moderator of how cultural-cognitive and normative factors influence high-impact female entrepreneurship. The regulative dimension reflects the degree to which formal rules, procedures, and bureaucratic constraints affect entrepreneurial action (Estrin et al. 2013). When these barriers are reduced, translating individual capacities and societal support into entrepreneurial outcomes is likely to be more effective. This institutional dimension has been shown to moderate the influence of individual cognitive resources on entrepreneurial outcomes. For instance, even when women possess the knowledge, skills, and confidence to start a business, unfavorable regulatory environments—such as excessive bureaucratic procedures, limited investment freedom, or lack of access to venture capital—can significantly undermine their potential (Terjesen and Amorós 2010; Demartini 2018; Xie and Lv 2016). Conversely, supportive regulative frameworks can amplify the positive effect of entrepreneurial cognition, acting as a catalyst that transforms personal capabilities into high-growth business outcomes (Estrin et al. 2013; Chowdhury et al. 2019). Recent findings by Stojčić et al. (2024) reinforce this view, showing that in innovation systems, especially within emerging economies, misaligned or overly rigid regulatory frameworks can lock actors into conservative trajectories, limiting their capacity to scale transformative initiatives. This is particularly relevant for women, who often operate in less innovative sectors (Ozkazanc-Pan and Clark 2018) and face barriers to training and funding (Braun 2010; Belitski and Desai 2021). Hence, we expect that a more favorable regulative context strengthens the relationship between cognitive perceptions and high-impact female entrepreneurship. Building on the reviewed literature, we suggest the following hypotheses:

Hypothesis 1 (H1): The regulative dimension (investment freedom, time to formalize a new business, number of procedures to initiate a business) moderates the relationship between the cultural-cognitive dimension (good perceptions regarding the conditions, the knowledge, and the skills) and high-impact female entrepreneurs.

Hypothesis 2 (H2): The regulative dimension (time to formalize a new business, number of procedures to initiate a business, and cost) moderates the relationship between the normative dimension (support towards women growing their businesses) and high-impact female entrepreneurs.

In addition to the moderation effects, we build on previous research that highlights how individual perceptions (cultural-cognitive dimension) do not operate in a vacuum but are shaped and enabled by broader institutional conditions. For example, Klyver et al. (2013) and Lee and Marvel (2014) found that contextual variables can mediate the relationship between individual-level factors and entrepreneurial action, enabling compensatory effects where unfavourable individual attributes are offset

by supportive environments. Similarly, Chen et al. (2023) show that supportive normative and regulative institutions can mitigate cognitive barriers and foster female entrepreneurship.

More specifically, Yousafzai et al. (2015) demonstrated that perceptions about societal support for women entrepreneurs—central to the normative dimension—can act as a mediating factor between cognitive variables and entrepreneurial outcomes. Recent empirical research supports conceptualizing the normative dimension as a mediating mechanism that channels the effects of women's perceived capabilities into high-impact entrepreneurial outcomes. For example, Simarasl et al. (2024) found that normative support -such as societal encouragement and legitimacy- enhances women's entrepreneurial self-efficacy, which in turn improves venture performance. Similarly, Kazumi and Kawai (2017) demonstrated that informal institutional support increases women's self-confidence, which mediates the relationship between the normative environment and business success. These studies highlight that normative factors are not merely external enablers but act within the causal chain, shaping how individual perceptions translate into entrepreneurial behavior.

Karim et al. (2023further revealed that, in contexts of strong gendered norms, women's access to resources or skills alone does not lead to entrepreneurial intent unless normative constraints -such as family disapproval- are addressed. Likewise, Jalil et al. (2023) showed that both social and psychological capital influence women's growth intentions through the mediating role of entrepreneurial attitude, shaped by social norms and internal motivation. Taken together, these findings justify a mediation approach by showing that the normative dimension explains *how* and *why* cultural-cognitive factors (like perceived skills and confidence) lead—or fail to lead—to entrepreneurial action, especially in high-growth contexts. Drawing from the literature discussed earlier, we propose the following hypothesis:

Hypothesis 3 (H3): The normative dimension (support towards women growing their businesses) mediates the relationship between the cultural-cognitive dimension (good perceptions regarding the conditions, the knowledge, and the skills) and high-impact female entrepreneurship.

Figure 1 shows the proposed model:

3 Methodology

As mentioned, this study follows a mixed-methods design involving two stages. The first stage analyzes quantitative secondary data from different databases to find the paths and the significant relationship between the institutional dimensions and high-impact female entrepreneurship rates across OECD countries. The second stage took those relationships and reviewed the causal mechanisms in depth through in-depth qualitative research with a sample of high-impact female entrepreneurs. The female entrepreneurs were chosen for the interview based on theoretical sampling (Eisenhardt and Graebner 2007). Combining qualitative and quantitative research using a mixed-methods design helps researchers avoid each approach's disadvantages (John-

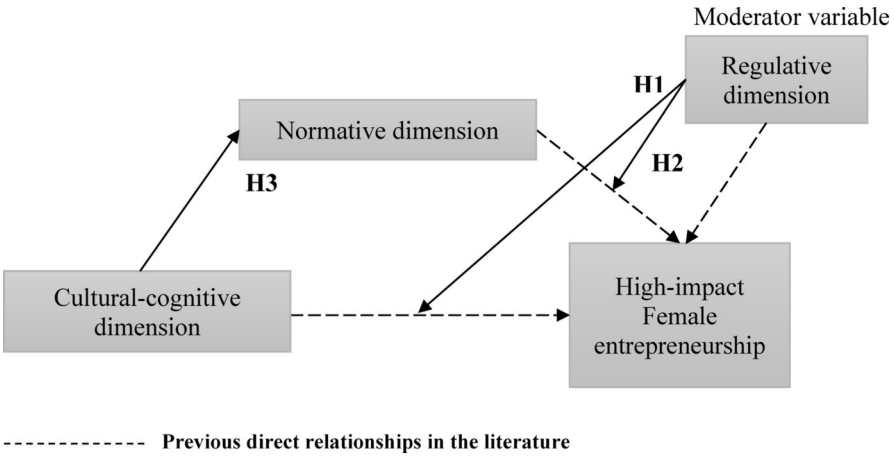

Fig. 1 Moderated Mediation Model

son et al. 2007). Moreover, it helps to have a more comprehensive understanding of the phenomenon and answer the proposed research question.

3.1 Quantitative

The database used for quantitative analysis comes from different sources; the information on the dependent variable is from the OECD database, and proxies for the regulative dimension are from the Doing Business. On the other hand, proxies of normative and cultural-cognitive dimensions are from the Adult Population Survey (APS) developed by Global Entrepreneurship Monitor (GEM). Finally, the control variables were obtained from the World Economic Forum and the International Monetary Fund. Table 1 presents the dependent and independent variables used in this research, including each source.

Regarding the sample, we integrated country-level data from each source between 2004 and 2017, considering data availability across the different datasets. The final sample consists of an unbalanced panel with 256 observations. The sample is restricted to OECD countries, as the dependent variable—high-impact female entrepreneurship—is only available for this group. Focusing on OECD countries allows us to analyze institutional influences in environments with relatively stable regulatory frameworks and established entrepreneurship ecosystems. Although the OECD provides a level of institutional homogeneity in terms of political and economic stability, it is not exclusively composed of high-income economies. While OECD membership is commonly associated with developed countries, several members—such as Mexico, Colombia, Chile, and Costa Rica—are still considered emerging or transition economies (OECD 2024). This diversity within the OECD allows us to capture institutional variations that may be relevant for understanding how institutional conditions might influence female entrepreneurs in different economic contexts.

Table 1 Definition of variables

	Variable	Description	Database
Dependent variable	High-impact Female entrepreneurship	Percentage of female self-employees with tertiary studies	OECD 2004–2017
Regulative dimension	Procedures	Number of business procedures (women) x Days to start a business (women)	Doing business 2004–2017
	Costs	Costs to start a business for (women) % of income per capita	
Normative dimension	Entrepreneurial career	The percentage of people in a country consider starting a business a good career choice.	GEM 2004–2017
	Entrepreneurial status	Percentage of people in a country that attaches high status to successful entrepreneurs.	
	Media attention	Percentage of people considering that there is lots of media attention for entrepreneurship in that country.	
Cultural–cognitive dimension	Opportunity	Percentage of people agreed with the statement, "There are good conditions to start a business in the next six months."	GEM 2004–2017
	Skills	Percentage of people agreed with the statement "You have the knowledge, skill, and experience required to start a new business."	
	Fear of failure	Percentage of people agreed with the statement, "Fear of failure would prevent starting a business."	
Control variables	Per capita income	Natural logarithm of gross domestic product (GDP) at purchasing power parity (PPP) per capita, constant prices (U.S. dollars).	InternationalMonetary Fund (IMF), World Economic Outlook Database. 2004–2017

3.1.1 Variables

The dependent variable in this study is high-impact female entrepreneurship, operationalized at the country level through the percentage of female self-employees with tertiary studies. Using the percentage of women with tertiary education as a proxy for high-impact female entrepreneurship is valid, as higher education is strongly linked to innovation and business creation. Most U.S. innovators hold advanced master's and doctorates in STEM fields (Nager et al. 2016). Higher education develops human capital, providing knowledge, skills, and networks essential for entrepreneurship (Passaro et al. 2018). It also expands access to resources, fosters innovation, and enhances leadership (Zhang et al. 2024). At the national level, countries with greater gender equality in science education show higher entrepreneurial activity in knowledge-intensive sectors and high-growth aspirations (Dilli and Westerhuis2018), reinforcing the link between tertiary education and high-impact entrepreneurship. While this proxy does not specifically capture women in high-impact entrepreneurship, it remains a strong indicator of women's potential in knowledge-intensive sectors, including those analyzed in this study.

The institutional dimensions are the explanatory variables in this model. These dimensions are not easy to measure, mainly because they are not directly observable. For this reason, we use some proxies to operationalize these constructs. The measurements are presented below:

Regulative dimension. To operationalize this dimension, we consider the World Bank's indicators of doing business. We use data on the number of procedures and the days to start a business. We also use the cost of starting a business (% of income per capita), and all these variables are specifically for women in each country.

Normative dimension. This dimension refers to the evaluation that people in society attach to entrepreneurship. The first proxy is entrepreneurial status, the percentage of people who attach high status to entrepreneurs. Moreover, to operationalize this dimension, we also consider entrepreneurial media attention, measured through the percentage of people who perceive media attention for entrepreneurship in their countries. Finally, the variable entrepreneurial career that measures the percentage of people in a country considering starting a business is a good career choice.

Cultural-cognitive dimension. It refers to the individual's perceived opportunities and capabilities to start a new venture, the factors they consider about the ease or difficulty of becoming an entrepreneur, formed based on the individual's interaction with the context. This measure incorporates information about perceived opportunities; it is measured as the percentage of people in a country who consider that there are good possibilities to initiate a new firm. On the other hand, we operationalize this construct with the variable called skills, which refers to the percentage of people who believe they have the knowledge, skills, and experience required to start a new business.

3.1.2 Preliminary analysis

Table 2 shows the correlation matrix. Most of the institutions considered are significantly correlated with the dependent variable.

In the quantitative analysis, we first run a panel data model to confirm the direct relationship between the institutional dimensions and high-impact female entrepreneurship. We run a pooled regression in Stata, omitting the data's space and time dimensions and calculating the ordinary least squares regression by OLS. Later, we estimate random and fixed effects models, and we use the Hausman specification test to verify the choice of the fixed or random-effects model, which shows that the difference in coefficients is not systematic. In this sense, we choose random effects. Second, Fig. 1 shows the quantitative analysis that calculates the mediated moderation. This model was computed using PROCESS statistical software (Hayes 2018).

3.2 Qualitative

3.2.1 Sample and case selection

We implement Fuzzy-set qualitative comparative analysis (fsQCA) to analyze the causal relationships between the institutional dimensions and high-impact female entrepreneurs. In fsQCA, the sample should meet two main characteristics: first, the

Table 2 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Female Entrepreneurship	1.000								
(2) Procedures	−0.172**	1.000							
(3) Cost	−0.036†	0.492*	1.000						
(4) Career	−0.176**	0.114**	0.257*	1.000					
(5) Status	0.123**	−0.213*	−0.273*	0.114**	1.000				
(6) Media	0.253*	−0.271*	−0.376*	0.102†	0.356*	1.000			
(7) Skills	−0.266*	0.065	0.075	0.519*	0.158*	0.157*	1.000		
(8) Opportunities	0.164*	−0.229*	−0.264*	0.234*	0.351*	0.441*	0.276*	1.000	
(9) Fear of Failure	−0.239*	0.132**	0.085	0.034	0.035	−0.319*	−0.051	−0.302*	1.000
(10) GDP	0.124**	−0.238*	−0.507*	−0.204*	0.271*	0.239*	−0.279*	0.279*	−0.119**

* Correlation is significant at the 0.01 level (two-tailed) ** Correlation is significant at the 0.05 level (two-tailed) † Correlation is significant at the 0.10 level (two-tailed)

cases should be similar enough to compare, and second, we need variation across the cases. This variation should be in the outcome and conditions (Ragin 2008).

Regarding selecting the cases, to balance comparability and diversity, we selected female entrepreneurs from two cities—Medellín and Barcelona—both recognized for their robust entrepreneurial ecosystems that actively promote business creation as a driver of economic growth. These cities provide an ideal context for studying high-impact female entrepreneurship in knowledge-intensive sectors. While both share similarities in their startup support mechanisms, their institutional and socio-economic conditions differ. This variation enables a rich cross-case comparison and ensures that fsQCA can uncover different configurations of institutional influences on entrepreneurship.

Barcelona has established itself as a European hub for innovation and entrepreneurship, driven by policies that foster Industry 4.0 and sustainability. Since 2000, the city's 22@ district has spearheaded initiatives to support startups, including Barcelona Activa, Europe's largest public business incubator, and the Barcelona Growth Center, a space designed to connect entrepreneurs with incubators, consultants, and accelerators. The city's strong infrastructure and dynamic startup ecosystem, reinforced by the resources of 22@, provide mentorship, investment, and business development support to early-stage tech ventures (Morisson 2020).

Similarly, Medellín has transformed from an industrial city to an innovation hub, driven by initiatives like the public-private Ruta N Corporation, established in 2009 to foster a knowledge economy by creating favourable conditions for entrepreneurship in STEM fields (Morisson 2019; Crespo et al. 2021). Medellín's innovation strategies have been heavily influenced by Barcelona's 22@ model, leading both cities to share key characteristics in their approaches to fostering entrepreneurship and technological development (Morisson 2020).

The contrast between Medellín and Barcelona highlights how local policies, institutional frameworks, and labor market dynamics shape the landscape for high-impact female entrepreneurs. By examining both cities, we gain insights into how these factors influence women's access to resources, networks, and opportunities in knowledge-intensive sectors.

The conditions for selecting the cases were that entrepreneurs should be women, part of the foundation team, no more than five years since the foundation, and have a new business in STEM sectors (science, technology, engineering, and mathematics). Most criteria were based on the principle that we need similar cases to compare. Most of them were searched through LinkedIn using the criteria of female CEOs and founders in the two cities after analyzing the potential cases based on our selection criteria and contrasting them with secondary data such as web pages, LinkedIn, and Instagram. We contacted the entrepreneurs through LinkedIn or email, depending on the available information. In the first stage, we contacted 24 female entrepreneurs. In Barcelona, 14 entrepreneurs were contacted and 10 in Medellín. Eight entrepreneurs located in Barcelona answered the message, and eventually, after a short chat and interview regarding the project, they agreed to participate. The process was similar to the entrepreneurs in Medellín, but they were more challenging to find. On LinkedIn, just two of the entrepreneurs we contacted replied. We had to ask different entrepreneurial ecosystem actors, such as university professors and consultants, if they knew

any woman with the cited criteria, and the first comment was always, "The sector is very specific, and few women start their business there." Due to the COVID-19 restrictions, all the interviews were done through Zoom video calls between June and October 2020. The interviews were recorded and transcribed accordingly.

Semi-structured interviews were continued until saturation of themes was achieved. We conducted interviews with 14 female entrepreneurs. The first two interviews are not part of our final sample because they were used as a pilot test to change some questions and ensure we had the right instrument. Each interview was between 50 and 70 min and was recorded and transcribed. The final sample includes 12 entrepreneurs; seven were immigrants, and nine started their businesses with co-founders. All the interviews were conducted in both cities' official languages. Table 3 includes the sociodemographic information of the sample.

The semi-structured interview themes were based on the entrepreneurial process: motivations to become an entrepreneur, experiences running a business as a woman, challenges and opportunities experienced, tactics for dealing with challenges, and aspirations for the future -based on Busenitz et al. (2000) and Langevang et al. (2018)- (see Appendix B).

Table 3 Description of the sample FsQCA

Case	Age (years)	Age Firm (months)	Number Employees	Immigrant yes = 1 no = 0	Co-founder yes = 1 no = 0	How it started	Technology/Patent+
1*	25	60	2	0	1	URP	Machine learning
2*	43	29	6	0	1	URP	Analytics
3*	26	60	1	0	0	PO	Nanotechnology+
4*	34	36	5	1	0	URP - PO	3D print
5*	29	48	12	0	1	SO	Specialized consultant
6*	37	60	15	0	1	MO	Specialized consultant
7**	44	25	2	1	1	URP	Analytics
8 **	51	60	4	1	0	MO	Machine Learning
9**	26	48	9	1	1	MO	InsurTech
10**	37	36	9	1	1	URP - SO	Digital image processing+
11**	32	24	6	1	1	PO	Specialized consultant
12**	32	37	6	1	1	MO -PO	Machine Learning
Mean	34	43	6.42				
Std. Dev.	7.77	13.59	4.03				
Min	25	24	1				
Max	51	60	15				

*Medellín **Barcelona + Patent

Cases 9 and 11 are not selling at the moment of the interview

URP = University research project, PO = Personal opportunity, SO = Spin off, MO = Market opportunity

3.2.2 Fuzzy-set qualitative comparative analysis

Qualitative Comparative Analysis is increasing in popularity in business and the social sciences (Dwivedi et al. 2018), particularly in entrepreneurship and innovation research (Kraus et al. 2018; Beynon et al. 2020), due to its ability to bridge quantitative and qualitative logics and to accommodate small and medium sample sizes (Kraus et al. 2018). The underpinnings of the analysis, which are set-theoretical, include combinatorial logic, fuzzy-set theory, and Boolean minimization to detect the combinations of case conditions that may be necessary and sufficient to produce an outcome (Ragin 2006). Necessary conditions are causes that must be present for an outcome to occur, while sufficient conditions are causes that always lead to the outcome. To identify these conditions, fsQCA seeks commonalities and differences across cases sharing the same outcome (Fiss 2011).

Recent advances in the methodological foundations of fsQCA highlight its role not only as an analytic technique but also as a theory-building tool. Di Paola et al. (2025) emphasize that QCA supports configurational theorizing by identifying patterns of interdependence among causal conditions, while maintaining close alignment with theory development.

Thus, the inductive approach of fsQCA identifies the configurational relationships between the conditions and an outcome (Fiss 2011); in this study, the institutional dimensions and the high-impact female entrepreneurship, respectively. Due to the different approaches to measuring and considering high impact in the literature, we chose new employment generation and high-technology applications to set the outcome. The fsQCA method is particularly apt for analyzing causal complexity and is, thus, appropriate for this research (Ragin 2008). One of the strengths of fsQCA is its applicability in small samples (Fiss 2011). Then, we use fsQCA software 3.0 for the analysis (Ragin 2018).

3.2.3 Measurement and calibration

After completing the data collection, we performed a content analysis of the raw interview data using qualitative data analysis software (Atlas.ti). To code the interviews, we developed an initial list of codes based on the preliminary list of indicators for the conditions (institutional dimensions) and the outcome (high-impact female entrepreneurship) (see Appendix C). As proposed in Basurto and Speer (2012), when interviewees pointed out an additional indicator of one of our institutional dimensions or the outcome we had not captured in the preliminary list of measures, we added it during the content analysis using open coding. After comparing the responses, we assign values to each indicator following Basurto and Speer (2012, p. 164). The sum of these indicator values yielded the score for each condition.

Before conducting the truth table analysis, we constructed the data matrix by calibrating the qualitative data. The calibrated data matrix is presented in Table 4, while the raw data and measurement scales are available in Appendix D. Calibration assigns each case a degree of set membership, translating qualitative data into a fuzzy-set scale ranging from 0 to 1, where 1 indicates full membership, 0 indicates

Table 4 Calibrated data matrix–Fuzzy qualitative comparative analysis

Case	Regulative	Normative	Cultural-cognitive	Em-ploy-ment	High-Tech
1	0.5	0.25	0.5	0.25	1
2	0.5	1	0.5	0.75	1
3	0	0.5	0	0	1
4	0.25	0.5	1	0.25	0.75
5	1	1	0.75	1	0.25
6	1	0.25	0.25	1	0.25
7	1	1	1	0.25	0.75
8	1	0	1	0.25	1
9	0.5	0.75	1	1	0.75
10	0	0.25	0.25	1	1
11	0.75	0	0	0.75	0.25
12	0	0.25	0.25	0.75	1

full non-membership, and 0.5 is the crossover point of maximum ambiguity between membership and non-membership.

To ensure methodological rigor and theoretical consistency, we relied on prior research to establish all calibration thresholds (Douglas et al. 2020). We applied a percentile-based approach for the fuzzy-set transformation, with the fully-in and fully-out thresholds set at +/- one standard deviation from the median of the scores for each condition (regulative, normative and cultural-cognitive dimensions). The crossover point was set at the median, as this represents the natural cut-off for distinguishing high and low values in the absence of predefined theoretical breakpoints (Ragin 2008). This approach aligns with best practices in fsQCA calibration, ensuring comparability while maintaining sensitivity to the distribution of the data (Fiss 2011).

Since the literature on the high-impact definition is imprecise, we contrast two outcomes. The first is employment, measured as the number of employees, and the second is high-tech, which measures the degree of innovation of each case. While the first variable indicates the level of employment generation, the latter provides information regarding the firm's innovation. Both components of high-impact entrepreneurs correspond to the definition that high-impact "ensures the utilization of invention, contributes to increased productivity, and both facilitates and contributes to economic growth" (Acs 2010). Outcomes scores also follow the calibration process, setting the membership through the +/- one standard deviation approach (Douglas et al. 2020).

4 Results

As mentioned earlier, a mixed methods approach was used to achieve the aim of the study. First, we present the results of the quantitative model, allowing us to establish the influence of the institutional dimensions on high-impact female entrepreneurship and their interactions. Second, the results of the fsQCA will enable the understanding of the causal mechanisms of the interactions.

4.1 Quantitative results

Table 5 shows the panel data analysis, which relates the institutional dimensions' influence on the proxy of high-impact female entrepreneurial activity across OECD countries.

Specifically, for the regulative dimension, when the time to open a business and the number of procedures for women in a country increase, the percentage of entrepreneurial activity studied decreases ($\beta = -0.003$, $p < 0.026$). Unexpectedly, the cost to start a business shows a positive and significant relationship with high-impact female entrepreneurship ($\beta = 0.126$, $p < 0.01$). One possible explanation is that higher startup costs may signal better institutional infrastructure, stricter regulatory environments, or more developed ecosystems, which in turn attract more ambitious and capable female entrepreneurs. This aligns with findings by Estrin et al. (2013), who suggest that entrepreneurs in more developed environments may be more willing to incur higher entry costs due to the potential for higher returns and access to support mechanisms. Similarly, Langowitz and Minniti (2007) highlight that institutional context can shape women's entrepreneurial choices beyond purely economic incentives. Regarding the normative dimension, when society considers entrepreneurship a good career choice, the percentage of high-impact female entrepreneurial activity decreases; this result is statistically significant and counterintuitive ($\beta = -0.045$, $p < 0.1$). In contexts where entrepreneurship is socially valued, traditional gender norms may still discourage women from pursuing an entrepreneurial career. Similar counterintuitive findings have been reported by Malmström et al. (2017), who showed that gender stereotypes influence how female entrepreneurs are evaluated, and by Alsos

Table 5 Results Cross-sectional time-series fGLS regression testing effects of institutional dimensions on high-impact female entrepreneurship

Female Entrepreneurship		Coef.	St.Err.	t-value	*p*-value	[95% Conf	Interval]	Sig
Regulative	Procedures	−0.003	0.001	−2.22	0.026	−0.006	0.000	**
	Cost	0.126	0.038	3.30	0.001	0.051	0.201	***
Normative	Career	−0.045	0.023	−1.96	0.050	−0.091	0.000	*
	Status	0.057	0.028	2.09	0.037	0.003	0.111	**
	Media	0.066	0.025	2.67	0.008	0.017	0.114	***
Cultural-cognitive	Skills	−0.122	0.027	−4.53	0.000	−0.175	−0.069	***
	Opportunity	0.034	0.019	1.77	0.077	−0.004	0.071	*
	Fear of failure	−0.078	0.027	−2.92	0.003	−0.130	−0.026	***
Moderation Effects	Opportunity x Procedures	0.002	0.007	0.23	0.811	−0.011	0.014	ns
	Status x Procedures	−0.031	0.011	−2.88	0.004	−0.052	−0.010	***
	Constant	11.412	2.261	5.05	0.000	6.981	15.842	***

Mean dependent var	9.595	SD dependent var	4.375
Number of observations	279	Chi-square	84.378
Prob > chi2	000	Akaike crit. (AIC)	1558.542
pseudo-R^2	0.2164		

*** p < 0.01, ** p < 0.05, * p < 0.1

and Ljunggren (2017), who found that women tend to operate in less scalable sectors despite societal support for entrepreneurship.

However, when society attaches high status to entrepreneurial activity, and the media attention for entrepreneurial activity is favorable, the percentage of high-impact female entrepreneurship increases. The results are statistically significant. Analyzing the results regarding the cultural-cognitive dimension, we found empirical evidence that fear of failure negatively influences high-impact female entrepreneurship ($\beta = -0.078, p < 0.01$). The perception of good opportunities also positively influences high-impact entrepreneurial activity ($\beta = 0.034, p < 0.1$). Although the proxy regarding the confidence in the knowledge, skill, and experience influence negatively the high-impact female entrepreneurship ($\beta = -0.122, p < 0.01$), this counterintuitive result aligns with findings from prior research. For instance, Díaz-García and Jiménez-Moreno (2010) observed that in certain contexts, higher self-assessed entrepreneurial capabilities among women do not necessarily lead to increased entrepreneurial activity, possibly due to heightened awareness of systemic barriers. Similarly, Wilson et al. (2007) found that overconfidence in one's skills can lead to a more critical assessment of the entrepreneurial environment, thereby reducing the likelihood of venture creation.

We control the model using the gross domestic product, and the results are consistent. Although this variable changes the model in prior research significantly, in this case, as we are contemplating data from OECD countries (more standardized in terms of development), we expect this variable does not have a huge impact.

After analyzing the influence of the three institutional dimensions on high-impact female entrepreneurship and confirming the relationships in prior literature, we examine the interactions. For the moderated mediation analysis, we selected the variable *procedures* as a proxy for the regulative dimension because it is widely recognized in institutional research as a reliable indicator of bureaucratic barriers and institutional rigidity (Estrin et al. 2013; Chowdhury et al. 2019). In contrast, we did not include variables such as *cost*, *career* and *skills*, despite their theoretical relevance, because their direct effects were statistically significant but counterintuitive. Specifically, these variables showed directions inconsistent with most prior research, which could compromise the robustness and interpretability of the interaction models. Thus, we prioritized theoretical alignment and empirical coherence in selecting the variables used for testing moderation effects.

H1 and H2 propose the moderation effects. On the one hand, H1 suggests that the moderation between regulative and cultural-cognitive dimensions influences high-impact female entrepreneurship. Results on H1 are not statistically significant ($\beta = 0.02$, p< n.s). On the other hand, H2 proposes the moderation between the regulative and the normative dimensions influencing high-impact female entrepreneurship. Table 5 shows that the interaction between status and procedures is significant, supporting H2. To confirm the moderation, we used the bootstrapping-based analytic approach described by Edwards and Lambert (2007), as shown in Table 6. As Berry, Golder, and Milton(2012) indicate, conditional effects are significant when both confidence interval lines lie below or above zero.

To illustrate this result regarding H2, Fig. 2 presents the interaction terms: when the procedures to start a business for a woman decrease, female entrepreneurship

Table 6 Conditional indirect effects of cultural-cognitive on high-impact female entrepreneurship– moderated by procedures

Procedures	Effect	BootSE	BootLLCI	BootULCI
−2.404	0.022	0.008	0.007	0.038
−0.404	0.008	0.006	−0.003	0.019
2.596	−0.013	0.010	−0.034	0.006

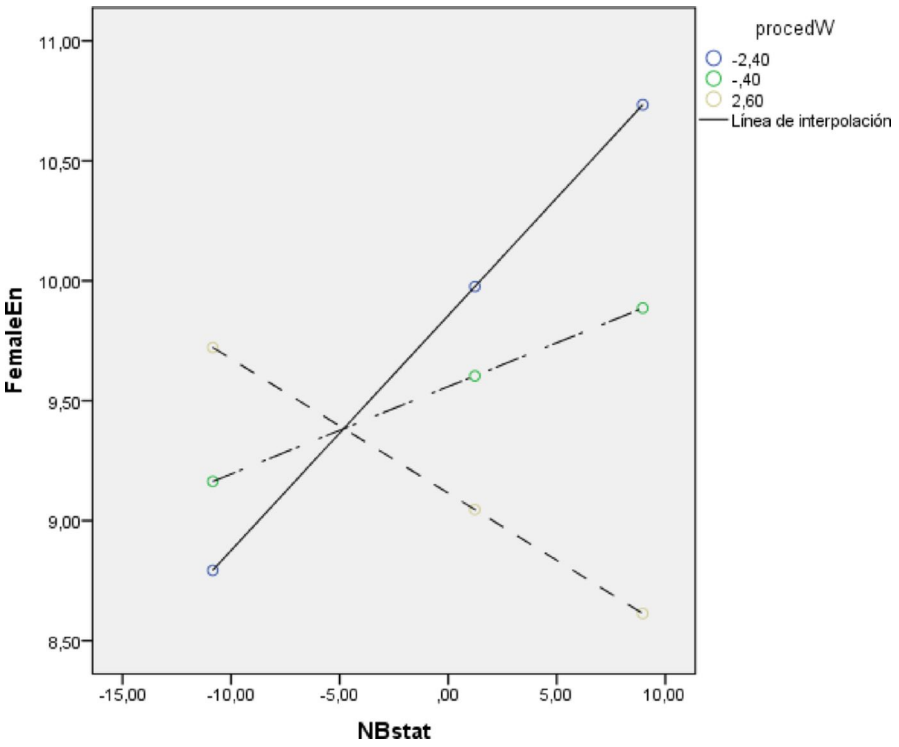

Fig. 2 Interaction effect of the regulative and normative dimension

increases, and the slope changes when the status of entrepreneurial activity increases, and the relationship becomes statistically significant.

Table 7 shows the moderated mediation effect of cultural-cognitive through a positive normative dimension (status) moderated by the procedures. First, the conditional direct effect, meaning the moderation between regulative and cultural-cognitive dimensions that influence high-impact entrepreneurship, is not significant at any point (conditional indirect effect = 0.022, SE = 0.008, 95% CI = 0.07 to 0.038); this result is consistent with the model in Table5 that does not support H1. Second, the effect of the indirect effect (mediation) is significant when there are fewer procedures (conditional indirect effect = 0.022, SE = 0.008, 95% CI = 0.07 to 0.038). The null of 0 does not fall between the lower and upper bounds of the confidence interval. The effect becomes not significant and weaker when there are more procedures.

Moreover, the test of moderated mediation's index indicates that the moderated indirect effect of procedures (regulative dimension) on high-impact female entrepreneurship is statistically significant. This result supports H3 regarding the indi-

Table 7 Conditional indirect and direct effects of cultural-cognitive on high-impact female entrepreneurship

Conditional Direct effect	Cultural-cognitive à High-impact FemaleEntrepreneurship (moderated)					
Procedures	Effect	SE	t	p	LLCI	ULCI
−2.404	0.030	0.022	1.382	0.168	−0.013	0.073
−0.404	0.033	0.018	1.801	0.073	−0.003	0.069
2.596	0.038	0.028	1.353	0.177	−0.017	0.093

Conditional Indirect effect	Cultural-cognitive à Normative à High-impact FemaleEntrepreneurship			
Procedures	Effect	BootSE	BootLLCI	BootULCI
−2.404	0.022	0.008	0.007	0.038
-.404	0.008	0.006	−0.003	0.019
2.596	−0.013	0.010	−0.034	0.006
Index of moderated mediation	Index	BootSE	BootLLCI	BootULCI
Procedures	-.007	.003	-.012	-.002

Model Summary						
R	R^2	MSE	F	df1	df2	p- value
0.382	0.146	16.843	9.451	5.00	277.00	0.000***

rect effect of the normative dimension in the relationship between cultural-cognitive and high-impact female entrepreneurship. Figure 3 shows that when entrepreneurial activity status is higher, the cultural-cognitive dimension's indirect effect on high-impact female entrepreneurship increases.

The test of the index of moderated mediation indicates that the moderated indirect effect of the regulative dimension (procedures) on the cultural-cognitive dimension was statistically significant (index = −0.007, SE = 0.003, 95% CI = −0.012 to 0.002). The null of 0 does not fall between the lower and upper bounds of the confidence interval. The model focuses on the cultural-cognitive dimension and its direct and indirect effects on high-impact female entrepreneurs, moderated mediation by the regulative and normative dimensions. The cultural-cognitive dimension is our focal antecedent (Hayes 2018, p. 510).

As mentioned, we found significant relationships between the institutional dimensions and high-impact female entrepreneurial activity across countries. However, quantitative analyses based on correlations do not allow asymmetric causality assumptions, which is one of the main criticisms of this approach (Fiss 2011). Consequently, this study's second phase seeks to go beyond the institutional dimensions' interaction and their effect on high-impact female entrepreneurship. That is why the fsQCA is proposed to overcome the limitation on causal relationships and allow in-depth analysis of how to measure the institutional dimensions that affect high-impact female entrepreneurship by comparing cases and analyzing their outcomes.

4.2 Qualitative analysis

After the calibration process, following Ragin (2008), the first step of the analysis process is to perform necessary condition tests and, finally, sufficiency tests. The necessary condition means the outcome is the subset of the causal conditions, which means that high-impact female entrepreneurship is caused by institutional dimen-

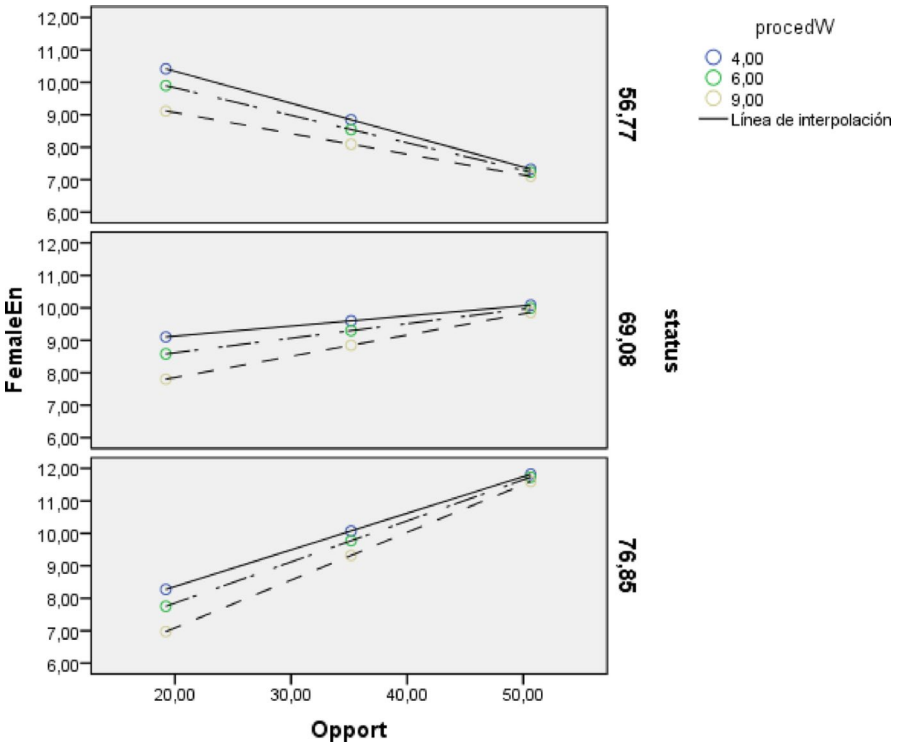

Fig. 3 Moderated mediation model

sions, which can be evaluated by the consistency score (Ragin 2006). A consistency score greater than 0.75 implies that a condition is necessary or almost always necessary (Ragin 2008). Table 8 shows the results of the necessary conditions tests for the operationalization of high-impact female entrepreneurship. According to the necessary conditions test and consistency score, the institutional dimensions must interact to achieve employment generation or high-tech.

Then, we perform sufficient condition tests using the truth table approach (Fiss 2011). The truth table was calculated with all the logically possible configurations for each outcome and then reduced by specifying the consistency and frequency threshold. Since our sample is 12 cases, a frequency threshold of one is appropriate. Then, those configurations without a case were deleted. Regarding the consistency threshold, we assign to each outcome the value = 1 when the consistency value of that configuration equals or exceeds 0.75 and assign the value = 0 otherwise.

We consider intermediate and parsimonious solutions to distinguish between core and peripheral conditions. A core condition has a strong causal relationship with the outcome, shown in parsimonious and intermediate solutions. Furthermore, the peripheral condition has a weaker causal relationship with the outcome, appearing only in the intermediate solution (Fiss 2011). Table 9 groups the solutions according to both core and peripheral conditions.

Table 8 Analysis of necessary conditions

Conditions tested	Outcome			
	Employment		HighTech	
	Consistency	Coverage	Consistency	Coverage
Regulative	0.68	0.73	0.61	0.79
~Regulative	0.50	0.64	0.47	0.85
Normative	0.54	0.65	0.56	0.87
~Normative	0.57	0.64	0.56	0.80
Cultural-cognitive	0.57	0.62	0.58	0.84
~Cultural-cognitive	0.57	0.73	0.50	0.78
Develop_country	0.57	0.67	0.53	0.79
~Develop_country	0.43	0.50	0.47	0.71
Regulative +Normative	0.79	0.65	0.75	0.79
Regulative +Cultural-cognitive	0.82	0.70	0.72	0.79
Normative +Cultural-cognitive	0.61	0.55	0.83	0.83
Regulative +Normative +Cultural-cognitive	0.82	0.62	0.86	0.79

To facilitate comparisons across the results (Rubinson 2019), Table 10 presents the configurations following Fiss's (2011) configuration chart.

All the intermediate solutions consistency scores are above the recommended minimum value of 0.75 (Ragin 2008), so these causal conditions are sufficient for high-impact female entrepreneurship measured through employment and high-tech outcomes.

For the outcome employment, the intermediate solution, which is recommended to analyze above the other solutions, consistency and solution coverage are 0.71 and 0.69, respectively, representing appropriate values for both indicators (Ragin 2008). Overall, the causal combinations in Table 9 account for 69% of the total membership in high-impact female entrepreneurship.

Regarding the high-tech outcome, the consistency and solution coverage are 0.89 and 0.86, respectively. In this analysis, the parsimonious and intermediate solution is the same. This solution accounts for 89% of the total membership in high-impact female entrepreneurship.

The raw coverage scores for all the solutions are relatively high and imply great empirical importance. The results show that sufficient configurations differ depending on the outcome we evaluate to measure high-impact female entrepreneurship. For employment generation outcome, the presence of the regulative dimension, combined with the normative dimension and the absence of the cultural-cognitive dimension, forms a sufficient configuration. This finding supports the study's assumption

Table 9 Analysis of sufficient conditions

Sufficient conditions	Raw coverage	Unique coverage	Consistency
Outcome: Employment			
Parsimonious solution			
Normative	0.54	0.36	0.65
Regulative*~Cultural-cognitive	0.36	0.18	0.91
solution coverage: 0.71			
solution consistency: 0.69			
Intermediate solution			
Regulative*~Cultural-cognitive	**0.36**	**0.18**	**0.91**
Regulative*Normative	**0.43**	**0.25**	**0.80**
solution coverage: 0.61			
solution consistency: 0.81			
Outcome: HighTech/Innovative			
Parsimonious solution			
~Regulative	0.61	0.31	1.00
Cultural-cognitive	0.58	0.28	0.81
solution coverage: 0.89			
solution consistency: 0.86			
Intermediate solution			
~Regulative	**0.61**	**0.31**	**1.00**
Cultural-cognitive	**0.58**	**0.28**	**0.81**
solution coverage: 0.89			
solution consistency: 0.86			

that institutional dimensions interact between them to influence high-impact female entrepreneurs. From a practical perspective, this suggests that well-defined regulations and strong normative support -such as policies promoting gender inclusion and social acceptance of female entrepreneurship- are crucial to fostering employment generation. However, the absence of the cultural-cognitive dimension in this configuration highlights that, in certain cases, external support mechanisms may play a more significant role than individual entrepreneurial perceptions or capabilities in driving employment growth.

Regarding the innovative high-tech outcome, the absence of the regulative dimension and the presence of the cultural-cognitive dimension are sufficient configurations for the outcome. This result suggests that in some cases, when the regulatory support is weak or lacking, female entrepreneurs compensate by leveraging their own skills, knowledge, and self-perception of opportunities. In other words, when formal policies or incentives for high-tech female entrepreneurship are insufficient, entrepreneurs rely more on self-driven learning and accumulated expertise to navigate business challenges. For example, in emerging economies where regulatory frameworks for high-tech entrepreneurship are underdeveloped or restrictive, women entrepreneurs often turn to international networks, online learning platforms, and community-driven support systems to access knowledge and funding.

Table 10 Configurations for High-Impact Female Entrepreneurship

	Employment				High-Technology	
Configurations	**1**[a]	**2**[a]	**3**[b]	**4**[b]	**5**[ab]	**6**[ab]
Regulative dimension		●	●	●	○	
Normative dimension	●			●		
Cultural-cognitive dimension		○	○			●
Consistency	0.65	0.91	0.91	0.80	1.00	0.81
Raw Coverage	0.54	0.36	0.36	0.43	0.61	0.58
Unique Coverage	0.36	0.18	0.18	0.25	0.31	0.28
Overall Solution Consistency	**0.71**		**0.81**		**0.86**	
Overall Solution Coverage	**0.69**		**0.61**		**0.89**	

[a] Configurations of Parsimonious Solution
[b] Configurations of Intermediate Solution
● Represent the presence of the condition ○ Represent the absence and blank spaces "dont care" meaning that the condition may be present or absent in the configuration

5 Discussion

How does the environment encourage or inhibit high-impact female entrepreneurship? This paper explores the institutional dimensions' influence on high-impact female entrepreneurs. The first quantitative stage shows that institutional dimensions influence high-impact entrepreneurial activity and are in constant interaction, corroborating prior results (Yousafzai et al. 2015). The second stage of this study was the qualitative analysis through fsQCA. Previous research that also implements fsQCA analysis focuses on female entrepreneurship rates (Li, Wu, Zhang, & Ling, 2020), comparison among men and women entrepreneurship, and not specific outcomes (Chen et al. 2023). Prior research focusing on the institutional context to explain women entrepreneurs' performance has not considered the different institutional dimensions, only some informal institutions (Zhao and Yang 2020). Through this research, we analyze the conditions that lead to high-impact female entrepreneurship and its employment and high-technology outcomes.

The first hypothesis (H1) was not supported, which proposes that the regulative dimension (measured as procedures to start a business) moderates the relationship between the cultural-cognitive dimension and high-impact female entrepreneurship. Overall, the model tested showed that the two variables selected as measures of the regulative dimension have a main effect on high-impact female entrepreneurship. Therefore, the procedures to start a new business have a negative effect on female

entrepreneurial activity, which is consistent with the literature (Langevang et al. 2018; Terjesen and Amorós 2010). However, the costs to start a business, also associated with the regulative dimension, have a positive and statistically significant sign. Although this result is counterintuitive, as we mentioned, it is explained because high-impact female entrepreneurship is unique, and those entrepreneurs must overcome high costs associated with the sector and high-growth firms, like patents and access to human and financial capital (Singh 1997; Devine et al. 2019). For this reason, it is expected that the regulatory dimension in this study does not have a statistically significant effect on the relationship between the cultural-cognitive dimension and high-impact female entrepreneurship. When comparing these results with the cases of female entrepreneurs, we find that they are aware of the high costs they incur when starting high-impact firms. For instance, entrepreneurs in both Medellín and Barcelona affirm they face legal barriers; they affirm that: "startups and digital companies are agile and flexible, but the regulations are old, very traditional, that means bureaucracy, administrative processes, translate in wasting time and resources" (Case 12), "You should be spending your time selling more, taking your business forward, and not in administrative bureaucracies" (Case 2). However, we found that the problem of not having a favorable regulative dimension does not stop them from moving forward.

Regarding the second hypothesis (H2), results showed that female entrepreneurship increases when the procedures to start a business for a woman decrease and there is a high status attached to entrepreneurial activity. This result corroborates that not only are the regulations necessary for high-impact female entrepreneurial activity, but the context related to the high status of entrepreneurs in society plays an important role (Darnihamedani and Terjesen 2022). For example, when deciding on a place to start a business, one of the entrepreneurs affirmed: "I started to look at which country I can start a business without feeling like a bad person because I have children and a company. I thought of the United States, but it is very far away. I have my family in France, but the support is zero, and in Barcelona, I find that they are open" (Case 8). Also, how the status of being an entrepreneur in the family and the city is relevant: "So my parents were always very happy and proud of me, with the things we have achieved in the business (…) I think we are fortunate to live in Medellín, we are in an ecosystem that promotes innovation, new entrepreneurship ideas and I think it is something very positive." (Case 5). The importance of the normative dimension is confirmed in the interviews through the answers regarding the importance of the culture and context.

Concerning the third hypothesis (H3), bootstrapping results showed significant indirect and direct effects, according to which the normative dimension explains the mechanism linking the cultural-cognitive dimension to high-impact female entrepreneurship (Kazumi and Kawai 2017). In other words, the normative dimension, status for entrepreneurship, accounts for part of the explained variance of the cultural-cognitive dimension, expressed here as the perception that a person has opportunities to start a business with high-impact female entrepreneurs. Some female entrepreneurs show how the normative dimension influences the cultural-cognitive dimension that expands the explanation of quantitative results. For example, the role models that influence the perception of the female's capacities and possibilities to start their busi-

ness in STEM sectors, “Let’s say that, in part, the idea of getting into engineering and also starting a business was thanks to my dad, because my dad is an engineer and since I was very young, he always talked to me about the universe, about physics, about mathematics.” (Case 3), “My dad had a company, so there was always an affinity to be able to start a business; in fact, I was working with him for a time (…) that opened up the world of what one can do with an enterprise.” (Case 4). Results show how the normative dimension influences the cultural-cognitive through parents, which generates different mindsets for high-impact female entrepreneurs (Karim et al. 2023).

As we can find examples in the interviews to illustrate the quantitative findings, the fsQCA corroborates and expands the mediated moderation model results regarding the interaction among the institutional dimensions influencing high-impact female entrepreneurship. The moderated mediation analysis becomes statistically significant when fewer procedures moderate it; this result shows the statistically significant interaction among the three institutional dimensions, which corroborates prior literature that claims the need to test these interactions (Alvarez et al.2025). For the 12 cases in this study, fsQCA results demonstrate the interaction among the three institutional dimensions as a necessary condition for high-impact entrepreneurship. However, the sufficiency results show the absence of the regulative dimension, with the assumptions of the other two dimensions’ presence leads to innovative female-led new ventures. This result is very interesting because it explains why panel data results do not support the interaction between the regulative and the cultural-cognitive dimensions interaction. Both are consistent with the difficulty reported in prior research that women always must overcome at the regulatory level (Terjesen and Amorós 2010; Langevang et al. 2018), for example, to raise venture capital (Demartini 2018).

Moreover, female entrepreneurs are vulnerable to gender discrimination when acquiring resources (Xie and Lv 2016; Kanze et al. 2018). In this sense, the cultural-cognitive dimension plays a relevant role in developing an innovative new business. In all the selected cases, the entrepreneurs believe that difficulties are expected in the process and are aware of the possible failure. However, it does not stop them from continuing. Moreover, some of them have failed in the process of starting a new business. Still, they continue because they have a high and positive cultural-cognitive dimension through entrepreneurship, even when the social context is not supportive. Those results explain why prior research, such as Kanze et al. (2018), finds that female entrepreneurs change their circumstances when they understand that in venture capital raising, women are discriminated against. Still, they increase their performance by answering the investors’ prevention questions with promotion answers. In this case, the ability of entrepreneurs to adapt (cultural-cognitive dimension) to the context is crucial to achieving positive results.

The results of the multivariate analysis (panel data and mediated moderation) and fsQCA are complementary. They serve to answer different questions that each isolated approach cannot address. Net effects of panel data and the moderated mediation models analysis only examine the direct and indirect effects of independent variables on dependent variables and ignore the complexity of antecedent combinations in reality. However, net effects analyses indicate whether the relationship between independent and dependent variables is statistically significant, and the relationship’s

direction may not be relevant to any particular case. For this reason, fsQCA is a good complement. It goes further in the specific analysis, maintaining the integrity of individual cases while identifying causal conditions combined to produce an outcome in the real world (Woodside, 2013).

6 Conclusions

This study contributes to advancing the literature by understanding the interactions of institutional dimensions to explain high-impact female entrepreneurship. The institutional dimensions explain high-impact female entrepreneurship rates and their outcomes regarding high technology and employment. Moreover, this study empirically confirms new causal mechanisms not explored before in the literature. The instrument development and the primary data design in the qualitative stage overcome the big issue and criticism when analyzing the institutional dimensions, because previous research has used proxies that are not entirely designed to measure the dimensions. We offer a systematic way to measure the institutional dimensions in entrepreneurship research through in-depth interviews. Also, we followed a mixed methods design that "combines qualitative and quantitative methods, approaches, and concepts in a way that produces complementary strengths and non-overlapping weaknesses" (Johnson et al. 2007, p. 127).

Our findings have broader implications for global entrepreneurship policy. The results suggest that different institutional dimensions play compensatory roles depending on the context, which is particularly relevant for tailoring entrepreneurship policies to local realities. For example, to generate employment, the regulative dimension must be present and positively perceived by high-impact female entrepreneurs -highlighting the need for agile regulatory frameworks, such as streamlined registration processes, funding access, and tax incentives-. In contrast, for innovation and high-tech entrepreneurship, the cultural-cognitive dimension -linked to self-efficacy, skills, and perceived opportunities- proves to be a sufficient condition. This shows that even in the absence of strong regulatory support, women entrepreneurs can drive innovation by relying on their capabilities, particularly when backed by education, mentorship, and peer networks.

Across both developed and developing contexts, women in high-impact sectors consistently perceive that regulatory frameworks move much slower than the pace of technological advancement and the speed at which their ideas evolve. This perceived lag calls for more adaptive and responsive regulatory environments. In sum, effective entrepreneurship policy must recognize the interplay between institutional dimensions and adapt to each context's specific constraints and strengths, ensuring support mechanisms that match the dynamic nature of female-led high-impact ventures.

This study also has some limitations and, in this way, opportunities for further research. First, while the institutional dimensions are analysed separately using country -and individual-level indicators-, these indicators follow a coherent theoretical foundation, as shown in Table 1 and the conditions' measurement process in Table 4 (see Appendix D). Future research could adopt a multilevel approach to explore the interrelations between these dimensions more deeply. Second, although the percent-

age of female entrepreneurs with tertiary education serves as a proxy for high-impact entrepreneurship, we acknowledge that it does not directly capture venture growth potential. Similarly, the proxies for the normative dimension reflect the societal perception of entrepreneurship in general rather than specifically female entrepreneurship. While these choices align with prior research, future studies could refine these measures for greater specificity. Finally, while fsQCA enables the analysis of causal relationships, its findings cannot be directly extrapolated to other contexts. Further research with larger samples could enhance the generalizability of these results.

Despite these limitations, this study provides valuable insights into the institutional conditions that influence high-impact female entrepreneurship. By deepening our understanding of these dynamics, we contribute to the broader discussion on fostering inclusive and supportive environments for female entrepreneurs, paving the way for future research and policy development.

Appendix A

See Table 11

Table 11 Summary table of studies on female entrepreneurship and institutional dimensions

Author and Year	Country/Region	Objective of the Study	Types of Institutions	Method	Proxies Used	Key Findings	Theoretical Contribution
Amine & Staub (2009)	Sub-Saharan Africa	Analyze environmental barriers to women's entrepreneurship using institutional theory.	Regulative, Normative, Cognitive	Literature Review	Not specified (conceptual synthesis)	Unfavorable institutional systems increase barriers for women entrepreneurs.	Derives specific gendered outputs based on institutional barriers.
Junaid et al. (2019)	Pakistan and Malaysia	Explore how informal institutions explain differences in women's entrepreneurship.	Normative, Cognitive	Quantitative (Probit regression)	Skills, knowledge, fear of failure, good career choice, media attention	Social-normative context drives differences despite similar formal institutions.	Introduces cultural-institutional mechanisms in similar formal environments.
Junaid et al. (2020)	56 countries	Identify institutional configurations promoting men's and women's entrepreneurship.	Normative, Cognitive	Qualitative (fsQCA)	Opportunity, skills, media, career, business opportunity	Combinations of cognitive and normative institutions enable female entrepreneurship.	Shows how configurations of institutions differ by gender and economic context.

Table 11 (continued)

Author and Year	Country/Region	Objective of the Study	Types of Institutions	Method	Proxies Used	Key Findings	Theoretical Contribution
Langevang et al. (2015)	Ghana	Explore institutional embeddedness of female entrepreneurship over time and space.	Regulative, Normative, Cognitive	Quantitative (Descriptive Analysis)	GEM APS data and contextual narrative	Strong entrepreneurial participation coexists with vulnerability and low growth.	Mixed embeddedness in dynamic institutional contexts.
Li et al. (2020)	63 countries	Examine how gendered institutions shape female TEA and TEAR.	Regulative, Normative, Cognitive	Qualitative (fsQCA)	Maternity leave, career attitudes, skills, opportunity perception	Cognitive equality is central to high female entrepreneurship.	Refines institutional theory using gendered dimensions.
Wang et al. (2019)	China	Analyze the mediating role of perceived institutions in gender gaps in growth ambition.	Regulative, Normative, Cognitive	Quantitative (SEM)	Perceptions of growth-oriented support, admiration, ambition	Women perceive institutions more negatively, lowering growth intentions.	Links institutional perception with ambition via gendered mechanisms.

Table 11 (continued)

Author and Year	Country/Region	Objective of the Study	Types of Institutions	Method	Proxies Used	Key Findings	Theoretical Contribution
Wu & Li (2020)	63 countries	Analyze institutional determinants of absolute and relative female entrepreneurship.	Regulative, Normative, Cognitive	Quantitative (Regression, EFA, CFA)	Maternity policies, media attention, opportunity perception, education	Cognitive institutions have strongest influence; regulative negative.	Confirms salience of cognitive factors in cross-country comparison.
Xie et al. (2021)	49 countries	Identify institutional configurations leading to FENT and FEGE.	Regulative, Normative, Cognitive	Qualitative (fsQCA)	Institutional indicators (not explicitly listed)	Cognitions drive activity; culture drives growth expectation.	Advances institutional complementarity logic in entrepreneurship.
Yousafzai et al. (2015)	92 countries	Examine institutional influence on women's entrepreneurial leadership via mediators.	Regulative, Normative, Cognitive	Quantitative (SEM)	Business freedom, status, media, skills, opportunity	Vision for women entrepreneurship (VWE) mediates institutional effects on leadership.	Introduces a mediating construct (VWE) between institutions and outcomes.

Appendix B

Semi-structured interview

Motivations to become an entrepreneur

1. What is your business about?
2. Do you remember the first moment you created the business?
3. Why did this idea emerge?
4. Finally, when do you decide to start the business?
5. Could you describe the process you followed when creating your firm?
6. Who helps you to create the business?
7. Who gives you the money to start?
8. Do you describe yourself as a successful entrepreneur?
9. How do parents consider individuals who are innovative and creative thinking

Experiences of running a business

1. How do you realize that you could run your own business?
2. What is your most important motivation to run this business?
3. Before starting, did you know how to protect your new business legally?
4. How was the process you followed to find information about the market for your products?
5. Is turning new ideas into businesses an admired career path in this country or your community?
6. Do you remember any situation in which you felt that your job as an entrepreneur was admired?
7. Do you think that being an entrepreneur is well-recognized?
8. How do your parents and friends consider you as an entrepreneur

Challenges and opportunities

1. What has been the main challenge in all the processes to start your business?
2. Have government organizations been important in starting your own business?
3. Do government sponsors organizations (or other formal organizations) help you develop your idea?
4. Was it easy to get financial support to start your business?
5. Is there any legal barrier to starting your business

Tactics for dealing with challenges

1. Is there local and national government support available for your type of business?
2. Do those who start new businesses know how to manage risk in your sector?
3. How did you deal with risk in your specific sector?
4. Suppose you are failing in this earlier business. Will the government assist you in starting again?

Aspirations for the future

1. Which are your expectations for the future regarding your business?
2. Do you expect to have (more) employees in the next year? How many?
3. What percentage do you expect to increase your income?
4. Do you have any contact with a government organization? Do you expect to have it in the future?

Appendix C

See Table 12

Table 12 Preliminary list of measures of the conditions and the outcome

Regulative	
Rules regarding the sector	Contacts with government programs to support E-ship
Contacts with university programs to support E-ship	Perception of the governmental programs
Financial support (credits) yes/no	Perception regarding the formalization process
Normative	
Support from family	Ease of starting a business in the city
Admiration/recognition of entrepreneurship in the city	Culture
Admiration/recognition of her work as an entrepreneur	Entrepreneurial culture
Entrepreneurial ecosystem	Role models
Social Support	
Cultural-cognitive	
Previous experience in the sector (years)	Technical skills
Previous experience in the sector (other projects related)	Management Skills
Previous entrepreneurial experience	Motivation to run the business
Knowledge regarding the (legal) protection of the new business	Perception of Female Entrepreneurship in STEM Fear of failure
Outcome	
High Tech	Number of employees
Sales– Profitability	

Table 13 Raw Data Matrix and indicators for each condition and outcome

Dimension	Indicator/Dimensions' proxies	Scales and metrics	Measurement/from the interviews	Cases											
				1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Regulative	Cost to start a business	Very bad = 1 Very good = 5	Perception regarding the cost of starting the business	1	2	2	2	3	4	2	1	2	3	3	1
Regulative	Financial resources - Own Money	No = 0 Yes = 1	Financial support (own money)	0	1	1	1	0	1	1	1	1	0	1	1
Regulative	Financial support -credit	No = 0 Yes = 1	Financial support (credits)	0	1	0	0	0	0	1	1	0	0	0	0
Regulative	Financial support - Entrepreneurship competitions	No = 0 Yes = 1	Financial support (Competitions)	1	0	0	0	0	0	0	0	0	1	0	0
Regulative	Government programs	Very bad = 1 Very good = 5	Perception of the governmental programs	5	3	2	4	1	4	4	2	4	5	2	2
Regulative	Venture capital	No = 0 Yes = 1	Is doing activities to get this financial resource or receive venture capital	0	0	0	1	0	0	0	0	1	1	0	1
Regulative	Entrepreneurship formalization	Very difficult = 1 Very easy = 5	Perception regarding the formalization process	2	5	4	2	5	2	2	5	4	1	4	2
Regulative	Rules regarding the sector	Very difficult = 1 Very easy = 5	The presence of specific rules regarding the sector and its impact on her business	3	2	1	1	5	4	5	4	2	1	4	5
Regulative	Contacts with government programs to support E-ship	No = 0 Yes = 1	1 = part of one or more programs, 0 = no	1	0	0	1	0	1	1	1	0	1	1	0
Regulative	Contacts with university programs to support E-ship	No = 0 Yes = 1	1 = part of one or more programs, 0 = no	1	0	0	1	0	0	0	1	0	1	0	0
Regulative				**14**	**14**	**10**	**13**	**14**	**16**	**16**	**16**	**14**	**14**	**15**	**12**

Table 13 (continued)

Dimension	Indicator/Dimensions' proxies	Scales and metrics	Measurement/from the interviews	Cases											
				1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Normative	Support from family	Low = 1 High = 5	Low or high support	4	5	4	2	5	2	5	1	5	3	4	4
Normative	Admiration/ recognition of entrepreneurship in the city	Negative = 1 Positive = 5	Perception regarding the admiration of entrepreneurship in general, Successful entrepreneurs receive High status	5	4	4	4	3	4	4	4	4	2	3	5
Normative	Admiration/ recognition of her work as a female entrepreneur	Negative = 0 Positive = 5	Perception of her job as an entrepreneur	4	5	2	4	4	4	4	3	4	4	4	4
Normative	Entrepreneurial culture	Disagree = 0 Agree = 5	Knowledge and informal support society	2	3	3	4	3	4	5	2	2	4	2	3
Normative	Entrepreneurial ecosystem	Low = 0 High = 5	Perception of ease of starting a business in the city	4	4	5	4	4	2	5	2	2	4	2	2
Normative	Entrepreneurial ecosystem for STEM	Low = 0 High = 5	Perception of ease of starting An IT business in the city	2	2	2	2	3	2	4	1	4	2	2	2
Normative	Role models	No = 0 Yes = 1	Parents entrepreneurs or close family entrepreneurs	0	1	0	0	0	0	1	1	0	0	0	1
Normative	Culture	Negative = 0 Positive = 5	Perception of the general culture positive to develop their skills	2	4	4	4	5	4	5	2	4	2	2	0
Normative				**23**	**28**	**24**	**24**	**27**	**22**	**33**	**14**	**25**	**21**	**19**	**21**
Cultural-cognitive	Management Skills	Low = 0 High = 5	Perception about the ability to run your own business (Managerial skills) - Education in Administration or related/previous experience managing business	5	3	3	5	4	3	5	4	4	3	5	4

Table 13 (continued)

Dimension	Indicator/Dimensions' proxies	Scales and metrics	Measurement/from the interviews	Cases											
				1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Cultural-cognitive	Technical Skills	Very bad = 1 Very good = 5	Perception about the Knowledge specific to the business (Technical skills) - Technical education regarding the business	5	5	5	4	5	4	4	5	5	5	5	5
Cultural-cognitive	Previous experience in the sector (years)	Low = 1 High = 5 According to the categories 0–3 = 1 4–6 = 2 6–9 = 3 10–15 = 4 more = 5	Years in the specific sector before starting the business	1	1	1	2	2	2	1	5	5	1	2	2
Cultural-cognitive	Previous experience	low = 1 high = 5 According to the categories 0–3 = 1 4–7 = 2 7–10 = 3 10–15 = 4 more = 5	Experience in other industries	1	5	1	5	2	5	5	5	5	2	3	2
Cultural-cognitive	Entrepreneurial experience	No = 0 Yes = 1	Previous entrepreneurial experience	0	0	0	1	0	1	1	1	1	0	1	0
Cultural-cognitive	Fear of failure	No = 0 Yes = 1	Fear of failure would prevent them from setting up a business/ more fear of failure indicates also more risk aversion	0	0	0	0	0	0	0	0	0	0	0	0
Cultural-cognitive	Capacity of learning and adaptation	low = 1 high = 5	Positive thinking regarding changes	5	5	4	5	5	4	5	5	5	4	1	4

Table 13 (continued)

Dimension	Indicator/Dimensions' proxies	Scales and metrics	Measurement/from the interviews	Cases											
				1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Cultural-cognitive	Capacity to identify opportunities	low = 1 high = 5	Positive thinking regarding new opportunities	5	5	5	5	5	3	5	5	5	4	1	4
Cultural-cognitive	Female E-ship in STEM	Negative = 1 positive = 5	Perception of Female E-ship in STEM	4	3	3	5	4	4	4	4	4	4	4	4
Cultural-cognitive	Manage the business as a woman	Negative = 1 positive = 5	Perception regarding the ease of Operating the business being a woman	4	4	2	4	4	4	5	2	3	4	4	2
Cultural-cognitive				**30**	**31**	**24**	**36**	**31**	**30**	**35**	**36**	**37**	**27**	**26**	**27**
Outcome	Employment	Number of employees 0–1 = 0 2–5 = 0.25 6–8 = 0.75 9 or more	Direct Employment	0.25	0.75	0	0.25	1	1	0.25	0.25	1	1	0.75	0.75
Outcome	High technology	Machine learning, nanotechnology, artificial intelligence = 1 Analytics, 3D print, Insurtech = 0.75 Specialized consultant = 0.25 None of the above = 0	High-tech related to innovation and technology impact	1	1	1	0.75	0.25	0.25	0.75	1	0.75	1	0.25	1

Appendix D

This appendix presents the raw data matrix used for the fsQCA analysis. The table is organized into four main columns—Dimension, Indicator/Dimensions' proxies, Scales and metrics, and Measurement/from the interviews—followed by twelve columns representing the individual cases (female entrepreneurs 1 to 12). The matrix displays the raw scores assigned to each indicator based on interview coding and measurement criteria. These values serve as the basis for calibration and subsequent truth table construction (Table 13)

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