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Women Leaders and Entrepreneurial Orientation in High-Technology Industries. A Problem of Role Congruity Between Glass Ceiling and Paper floor?

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Abstract: While women entrepreneurship is slowly, but progressively, growing in high-technology industries, women still face considerable constraints in many dimensions of the entrepreneurial process. We theorize that these constraints are not related to women's lack of capabilities and attitudes but rather to a perceived women's lack of congruity with the entrepreneurial role. We propose that role congruity affects the relationship between the woman entrepreneur and internal stakeholders (e.g., employees), not only external ones, thereby dampening the entrepreneurial orientation of women-led firms. We suggest that women entrepreneurs address the perception of role incongruity by taking actions aimed at improving role congruity and reducing the importance of role-congruity assessment. The former type of action involves the adoption of an entrepreneurial bricolage strategic posture, while the latter involves support from entrepreneurial support organizations (ESOs). Through a regression analysis on a sample of 463 Italian firms, we find that entrepreneurial orientation is lower in women-led ventures and that the adoption of entrepreneurial bricolage behaviors reduces this gender-related penalty; however, we do not find any effect on the part of support from ESOs.

Keywords: entrepreneurial bricolage; high-technology entrepreneurship; internal stakeholders; entrepreneurial support organizations; women entrepreneurship

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1 Introduction

Women entrepreneurship in the high-tech sectors has been slowly but progressively rising in recent years, with women-led technology-focused businesses making an increasing contribution to the industry, representing a promising factor in terms of inclusion and growth (DuBow and Wu 2023; GEM 2022; Trauth and Quesenberry 2023), and challenging the "*the idealized world of gentle male tech-nerds and their heroic meritocratic paths to success through pushing technological innovation*" (Welter and Baker 2021, p. 1161). These trends are epitomized by Alice Zhang's efforts to shape the culture of Verge Genomics, the artificial intelligence-enabled drug discovery company of which she is co-founder and CEO: "*At Verge, we have become obsessed with building a conscious culture that chooses authenticity over fear*. […] *As one scientist at Verge shared with their manager, "I can do good science anywhere, but Verge is the only place I can practice conscious culture.""* (Zhang 2024). This idea is reinforced by the company's Head of Computational Biology: "*The result is a workplace where: We can see our emotions as holding rich data and clues about our perception of risk, our desire for change, and what's worthy of pursuing.*" (Hanson-Smith 2023). The unconventional approaches of the company are not limited to the activation of employees' commitment, but extend to financing: "*we found investors that were a lot more better aligned with us on the tech side [than classical venture capitalists]. […] They often encourage us to do what's best for the platform, rather than having a myopic view of investing everything in a single program. Always question the status quo and conventional wisdom. Find a founder support network.*" (Wu 2022). The company has proven successful in obtaining investments, establishing partnerships and developing a promising pipeline, and Alice Zhang has been acknowledged with several innovation awards.

This example suggests that technological change stimulates opportunities for innovation and firm growth, increases competition in both resources and product markets, introduces uncertainty into the strategy process (e.g., Lo, Nag, and Agung 2020), and paves the way for unconventional approaches to employee relations. It is therefore not surprising that in high-tech industries, firm performance is positively associated with higher levels of entrepreneurial orientation (EO) (Rauch et al. 2009; Lomberg et al. 2017) – that is, a strategic posture of the firm that encompasses behaviors such as innovativeness, proactiveness, and risk-taking (Miller 1983; Covin and Slevin 1989), as well as competitive aggressiveness and autonomy (Lumpkin and Dess 1996), which allows firms to adjust their operational processes in response to the dynamic nature of competitive landscapes (Covin and Slevin 1989; Lee et al. 2019).

The extensive literature on EO has revealed its beneficial effects on performance, the influence of different categories of antecedents, and the effect of

contingent factors (Rauch et al. 2009; Wales 2016). However, as Wales et al. (2021) affirmed, "*the theoretical mechanisms of EO and rationale through which EO influences firm performance have not been clearly or consistently specified*" (p. 564). What deserves more attention is the leadership style of the organizational leaders (Wales, Covin, and Monsen 2020), and especially their ability to elicit consistent entrepreneurially oriented behaviors from the members of a firm.

Within this overall picture, in this study, we investigate the relationship between the EO of a new technology-based firm and the gender of its leading founder, theorizing that EO is shaped by internal stakeholders' perception of the leader's entrepreneurial effectiveness (Engelen et al. 2015). This approach allows us to overcome the lack of attention in scholarship to the perceptions of women entrepreneurs on the part of internal stakeholders, such as co-workers and employees (e.g., Dean and Ford 2017; Marlow and McAdam 2012), despite their crucial impact on the growth of entrepreneurial ventures (e.g., Agarwal et al. 2016; Bagheri, Newman, and Eva 2022).

Drawing on social role theory and role congruity theory (Eagly 1987; Eagly and Karau 2002), we conjecture that ventures led by women founders will exhibit lower levels of EO than their male-led counterparts because employees perceive a lack of congruity between the stereotypical demands of the entrepreneurial role and the social expectations associated with a woman occupying a leadership position, as epitomized in the "think entrepreneur – think male" paradigm (Jennings and Tonoyan 2022; Laguía et al. 2022). As a result, employees who do not fully recognize a woman as a leader show diminished trust, support, commitment, and ultimately willingness to enact behaviors consistent with EO. This paper puts forward that in addition to the well-known "glass ceiling" effect – by which senior members in a company hierarchy do not recognize the value of women employees and jeopardize their opportunities for advancement – women leaders operate on a fragile "paper floor", with no support underneath that can collapse at any time.

We also theorize about potential intervening mechanisms that might mitigate or even reverse this relationship by influencing perceptions of role (in)congruity for women entrepreneurs. Specifically, we examine the influence of (1) actions that may improve role congruity, such as adopting behaviors associated with a particular approach to the entrepreneurial process, namely bricolage (Baker and Nelson 2005), and (2) actions that may mitigate the salience of role congruity judgments, such as acting in contexts in which organizational features lessen the centrality of social roles (Anglin et al. 2022b; Eagly and Wood 1991); we propose that entrepreneurial support organizations (ESOs) – a class of organizations that aim to facilitate the entrepreneurial process by providing a broad range of services – is one context with such characteristics.

Our hypotheses are tested on a unique sample of 463 new technology-based firms operating in Italy: this context presents structural barriers to women entrepreneurship that are markedly different from the context of Verge Genomics, but are nonetheless meaningful to disentangle the relationship between leader gender, employee expectations, and strategic posture. Indeed, the country has one of the lowest rates of women labor force in OECD countries (Poggesi, Mari, and De Vita 2020), indicating conditions that negatively affect institutional norms in the context of women entrepreneurship (e.g., DeClercq, Kaciak, and Thongpapanl 2022).

This study advances the literature on EO by theorizing the role of internal stakeholders in enacting a set of behaviors conducive to the pursuit of this strategic posture. Indeed, the role of internal stakeholders has been marginal in studies of EO (e.g., Miller and Lloyd-Reason 2013; Kock and Gemünden 2021), despite the consensus on qualifying EO as an organizational-level phenomenon and the notion that leaders' effectiveness depends on their ability to mobilize followers. We also contribute to the literature on the relationship between gender and EO (e.g., Goktan and Gupta 2015; Arzubiaga et al. 2018; DeClercq, Kaciak, and Thongpapanl 2022) by acknowledging the double penalty that affects women operating at the intersection of the male-dominated business and scientific systems (Kuschel et al. 2020). Finally, this study expands the application of role congruity theory to understanding the antecedents of EO. While role congruity theory has begun to be applied as an interpretive framework for a variety of organizational-level outcomes, including in the context of entrepreneurial firms (Del Carmen Triana et al. 2024), the phenomenon of EO is still overlooked.

2 Theoretical Background

2.1 Role Congruity Theory in Entrepreneurship

Rooted in role theory (Biddle 1986) and social role theory (Eagly 1987; 1997), the role congruity theory (Eagly and Karau 2002) emerged as an attempt to understand the causes of the barriers and prejudices that prevent women, despite their competence, from reaching high positions in society, a phenomenon captured by the popular metaphor of the "glass ceiling". While role theory set the stage – positing that shared expectations about patterns of human behavior are associated with the social category (e.g., demographic, cultural, and behavioral) and the social responsibility of individuals and the situation in which they interact with others – it is social role theory that established a link between gender stereotypes and the social roles of women and men, with specific regard to the division of labor. In this perspective, among the sets of social norms established in a given society, some define work roles

and behaviors as typically masculine or feminine: individuals internalize these norms through a process of socialization which drives them to adopt cognitions, skills, and beliefs that are consistent with gender-typical work roles, thereby shaping expectations about how men and women should behave in different work environments. Specifically, men are expected to exhibit agentic traits (i.e. to be competent, assertive, competitive, and dominant) and women are expected to exhibit communal traits (i.e. to be trustworthy, unselfish, concerned with others, and emotionally expressive) (Eagly and Mladinic 1989). These norms also shape expectations of how other individuals should behave in the work context. Role congruity theory (Eagly and Karau 2002) provides further insight by observing that individuals often occupy multiple social roles (e.g., man and woman; business leader and employee) that may or may not be perceived as congruent with the expectations of other social actors: the judgment of congruity concerns the extent to which the stereotypical characteristics of men and women are consistent with those associated to a given organizational role. The theory suggests that individuals who simultaneously occupy social roles characterized by conflicting expectations are at greater risk of receiving biased and unfavorable evaluations from external observers. Therefore, because leadership roles stereotypically require agentic traits, observers will perceive a woman in a leadership position as incongruent because she is expected to have communal traits; and the judgment of incongruity will persist even if that woman has exhibited agentic behaviors that are inconsistent with the social role assigned to women (Rudman and Glick 2001).

Although initially developed to explain the sources of prejudice against women leaders, role congruity theory has found fruitful applications in the field of Entrepreneurship (see Del Carmen Triana et al. 2024, for a detailed review of its influence in Management studies), contributing to the recognition of the gendered nature of the entrepreneurial role and that the notion of the "well-performing entrepreneur" is socially taught through upbringing and socialization processes (e.g., Ahl 2006; Marlow and McAdam 2012). Indeed, despite recent signals of subtle changing trends (Welter and Baker 2021), the dominant entrepreneurial stereotype, characterized by heroic traits-that of someone who faces a wild environment and succeeds by being assertive, strong, and fierce-fits better with men (Hamilton 2013; Byrne, Fattoum, and Diaz Garcia 2019; Gupta, Wieland, and Turban 2019); consequently, women entrepreneurs tend to be disadvantaged compared to their male counterparts along several business dimensions (e.g., Liñán, Jaen, and Martin 2022; Lauto, Salvador, and Visintin 2022; Audretsch, Belitski, and Brush 2022, 2025; Reyes and Neergaard 2023; Poggesi et al. 2020; Tonoyan, Strohmeyer, and Jennings 2020; Avnimelech and Rechter 2023). Moreover, due to role incongruity, women entrepreneurs' actions, decisions, and performance are closely scrutinized by key stakeholders, who require them to demonstrate higher standards of competence

(Kanter 1977; Martin et al. 2015). For those operating in high-tech industries, this burden extends to their competence in the scientific and technological domain, which is similarly male-dominated and subject to strong gender role characterization (e.g., Brush et al. 2022; Nyul et al. 2025). These women entrepreneurs encounter a "double masculinity penalty" (Kuschel et al. 2020) in their relationship with both external and internal stakeholders.

Empirical studies within this literature have focused on patterns of financing (e.g., Cowden, Creek, and Maurer 2021; Anglin, Courtney, and Allison 2022; Butticè, Croce and Ughetto 2023; Malmström et al. 2024), admission to entrepreneurial support programs (e.g., Yang, Kher, and Newbert 2020; Avnimelech and Rechter 2023), innovation (e.g., Tang et al. 2024; Sundermeier 2024), and growth and overall venture performance (e.g., Hmieleski and Sheppard 2019; Zhao and Yang 2021; Yacus, Esposito, and Yang 2019). The framework of role congruity has been much less frequently employed to frame the understanding of one of the most distinctive expressions of entrepreneurial behaviors, such as EO, which we discuss in the next section.

2.2 The Effect of Role Congruity on Entrepreneurial Orientation

The notion of EO identifies entrepreneurship as a fundamental organizational attribute (Miller 1983; Covin and Slevin 1989; Lumpkin and Dess 1996) and entails the pervasiveness of an entrepreneurial posture across various dimensions: the goals, beliefs, and mindset of top managers and leaders; the culture, processes, and routines that guide employees' conduct; and strategic decisions aimed at pursuing opportunities (Ireland, Covin, and Kuratko 2009; Covin and Wales 2019; Wales, Monsen, and McKelvie 2011; Wales, Covin, and Monsen 2020; Covin et al. 2020). The importance of EO is related to the fact that it has been consistently and positively associated with performance, mostly in terms of financial outcomes and growth across diverse organizational contexts (Anderson et al. 2022; Rauch et al. 2009), and has been recognized as a key success factor in newly established firms and high-tech industries (e.g., Rauch et al. 2009; Stam and Elfring 2008; Wang, Thornhill, and De Castro 2017).

EO has been conceptualized primarily from two distinct but related perspectives. The first, proposed by Miller (1983) and later developed by Covin and Slevin (1989), defines EO as "*a basic*, *unidimensional strategic orientation*" (Covin and Slevin 1989, p. 79) that requires the concurrent presence of three components: innovativeness (i.e. the tendency to engage in activities that lead to new products or services), proactiveness (i.e. the attitude toward pursuing new opportunities), and risk-taking (i.e. the willingness to invest resources in projects with uncertain

returns). The second perspective, developed by Lumpkin and Dess (1996), introduces two additional factors: competitive aggressiveness (i.e. the propensity to intensely challenge competitors) and autonomy (i.e. independence and freedom of action in the pursuit of opportunities). This conceptualization does not require that the five components occur simultaneously.

The strategic posture of a firm, including its EO, depends crucially on the interaction between the efforts made by the entrepreneurs to influence employees' behaviors and the perceived legitimacy of entrepreneurs' demands from employees. Regarding the first dimension, it should be noted that founders define processes and structures resembling their venture idea and deploying their personal resources (Baron and Hannan 2002; Mathias, Williams, and Smith 2015; Pittino, Visintin, and Lauto 2017), without facing the constraints that characterized bureaucratic, large established organizations (Daily et al. 2002; Hou et al. 2022). However, the degree to which a firm pursues an EO is the result of the interplay among the priorities and perceptions of organizational members: strategic leaders, managers, and employees (Wales, Monsen, and McKelvie 2011): recent contributions (e.g., Clark et al. 2023; Covin et al. 2020; Howard and Floyd 2024; Hung et al. 2023; Weinzimmer, Michel, and Robin 2021) emphasize that a shared understanding of entrepreneurially oriented behaviors among teams and individuals is a condition for the effective development of such a posture. Therefore, the relationship between leaders and employees appears to be a critical factor in shaping a firm's EO.

Whileentrepreneurs generally enjoy high status and power because they allocate resources within the venture (Hou et al. 2022) and can direct employees toward their priorities, the insight offered by gender role theory highlights the importance of the stereotypes from which employees infer a person's ability to perform the entrepreneurial role: a judgment of incongruity of a woman leader with her role would jeopardize her effort to steer strategic posture of the firm.

The definition of strategic priorities and related supporting organizational practices is paramount among the entrepreneurial decisions that are scrutinized with a gendered lens; such judgment is particularly relevant in uncertain institutional and industrial contexts (Audretsch et al. 2022), like those in which young high-tech firms operate. In these contexts, leaders can deploy their strategy as long as they are credited with significant power and authority, which is largely dependent on their internal stakeholders belief on their ability to navigate the firm through uncertain conditions, making decisive choices and deploy initiatives that can guide the whole group toward stability and success, including the assignment of tasks to employees, which is gender-dependent (Flabbi et al. 2019). A positive assessment of an entrepreneur's congruity with his/her role is critical to convincingly pursue an entrepreneurially oriented posture. Furthermore, role

congruity facilitates the influence of employees' behaviors through role modeling (Bandura 1986; Brown, Treviño, and Harrison 2005).

Research indicates that both prospective and current employees – especially males who predominate in high-tech industries – tend to prefer men entrepreneurs (Hubner, Rudic, and Baum 2023; Laguía et al. 2022; Piva and Rovelli 2023; Rudic, Hubner, and Baum 2021). This preference is reinforced by the expectation that the gender of the entrepreneur should align with the perceived gendered nature of the firm's core business (Abraham and Burbano 2022), which in high-tech industries is perceived as masculine (Jennings and Tonoyan 2022).

Indeed, in these industries, employees' expectations of job attributes are based on ideas about pioneering, innovation, and survival (Block, Fisch, and Van Praag 2018) and on bold and aggressive entrepreneurial postures (Gupta and Turban 2012; Gupta, Wieland, and Turban 2019), all of which have a masculine connotation. Furthermore, being gender role widespread in the society, is possible to expect that employees who are initially neutral or positive towards a woman leader (e.g., because they are attracted to the novelty of a woman entrepreneur in a male-dominated field), or have a fruitful professional relationship, are exposed to a wealth of historical visions, media representations, societal discourse, and even training practices that highlight the incongruity of women with the entrepreneurial role. These stereotypes are strengthened by the dominance of "celebrity leaders," who are portrayed as role models for men and women technological entrepreneurs alike (Mui, Parker, and Titus 2022).

Role congruity has a profound impact on EO as employees may be reluctant to engage in or support initiatives that clash with stereotypes associated with the entrepreneur's gender (Ayman, Korabik, and Morris 2009; Kacperczyk, Younkin, and Rocha 2023), as recent research in family business context has shown (Hernández-Linares et al. 2023). This reluctance may affect the activities that are central to EO, such as opportunity recognition and exploitation, innovation, and the ability to scale operations, which is essential for achieving growth and sustainability (Dean and Ford 2017; Leitch and Volery 2017; Renko, Tarabishy, and Carsrud 2015). For instance, opportunity recognition, a cornerstone of EO, relies heavily on the ability to perceive and act upon market gaps and customer needs. However, gender stereotypes can lead to dismissive attitudes toward opportunities identified by women entrepreneur, irrespective of their viability or innovation potential. Similarly, innovation processes that demand diverse perspectives and collaborative efforts may be stifled if the contributions of women entrepreneurs are undervalued. Furthermore, scaling of a business may be hindered if stakeholders question a woman entrepreneur's capability to effectively lead expansion efforts. Finally, it should be noted that individuals who are highly competent in a given domain and who strive to improve their

recognition as – high-tech women entrepreneurs – are more exposed to the threat of stereotyping (Del Carmen Triana et al. 2024).

This evidence suggests that the consequences of role incongruity for women leaders go beyond the well-known "glass ceiling effect" – where competence does not translate into access to positions of greater power due to a lack of recognition by more powerful organizational members – because they also involve subordinates' resistance to recognizing women leaders, giving rise to a "paper floor effect" (Guvenen, Kaplan, and Song 2014), where they remain at risk of sudden and unexpected downfall, as if the floor beneath them could crack at any moment. This imagery underscores the fragility of women's authority in traditionally men-dominated fields, where their leadership is under constant scrutiny and often more easily challenged or undermined.

Therefore, we propose the following:

Hypothesis 1: Due to the incongruity with the entrepreneurial role perceived by internal stakeholders, the level of EO in women-led new technology-based firms is lower than in men-led firms.

2.3 Actions for Coping with a Perceived Lack of Role Congruity

We propose that there are potential intervening mechanisms that can mitigate or even reverse the negative association between women entrepreneurs and EO by impacting perceptions of their role (in)congruity. In particular, we examine the influence of actions aimed at (1) improving role congruity and (2) mitigating the salience of role-congruity assessment.

2.3.1 Entrepreneurial Bricolage

Regarding the first type of action, we focus on the enactment of behaviors related to entrepreneurial bricolage. Bricolage is recognized as one of the approaches – on the side of causation and effectuation – that help us to conceptualize entrepreneurial behavior in the process of creating and developing new ventures (Fisher 2012); while causation and effectuation can be considered as decision logics (An et al. 2020), bricolage specifically refers to a resourcing behavior that involves "*making do by applying combinations of resources at hand to new problems and opportunities*" (Baker and Nelson 2005, p. 353), as an alternative to seeking ways to acquire standard resources in the market. Intrinsic to the idea of bricolage is the notion that entrepreneurs actively engage with problems and opportunities, reusing and recombining

easily available and cheap resources for novel ends. Despite the possibility of conducing to suboptimal outcomes (Desa and Basu 2013; Powell and Baker 2014), An et al. (2020) show that bricolage is conducive to high performance in small, early-stage firms that embrace either a causation or an effectuation decision-making logic. Indeed, such an approach is consistent with young firms' efforts to seek the most effective resource configuration–even an unconventional one – to find novel approaches to compete with incumbents (Steffens et al. 2023; Stenholm and Renko 2016; Yu et al. 2020), as well as to address resource constraints that impede the pursuit of large-scale, time consuming, and risky innovation projects in high-tech industries (e.g., Reypens, Bacq, and Milanov 2021; Senyard et al. 2014; Wu, Liu, and Zhang 2017).

Bricolage is in line with several of the constituting dimensions of EO (Xiaobao et al. 2022): the use of unconventional resources at hand and the recombination of existing sets of resources are associated with the development of novel products and services; the attitude toward "making-do" (rather than waiting for accessing the ideal resource endowment) is aligned with the rapid pursuit of opportunities and the attempt to overcome externally imposed, conventional constraints.

More importantly for our argument, entrepreneurial bricolage represents an appropriate strategic posture for women entrepreneurs who face the double penalty of being outsiders in both the business and the scientific/technological domain and attempt to actively redefine the entrepreneurial role by emphasizing dimensions such as adaptability, flexibility, resourcefulness, creativity, and collaboration (e.g., Desa and Basu 2013; Fisher et al. 2012; Hou et al. 2022; Michaelis et al. 2022; Welter, Xheneti, and Smallbone 2018; Yu and Wang 2021; Yu et al. 2020), which are typically associated with woman approaches to leadership (e.g., Kubberød, Jones, and Pettersen 2021). Due to the aforementioned prejudices, women entrepreneurs are confronted with a research environment that is qualitatively and quantitatively inferior to the level ideally required to pursue the goal and nonetheless they decide to operate by creating novel mean-ends relationships by using the resources at hand, thus providing a suitable context for bricolage. Furthermore, bricolage entails the deployment of a series of tactics for the activation of social relationships aimed at personally reassuring stakeholders about the viability of the business idea and at fostering resource acquisition (Di Domenico, Haugh, and Tracey 2010); the deployment of these tactics closely resonates the effort that women make to demonstrate their congruity with the entrepreneurial role. In general terms, in a situation where established norms have often confined women to predefined roles, women entrepreneurs emerge as they reject cultural constraints and act to address such challenges leveraging their ingenuity to build ventures that not only generate economic growth but also change the overall perception of women in technology industries (Rahman et al. 2021).

From a role congruity perspective, the behavior of a woman entrepreneur who implements a bricolage strategy is largely aligned with stereotypical expectations of women entrepreneurship and therefore does not activate the negative judgment among stakeholders that results from role incongruity (Eagly and Karau 2002). This alignment enhances the perception of women entrepreneurs as effective and capable leaders, especially in firms where strategic flexibility is conducive to higher performance through direct interaction and role modeling (Hensellek, Kleine-Stegemann and Kollmann 2023). Consistent with these arguments, Digan et al. (2019) found that in women-led ventures, bricolage enhances the beneficial effects of entrepreneurial empowerment (i.e. perceived competence, self-determination, and ability to lead a firm) on performance.

Overall, we suggest that women entrepreneurs who engage in behaviors associated with bricolage can mobilize the contributions of internal stakeholders, such behaviors improve their credibility as leaders, because they engage with a complex entrepreneurial endeavor while staying true to their own strengths and capabilities.

Hypothesis 2: Due to its congruity with the stereotypical role of women entrepreneurs, the adoption of bricolage as an entrepreneurial behavior positively moderates the relationship between women leadership in new technology-based firms and EO.

2.3.2 Entrepreneurial Support Organizations

ESOs support individuals and groups engaged in the entrepreneurial process (before and after the establishment of a venture) by providing both tangible and intangible assistance through a systematic approach, with the aim of increasing their chances of survival and development. These organizations – which include incubators, science parks, accelerators, makerspaces, and co-working spaces[1] – have the primary purpose of helping entrepreneurs overcome the challenges and uncertainties they face at different stages of their ventures, including emergence, development, survival, and long-term growth (Bergman and McMullen 2022; Rathino et al. 2020). Each type of ESO pursues different goals and provides a different formula of services that is better suited to help different types of entrepreneurs (Audretsch and Belitski 2019); beyond these differences, it is possible to recognize some typical forms of support: provision of finance and access to potential financiers; shared physical

1 To reduce the heterogeneity of the phenomenon, we adopt the more restrictive definition by Bergman and McMullen (2022), that excludes other actors that contribute to the entrepreneurial process (Rathino et al. 2020) such as government agencies, public policies, specialized investors, university technology transfer offices.

infrastructure; and mentorship, advice, and access to relevant networks (Bergman and McMullen 2022; Block et al. 2018). Moreover, ESOs help supported firms through the selection process by signaling the legitimacy of affiliated ventures in the technology-based business field (Clayton 2024), and this signal is relevant to both external and internal stakeholders.

We contend that an entrepreneur affiliated with an ESO chooses to operate in a context that mitigates the influence of gender role–related considerations and therefore is more likely to obtain the recognition of his/her role and skills from stakeholders, thereby making it possible to elicit behaviors that are consistent with EO. The lesser relevance of gender in ESO compared to the general field of entrepreneurship can be observed at different levels. Early conceptualizations of ESOs highlight that criteria for admission emphasize the evaluation of the business plan along technical and economic criteria (e.g.,Aerts, Matthyssens, and Vandenbempt 2007; Lumpkin and Ireland 1988; Rice 2002). The formal endorsement of a merit-based business culture should lower the importance of gender-role-congruity expectations from stakeholders (Avnimelech and Rechter 2023; Chandler et al. 2022): admission to an ESO can be considered an indicator of congruency with the entrepreneurial role. However, recent studies have found that the congruence of the gender of the entrepreneur with the business idea is taken into account in the selection process, even in ESOs (Beyhan, Akçomak, and Cetindamar 2024; Yang, Kher, and Newbert 2020). Accepting that the admission process is biased against women, it is possible to expect that women entrepreneurs gaining support from ESOs demonstrate *a fortiori* the viability of their entrepreneurial skills so that they are in the condition of eliciting employees' behaviors that are consistent with EO.

A second crucial dimension of ESOs includes their service offerings that combine shared resources (such as office space and laboratory facilities) – which are assumed to be provided on technical, gender-neutral grounds (Aerts, Matthyssens, and Vandenbempt 2007; Rice 2002) – and more sophisticated services aimed at filling the resource and competence gaps (Bruneel et al. 2012; Hausberg and Korreck 2020). These kinds of services are likely to be influenced by gender-dependent patterns, as they are shaped by the relationship between the professional, who provides the service, and the entrepreneur and target the dimensions of the entrepreneurial process that have a clear gender connotation, such as those connected to the development of entrepreneurial self-efficacy (Avnimelech and Rechter 2023; Clayton 2023; Cohen et al. 2019; Entrialgo and Iglesias 2018; Kuratko, Fisher, and Audretsch 2021; Maxheimer and Nicholls-Nixon 2022; Nicholls-Nixon and Maxheimer 2022). While there is evidence that the social setting of ESOs may pose challenges to women entrepreneurs by reproducing masculine norms of entrepreneurial behavior (e.g., Brush et al. 2019; Marlow and McAdam 2012; 2015), therefore emphasizing their lack of congruence with their role, recent trends indicate an expansion of the aims of

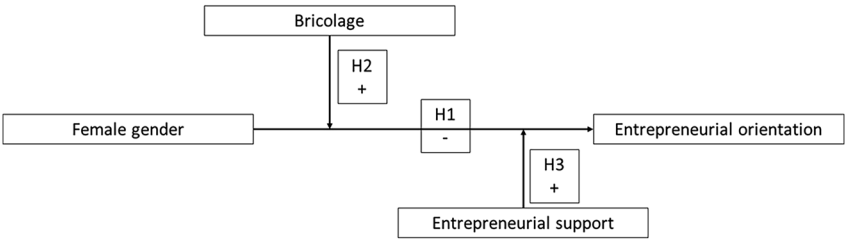

Figure 1: Conceptual model.

ESOs to consider the creation of an inclusive and supportive environment that transcends gender roles and biases (Achtzehn, Treanor, and Amess 2023; Arshed, Martin, and Knox 2022; Bakker and McMullen 2023; Clayton 2023; Dams et al. 2022; Grandy and Culham 2022; Stolze and Slavova 2022; Treanor et al. 2021). If this were to be true, the support from an ESO may represent, for high-tech women entrepreneurs, a way to effectively acquire entrepreneurial knowledge, networks, and entrepreneurial self-efficacy (Avnimelech and Rechter 2023), which enable their ventures to close the gaps that generally constrain their entrepreneurial behavior. The fact that the new women-led venture is hosted in an ESO may therefore make coworkers and employees less sensitive to gender role congruency in the assessment of the effectiveness of entrepreneurial leadership.

Hypothesis 3: By increasing the congruity with the entrepreneurial role, support from an ESO positively moderates the relationship between women leadership in new technology-based firms and EO.

Our overall conceptual model is summarized in Figure 1.

3 Research Design

The empirical analysis was carried out on an initial population of 2,700 Italian incorporated companies registered with the Chamber of Commerce and included in the Moody's ORBIS database (formerly the AIDA section of the Bureau Van Dijk database); we defined the population according to the following criteria: 1) less than 10 years old; 2) operating in a high-tech industry as defined by the OECD. Within this group, we excluded the companies that were wholly owned by another company, resulting in a final sample of 1,297 companies, from which we selected a representative sample of 500 firms. We used *t*-tests and chi-square tests to determine the representativeness in terms of geographical area and sector.

Data collection was conducted by a consultancy firm using a questionnaire developed by the research group, which also trained the interviewers. The interviews were conducted by telephone in August and September 2018. We adopted a key informant approach (Kumar, Stern, and Anderson 1993), focusing on the founder-CEOs or the person designated as the "leading member" of the entrepreneurial team (e.g., Hahn, Minola, and Eddleston 2019) as our primary respondents: these individuals are likely to be the most influential decision-makers and possess extensive knowledge about the strategic direction of the firm (Wiklund and Shepherd 2005). After excluding observations with missing values in one or more of the variables used in our study, we obtained a final usable sample of 463 firms. Because the responses were collected by a consultancy firm through telephone interviews over the course of three weeks, the results should not be affected by early or late respondents. We supplemented the data provided by respondents with financial information retrieved from Moody's ORBIS database.

On average, the firms in our sample are five years old and employ (in addition to the entrepreneurial team) 1.81 employees; the vast majority operate in the ICT (20.7 %), research and development (18.3 %), and manufacturing (16.6 %) sectors. With regard to the geographic distribution, 43 % of the firms operate in the North, about 23 % in the Center, and 34 % in the South and Islands.

The choice of Italy as the empirical setting is due to the fact that women are a minority in the entrepreneurial scene, representing the 22 % of entrepreneurs (against 32 % in the European Union) and therefore are prone to gender role biases. Nonetheless, recent trends reveal an increase in woman-led new ventures in high-tech sectors, which experienced 25 % growth between 2019 and 2022 (Unioncamere Observatory on Women Entrepreneurship 2022), indicating the relevance of this phenomenon.

3.1 Measures

3.1.1 Dependent Variable

The study focuses on the impact of the presence of a woman leading entrepreneur on the entrepreneurial-orientation level of the firm. The dependent variable, *Entrepreneurial orientation (EO)*, is measured using a scale originally developed by Covin and Slevin (1989) that is based on nine items capturing firm innovativeness, proactiveness and risk taking. Each item is measured on a 7-point Likert scale. An exploratory factor analysis suggested dropping one of the items, n. 6, leading to a final Cronbach's Alpha of 0.74 (See Appendix A.1).

3.1.2 Independent Variables and Moderators

The presence of a woman leading entrepreneur (*Woman founder*) is measured through a dummy variable that takes a value of 1 if the leading founder is a woman and 0 otherwise.

The two moderating variables are *Bricolage* and *Entrepreneurial support organization* (ESO). *Bricolage* is measured used the nine-item scale proposed by Davidsson, Baker, and Senyard (2017), which considers various aspects of this strategic posture, such as entrepreneurs' confidence in finding practical solutions, their willingness to expand beyond existing resources, and their ability to combine them effectively. An exploratory factor analysis suggested dropping items 4 and 9, leading to a final factor with a satisfactory Cronbach's Alpha of 0.78 (see Appendix A.2).

We also performed confirmatory factor analysis to investigate the measurement model's fit; despite the significant chi-square statistic, the model exhibits good fit as evidenced by CFI = 0.956, RMSEA = 0.04, SRMR = 0.044, TLI = 0.938 the analysis returned satisfactory results, even if EO show a couple of low standardized loadings. Also, while the chi-square test is statistically significant, it is well-known that this test is overly sensitive in large samples and is not a definitive measure of model fit (Kline 2016). The items in the resulting scales are sufficiently correlated (r's = 0.14 to 0.45, p's < 0.01).

Entrepreneurial support organization is a dummy variable that takes a value of 1 if the firm has been hosted in a science park, incubator, or accelerator and a value of 0 otherwise. The chi-square test is statistically significant, it is well-known that this test is overly sensitive in large samples and is not a definitive measure of model fit (Kline 2016).

We employed several control variables: the natural logarithm of the age of the firm (*Firm age*), which is the number of years since the firm's establishment, because, as age increases, firms may be less likely to favor risk-taking actions, with the potential to reduce EO (e.g., Leonard-Barton 1992); the natural logarithm of the number of full-time equivalent employees (*Firm size*), as smaller firms may have fewer slack resources to use for experimentation, thereby reducing EO; the geographical location of the firm (a dummy that equals 1 if the firm is located in the regions of the South of Italy and 0 otherwise), to account for the different level of environmental munificence, that is a fact that may impact on EO (e.g., Rosenbusch, Rauch, and Bausch 2013); *Public financial support* is a dummy assuming a value of 1 if the firm has benefitted from financial support from public agencies and 0 otherwise; this factor that can impact EO by changing the attitudes of the founders toward innovation (e.g. Chapman and Hewitt-Dundas 2018); the *Financial performance* is the

average return on assets in the previous periods, as this can also increase the amount of available slack; the number of shareholders (*Number of shareholders*); the previous experience of the entrepreneurial team, either as managers or entrepreneurs (*Previous business experience*), as it can have a direct effect on EO (Altinay and Wang 2011); the degree of *Participative decision making* among the members of the firm's management team, as measured according to the four-item scale developed by Flood et al. (2000), that captures the distinctive impact of the leading founders' features on EO; similarly, we consider the concentration of ownership captured by the presence of a single owner with an absolute majority of shares (*Ownership concentration*). In addition, we also controlled for the *Founders' age*, as age has been shown to be a significant predictor of EO in entrepreneurial firms (e.g., Deb and Wiklund 2017). Industry dummies are also included, capturing sectoral heterogeneity at the NACE two-digit level.

Like most studies of entrepreneurial orientation and bricolage, our study also depends on data provided by individual participants and their self-reported evaluations of performance. To assess the existence of common method bias (CMB) we conducted Harman's one-factor test (Harman 1976), which employs unrotated factor analysis. The first factor explains less than 50 % of the variance, namely 22.9 % (see Appendix A.3), which lead us to conclude that there are no issues with CMB and that the factor structure is not the result of the measurement process, as suggested by Podsakoff and Organ (1986).

3.2 Robustness Test

While we use EO as our dependent variable – reflecting the commitment of internal members to an entrepreneurial posture – we recognize that not directly measuring internal stakeholders' perceptions of role congruity could raise concerns about the robustness of our findings. To address this limitation, we conducted a robustness check by estimating an additional model that incorporates a three-way interaction term. This term includes the prevalence of women-led new ventures at the provincial level (NUTS-3), which we use as a proxy for the perceived role congruity of company stakeholders, interpreting the perceived alignment between societal expectations of women and the characteristics typically associated with the entrepreneurial role. The dummy variable *Prevalence of women entrepreneurship* takes value 1 if the province where the firm is located is in the group with the highest share of high-tech women entrepreneurs, in the five-level ranking proposed by the 2014 Unioncamere Observatory on Women Entrepreneurship report, and 0 otherwise.

The assumption underlying this approach is that areas with lower prevalence of women entrepreneurs correspond to lower perceived role congruity (e.g., Entrialgo and Iglesias 2018; Rocha and Van Praag 2020). In these contexts, we hypothesize a stronger negative effect of woman leadership on new venture's EO, and a stronger effect of moderators (*Bricolage* and *Entrepreneurial support organization*) as mechanisms to restore role congruity. Conversely, areas with higher prevalence of women entrepreneurs may exhibit less pronounced effects of these moderators due to a baseline increase in perceived congruity. Results from the robustness check, including plots of marginal effects, are presented in the results section.

3.3 Endogeneity and Selection Bias

Given the over-representation of women-led firms in our sample in comparison to the population, we considered the potential for selection bias and endogeneity in our analysis. Selection bias may arise because women-led firms are more likely to be included in the study, potentially skewing the results. To address this, we implemented a two-stage Heckman selection model.

In the first stage, we modeled the likelihood of a firm being led by a woman using firm characteristics. As instruments, we utilized two variables: (a) the firm's location in central or southern Italian regions, where women participation in the labor market – and consequently in entrepreneurship – is lower (e.g., Righetto 2023); and (b) the prevalence of women-led ventures in high-tech industries at the provincial (NUTS-3) level. These instruments are theoretically and related to the likelihood of a firm being led by a woman (Rocha and Van Praag 2020), and also empirically correlated to the likelihood of a woman entrepreneur in our sample (coefficients are −0.51 and 0.10, both significant at $p < 0.05$ level), but are not conceptually directly linked nor correlated (0.06; p = n.s.) to the firm's EO, thus satisfying the exclusion restriction criterion.

In the second stage, we included the Inverse Mills Ratio (IMR) generated from the first stage in our primary regression analysis of EO. This step controls for potential selection bias, allowing us to disentangle the true relationship between women entrepreneurship and EO.

The results of the analysis, both with and without the IMR, are consistent, suggesting that selection bias does not substantially influence the observed relationships. By incorporating the IMR, we ensure that our findings are robust and not artifacts of the over-representation of women-led firms in our sample.

4 Results

4.1 Main Analysis

Table 1, which reports the descriptive statistics, highlights that a woman is a founder in 39 % of the firms in our sample, indicating a considerable women-entrepreneurship presence in our sample. The average level of *Entrepreneurial orientation* is 2.84, while the average level of *Bricolage* is 3.82, both of which are calculated on a scale from 1 to 5; about one-third of the firms benefitted from the services of an ESO.

We disentangle the effects of ESOs and the adoption of a bricolage approach on the relationship between the gender of the firm leader and EO through a regression analysis, the outcome of which is reported in Table 2.

After presenting the control-only Model 1, we introduce the variable relative to the gender of the firm leader and, in Model 2, we test whether adopting a bricolage posture affects EO. The model indicates a weak negative effect for women leadership. In Model 3, we assess whether the effect of bricolage differs in firms led by women by introducing an interaction term. This model indicates that women-led firms reduce their tendency to present less entrepreneurial behaviors as they adopt a bricolage strategy more intensively. In Model 4, we introduce the effect of support from an ESO, finding no significant effects. Finally, in Model 5, we simultaneously consider the interaction effects between gender and bricolage and ESO.

Model 5 shows that Hypothesis 1 is supported: the negative coefficient associated with gender (coefficient: –0.346, significant at 5 % level) is an indication that woman-led firms display lower levels of EO. Hypothesis 2 is also supported: bricolage positively moderates the relationship between a woman founder and firm EO (coefficient: 0.277, significant at 5 % level). The calculation of the coefficients allowed us to appreciate the differences in the intensity of the effect of bricolage on EO between genders (Figure 2). While there is no noticeable change in the impact of bricolage on EO for male entrepreneurs, in the case of women entrepreneurs, it becomes stronger as reliance on bricolage becomes more pronounced. Finally, Hypothesis 3 is not supported. Being part of an ESO does not have a positive moderating effect on the relationship between a woman leader and firm EO, nor a negative one.

4.2 Robustness Analysis

As explained in the method section, robustness tests were performed to explore the moderating role of perceived role congruity in the relationship between bricolage

Table 1: Means, standard deviations and correlations.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EO	2.84	0.74	1													
Firm size	1.81	4.94	−0.04	1												
Firm age	5.42	2.08	0.09	−0.01	1											
Geographical location	0.21	0.41	−0.02	0.05	−0.01	1										
Financial performance	6.47	11.6	−0.04	−0.02	−0.02	−0.04	1									
Public financial support	0.37	0.84	−0.16	0.07	−0.17	−0.1	0.05	1								
Number of shareholders	4.46	7.39	0.07	−0.04	0.11	0.13	−0.02	−0.07	1							
Previous business experience	1.19	1.55	0.1	0.05	−0.03	0.04	−0.09	−0.03	0.17	1						
Participative decision making	3.79	0.80	0.15	0.01	0.08	0.1	0.03	−0.14	0.11	0.04	1					
Ownership concentration	2.08	0.70	−0.07	0.01	−0.12	0.01	−0.07	0.09	−0.06	−0.04	−0.29	1				
Founders' age	44.04	8.78	−0.09	0.08	−0.11	0.04	−0.02	−0.03	−0.02	0	−0.03	−0.06	1			
Woman founder	0.39	0.49	−0.08	−0.01	0.01	−0.15	−0.01	0.09	−0.01	0.01	0.01	0.01	−0.12	1		
Bricolage	3.82	0.52	0.12	−0.04	0.13	−0.04	0.02	−0.1	0.06	0.01	0.34	−0.12	−0.01	−0.01	1	
ESO	0.33	0.47	0.16	−0.11	0.12	−0.02	−0.04	−0.34	0.07	−0.05	0.14	−0.08	−0.08	−0.18	0.15	1

Correlations higher than |0.09| are significant at $p < 0.05$.

Table 2: Outcomes of regression analysis.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Firm size	−0.00	−0.00	−0.00	−0.00	−0.00
Firm age	0.01	0.01	0.01	0.01	0.01
Geographical location	−0.07	−0.09	−0.08	−0.09	−0.08
Financial performance	−0.00	−0.00	−0.00	−0.00	−0.00
Public financial support	−0.25*	−0.22*	−0.23*	−0.22*	−0.24*
Number of shareholders	0.00	0.00	0.00	0.00	0.00
Previous business experience	0.04+	0.04+	0.04*	0.04+	0.04+
Participative decision making	0.09*	0.08+	0.08+	0.08+	−0.08+
Ownership concentration	−0.01	−0.01	−0.01	−0.01	−0.00
Founders' age	−0.01	−0.01+	−0.01	−0.01+	−0.01
Woman founder		−0.14+	−0.35*	−0.13	−0.35*
Bricolage		0.05	−0.04	0.05	−0.04
ESO		0.05	0.06	0.06	0.07
Woman Founder * Bricolage			0.27+		0.28*
Woman Founder * ESO				−0.01	−0.05
Industry dummies	YES	YES	YES	YES	YES
IMR	−0.36	−0.33	−0.29	−0.33	−0.30
R^2	0.12	0.13	0.13	0.13	0.13
Adjusted R^2	0.07	0.07	0.08	0.07	0.08
F Statistic	2.49***	2.41***	2.48***	2.32***	2.39***
N	463	463	463	463	463

+$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

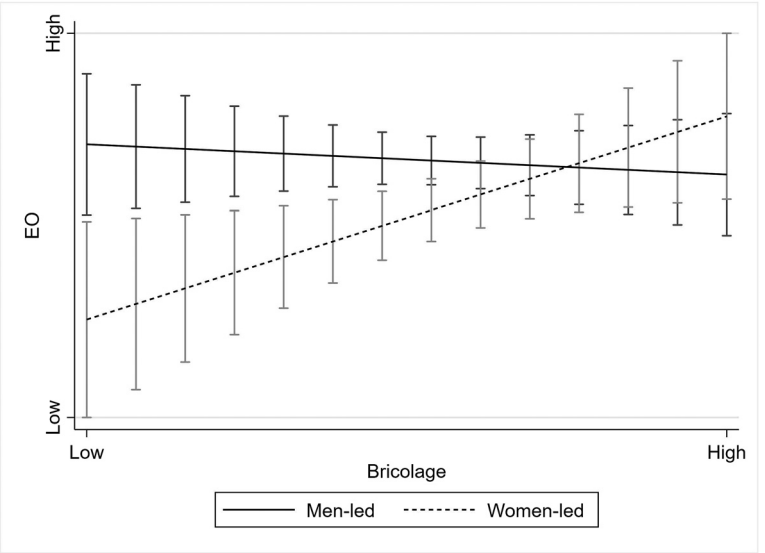

Figure 2: Two-way interaction plot.

Table 3: Outcomes of regression analysis.

Variables	Model 6
Firm size	−0.00
Firm age	0.01
Geographical location	−0.06
Financial performance	−0.00
Public financial support	−0.21*
Number of shareholders	0.00
Previous business experience	0.04+
Participative decision making	−0.07
Ownership concentration	−0.02
Founders' age	−0.01+
Woman founder	−0.32+
Bricolage	−0.05
ESO	0.13
Incidence of women entrepreneurship	0.32+
Woman Founder * Bricolage	0.31+
Woman Founder * ESO	0.00
Woman Founder * incidence of women entrepreneurship	−0.10
Woman Founder * incidence of women entrepreneurship * Bricolage	−0.06
Woman Founder * incidence of women entrepreneurship * ESO	−0.05
Industry dummies	YES
IMR	−0.27
Wald Chi (34)	75.83***
Number of groups	91
Var(cons)	0.03
Var(residual)	0.45
N	463

+$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

and EO. These tests aim to assess whether the prevalence of women entrepreneurs in the province, used as a proxy for role congruity, influences this relationship. It is possible to assume that in provinces where high-tech women entrepreneurship is more common, employees tend to mitigate their perception of role incongruity. We test this assumption in Model 6 through a multilevel linear mixed model that accounts for the fact that firms are clustered in provinces. The results of the robustness test are presented in Table 3, and the marginal effects analysis is visualized in Figure 3.

In the marginal effects analysis derived from Model 6, which identifies women-led firms based on the gender of the leading founder, the results show that bricolage significantly enhances EO for women-led firms in contexts with low perceived role congruity (marginal effect = 0.3789, $p = 0.004$). This finding supports the theory that

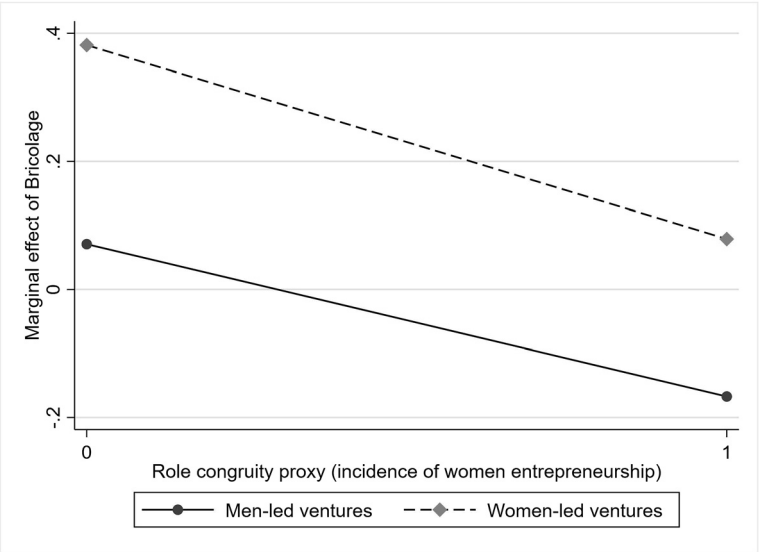

Figure 3: Plot of marginal effects.

bricolage compensates for the lack of role congruity by signaling adaptability and resourcefulness to stakeholders. However, in contexts with high role congruity, the effect of bricolage diminishes and becomes statistically insignificant (marginal effect = 0.0792, p = 0.384), reflecting the reduced need for compensatory strategies where women entrepreneurs are more accepted.

For male-led firms, bricolage has a minimal and statistically insignificant effect on EO in contexts with low perceived role congruity (marginal effect = 0.0687, p = 0.507) and even shows a slight negative effect in contexts with high role congruity (marginal effect = –0.1753, p = 0.022). This suggests that bricolage is not a crucial factor for men entrepreneurs, who inherently align with traditional entrepreneurial stereotypes, and may even be less effective in contexts with greater acceptance of women entrepreneurs.

Moreover, consistent with the findings from the main analysis, the influence of ESOs remains insignificant across all contexts, further emphasizing that these organizations do not substantially alter the relationship between gender, bricolage, and EO.

Overall, the results support the idea that perceived role congruity is a key intervening mechanism in the relationship between bricolage and EO, even though it is not measured directly. The significant positive effect of bricolage in contexts of low perceived role congruity, particularly for women-led firms, aligns with the theory

Table 4: Marginal effects.

Variables	Marginal effects
Men-led firm, medium-low incidence of women entrepreneurship	0.05
Men-led firm, medium-high incidence of women entrepreneurship	−0.16
Women-led firm, medium-low incidence of women entrepreneurship	0.37*
Women-led firm, high incidence of women entrepreneurship	0.09

that bricolage helps mitigate biases by addressing stakeholders' skepticism. Conversely, as role congruity improves, bricolage's relevance diminishes, highlighting the context-dependent nature of its effectiveness (Table 4).

5 Discussion

This research provides insights into the intersections of three related streams of literature: women entrepreneurship, high-tech entrepreneurship, and EO. Our study addresses the topic of EO from one of the least explored, but most relevant, perspectives, namely its antecedents (e.g., Wales 2016), such as the gender of the strategic leader. Our findings are consistent with those of previous studies in which women entrepreneurs reported lower levels of EO (e.g., Fellnhofer, Puumalainen, and Sjögrén 2016; Goktan and Gupta 2015; Lim and Envick 2013). Through the lens of role congruity (Eagly and Karau 2002) and encourage the search for alternative explanations for the relationship between business leader gender and EO in high-tech ventures. Specifically, the lack of congruity between the leader's gender and the expectations of internal stakeholders appears to reduce the leader's perceived effectiveness in guiding the firm toward an entrepreneurial strategic posture. Thus, this work adds an analytical dimension (i.e. that related to internal stakeholders) to the understanding of gender differences in the behavior and performance of high-tech ventures, as well as the lower levels of EO associated with women entrepreneurs. Such a change in perspective seems urgently needed. While the general literature on leadership has widely examined the influences of gender on the relationship between leaders and followers (Shen and Joseph 2021), the characterization of the gender roles of entrepreneurs has been drawn with reference to the general population (e.g., Gupta, Wieland, and Turban 2019). In this sense, our study contributes to the efforts towards a greater contextualization of the phenomenon of entrepreneurship (Baker and Welter 2020; Mustafa and Treanor 2022), in particular of the gender roles in entrepreneurship (Lyons 2022), also with reference to the dynamics of high-tech industries which present specific features in this regard in terms of gender roles (e.g., Audretsch et al. 2022; Brush et al. 2019). However, the relationship between entrepreneurs and followers has been largely neglected. While gender roles do not seem to influence the attractiveness of the firm to potential

employees (Hubner, Rudic, and Baum 2023), our findings provide an impetus for a broader application of gender role theory in entrepreneurship, which has largely focused on the relationship between entrepreneurs and investors (e.g., among recent works, Balachandra, Fischer, and Brush 2021; Bellucci et al. 2025; Conley and Bilimoria 2022; Henry et al. 2022).

Our results put the findings of Andersén (2017) under a new light, who pointed out that conceptions of change and renewal, which are intrinsic to entrepreneurial posture, may increase uncertainty and role ambiguity at the employee level. Their study found that employees can cope with such role ambiguity by relying on the support of co-workers, while the support offered by managers has no effect. We conjecture that such a lack of effect could be spurious; while support from men managers assists in diminishing role ambiguity, support from women managers contributes to the role ambiguity experienced by employees because such support originates from individuals who are not aligned with employees' gender role expectations.

In general, our findings resonate with the importance of stakeholder management in entrepreneurial firms by Mitchell et al. (2021), especially regarding the effect of the dimensions of power and legitimacy in shaping the relationship between women leaders and employees.

This study also encourages to re-evaluate the effectiveness of different types of coping mechanisms that women founders can employ to overcome role incongruence. We find evidence in favor of the adoption of unconventional strategies, such as bricolage, which, despite not being systematically pursued with a high frequency by women entrepreneurs (e.g., Bojica et al. 2020; Davidsson, Baker, and Seynard 2017), features elements such as adaptability and flexibility that are congruent with the expectations of internal stakeholders. Therefore, women entrepreneurs who act according to the bricolage strategy are better able to elicit the commitment of employees and direct them toward entrepreneurial goals. In particular, in line with the findings of Hubner, Rudic, and Baum (2023) and Cowden et al. (2023), alternative approaches to causation are consistent with women entrepreneurial leadership. The finding of a positive relationship between bricolage and EO in women-led firms also offers insights regarding the antecedents and boundary conditions of EO, addressing the call by Wales et al. (2021) for a more refined understanding of the organizational practices leading to EO.

We do not find support for the role of ESOs as a conventional strategy for coping with role incongruity, thereby supporting the idea that the nature of ESOs as "gendered spaces" offsets their potentially beneficial effects on EO in woman-led firms (Brush et al. 2019). On the one hand, this finding could provide support for the position that ESOs are a highly masculinized setting, one that reinforces, rather than alleviates, women's marginality in the business system, as the studies by Marlow and

McAdam (2012, 2015) have shown. On the other hand, this finding may have been influenced by the developmental trajectory of the Italian ESOs, which may not have targeted minority-led firms by offering tailored services.

6 Concluding Remarks

This paper advances our understanding of entrepreneurship by demonstrating that role congruity theory can be applied to leader-follower dynamics in both top-down and bottom-up approaches, thereby influencing EO and performance. This dual application underscores the theory's versatility in explaining how perceptions of role congruity within organizational hierarchies can significantly impact the effectiveness of leadership and overall organizational success. Acknowledging the relevance of role congruity in the leader–follower relationship offers a theoretical interpretation of a phenomenon that has been explained mainly with reference to alleged fundamental differences between men and women (Brush and Cooper 2012; Gupta, Wieland, and Turban 2019) and in particular, women's limitations in terms of risk-taking, network building, innovativeness, and limited interest in business expansion. In line with recent work demonstrating the prevalence of contextual characteristics over individual traits (e.g., Audretsch, Belitski, and Brush 2022), our contribution adopts a socially constructed concept of gender and entrepreneur and draws attention to the impact that such preconceptions may have on the relationship between the entrepreneur and her employees, paving the way for an entirely new bottom-up explanation of the glass ceiling effect. By examining the interplay between societal constructions of gender roles and entrepreneurial leadership, we illuminate the subtle yet profound ways in which gendered expectations can shape the business landscape.

Notwithstanding our contribution to advancing the literature on EO and gender in high-tech firms, our results are not without limitations. First, we used a subjective measure of EO, which may be reflected in lower perceptions of individual and firm EO associated with women entrepreneurs (Fellnhofer, Puumalainen, and Sjögrén 2016). The adoption of accounting-based measures of EO (Vanacker, Zahra, and Holmes 2021) could strengthen the methodological rigor of future studies. Second, while our study improves the theoretical understanding of the relationship between gender and EO by incorporating the role of internal stakeholders, it falls short of measuring the extent to which employees perceive the behaviors of an entrepreneur as congruent with their expectations. Developing and validating an instrument to measure such dimensions is important in fostering the development of this stream of research. Third, in our empirical analysis, we use a single variable that captures a firm's affiliation with any type of ESO, and thus do not take into account their differences in terms of goals and the relational intensity of the forms of support – both factors that may affect the relationship between gender and EO; a more

fine-grained articulation of ESOs would be beneficial in future studies. Furthermore, the generalizability of the findings of this study is constrained by the specificities of the Italian context in terms of the limited participation of women in high-technology industries, and entrepreneurship in particular (DeClercq, Kaciak, and Thongpapanl 2022; Poggesi, Mari, and De Vita 2020), and the relatively small size of the survey sample. Finally, similar to much of the literature, this study improperly refers to biological sex as "gender"; the rigorous use of the concept to mean socially constructed sex (Ahl 2006; Henry, Foss, and Ahl 2016) could open up interesting avenues for the investigation of how non-binary entrepreneurs (see, e.g., Darden, Kellermanns, and Best 2022) face the (even more powerful) challenges of role congruity in the relationship with internal stakeholders. Such a conceptualization of gender could pave the way to further investigations of the interaction of this construct with other social identity categories (e.g., age, social class, parenthood, and disability), as advocated by Jennings and Tonoyan (2022).

Despite the above limitations, this study offers important insights for women entrepreneurs and policymakers. Women entrepreneurs should be reminded that many of the phenomena that characterize their activity are strongly influenced by people's perceptions about their congruity with the role they aim at performing and that on many occasions they are driven to mistakenly believe that they have specific limits that prevent or make hard their success. This is not only true for access to finance (Ghosh, Ghosh, and Chowdhury 2018) or for admission to specific networks but also for those same employees that they have selected, hired, and compensated for. Our study points out that women entrepreneurs should not take for granted the contribution and commitment of internal stakeholders (thereby, risking focusing only on – apparently less controllable – external ones) but should deliberately activate their contribution.

In our study, we do not suggest that women should rely primarily on bricolage as their primary strategy for involving and engaging internal stakeholders in innovative activities or postures. Rather, we suggest that because of persistent perceptions of role ambiguity, bricolage is currently more readily accepted as a coherent approach to innovation for women. This acceptance may inadvertently limit women's options, particularly in the pursuit of radical innovations where broader strategic behaviors may be more effective.

In terms of policy implications, it is crucial to go beyond existing government policies that already support the presence of women in high-tech industries and STEM fields. There is a strong need to address the issue of role congruity perceptions. This could be effectively addressed by widely publicizing examples of successful women in science and in high-tech business to reduce their perception as exceptions. These examples should showcase a variety of leadership styles and innovative achievements to demonstrate the versatility and capability of women in high-tech entrepreneurship.

In addition, it is important to develop targeted coaching programs for women entrepreneurs. These programs should focus on enhancing their communication and leadership skills to enable them to assert their roles confidently and convincingly. By fostering a sense of security and authority in women leaders, these initiatives can help change internal perceptions within their companies, leading to a more inclusive and supportive environment for fostering entrepreneurial orientation across diverse leadership styles. Such measures will not only support women in leveraging a broader set of entrepreneurial strategies, but will also help to break down the stereotypes that limit their full participation in high-tech entrepreneurship.

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Appendix

See Tables A1–A3.

Table A1: EFA Bricolage.

Component Matrix	Component 1
BRIC_1	0.676
BRIC_2	0.595
BRIC_3	0.682
BRIC_5	0.669
BRIC_6	0.669
BRIC_7	0.713
BRIC_8	0.609

Extraction method: principal component analysis. 1 component extracted.

Table A2: EFA EO.

	Component 1
EO1	0.562
EO2	0.559
EO3	0.559
EO4	0.591
EO5	0.609
EO7	0.641
EO8	0.626
EO9	0.633

Extraction method: principal component analysis. 1 component extracted.

Table A3: Harman's single factor test.

Total variance explained						
Component	**Initial Eigenvalues**			**Extraction sums of squared loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.445	22.969	22.969	3.445	22.969	22.969
2	2.575	17.166	40.134			
3	1.222	8.147	48.281			
4	0.980	6.533	54.814			
5	0.828	5.522	60.336			
6	0.782	5.212	65.548			
7	0.706	4.705	70.253			
8	0.665	4.435	74.688			
9	0.626	4.175	78.863			
10	0.619	4.127	82.990			
11	0.581	3.874	86.864			
12	0.526	3.507	90.371			
13	0.513	3.420	93.791			
14	0.471	3.143	96.933			
15	0.460	3.067	100.000			

Extraction method: principal component analysis.

References

Abraham, M., and V. Burbano. 2022. "Congruence between Leadership Gender and Organizational Claims Affects the Gender Composition of the Applicant Pool: Field Experimental Evidence." *Organization Science* 33 (1): 393–413.

Achtzehn, S., L. Treanor, and K. Amess. 2023. "Do Enterprise Education Competitions Have Gendered Outcomes Amongst STEM Early-Career Researchers?" *International Small Business Journal* 41 (8): 801–24.

Aerts, K., P. Matthyssens, and K. Vandenbempt. 2007. "Critical Role and Screening Practices of European Business Incubators." *Technovation* 27 (5): 254–67.

Agarwal, R., B. A. Campbell, A. Franco, and M. Ganco. 2016. "What Do I Take with Me? the Mediating Effect of Spin-Out Team Size and Tenure on the Founder-Firm Performance Relationship." *Academy of Management Journal* 59 (3): 1060–87.

Ahl, H. 2006. "Why Research on Women Entrepreneurs Needs New Directions." *Entrepreneurship Theory and Practice* 30 (5): 595–621.

Altinay, L., and C. L. Wang. 2011. "The Influence of an Entrepreneur's Socio-cultural Characteristics on the Entrepreneurial Orientation of Small Firms." *Journal of Small Business and Enterprise Development* 18 (4): 673–94.

An, W., C. C. Rüling, X. Zheng, and J. Zhang. 2020. "Configurations of Effectuation, Causation, and Bricolage: Implications for Firm Growth Paths." *Small Business Economics* 54: 843–64.

Andersén, J. 2017. "What about the Employees in Entrepreneurial Firms? A Multi-Level Analysis of the Relationship between Entrepreneurial Orientation, Role Ambiguity, and Social Support." *International Small Business Journal* 35 (8): 969–90.

Anderson, B. S., J. Schueler, M. Baum, W. J. Wales, and V. K. Gupta. 2022. "The Chicken or the Egg? Causal Inference in Entrepreneurial Orientation–Performance Research." *Entrepreneurship Theory and Practice* 46 (6): 1569–96.

Anglin, A. H., C. Courtney, and T. H. Allison. 2022. "Venturing for Others, Subject to Role Expectations? A Role Congruity Theory Approach to Social Venture Crowd Funding." *Entrepreneurship Theory and Practice* 46: 421–48.

Anglin, A. H., P. A. Kincaid, J. C. Short, and D. G. Allen. 2022. "Role Theory Perspectives: Past, Present, and Future Applications of Role Theories in Management Research." *Journal of Management* 48 (6): 1469–502.

Arshed, N., G. Martin, and S. Knox. 2022. "Ties that Bind or Blind? The Role of Identity and Place in Understanding Women Entrepreneurs Support." *Entrepreneurship Theory and Practice* 47 (6): 2205–32.

Arzubiaga, U., T. Iturralde, A. Maseda, and J. Kotlar. 2018. "Entrepreneurial Orientation and Firm Performance in Family SMEs: The Moderating Effects of Family, Women, and Strategic Involvement in the Board of Directors." *The International Entrepreneurship and Management Journal* 14: 217–44.

Audretsch, D. B., and M. Belitski. 2019. "Science Parks and Business Incubation in the United Kingdom: Evidence from University Spin-Offs and Staff Start-Ups." In *Science and Technology Parks and Regional Economic Development. Palgrave Advances in the Economics of Innovation and Technology*, edited by S. Amoroso, A. Link, and M. Wright, 99–122. Cham: Palgrave Macmillan.

Audretsch, D. B., M. Belitski, and C. Brush. 2022. "Innovation in Women-Led Firms: An Empirical Analysis." *Economics of Innovation and New Technology* 31 (1-2): 90–110.

Audretsch, D., M. Belitski, and C. Brush. 2025. "How to Secure an Innovation Grant for Firms in New Industries? Gender and Resource Perspectives." *International Journal of Entrepreneurial Behavior & Research* 31 (2/3): 314–43.

Audretsch, D. B., M. Belitski, F. Chowdhury, and S. Desai. 2022. "CEO Gender, Institutional Context and Firm Exports." *International Business Review* 31 (5): 102008.

Avnimelech, G., and E. Rechter. 2023. "How and Why Accelerators Enhance Female Entrepreneurship." *Research Policy* 52 (2): 104669.

Ayman, R., K. Korabik, and S. Morris. 2009. "Is Transformational Leadership Always Perceived as Effective? Male Subordinates' Devaluation of Female Transformational Leaders." *Journal of Applied Social Psychology* 39: 852–79.

Bagheri, A., A. Newman, and N. Eva. 2022. "Entrepreneurial Leadership of CEOs and Employees' Innovative Behavior in High-Technology New Ventures." *Journal of Small Business Management* 60 (4): 805–27.

Baker, T., and R. E. Nelson. 2005. "Creating Something from Nothing: Resource Construction through Entrepreneurial Bricolage." *Administrative Science Quarterly* 50 (3): 329–66.

Baker, T., and F. Welter. 2020. *Contextualizing Entrepreneurship Theory*. New York: Routledge.

Bakker, R. M., and J. S. McMullen. 2023. "Inclusive Entrepreneurship: A Call for a Shared Theoretical Conversation about Unconventional Entrepreneurs." *Journal of Business Venturing* 38 (1): 106268.

Balachandra, L., K. Fischer, and C. Brush. 2021. "Do (Women's) Words Matter? The Influence of Gendered Language in Entrepreneurial Pitching." *Journal of Business Venturing Insights* 15: e00224.

Bandura, A. 1986. *Social Foundations of Thought and Action: A Social Cognitive View*. Englewood Cliffs, NJ: Prentice Hall.

Baron, J. N., and M. T. Hannan. 2002. "Organizational Blueprints for Success in High-Tech Start-Ups: Lessons from the Stanford Project on Emerging Companies." *California Management Review* 44 (3): 8–36.

Bellucci, A., G. Gucciardi, R. Locatelli, and C. M. Schena. 2025. "Gender Gap in Business Angel Financing." *Entrepreneurship Research Journal* 15 (2): 289–324.

Bergman, B. J., and J. S. McMullen. 2022. "Helping Entrepreneurs Help Themselves: A Review and Relational Research Agenda on Entrepreneurial Support Organizations." *Entrepreneurship Theory and Practice* 46 (3): 688–728.

Biddle, B. J. 1986. "Recent Developments in Role Theory." *Annual Review of Sociology* 12 (1): 67–92.

Beyhan, B., S. Akçomak, and D. Cetindamar. 2024. "The Startup Selection Process in Accelerators: Qualitative Evidence from Turkey." *Entrepreneurship Research Journal* 14 (1): 27–51.

Block, J. H., M. G. Colombo, D. J. Cumming, and S. Vismara. 2018. "New Players in Entrepreneurial Finance and Why They Are There." *Small Business Economics* 50: 239–50.

Block, J. H., C. O. Fisch, and M. Van Praag. 2018. "Quantity and Quality of Jobs by Entrepreneurial Firms." *Oxford Review of Economic Policy* 34 (4): 565–83.

Bojica, A. M., J. R. Jiménez, J. R. Nava, and M. M. Fuentes-Fuentes. 2020. "Bricolage and Growth in Social Entrepreneurship Organisations." *Entrepreneurship & Regional Development* 30 (3–4): 362–89.

Brown, M. E., L. K. Treviño, and D. A. Harrison. 2005. "Ethical Leadership: A Social Learning Perspective for Construct Development and Testing." *Organizational Behavior and Human Decision Processes* 97 (2): 117–34.

Bruneel, J., T. Ratinho, B. Clarysse, and A. Groen. 2012. "The Evolution of Business Incubators: Comparing Demand and Supply of Business Incubation Services across Different Incubator Generations." *Technovation* 32 (2): 110–21.

Brush, C. G., and S. Y. Cooper. 2012. "Female Entrepreneurship and Economic Development: An International Perspective." *Entrepreneurship & Regional Development* 24 (1–2): 1–6.

Brush, C., L. F. Edelman, T. Manolova, and F. Welter. 2019. "A Gendered Look at Entrepreneurship Ecosystems." *Small Business Economics* 53: 393–408.

Brush, C. G., K. A. Eddleston, L. F. Edelman, T. S. Manolova, M. McAdam, and C. Rossi-Lamastra. 2022. "Catalyzing Change: Innovation in Women's Entrepreneurship." *Strategic Entrepreneurship Journal* 16 (2): 243–54.

Butticè, V., A. Croce, and E. Ughetto. 2023. "Gender Diversity, Role Congruity and the Success of VC Investments." *Entrepreneurship Theory and Practice* 47 (5): 1660–98.

Byrne, J., S. Fattoum, and M. C. Diaz Garcia. 2019. "Role Models and Women Entrepreneurs: Entrepreneurial Superwoman Has Her Say." *Journal of Small Business Management* 57 (1): 154–84.

Chandler, J. A., J. C. Short, M. K. Hasan, and G. Fan. 2022. "Founding Team Characteristics and the Pursuit of Social Motives: A Role Theory Perspective." *Journal of Business Venturing Insights* 17: e00289.

Chapman, G., and N. Hewitt-Dundas. 2018. "The Effect of Public Support on Senior Manager Attitudes to Innovation." *Technovation* 69: 28–39.

Clark, D. R., R. J. Pidduck, G. T. Lumpkin, and J. G. Covin. 2023. "Is it Okay to Study Entrepreneurial Orientation (EO) at the Individual Level? Yes." *Entrepreneurship Theory and Practice* 48 (1): 349–91.

Clayton, P. 2023. "Different Outcomes for Different Founders? Local Organizational Sponsorship and Entrepreneurial Finance." *Small Business Economics* 62: 23–62.

Clayton, P. 2024. "Mentored without Incubation: Start-Up Survival, Funding, and the Role of Entrepreneurial Support Organization Services." *Research Policy* 53 (4): 104975.

Cohen, S., D. C. Fehder, Y. V. Hochberg, and F. Murray. 2019. "The Design of Startup Accelerators." *Research Policy* 48 (7): 1781–97.

Conley, N., and D. Bilimoria. 2022. "Barriers and Mitigating Strategies of Entrepreneurial Business Growth: The Role of Entrepreneur Race and Gender." *Entrepreneurship Research Journal* 12 (3): 391–439.
Covin, J. G., and D. P. Slevin. 1989. "Strategic Management of Small Firms in Hostile and Benign Environments." *Strategic Management Journal* 10 (1): 75–87.
Covin, J. G., and W. J. Wales. 2019. "Crafting High-Impact Entrepreneurial Orientation Research: Some Suggested Guidelines." *Entrepreneurship Theory and Practice* 43 (1): 3–18.
Covin, J. G., J. C. Rigtering, M. Hughes, S. Kraus, C. F. Cheng, and R. B. Bouncken. 2020. "Individual and Team Entrepreneurial Orientation: Scale Development and Configurations for Success." *Journal of Business Research* 112: 1–12.
Cowden, B. J., S. A. Creek, and J. D. Maurer. 2021. "Gender Role Congruity and Crowdfunding Success." *Journal of Small Business Management* 59: 134–52.
Cowden, B., M. Karami, J. Tang, W. Ye, and S. Adomako. 2023. "The Gendered Effects of Effectuation." *Journal of Business Research* 155: 113403.
Daily, C. M., P. P. McDougall, J. G. Covin, and D. R. Dalton. 2002. "Governance and Strategic Leadership in Entrepreneurial Firms." *Journal of Management* 28 (3): 387–412.
Darden, B. B., F. W. Kellermanns, and E. L. Best. 2022. "Entrepreneurial Fear of Failure: Transgender versus Cis-Gender Entrepreneurs." *Journal of Business Venturing Insights* 18: e00332.
Dams, C., V. Sarria Allende, M. Cornejo, R. A. Pasquini, and G. Robiolo. 2022. "Impact of Accelerators, as Education & Training Programs, on Female Entrepreneurs." *Entrepreneurship Research Journal* 12 (3): 329–62.
Davidsson, P., T. Baker, and J. M. Senyard. 2017. "A Measure of Entrepreneurial Bricolage Behavior." *International Journal of Entrepreneurial Behavior & Research* 23 (1): 114–35.
Dean, H., and J. Ford. 2017. "Discourses of Entrepreneurial Leadership: Exposing Myths and Exploring New Approaches." *International Small Business Journal* 35 (2): 178–96.
Deb, P., and J. Wiklund. 2017. "The Effects of CEO Founder Status and Stock Ownership on Entrepreneurial Orientation in Small Firms." *Journal of Small Business Management* 55 (1): 32–55.
De Clercq, D., E. Kaciak, and N. Thongpapanl. 2022. "Tacking into the Wind: How Women Entrepreneurs Can Sail through Family-To-Work Conflict to Ensure Their Firms' Entrepreneurial Orientation." *Entrepreneurship Research Journal* 12 (3): 263–98.
Del Carmen Triana, M., R. Song, C. T. Um, and L. Huang. 2024. "Stereotypical Perception in Management: A Review and Expansion of Role Congruity Theory." *Journal of Management* 50 (1): 188–215.
Desa, G., and S. Basu. 2013. "Optimization or Bricolage? Overcoming Resource Constraints in Global Social Entrepreneurship." *Strategic Entrepreneurship Journal* 7 (1): 26–49.
Di Domenico, M., H. Haugh, and P. Tracey. 2010. "Social Bricolage: Theorizing Social Value Creation in Social Enterprises." *Entrepreneurship Theory and Practice* 34 (4): 681–703.
Digan, S. P., G. K. Sahi, S. Mantok, and P. C. Patel. 2019. "Women's Perceived Empowerment in Entrepreneurial Efforts: The Role of Bricolage and Psychological Capital." *Journal of Small Business Management* 57 (1): 206–29.
DuBow, W., and Z. Wu. 2023. *NCWIT Scorecard: The Status of Women in Technology*. Boulder, CO: NCWIT.
Eagly, A. H. 1987. *Sex Differences in Social Behavior: A Social-Role Interpretation*. New York: Lawrence Erlbaum Associates, Inc.
Eagly, A. H. 1997. "Sex Differences in Social Behavior: Comparing Social Role Theory and Evolutionary Psychology." *American Psychologist* 52 (12): 1380–3.
Eagly, A. H., and S. J. Karau. 2002. "Role Congruity Theory of Prejudice toward Female Leaders." *Psychological Review* 109 (3): 573–98.
Eagly, A. H., and A. Mladinic. 1989. "Gender Stereotypes and Attitudes toward Women and Men." *Personality and Social Psychology Bulletin* 15: 543–58.

Eagly, A. H., and W. Wood. 1991. "Explaining Sex Differences in Social Behavior: A Meta-Analytic Perspective." *Personality and Social Psychology Bulletin* 17 (3): 306–15.

Engelen, A., V. Gupta, L. Strenger, and M. Brettel. 2015. "Entrepreneurial Orientation, Firm Performance, and the Moderating Role of Transformational Leadership Behaviors." *Journal of Management* 41 (4): 1069–97.

Entrialgo, M., and V. Iglesias. 2018. "Are the Intentions to Entrepreneurship of Men and Women Shaped Differently? The Impact of Entrepreneurial Role-Model Exposure and Entrepreneurship Education." *Entrepreneurship Research Journal* 8 (1): 20170013.

Fellnhofer, K., K. Puumalainen, and H. Sjögrén. 2016. "Entrepreneurial Orientation and Performance – Are Sexes Equal?" *International Journal of Entrepreneurial Behavior & Research* 22 (3): 346–74.

Fisher, G. 2012. "Effectuation, Causation, and Bricolage: A Behavioral Comparison of Emerging Theories in Entrepreneurship Research." *Entrepreneurship Theory and Practice* 36 (5): 1019–51.

Fisher, G., R. Stevenson, E. Neubert, D. Burnell, and D. Kuratko. 2012. "Entrepreneurial Hustle: Navigating Uncertainty and Enrolling Venture Stakeholders through Urgent and Unorthodox Action." *Journal of Management Studies* 57 (5): 1002–36.

Flabbi, L., M. Macis, A. Moro, and F. Schivardi. 2019. "Do Female Executives Make a Difference? The Impact of Female Leadership on Gender Gaps and Firm Performance." *The Economic Journal* 129 (622): 2390–423.

Flood, P. C., E. Hannan, K. G. Smith, T. Turner, M. A. West, and J. Dawson. 2000. "Chief Executive Leadership Style, Consensus Decision Making, and Top Management Team Effectiveness." *European Journal of Work & Organizational Psychology* 9 (3): 401–20.

GEM (Global Entrepreneurship Monitor). 2022. *Global Entrepreneurship Monitor 2021/2022 Global Report: Opportunity Amid Disruption*. London: GEM.

Ghosh, P. K., S. K. Ghosh, and S. Chowdhury. 2018. "Factors Hindering Women Entrepreneurs' Access to Institutional Finance-An Empirical Study." *Journal of Small Business & Entrepreneurship* 30 (4): 279–91.

Goktan, A. B., and V. K. Gupta. 2015. "Sex, Gender, and Individual Entrepreneurial Orientation: Evidence from Four Countries." *The International Entrepreneurship and Management Journal* 11: 95–112.

Grandy, G., and A. Culham. 2022. "Women-focused Entrepreneurial Support Organizations: Creating Change in Entrepreneurial Ecosystems through Building Gender Capital?" *Journal of Small Business and Entrepreneurship* 34 (5): 502–23.

Gupta, V. K., and D. B. Turban. 2012. "Evaluation of New Business Ideas: Do Gender Stereotypes Play a Role?" *Journal of Managerial Issues*: 140–56.

Gupta, V. K., A. M. Wieland, and D. B. Turban. 2019. "Gender Characterizations in Entrepreneurship: A Multi-level Investigation of Sex-role Stereotypes about High-growth, Commercial, and Social Entrepreneurs." *Journal of Small Business Management* 57 (1): 131–53.

Guvenen, F., G. Kaplan, and J. Song. 2014. *The Glass Ceiling and the Paper Floor: Gender Differences Among Top Earners, 1981–2012*. National Bureau of Economic Research. No. w20560.

Hahn, D., T. Minola, and K. A. Eddleston. 2019. "How Do Scientists Contribute to the Performance of Innovative Start-ups? An Imprinting Perspective on Open Innovation." *Journal of Management Studies* 56 (5): 895–928.

Hamilton, E. 2013. "The Discourse of Entrepreneurial Masculinities (And Femininities)." *Entrepreneurship & Regional Development* 25 (1–2): 90–9.

Hanson-Smith, Victor. 2023 In this issue. "How Radical Candor, Mindfulness, Compassion, and Authenticity Help Drive Verge's Scientific Innovation." *Verge Genomics*. https://verge-genomics-2020.squarespace.com/blog-all/how-radical-candor-mindfulness-compassion-and-authenticity-help-drive-verges-scientific-innovation.

Harman, H. H. 1976. *Modern Factor Analysis*. Chicago: University of Chicago Press.

Hausberg, J. P., and S. Korreck. 2020. "Business Incubators and Accelerators: A Co-citation Analysis-Based, Systematic Literature Review." *The Journal of Technology Transfer* 45: 151–76.

Hensellek, S., L. Kleine-Stegemann, and T. Kollmann. 2023. "Entrepreneurial Leadership, Strategic Flexibility, and Venture Performance: Does Founders' Span of Control Matter?" *Journal of Business Research* 157: 113544.

Hernández-Linares, R., M. C. López-Fernández, K. A. Eddleston, and F. Kellermanns. 2023. "Learning to Be Entrepreneurial: Do Family Firms Gain More from Female Leadership Than Nonfamily Firms?" *Strategic Entrepreneurship Journal* 17 (4): 971–1001.

Henry, C., L. Foss, and H. Ahl. 2016. "Gender and Entrepreneurship Research: A Review of Methodological Approaches." *International Small Business Journal* 34 (3): 217–41.

Henry, C., S. Coleman, B. Orser, and L. Foss. 2022. "Women's Entrepreneurship Policy and Access to Financial Capital in Different Countries: An Institutional Perspective." *Entrepreneurship Research Journal* 12 (3): 227–62.

Hmieleski, K. M., and L. D. Sheppard. 2019. "The Yin and Yang of Entrepreneurship: Gender Differences in the Importance of Communal and Agentic Characteristics for Entrepreneurs' Subjective Well-Being and Performance." *Journal of Business Venturing* 34 (4): 709–30.

Hou, F., M. D. Qi, Y. Su, X. X. Tan, and B. X. Yang. 2022. "Trickle-down Effects of Entrepreneurial Bricolage and Business Model Innovation on Employee Creativity: Evidence from Entrepreneurial Internet Firms in China." *Frontiers in Psychology* 12: 801202.

Howard, M. C., and A. Floyd. 2024. "Reassessing Passion and Perseverance as Dimensions of Individual Entrepreneurial Orientation: A Conceptual and Empirical Investigation into Theory and Measurement." *Entrepreneurship Research Journal* 14 (1): 89–120.

Hubner, S., B. Rudic, and M. Baum. 2023. "How Entrepreneur's Leadership Behavior and Demographics Shape Applicant Attraction to New Ventures: The Role of Stereotypes." *International Journal of Human Resource Management* 34 (11): 2137–72.

Hung, K. T., S. Banerjee, O. Nordstrom, C. Tangpong, Y. Li, and J. Li. 2023. "The Influence of Top Management's Strategic Planning Capacity and Entrepreneurial Orientation on Corporate Entrepreneurship." *Entrepreneurship Research Journal* 14 (4): 2001–28.

Ireland, R. D., J. G. Covin, and D. F. Kuratko. 2009. "Conceptualizing Corporate Entrepreneurship Strategy." *Entrepreneurship Theory and Practice* 33 (1): 19–46.

Jennings, J. E., and V. Tonoyan. 2022. "Research on Gender Stereotyping and Entrepreneurship: Suggestions for Some Paths Worth Pursuing." *Entrepreneurship Research Journal* 12 (3): 187–212.

Kacperczyk, O., P. Younkin, and V. Rocha. 2023. "Do Employees Work Less for Female Leaders? A Multi-Method Study of Entrepreneurial Firms." *Organization Science* 34 (3): 1111–33.

Kanter, R. M. 1977. "Some Effects of Proportion on Group Life: Skewed Sex Ratios and Responses to Token Women." *American Journal of Sociology* 82 (5): 965–90.

Kline, R. B. 2016. *Principles and Practice of Structural Equation Modeling*, 4th ed. New York: Guilford Press.

Kock, A., and H. G. Gemünden. 2021. "How Entrepreneurial Orientation Can Leverage Innovation Project Portfolio Management." *R & D Management* 51 (1): 40–56.

Kubberød, E., S. Jones, and I. B. Pettersen. 2021. "Learning to Not Belong: Entrepreneurial Learning Experiences of Women High-Tech Entrepreneurs." *International Journal of Entrepreneurial Behavior & Research* 27 (8): 1983–2008.

Kumar, N., L. Stern, and J. C. Anderson. 1993. "Conducting Interorganizational Research Using Key Informants." *Academy of Management Journal* 36 (6): 1633–51.

Kuratko, Donald F., Greg Fisher, and David B. Audretsch. 2021. "Unraveling the Entrepreneurial Mindset." *Small Business Economics* 57: 1681–91.

Kuschel, K., K. Ettl, C. Díaz-García, and G. Alsos. 2020. "Stemming the Gender Gap in STEM Entrepreneurship–Insights into Women's Entrepreneurship in Science, Technology, Engineering and Mathematics." *The International Entrepreneurship and Management Journal* 16 (1): 1–15.

Laguía, A., D. Wach, C. Garcia-Ael, and J. A. Moriano. 2022. ""Think Entrepreneur–Think Male": The Effect of Reduced Gender Stereotype Threat on Women's Entrepreneurial Intention and Opportunity Motivation." *International Journal of Entrepreneurial Behavior & Research* 28 (4): 1001–25.

Lauto, G., E. Salvador, and F. Visintin. 2022. "For what They Are, Not for what They Bring: The Signaling Value of Gender for Financial Resource Acquisition in Academic Spin-Offs." *Research Policy* 51 (7): 104554.

Lee, Y., Y. Zhuang, M. Joo, and T. J. Bae. 2019. "Revisiting Covin and Slevin (1989): Replication and Extension of the Relationship between Entrepreneurial Orientation and Firm Performance." *Journal of Business Venturing Insights* 12: e00144.

Leitch, C. M., and T. Volery. 2017. "Entrepreneurial Leadership: Insights and Directions." *International Small Business Journal* 35 (2): 147–56.

Leonard-Barton, D. 1992. "Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development." *Strategic Management Journal* 13 (S1): 111–25.

Lim, S., and B. R. Envick. 2013. "Gender and Entrepreneurial Orientation: A Multi-Country Study." *The International Entrepreneurship and Management Journal* 9: 465–82.

Liñán, F., I. Jaén, and D. Martín. 2022. "Does Entrepreneurship Fit Her? Women Entrepreneurs, Gender-Role Orientation, and Entrepreneurial Culture." *Small Business Economics* 58 (2): 1051–71.

Lo, J. Y., R. Nag, L. Xu, and S. D. Agung. 2020. "Organizational Innovation Efforts in Multiple Emerging Market Categories: Exploring the Interplay of Opportunity, Ambiguity, and Socio-Cognitive Contexts." *Research Policy* 49 (3): 103911.

Lomberg, C., D. Urbig, C. Stöckmann, L. D. Marino, and P. H. Dickson. 2017. "Entrepreneurial Orientation: The Dimensions' Shared Effects in Explaining Firm Performance." *Entrepreneurship Theory and Practice* 41 (6): 973–98.

Lumpkin, G. T., and G. G. Dess. 1996. "Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance." *Academy of Management Review* 21 (1): 135–72.

Lumpkin, J. R., and R. D. Ireland. 1988. "Screening Practices of New Business Incubators: The Evaluation of Critical Success Factors." *American Journal of Small Business* 12 (4): 59–81.

Lyons, T. S. 2022. "Introduction: Gender and Entrepreneurship." *Entrepreneurship Research Journal* 12 (3): 185–6.

Malmström, M., B. Burkhard, C. Sirén, D. Shepherd, and J. Wincent. 2024. "A Meta-Analysis of the Impact of Entrepreneurs' Gender on Their Access to Bank Finance." *Journal of Business Ethics* 192 (4): 803–20.

Marlow, S., and M. McAdam. 2012. "Analyzing the Influence of Gender upon High–Technology Venturing within the Context of Business Incubation." *Entrepreneurship Theory and Practice* 36 (4): 655–76.

Marlow, S., and M. McAdam. 2015. "Incubation or Induction? Gendered Identity Work in the Context of Technology Business Incubation." *Entrepreneurship Theory and Practice* 39 (4): 791–816.

Martin, L., L. Wright, Z. Beaven, and H. Matlay. 2015. "An Unusual Job for a Woman? Female Entrepreneurs in Scientific, Engineering and Technology Sectors." *International Journal of Entrepreneurial Behavior & Research* 21 (4): 539–56.

Mathias, B. D., D. W. Williams, and A. R. Smith. 2015. "Entrepreneurial Inception: The Role of Imprinting in Entrepreneurial Action." *Journal of Business Venturing* 30 (1): 11–28.

Maxheimer, M. M., and C. L. Nicholls-Nixon. 2022. "What Women Want (And Need) from Coaching Relationships during Business Incubation." *Journal of Small Business and Entrepreneurship* 34 (5): 548–77.

Michaelis, T. L., D. J. Scheaf, J. C. Carr, and J. M. Pollack. 2022. "An Agentic Perspective of Resourcefulness: Self-Reliant and Joint Resourcefulness Behaviors within the Entrepreneurship Process." *Journal of Business Venturing* 37 (1): 106083.

Miller, D. 1983. "The Correlates of Entrepreneurship in Three Types of Firms." *Management Science* 29 (7): 770–91.

Miller, L., and L. Lloyd-Reason. 2013. "The Interplay of Entrepreneurial Cognition and Internal Stakeholders." *International Journal of Entrepreneurship and Small Business* 19 (2): 276–91.

Mitchell, J. R., T. L. Israelsen, R. K. Mitchell, and D. S. Lim. 2021. "Stakeholder Identification as Entrepreneurial Action: The Social Process of Stakeholder Enrollment in New Venture Emergence." *Journal of Business Venturing* 36 (6): 106146.

Mui, R., O. Parker, and V. Titus Jr. 2022. "Merit versus Maleness: How Strategic Positioning Can Mitigate External Gender Bias." *Business Horizons* 65 (4): 427–36.

Mustafa, M., and L. Treanor. 2022. "Gender and Entrepreneurship in the New Era: New Perspectives on the Role of Gender and Entrepreneurial Activity." *Entrepreneurship Research Journal* 12 (3): 213–26.

Nicholls-Nixon, C. L., and M. M. Maxheimer. 2022. "How Coaching Services Help Early Stage Entrepreneurs: An Exploration of Gender Differences." *Journal of Small Business and Enterprise Development* 29 (5): 742–63.

Nyul, B., I. Ksenofontov, A. Fleischmann, and R. Kahalon. 2025. "Brilliance as Gender Deviance: Gender-Role Incongruity as Another Barrier to Women's Success in Academic Fields." *Journal of Experimental Social Psychology* 116: 104680.

Pittino, D., F. Visintin, and G. Lauto. 2017. "A Configurational Analysis of the Antecedents of Entrepreneurial Orientation." *European Management Journal* 35 (2): 224–37.

Piva, E., and P. Rovelli. 2023. "Applicant Attraction to New Ventures: The Combined Effects of Entrepreneurs' Physical Attractiveness and Gender." *Journal of Small Business Management* 62 (5): 2523–62.

Podsakoff, P. M., and D. W. Organ. 1986. "Self-reports in Organizational Research: Problems and Prospects." *Journal of Management* 12 (4): 531–44.

Poggesi, S., M. Mari, L. De Vita, and L. Foss. 2020. "Women Entrepreneurship in STEM Fields: Literature Review and Future Research Avenues." *The International Entrepreneurship and Management Journal* 16 (1): 17–41.

Powell, Erin E., and Ted Baker. 2014. "It'S What You Make of It: Founder Identity and Enacting Strategic Responses to Adversity." *Academy of Management Journal* 57 (5): 1406–33.

Rahman, S. A., M. M. D. Alam, G. M. Khan, and R. E. Kennedy. 2021. "Shaping Bricolage Behaviour: The Role of Personality Traits Among Female Entrepreneurs in an Emerging Economy." *International Journal of Emerging Markets* 18 (3): 525–46.

Rathino, Thiago, Alejandro Amezcua, Benson Honig, and Zhaocheng Zeng. 2020. "Supporting Entrepreneurs: A Systematic Review of Literature and an Agenda for Research." *Technological Forecasting and Social Change* 154: 119956.

Rauch, A., J. Wiklund, G. T. Lumpkin, and M. Frese. 2009. "Entrepreneurial Orientation and Business Performance: An Assessment of Past Research and Suggestions for the Future." *Entrepreneurship Theory and Practice* 33 (3): 761–87.

Renko, M., A. El Tarabishy, A. L. Carsrud, and M. Brännback. 2015. "Understanding and Measuring Entrepreneurial Leadership Style." *Journal of Small Business Management* 53 (1): 54–74.

Reyes, C., and H. Neergaard. 2023. "Feminist Perspectives on Gender and Technology Entrepreneurship in Incubator Settings." *International Journal of Gender and Entrepreneurship* 15 (1): 64–93.

Reypens, L., S. Bacq, and H. Milanov. 2021. "Beyond Bricolage: Early-Stage Technology Venture Resource Mobilization in Resource-Scarce Contexts." *Journal of Business Venturing* 36 (4): 106110.

Rice, M. P. 2002. “Co-production of Business Assistance in Business Incubators: An Exploratory Study.” *Journal of Business Venturing* 17 (2): 163–87.
Righetto, G. 2023. “Marriage Patterns and the Gender Gap in Labor Force Participation: Evidence from Italy.” *Labour Economics* 82: 102359.
Rudic, B., S. Hubner, and M. Baum. 2021. “Hustlers, Hipsters and Hackers: Potential Employees’ Stereotypes of Entrepreneurial Leaders.” *Journal of Business Venturing Insights* 15: e00220.
Rudman, L. A., and P. Glick. 2001. “Prescriptive Gender Stereotypes and Backlash toward Agentic Women.” *Journal of Social Issues* 57 (4): 743–62.
Rocha, V., and M. Van Praag. 2020. “Mind the Gap: The Role of Gender in Entrepreneurial Career Choice and Social Influence by Founders.” *Strategic Management Journal* 41 (5): 841–66.
Rosenbusch, N., A. Rauch, and A. Bausch. 2013. “The Mediating Role of Entrepreneurial Orientation in the Task Environment–Performance Relationship: A Meta-Analysis.” *Journal of Management* 39 (3): 633–59.
Senyard, J., T. Baker, P. Steffens, and P. Davidsson. 2014. “Bricolage as a Path to Innovativeness for Resource-Constrained New Firms.” *Journal of Product Innovation Management* 31: 211–30.
Shen, W., and D. L. Joseph. 2021. “Gender and Leadership: A Criterion-Focused Review and Research Agenda.” *Human Resource Management Review* 31 (2): 100765.
Stam, W., and T. Elfring. 2008. “Entrepreneurial Orientation and New Venture Performance: The Moderating Role of Intra-and Extraindustry Social Capital.” *Academy of Management Journal* 51 (1): 97–111.
Steffens, P. R., T. Baker, P. Davidsson, and J. M. Senyard. 2023. “When Is Less More? Boundary Conditions of Effective Entrepreneurial Bricolage.” *Journal of Management* 49 (4): 1277–311.
Stenholm, P., and M. Renko. 2016. “Passionate Bricoleurs and New Venture Survival.” *Journal of Business Venturing* 31: 595–611.
Stolze, H. J., and S. Slavova. 2022. “Gender and Ethnic Diversity in Startup Accelerators: An Examination of the US Startup Ecosystem.” *Small Business Economics* 59 (2): 427–49.
Sundermeier, J. 2024. “It Just Seems that They Don’t Act like Men’: The Influence of Gender Role Stereotypes on Women’s Entrepreneurial Innovation Activities.” *Journal of Business Research* 185: 114902.
Tang, J., W. Ye, M. Hu, S. X. Zhang, and S. A. Khan. 2024. “The Gendered Effect of Populism on Innovation.” *Journal of Business Venturing* 39 (4): 106393.
Tonoyan, V., R. Strohmeyer, and J. E. Jennings. 2020. “Gender Gaps in Perceived Start-Up Ease: Implications of Sex-Based Labor Market Segregation for Entrepreneurship across 22 European Countries.” *Administrative Science Quarterly* 65 (1): 181–225.
Trauth, E. M., and J. L. Quesenberry. 2023. “Introduction to the Handbook of Gender and Technology.” In *Handbook of Gender and Technology*, 1–21. Cheltenham: Edward Elgar Publishing.
Treanor, L., H. Noke, S. Marlow, and S. Mosey. 2021. “Developing Entrepreneurial Competences in Biotechnology Early Career Researchers to Support Long-Term Entrepreneurial Career Outcomes.” *Technological Forecasting and Social Change* 164: 120031.
Unioncamere Observatory on Women Entrepreneurship (2022): https://urly.it/3wn-9.
Vanacker, T., S. A. Zahra, and R. M. Holmes. 2021. “Corporate Entrepreneurship, Country Institutions and Firm Financial Performance.” *Journal of World Business* 56 (3): 101162.
Wales, W. J. 2016. “Entrepreneurial Orientation: A Review and Synthesis of Promising Research Directions.” *International Small Business Journal* 34 (1): 3–15.
Wales, W. J., J. G. Covin, and E. Monsen. 2020. “Entrepreneurial Orientation: The Necessity of a Multilevel Conceptualization.” *Strategic Entrepreneurship Journal* 14 (4): 639–60.

Wales, W., E. Monsen, and A. McKelvie. 2011. "The Organizational Pervasiveness of Entrepreneurial Orientation." *Entrepreneurship Theory and Practice* 35 (5): 895–923.

Wales, W. J., S. Kraus, M. Filser, C. Stöckmann, and J. G. Covin. 2021. "The Status Quo of Research on Entrepreneurial Orientation: Conversational Landmarks and Theoretical Scaffolding." *Journal of Business Research* 128: 564–77.

Wang, T., S. Thornhill, and J. O. De Castro. 2017. "Entrepreneurial Orientation, Legitimation, and New Venture Performance." *Strategic Entrepreneurship Journal* 11 (4): 373–92.

Weinzimmer, L. G., E. J. Michel, and J. Robin. 2021. "The Nature of Entrepreneurial Orientation Strength: The Impact of Shared Values on Firm Performance." *Journal of Management and Organization* 27 (4): 715–35.

Welter, F., and T. Baker. 2021. "Moving Contexts onto New Roads: Clues from Other Disciplines." *Entrepreneurship Theory and Practice* 45 (5): 1154–75.

Welter, F., M. Xheneti, and D. Smallbone. 2018. "Entrepreneurial Resourcefulness in Unstable Institutional Contexts: The Example of European Union Borderlands." *Strategic Entrepreneurship Journal* 12 (1): 23–53.

Wiklund, Johan, and Dean Shepherd. 2005. "Entrepreneurial Orientation and Small Business Performance: A Configurational Approach." *Journal of Business Venturing* 20 (1): 71–91.

Wu, G. 2022. Verge Genomics' Alice Zhang on a Young Biotech Founder's 'superpower' and Going from Target to Drug. Biopharmadive. https://www.biopharmadive.com/news/alice-zhang-verge-founder-biotechs-CEOs/634836/.

Wu, L., H. Liu, and J. Zhang. 2017. "Bricolage Effects on New-Product Development Speed and Creativity: The Moderating Role of Technological Turbulence." *Journal of Business Research* 70: 127–35.

Xiaobao, P., G. Rui, Z. Jiewei, and S. Xiaofan. 2022. "The Impact of Resource Bricolage on Entrepreneurial Orientation in Start-Ups: The Moderating Roles of TMT Heterogeneity and TMT Behavioral Integration." *Frontiers in Psychology* 13: 900177.

Yacus, A. M., S. E. Esposito, and Y. Yang. 2019. "The Influence of Funding Approaches, Growth Expectations, and Industry Gender Distribution on High-growth Women Entrepreneurs." *Journal of Small Business Management* 57 (1): 59–80.

Yang, S., R. Kher, and S. L. Newbert. 2020. "What Signals Matter for Social Startups? It Depends: The Influence of Gender Role Congruity on Social Impact Accelerator Selection Decisions." *Journal of Business Venturing* 35 (2): 105932.

Yu, X., and X. Wang. 2021. "The Effects of Entrepreneurial Bricolage and Alternative Resources on New Venture Capabilities: Evidence from China." *Journal of Business Research* 137: 527–37.

Yu, X., Y. Li, Z. Su, Y. Tao, B. Nguyen, and F. Xia. 2020. "Entrepreneurial Bricolage and its Effects on New Venture Growth and Adaptiveness in an Emerging Economy." *Asia Pacific Journal of Management* 37: 1141–63.

Zhang, A. 2024. Verge Genomics CEO: Why I Urge My Employees to Share Their Fears and Vulnerabilities – And Do the Same with Them. Fortune. https://fortune.com/2024/06/05/ceo-leadership-advice-management-success-vulnerability-verge-genomics/.

Zhao, E. Y., and L. Yang. 2021. "Women Hold up Half the Sky? Informal Institutions, Entrepreneurial Decisions, and Gender Gap in Venture Performance." *Entrepreneurship Theory and Practice* 45 (6): 1431–62.