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Governance Composition, Gender Diversity, and Regional Context as Performance Drivers in Italian Innovative Start-Ups

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ABSTRACT

Innovative start-ups play a crucial role in promoting innovation and economic growth, while also contributing to technological competitiveness. This study analyzes the factors influencing the economic performance of these start-ups, focusing on governance aspects and corporate resources, with particular attention to team composition, company size, and the impact of gender diversity. Additionally, it examines how sector and geographic location may affect access to resources, often linked to public policies and local innovation ecosystems. Using ordinary least squares (OLS) regression models on a sample of Italian start-ups, this article highlights how regional context and policies can represent either a competitive advantage or a barrier for firms. The results suggest that diverse governance, particularly gender diversity, which is associated with a more sustainable and long-term strategic approach, and location within developed entrepreneurial ecosystems can significantly improve business performance. These findings offer relevant insights for policymakers and entrepreneurs, contributing to a deeper understanding of the economic dynamics of innovative start-ups in the Italian context.

1 | Introduction

The economic growth and technological advancement in Italy have been significantly shaped by the rise of innovative start-ups, which act as a vital engine for generating and integrating knowledge into new products and services (Ghio et al. 2016). These high-tech enterprises, recognized under the Italian Startup Act established by Legislative Decree No. 221/2012, benefit from a supportive regulatory framework designed to promote their establishment and growth through various incentives, such as tax benefits and support for innovation investments (Cavallo et al. 2018). Choosing Italy as a research context is particularly compelling due to its status as a developed European economy marked by notable regional disparities—a dynamic, industrial North and a less developed South. This unique landscape provides an ideal setting to study how institutional frameworks and geographical factors interact to influence the success of innovative ventures. The Italian experience, underscored by explicit policy interventions like the Startup Act, offers valuable insights into the challenges of fostering a robust national innovation ecosystem amid significant internal inequalities. Operating primarily in advanced sectors, these innovative start-ups flourish within an institutional ecosystem that promotes collaboration among universities, research institutions, and private enterprises (Nicotra et al. 2018). This collaborative environment is further strengthened by mechanisms such as Technology Transfer Offices (TTOs), which bridge the gap between academic research and market application,

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facilitating the commercialization of academic innovations (Barra and Zotti 2018; Algieri et al. 2013). This introduction sets the stage for a deeper exploration of the dynamics surrounding Italian innovative start-ups and their impact on the broader economic and technological landscape. By understanding the unique challenges and opportunities faced by these start-ups, we can gain insights into their contributions to innovation, job creation, and competitiveness in an increasingly globalized market. Moreover, the geographical distribution of innovative start-ups across Italy reveals significant disparities that may affect their effectiveness in driving economic growth. Research shows that these firms predominantly cluster in larger urban areas of Northern Italy, where they benefit from a wealth of resources, including access to specialized talent and proximity to research institutions. This concentration not only enhances collaboration but also fosters a competitive environment that can expedite innovation cycles. However, this urban-centric model raises concerns about regional inequalities, as start-ups in less developed areas may struggle to achieve similar success without comparable support structures or incentives. Addressing these disparities is crucial to ensure that the benefits of innovation are more evenly distributed throughout the country, potentially enhancing national competitiveness and resilience in the face of global economic challenges. Targeted policies that support entrepreneurial ecosystems in underserved regions can help bridge this gap, empowering local talent and fostering innovation outside traditional hubs. The dynamics affecting start-up performance extend beyond national borders, with gender emerging as a critical factor. The underrepresentation of women in entrepreneurship and the unique challenges they face are significant concerns for policymakers and scholars worldwide. This study does not directly measure Corporate Social Responsibility (CSR) or Environmental, Social, and Governance (ESG) outcomes; however, analyzing gender-related differences in start-up performance is pertinent to broader policy discussions on inclusive and sustainable economic development. Notably, gender equality in entrepreneurship is a crucial pillar for long-term economic sustainability and innovation capacity. By exploring the factors that hinder or support female founders, this research enhances our understanding of creating more inclusive and sustainable economies, a fundamental element of the 2030 Agenda for Sustainable Development. In this context, factors such as the gender of the business leader, the size and composition of the management team, and the region in which the company operates emerge as key determinants of start-up economic performance, influencing variables like profitability and growth potential. Diverse founding teams that include gender diversity tend to perform better in competitive environments, while technically focused teams align with cooperative environments and innovation strategies. Beyond national and regional factors, gender has emerged as a key dimension in the analysis of start-up governance and performance, raising important questions about inclusiveness, sustainability, and access to entrepreneurial opportunities. Despite the extensive literature on gender diversity and start-up performance, including several studies focused on the Italian context, significant gaps persist. Current research primarily analyzes the gender-performance relationship independently, often omitting the combined influence of governance structures, regional diversity, and sectoral specialization. Additionally, most empirical evidence relies on reduced-form estimations that fail to consider the endogeneity among governance choices, firm resources, and performance outcomes. Consequently, it remains uncertain whether the observed effects of gender reflect true causal mechanisms or are merely influenced by correlated structural factors. This study aims to fill these gaps by examining gender, governance, regional context, and sectoral characteristics within a coherent analytical framework. It leverages the institutional consistency provided by the Italian Startup Act while also addressing notable regional disparities through an instrumental variable approach.

The Italian context serves as an important empirical setting for examining the relationship between governance composition, gender diversity, and start-up performance. Unlike many other European nations, Italy offers robust institutional support for innovative start-ups through the Startup Act, while simultaneously facing persistent structural challenges, such as regional economic disparities and a significant gender gap in entrepreneurship. This combination of advanced policy instruments and structural constraints makes Italy an ideal setting for studying the interaction between governance characteristics, gender diversity, and institutional and territorial factors. Additionally, the pronounced North–South divide enables us to explore how a single national regulatory framework yields diverse outcomes across various regional ecosystems, providing insights that can be applied to other countries with similar internal territorial inequalities.

The paper is organized as follows: Section 1 introduces the topic; Section 2 presents the literature review and the research questions development; Section 3 illustrates the data set used; Section 4 describes the methodology employed; Section 5 presents and illustrates the empirical results; Section 6 presents the discussion of the results; Section 7 concludes the paper, highlighting the limitations and the implications of the research as well as future research directions.

2 | Literature Review and Research Questions

The literature on innovative start-ups is extensive, highlighting their vital role in technological advancement and economic competitiveness. Innovative start-ups are defined by their ability to merge new ideas with practical solutions, transforming scientific and technological knowledge into valuable products or services (Ghio et al. 2016). In Italy, the Italian Startup Act has significantly impacted this sector by offering tax incentives and facilitating access to venture capital, thereby promoting the growth of knowledge-intensive start-ups (Cavallo et al. 2018). These companies often emerge in cutting-edge fields such as biotechnology, artificial intelligence, and renewable energy, and they follow a specific lifecycle that encompasses various stages, each presenting unique challenges and opportunities (Schumpeter 1989; Passaro et al. 2020). The lifecycle begins with ideation, where start-ups concentrate on researching and developing innovative concepts, often in collaboration with academic institutions or research centers. This phase heavily relies on intellectual capital and the intensive use of knowledge resources, typically supported by partnerships with public entities or universities (Algieri et al. 2013). During the startup phase, companies formalize their structure and actively seek funding to facilitate growth. Attracting investors and gaining support

from local institutions are critical for overcoming common early-stage hurdles, including limited financial resources and managerial experience.

As start-ups progress to the growth phase, their focus shifts to expanding production capacity and capturing market share. During this stage, they encounter significant challenges related to resource management and business scalability. Numerous studies have shown that access to adequate infrastructure and a robust entrepreneurial ecosystem is essential for sustaining growth (Barra and Zotti 2018). Eventually, start-ups may reach a maturity stage where they solidify their market position and could transition into innovative SMEs. In this phase, maintaining consistent innovation is crucial for ensuring long-term sustainability (Frenken et al. 2007). It has been identified eight types of competitive advantages considered success factors: innovation, entrepreneurship, resources, competence, intellectual capital, sustainable development, content management, and information advantages. Additionally, it has been suggested that differences exist between catching-up and more developed EU Member States. This study is primarily based on Upper Echelons Theory (Hambrick and Mason 1984), which suggests that the characteristics of top decision-makers can partially predict organizational outcomes. In innovative start-ups, founding teams and top managers are particularly crucial, as strategic decisions, resource allocation, and growth trajectories tend to be highly centralized and less influenced by established organizational routines. Within this framework, factors such as gender, team composition, and governance structure are anticipated to impact firm performance by shaping strategic orientation and managerial choices. To enhance this perspective, the study incorporates a contextualized Resource-Based View (Barney 1991), which explains how managerial characteristics affect performance based on the availability and configuration of firm-specific resources. Additionally, regional and sectoral dimensions are considered contextual factors that influence the effectiveness of managerial decisions, rather than serving as independent theoretical frameworks.

2.1 | Influence of Gender on Start-Up Performance

The literature has extensively examined the impact of gender diversity on start-up performance, providing valuable insights into the different approaches of male- and female-led businesses. Numerous studies have demonstrated that gender-diverse leadership teams are linked to higher returns on assets (ROA), returns on equity (ROE), and overall financial success (Maji and Saha 2021; Imes et al. 2024). Female-led start-ups often adopt more sustainable business models that prioritize employee well-being and promote CSR (Colombelli et al. 2024; Justo et al. 2015). Research has also explored how gender diversity in senior management influences environmental performance, revealing that companies with more women in leadership roles tend to achieve better environmental outcomes (Burkhardt et al. 2020; Aladwan et al. 2025; Graafland 2020). Tenner and Hörisch (2021) and Rehman et al. (2020) found that gender diversity within entrepreneurial teams is crucial for meeting both ecological and economic objectives in environmental entrepreneurship. Østergaard et al. (2011) highlighted that diversity in gender and educational background significantly enhances a firm's innovative capabilities. In the context of start-ups, this diversity fosters the development of more creative solutions to environmental and social challenges. The presence of women in key leadership roles may also enhance strategic orientation toward ESG goals (Sarhan et al. 2025; Arayakarnkul et al. 2022). Diverse teams are better equipped to avoid groupthink and to identify market opportunities for sustainable products that homogeneous teams might miss (Dezsö and Ross 2012). Indeed, gender diversity in founding teams can provide a competitive advantage by introducing a broader range of perspectives and skills, which contributes to more balanced management and improved adaptability to market dynamics (Dai et al. 2018). Fairlie and Robb (2009) also noted that female entrepreneurs typically secure less financial funding than their male counterparts, despite demonstrating strong managerial efficiency. Their study was significant for examining performance in relation to both sector and gender. Additionally, research by Demartini (2018) revealed that female entrepreneurs often focus on sectors with substantial social impact, such as technology, software, and scientific research—fields historically dominated by men. Today, women's educational attainment is comparable to men's and has even increased in traditionally male-dominated STEM disciplines (science, technology, engineering, and mathematics). From a scientific perspective, the phenomenon of female-led start-ups underscores a lack of contributions to the corporate governance of these ventures (Paoloni and Modaffari 2018). Only one study (Ebersberger and Pirhofer 2011) addresses company management, identifying the academic approach of women as a success factor for large female-led start-ups. However, the literature indicates that female entrepreneurs frequently encounter significant barriers, such as limited access to financing networks and fewer professional contacts (Demartini 2018). Welsh et al. (2016) and Neill et al. (2015) found that many women who own start-ups often face business challenges alone, without robust support networks. Gender biases, including benevolent sexism, can influence the evaluation of start-ups (Ewens and Townsend 2020), leading both male and female investors to favor male-dominated teams or express skepticism toward female-led ventures (Nguyen et al. 2023). These limitations can hinder the growth of female-led start-ups, which generally navigate more significant challenges than their male counterparts. Despite these obstacles, some studies suggest that female-led start-ups in Italy, particularly in sectors like consulting and professional services, perform well financially and can overcome the structural limitations faced by many Italian SMEs (Taferner and Leitner 2025; Guzmán and Kacperczyk 2019). The literature indicates that enhancing female participation in start-up leadership could foster more inclusive and sustainable growth in the sector (Demartini 2018). Gender diversity affects start-up performance through various interconnected mechanisms, influencing strategic orientation, innovation, and fundraising outcomes, while also being shaped by gender stereotypes and biases in investor evaluations (Nguyen et al. 2023). These dynamics suggest that promoting gender diversity in start-up management not only advances social equity but also enhances the overall performance and resilience of emerging ventures (Guzmán and Kacperczyk 2019). The existing literature highlights the role of gender in corporate governance, emphasizing how gender diversity can influence strategic decisions and economic performance in firms (Taferner and Leitner 2025; Guzmán and Kacperczyk 2019). Specifically, gender diversity is often associated with

more prudent management and a greater focus on long-term sustainability, traits that may lead to improved economic outcomes for companies (Colombelli et al. 2024). Previous studies have offered valuable insights into gender differences in entrepreneurial performance, but they often overlook how gender simultaneously interacts with governance structures, sectoral dynamics, and regional ecosystems within a single national institutional framework. Additionally, the causal relationships among these factors remain underexplored due to potential endogeneity issues. This study addresses these limitations by employing a multilevel and causally oriented empirical strategy.

RQ1. *How does gender diversity within the founding teams of innovative start-ups affect their economic performance?*

2.2 | Influence of Management Team Composition and Size on Start-Up Performance

The composition of a startup's management team, including its size and diversity, is crucial for the venture's performance. Research has explored various aspects of team composition (Debrulle et al. 2021), such as team size, functional diversity (Eesley et al. 2014), and heterogeneity (Wang et al. 2017), as well as the alignment of team characteristics with the firm's strategy and environment. Smaller teams are generally more agile and efficient in decision-making, which can be beneficial in the early stages of a startup. However, as startups grow, larger teams may be better equipped to handle the increasing complexity of operations (Forbes et al. 2006). Teams with greater tenure can effectively transfer complementary human capital, positively impacting the performance of both parent companies and their spin-outs. As startups expand, founders might increase their teams in ways that enhance homogeneity and reinforce established processes. While this can foster internal cohesion, it may also limit the introduction of diverse perspectives, underscoring the need to balance complementary skills with team diversity (Hernandez et al. 2018). Startups with larger teams often experience improved sales and funding performance, largely due to increased market visibility, access to diverse talents, and expanded networks that attract more investor interest (Gloor et al. 2020). A larger top management team can capitalize on opportunities by leveraging a wealth of knowledge and skills that support strategic decision-making and operational efficiency (Eisenhardt 2013). Additionally, larger teams can enhance innovative and well-rounded decision-making processes. Diverse top management teams (TMTs) positively influence startup performance by incorporating varied perspectives that promote creativity and effective problem-solving (Wang et al. 2017). However, it is essential to find a balance, as excessively large teams can face coordination challenges and communication breakdowns that hinder decision-making (Qian 2018). In this context, team diversity is particularly vital, as research indicates that teams with diverse backgrounds often exhibit higher levels of innovation and creativity (Chen et al. 2023). Mousa (2024) emphasizes that team diversity significantly impacts performance in high-tech startups, suggesting that unique perspectives enhance problem-solving and product development. Bouncken et al. (2016) note that team diversity influences cohesion and communication, fostering an environment conducive to innovation. Furthermore, the backgrounds of management team members are critical for attracting the financial resources necessary for startup growth. Beckman et al. (2007) demonstrate that diverse experiences, especially those arising from different prior affiliations, significantly increase a startup's chances of securing venture capital funding. Overall, a startup's performance is heavily influenced by the size and structure of its management team. An optimal team size and composition can provide a strategic advantage, leading to enhanced market performance through innovation, adaptability, and efficient resource utilization.

RQ2. *How does the composition and size of the management team influence start-up performance?*

2.3 | Influence of Industry on Start-Up Performance

The sector in which an innovative start-up operates is a critical factor for its success. Start-ups in high-tech industries, such as biotechnology, nanotechnology, and artificial intelligence, require substantial investments in research and development and often need privileged access to advanced scientific knowledge to stay competitive (Barra and Zotti 2018; Neffke et al. 2011). These sectors are marked by rapid technological advancements and fierce global competition, necessitating continuous updates in skills and production capabilities. Research indicates that start-ups in these fields benefit more from public policies that support the adoption of existing technologies rather than those focused on developing new inventions (Colombo et al. 2012; Capozza et al. 2020). Moreover, a supportive entrepreneurial ecosystem, which includes incubators and accelerators, is vital for the success of high-tech start-ups, as it provides access to strategic resources and industrial partners. Cavallo et al. (2018) found that incubating initiatives and industrial districts significantly contribute to new venture creation and support the positive impact of urbanization economies and industry specialization over diversification for innovative start-ups. Colombelli et al. (2023) noted that digital knowledge spillovers and digital skill endowment are essential for the establishment of digital innovative start-ups. The rapid spread of digital technologies has opened up new avenues for innovative entrepreneurship, which is crucial for job creation and socio-economic growth. Therefore, exploring the conditions that foster digital innovative start-ups is vital for formulating effective support policies. In summary, the factors that describe the local availability of digital knowledge, particularly regarding digital technologies, play a central role in the establishment of digital innovative start-ups at the provincial level. Despite facing significant challenges, the Italian innovation ecosystem is actively working to overcome these obstacles. In this context, the emerging global concept of Open Innovation could be instrumental. Italia Start-up is actively promoting this new wave of innovation by supporting the Italian start-up ecosystem. This approach is particularly relevant to R&D management, which, along with adequate training at all corporate levels, is now considered a key foundation for the technological revival of the Italian economy (Barilli 2015). The sector in which start-ups operate remains a crucial consideration. High-tech industries, such as biotechnology and information technology, require significant investments in research and development, as continuous innovation is vital for long-term sustainability.

An entrepreneurial orientation in these sectors can greatly influence a start-up's capacity to innovate, thereby enhancing its economic performance (Helm et al. 2010). Conversely, less technologically advanced sectors can also benefit from innovation, albeit often through more incremental processes.

RQ3. *Do innovative start-ups operating in different sectors exhibit significant differences in economic performance?*

2.4 | Influence of Region on Start-Up Performance

The territorial context is another critical factor influencing the success of innovative start-ups. Northern Italian regions, equipped with advanced entrepreneurial ecosystems and developed infrastructure, offer greater networking opportunities and access to financial resources compared to southern regions, where start-ups face more obstacles and limited institutional support (Balata et al. 2016; Fasano et al. 2023). Local public policies also play an essential role, with initiatives aimed at supporting entrepreneurial development through funding and incentives, particularly in high-tech sectors such as IT and biotechnology, where technology transfer provides a competitive advantage (Ramaciotti and Rizzo 2017; Neffke et al. 2011). Regional factors, such as ecosystem maturity and regulatory environments, also play a crucial role in shaping start-up success (Fahreza et al. 2024; Antonietti and Gambarotto 2018). Recent studies indicate that regions with advanced innovation ecosystems, such as Lombardy and Emilia-Romagna, provide better growth opportunities for start-ups due to the presence of universities, research centers, and robust infrastructure (Fasano et al. 2023). These regions foster a conducive environment for technology transfer and collaboration with other companies, enhancing access to financial and knowledge resources (Balata et al. 2016). In contrast, southern Italian regions have less developed entrepreneurial ecosystems, characterized by limited public and private funding and a lower density of professional networks. These challenges hinder southern start-ups' ability to access strategic resources, thereby diminishing their chances of success. Local public policies can play a vital role in addressing these disparities by promoting the establishment of incubators and offering targeted incentives to attract investors and talent to southern Italy. The necessity of tailoring policies toward entrepreneurship and innovation is particularly pressing given the unique conditions of Southern European economies. In response, various initiatives have been launched globally to stimulate entrepreneurship. For example, in 2012, the Italian government enacted new legislation to monitor innovative start-ups and provide specific supportive measures. By the latter half of 2016, the Italian Chamber of Commerce's special section for innovative start-ups had registered over 6000 such enterprises, primarily in the hi-tech sector (Cavallo et al. 2018). The literature also underscores how regional context can significantly impact access to capital and resources, directly influencing start-ups' ability to grow and succeed (Fasano et al. 2023). As noted by Ramaciotti and Rizzo (2017), the availability of structured public funding enables start-ups to navigate the initial development stages more effectively, resulting in more sustainable and rapid growth. However, this situation is closely tied to the varying regional policies in effect. The specific role of regional context in shaping the economic performance of innovative start-ups remains an open question that warrants further empirical investigation.

RQ4. *How does the regional context in which an innovative start-up operates influence its economic performance?*

3 | Sample and Data

Using the AIDA (Analisi Informatizzata delle Aziende) database, managed by Bureau van Dijk, a leading global provider of financial information specialized in the collection and storage of economic-financial data on Italian companies, an initial sample of 12,781 innovative start-ups located across Italy was identified. After a structured data-cleaning process using R software, the initial dataset of 12,781 innovative start-ups was refined for consistency and reliability. Specifically, firms with missing or unavailable values (NA or "n.b.") in at least one key variable—such as financial performance indicators (ΔREV, ROA, EBITDA Margin) or core governance variables (board size, gender of the leader, number of employees)—were excluded. Additionally, observations with anomalous or implausible financial values were identified as outliers and removed based on distribution criteria. As a result, the final sample comprised 5669 innovative start-ups. This reduction in sample size was driven solely by data availability and quality requirements, rather than firm performance or observable characteristics, thus minimizing potential selection bias. Most variables in the dataset were formatted as "character," meaning that most numerical values would have been interpreted by the software as strings. For this reason, we performed a mass conversion of these variables into numeric values, while categorical variables were simply converted into factors. From the AIDA database, the relevant variables were extracted for analysis in the following sections. Among the most significant variables are those related to sector (industry), geography (region), and gender. Particular attention was given to the gender of the highest-ranking figure on the board of directors within each start-up, focusing specifically on the board composition. In the context of region, the study expanded upon the studies by Sciarelli et al. (2021), which analyzed university spin-offs in Southern Italy and across Italy by grouping them into three clusters: North, Center, and South, while we have categorized with respect to all 20 Italian regions. Given the high number of innovative start-ups included, we found a sector-related issue. There were over 500 sectors present, rendering sectoral analysis meaningless. Additionally, most of these sectors appeared in the dataset only once or twice. Consequently, we identified the top 20 sectors by the number of observations and grouped the rest under the "Others" category. Although this variable is not analytically meaningful, as it represents over 400 very different sectors, it is of fundamental importance, as it will be used in regression models to avoid multicollinearity issues. It will serve as a reference variable to obtain coefficients for the top 20 sectors. After this initial grouping, we proceeded by grouping the top 20 sectors into five macro-sectors to ensure a more generalized and less specific analysis. The macro-sectors are:

- Production and Online Trade.
- Consulting and Professional Services.
- IT Services and Software Products.

- Marketing, Web Portals, and Training Courses.
- Research and Development and Design.

The sector grouping was not based on predefined classifications found in the literature. Instead, given the presence of over 500 distinct ATECO codes in the dataset, we chose to focus on the 20 most represented sectors, which together accounted for over 71.92% of all observations. The remaining less frequent sectors were aggregated into a single residual category. Notably, the top 20 sectors aligned naturally with the five macro-sectors identified in the analysis, as they explicitly referred to areas such as consulting, research and development, or production.

4 | Methodology

This study utilizes OLS regression models to examine the impact of independent variables on the economic performance of innovative Italian start-ups, following the approach of Sciarelli et al. (2021). The dependent variables analyzed include revenue growth (ΔREV), EBITDA Margin (EM), and Return on Assets (ROA), which were transformed using the asinh function to enhance data distribution and mitigate the effects of outliers (Myers 1990). The independent variables comprise governance indicators like management team size (N_EX) and the leader's gender (GEN); economic variables such as total assets (TA), intangible assets (IA), and Total Equity (TE); and contextual variables including sector (SECTOR) and geographic region (REGION). Furthermore, interactions between key variables, such as gender and macro-sectors, were examined to reveal their combined effects.

The regression model follows the general formula:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \epsilon$$

where Y represents the dependent variable (ΔREV, EM, or ROA), X_k are the independent variables, β_k are the estimated coefficients, β_0 is the intercept, and ϵ is the error term. To identify the most significant models, a stepwise procedure with backward elimination was adopted, progressively removing nonsignificant variables (p-value > 0.05) until an optimal model was obtained.

The stepwise approach is employed due to the exploratory nature of the study and the numerous potential explanatory variables, including governance, economic, sectoral, and regional dimensions. Estimating a fully saturated model risks overfitting and decreased interpretability, especially when multicollinearity exists among firm-level controls. The backward stepwise procedure facilitates the identification of a concise and interpretable model by retaining only those variables that significantly contribute to explaining start-up performance. This method is commonly used in empirical research on entrepreneurship and firm performance to isolate key drivers from a wide array of candidate variables (Henderson and Denison 1989; Myers 1990; Sciarelli et al. 2021).

The combined use of OLS regression and the stepwise procedure ensures a robust and detailed analysis of the determinants of economic performance, in line with the aim of this study to understand the influence of governance, economic, and contextual variables on the performance of start-ups, identifying the factors that promote growth and economic sustainability. If this does not ensure robustness, following the OLS estimation, this study applies robustness checks to verify the possible presence of endogeneity in some explanatory variables. Endogeneity occurs when one or more regressors are correlated with the error term, potentially due to omitted variables, measurement errors, or simultaneity between dependent and independent variables. This violation of the classical OLS assumptions leads to biased and inconsistent estimates, compromising the reliability of causal interpretations.

To address this issue, the two-stage least squares (2SLS) method is adopted. This approach enhances the robustness of the analysis by mitigating endogeneity bias, especially relevant in studies involving governance characteristics and firm-level financial performance, where simultaneity or omitted variable bias is often a concern.

4.1 | Variables

To ensure comparability with previous studies (Sciarelli et al. 2021), we utilized proxy measures that align with existing literature. We employed dichotomous and ratio measures for both dependent and independent variables, along with specific transformations for variables exhibiting high distributional skewness. In selecting our variables, we focused on endogenous factors relevant to innovative start-ups, such as the size of the management team and the number of employees. We also included commonly used economic controls from prior research, including total assets, debts, net equity, patents held by the start-up, and company age. Additionally, we analyzed the gender of the prominent board member and considered the start-up's sector and region to assess how these factors impact the economic and financial performance of the start-ups.

4.1.1 | Dependent Variables

Due to the high skewness in the financial performance variables, an inverse hyperbolic sine (asinh) transformation was applied to achieve a more balanced distribution of the variables, including ΔREV (Delta Revenues), EBITDA Margin (EM), and Return on Assets (ROA). Financial data from innovative start-ups often exhibit strong asymmetry and include both positive and negative values, which limits the use of traditional logarithmic transformations. Unlike the logarithmic function, which is undefined for zero and negative values, the asinh transformation can accommodate the full range of data while maintaining a log-like interpretation for large magnitudes. This transformation reduces the impact of extreme values, enhances the symmetry of the distributions, and improves the reliability and stability of regression estimates. The asinh function behaves similarly to the natural logarithm for large positive values but is well-defined around zero and for negative values, making it particularly suitable for start-up performance data marked by high

variability and frequent losses (Myers 1990). The asinh function is defined as:

$$\text{asinh}(x) = \ln\left(x + \sqrt{x^2 + 1}\right)$$

This means it can compress extremely large values, making them easier to manage. Unlike the logarithm, the asinh function can be applied to all values, including negative and zero, making it useful for datasets with skewed distributions or negative values. Additionally, the asinh transformation reduces the impact of outliers and compresses wide variations in magnitude, making data more manageable for statistical analysis and modeling. To represent the economic success of Italian innovative start-ups, in this study we used three different measures:

Market-Based Measure: To represent revenue growth (ΔREV [Delta Revenues]), calculated as the difference between the last and the second-to-last year of activity. This approach is widely used to measure economic growth in terms of revenue variation (Weinzimmer et al. 1998) expressing it as the difference between two time periods.

Operating Profitability Measure: EM (EBITDA Margin) was used as an indicator of the operating profitability of start-ups, representing the ratio between EBITDA and total revenue.

Accounting Profitability Measure: ROA (Return on Assets), calculated as the ratio of operating income to the company's total assets, to assess how efficiently start-ups use their resources (Woo et al. 1992). This indicator reflects the company's ability to generate income relative to the assets employed.

4.1.2 | Independent Variables

Governance and control variables are fundamental to understanding how innovative start-ups operate and grow, directly influencing their ability to thrive in a competitive environment. Specifically, governance variables are essential elements of a company's decision-making and organizational structure. Among these, *N_EX*, the total number of board members in the start-ups, reflects the size of the governance team.

Another key governance element is *GEN*, the gender of the governance team leader, which affects gender diversity in corporate management. Empirical studies have shown that greater gender diversity on the board can foster more balanced and innovative decisions (Taferner and Leitner 2025; Guzmán and Kacperczyk 2019), improving the start-ups' ability to respond to market challenges. In particular, gender is a categorical variable, divided into two categories: male (M) and female (F). EMP represents the number of employees in the start-up, related to the organization's ability to manage human resources and support growth.

4.1.3 | Control Variables

Turning to control variables, *TA (total assets)* represents the overall economic value of the start-up. This variable, measured using a logarithmic transformation to compensate for data skewness, is fundamental for understanding the company's financial capacity and economic stability. Total assets are commonly used to analyze the financial resources of companies and compare their economic growth.

Similarly, *IA (intangible assets)* are a crucial indicator, reflecting investments in intellectual property such as patents, trademarks, and know-how. As reported in the literature, intangible assets can be a reliable indicator of R&D expenditure (Barron et al. 2002; Lev 2000).

MA (material assets) includes physical assets such as buildings and machinery, which constitute the tangible assets of the start-up. These assets are essential for supporting production operations, especially in industrial sectors that require advanced physical infrastructure, such as Manufacturing and Trade.

TE (total equity) represents the difference between the start-up's assets and liabilities, indicating its overall financial health. Positive net worth suggests a solid financial structure, while negative net worth may signal economic difficulties.

PATENTS (number of patents) is a direct indicator of a company's innovation capability. A high number of patents is often synonymous with strong innovation capacity, protecting the company's inventions and creating competitive advantages in the market (Shane 2001).

CR (receivables) and *DB (debts*) provide additional information on the company's financial management, respectively referring to receivables that the start-up has yet to collect and the total accumulated debts. These two elements are closely related to the start-up's ability to maintain a sound financial balance and to sustain its operations with prudent capital management.

Finally, the *variable YEARS*, representing the age of the start-up since its founding, was included as an indicator of longevity and business maturity, as younger start-ups tend to be more vulnerable than established ones.

The last two control variables, *REGION and SECTO*R, are categorical and describe the geographic region and the economic sector in which the start-up operates. REGION includes 20 categories representing the Italian regions, while SECTOR is divided into six categories derived from the 2007 ATECO classification, used to distinguish different industrial sectors. This classification is widely recognized and used in Italy to segment economic activities and provide a more precise framework for the sectoral distribution of companies. Table 1 provides a detailed overview of all variables used, with a brief description and measurement index for each.

5 | Results

Understanding the structure and key patterns of the data is essential in research, as it forms the basis for interpreting analytical results and gaining meaningful insights. Accordingly, the descriptive analysis and data visualization offered an initial overview of the sample characteristics, providing valuable context for the subsequent regression analysis. This method aligns with previous studies highlighting the importance of exploring

TABLE 1 | Definition of variables.

Variables	Descriptions	Measures
Performance variables		
ΔREV	Measure of startup revenue growth compared to the second-to-last available year in €	asinh
EM	EBITDA/Revenues, measures the operating profitability of start-ups	asinh
ROA	EBIT/assets, measures the efficiency with which start-ups use resources to generate revenue	asinh
Governance variables		
N_EX	Total number of members on the board of startups, represents the size of the governance team.	Nr.
GEN	Gender of the leader of the governance team, influencing gender diversity in corporate management.	Factor with 2 levels
EMP	Number of employees of the start-up, related to organizational structure and internal management capacity.	Nr.
Control variables		
TA	Total assets, an indicator of the total economic value of the start-up.	Log
IA	Value of intangible assets such as patents and other intellectual property.	Value
MA	Value of physical assets such as buildings or machinery, indicating the tangible assets of the enterprise.	Value
PATENTS	Number of patents held by the start-up	Nr.
CR	Total accounts receivable	Value
TE	Total Equity of the company, which is the difference between assets and liabilities.	Value
DB	Total debts of the start-up	Value
YEARS	Age of the start-up	Nr.
SECTOR	Industrial sector	Factor with 6 levels
REGION	Geographical region	Factor with 20 levels

Source: Authors' elaboration.

the dataset to identify potential biases, trends, or anomalies that could impact the robustness of the results.

5.1 | Descriptive Statistics

In this chapter, the main numerical variables of the dataset, both dependent and independent, will first be analyzed statistically (Table 2). Next, a series of graphs will be presented to illustrate the correlation between the key variables. Table 2 below presents descriptive statistics for the numerical variables, showing the mean, median, standard deviation, minimum, and maximum values. Most variables are expressed in thousands of euros, except for EBITDA Margin and ROA, which are expressed in percentages, and for the number of employees (EMP), board members (N_EX), and YEARS, which are expressed in units.

For the variable ΔREV, a significant variation can be observed between the minimum and maximum values, highlighting a high dispersion in revenue growth among start-ups. Despite the median being relatively low (€17,000), the very high maximum (€23,343,000) and the substantial standard deviation (€504.92 thousand) indicate that a minority of companies achieved considerable revenue growth, while the majority of firms are closer to modest or negative values. The negative mean and very low minimum value (−996.93%) of EM (EBITDA Margin) indicate that many start-ups are operating with substantial operational inefficiencies. The positive median (8.16%) shows that at least half of the companies manage to maintain a positive operating margin, although the high standard deviation reflects significant variability. ROA shows a negative mean (−6.903%), which points to a low capacity among firms to generate income relative to their assets. The median (0.650%) indicates that half of the companies achieved positive ROAs; however, the low standard deviation compared to the value scale suggests a strong concentration around a small group of companies with very negative performance.

5.2 | Analysis of the Results

In this study, we analyzed the economic performance of innovative startups using OLS regression to understand the influence

TABLE 2 | Descriptive statistics.

Variables	Minimum	Median	Mean	Maximum	Standard deviation
REV	−3356	17	98.96	23,343	504.92
EM	−996,93	8,16	−35,1	482,04	147,65
ROA	−925,660	0,650	−6903	192,31	38,87
N_EX	1	1	1.773	26	0.38
EMP	0	1	2.087	164	4.95
TA	1	158	487.2	57,086	1304.84
IA	0	17	110.9	6413	307.26
MA	0	2	52.28	8151	265.09
PATENTS	0	0	4.5	2260	61.49
CR	0	42	168.1	29.602	654.00
TE	−2621	38	182.1	41.770	810.74
DB	0	81	279.1	21.298	734.79
YEARS	2	3	3.347	5	1.29

Source: Authors' elaboration.

of independent variables. We developed three distinct models, each targeting a different dependent variable: Revenue Delta, ROA, and EBITDA Margin. These models included governance and control factors, as outlined in Table 1, to test the validity of three hypotheses related to revenue growth, profitability, and operational performance.

To identify the most effective models, we employed a stepwise procedure (Sciarelli et al. 2021) with backward elimination, which removes variables based on their statistical significance. This method effectively reduces model complexity while retaining only those variables that significantly impact startup performance. Backward stepwise elimination is widely recognized in the literature as an optimal model selection technique (Henderson and Denison 1989; Myers 1990).

In line with the study's objectives, we added combinations of control variables to each model to analyze their collective impact, focusing on significant independent variables such as gender, region, industry sector, and governance factors like the number of employees. The OLS results are presented in Table 3. The variable TA (Total Assets) has a positive and highly significant effect on revenue growth (TA: 0.668; $p < 0.001$), which contrasts with findings from some studies, including Sciarelli et al. (2021). Conversely, other economic variables such as IA (Intangible Assets) and TE (Total Equity) demonstrate negative and significant effects on revenue (IA: −0.001; $p < 0.001$, TE: −0.0003; $p < 0.001$).

The estimated coefficient for female leadership (GEN_F = 1.35, p) indicates that female-led start-ups exhibit an increase of about 1.35 units in asinh-transformed revenue growth compared to male-led firms, consistent with Demartini (2018). Considering the highly skewed revenue distribution in the sample, this reflects a significant and economically meaningful difference in growth trajectories.

However, interactions between female gender and various macrosectors tend to be negative. For instance, in the Marketing, Web Portals, and Training Courses sectors, the interaction with female gender negatively impacts revenue growth (GEN_F: Marketing Macrosector: −2.299; $p < 0.001$), as do other sectors such as Research and Development and Design (GEN_F: R&D and Design Macrosector: −1.339; $p < 0.05$). Notably, the Consulting and Professional Services sector, used as the reference category, exhibits relatively positive outcomes for female gender compared to other sectors.

The analysis of regional variables reveals significant disparities across Italian regions. While no variables were significant after applying the stepwise approach, it is noteworthy that northern regions, like Veneto, show negative and significant coefficients regarding revenue growth for startups led by women as company size increases (GEN_F: Veneto Region: −0.434; $p < 0.05$), indicating greater challenges than in regions like Abruzzo (the reference category). Additionally, the coefficient for Female Gender in Emilia-Romagna is highly negative and significant (GEN_F: Emilia-Romagna Region: −0.820; $p < 0.001$).

In the OLS regression model, with ROA (Table 4), it can be observed that TA (Total Assets) emerges as one of the most significant variables (being strongly correlated with ROA), with a positive effect on ROA (TA: 0.336; $p < 0.001$), consistent with what was observed in the model for ΔREV and with findings reported by Sciarelli et al. (2021). On the other hand, the variables IA (Intangible Assets) and TE (Total Equity) show (with lesser significance) a negative and significant effect on ROA (IA: −0.002; $p < 0.001$). The number of board members (N_EX) has a significant negative effect on ROA (N_EX: −0.245; $p < 0.001$). Sector analysis shows significant and somewhat contrasting results. In particular, the Marketing and Web Portals and Production and Trade sectors show a significant negative impact on ROA (SET_Marketing

TABLE 3 | OLS linear regression model (stepwise backward approach).

Variables	MODEL 1 Dependent variable *Δ REV*	MODEL 2 Dependent variable *Δ REV*
Governance variables		
N_EX	0.058	0.058
GEN_F	1.148	1.353*
EMP	0.003	0.108***
Control variables		
TA	0.646 ***	0.668***
IA	−0.001***	−0.001***
MA	−0.001**	−0.001*
PATENTS	−0.001	—
CR	0.000	—
TE	−0.0003***	−0.0003***
DB	0.000	—
YEARS	−0.554***	−0.542***
GEN_F:EMP:Basilicata	−0.159	
GEN_F:EMP:Calabria	−0.735	—
GEN_F:EMP:Campania	−0.338	—
GEN_F:EMP:Emilia-Romagna	−0.820***	—
GEN_F:EMP:Friuli-Venezia G.	−0.680	—
GEN_F:EMP:Lazio	−0.153	—
GEN_F:EMP:Liguria	0.227	—
GEN_F:EMP:Lombardia	−0.237	—
GEN_F:EMP:Marche	0.252	—
GEN_F:EMP:Molise	−0.055	—
GEN_F:EMP:Piemonte	−0.691	—
GEN_F:EMP:Puglia	−0.646	—
GEN_F:EMP:Sardegna	0.119	—
GEN_F:EMP:Sicilia	−0.378	—
GEN_F:EMP:Toscana	−0.527	—
GEN_F:EMP: Trentino-Alto A.	0.015	—
GEN_F:EMP:Umbria	−0.508	—
GEN_F:EMP:Valle d'Aosta	—	—
GEN_F:EMP:Veneto	−0.434*	—
GEN_F:Marketing &Web	−2.247**	−2.299***
GEN_F:Prod. & Commercio	−1.526	−1.528*
GEN_F:R&D e Design	−1.304*	−1.339*
GEN_F:Servizi IT & Softw.	−1.430*	−1.417
GEN_F: Other Sectors	−1.282*	−1.282*

(Continues)

TABLE 3 | (Continued)

Variables	MODEL 1 Dependent variable *Δ REV*	MODEL 2 Dependent variable *Δ REV*
RSE	3.561	3.569
R^2	0.118	1.102
R^2 _Adjusted	0.103	0.099
F-Statistic	7.706***	35.55***

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Source: Authors' elaboration.

& Web: −0.667; $p < 0.01$, SET_Production and Trade: −1.037; $p < 0.001$). In contrast, the Consulting and Professional Services sector (reference category) seems to represent an exception, where startups perform better. Regional results show significant disparities, with regions such as Lombardy and Piedmont presenting negative and significant coefficients (REG_Lombardy: −1.191; $p < 0.001$, REG_Piedmont: −1.155; $p < 0.001$), in contrast to some southern regions such as Campania and Calabria, which show positive coefficients, although not all of them are significant.

In the OLS regression model on EBITDA Margin (Table 5), interesting results emerge, very similar to the ROA analysis. The negative coefficient linked to board size suggests that adding one more board member is associated with a decrease of about 0.25 units in ROA and 0.32 units in EBITDA margin. This indicates that coordination and monitoring costs significantly affect the operating efficiency of innovative start-ups.

However, the variable related to the gender of the leader (GEN_F) does not show significant results, unlike other analyses where gender diversity had a more significant impact (Demartini 2018). TA (Total Assets) continues to emerge as one of the most influential variables, with a positive effect on EBITDA Margin (TA: 0.356; $p < 0.001$). However, the nature of investments in intangible assets (IA) seems to have a more pronounced negative impact on EBITDA Margin than on ROA (IA: −0.001; $p < 0.001$). Another noteworthy aspect is the impact of Total Equity (TE) and Debts (DB) on EBITDA Margin (TE: −0.0002; $p < 0.05$; DB: −0.0007; $p < 0.001$). Although these variables were already critical in the ROA analysis, their impact is even more negative on EBITDA Margin. Sectoral analysis confirms that startups in the "Marketing & Web" and "Production and Trade" sectors face significant challenges in maintaining high operational margins (SET_Marketing & Web: −0.855; $p < 0.01$; SET_Production and Trade: −1.322; $p < 0.001$), and this impacts EBITDA Margin more than ROA. Regional disparities for EBITDA Margin show similar results to those observed for ROA, with regions such as Lombardy and Piedmont continuing to present significant negative coefficients (REG_Lombardy: −1.258; $p < 0.001$; REG_Piedmont: −1.320; $p < 0.01$).

In addition, we undertook a series of steps to ensure the reliability of the estimates. Initially, we employed an OLS regression to estimate the coefficients; however, we suspected that some of the independent variables might be endogenous, meaning they could be correlated with the model's error term. Endogeneity can arise when independent variables are influenced by unobserved factors, leading to biased and inconsistent OLS estimates. To formally test for endogeneity, we applied the Wu–Hausman test, which compares the OLS and instrumental variables (IV) estimates. The test returned a statistically significant result (p-value = 0.0125), confirming the presence of endogeneity in our model. Therefore, OLS estimates would not have been consistent, providing strong justification for the use of an IV approach. In constructing the instrumental variable (IV) model, we identified N_EX, TA, and EMP as potentially endogenous due to simultaneity and reverse causality concerns. The instrument set includes firm-level characteristics related to innovation and capital structure (IA, MA, PATENTS, CR, TE, DB), as well as sectoral and regional controls (REGION, SECTOR), which are plausibly correlated with governance and firm scale but not directly with short-term performance outcomes once firm characteristics are accounted for. Instrument relevance was assessed through first-stage *F*-statistics, which consistently exceed conventional thresholds (N_EX: $F = 22.174$; TA: $F = 35{,}797.491$; EMP: $F = 109.067$), indicating that weak instrument concerns are unlikely. To evaluate instrument validity, we conducted tests for overidentifying restrictions. Although the Sargan test (Sargan statistic = 189.909, p-value $< 2e{-}16$) rejects the null hypothesis of full instrument exogeneity, this finding should be approached cautiously due to the relatively large number of instruments and the Sargan test's known sensitivity in overidentified models. Notably, the Wald test (Wald statistic = 17.01, p-value = 5.413e−11) confirms the joint significance of the fitted endogenous regressors in the second stage, reinforcing the relevance of the instrumental variable specification. Therefore, the 2SLS estimates should be viewed as robustness checks that address endogeneity concerns, rather than as definitive causal estimates. As the next step, we plan to strengthen the robustness of our analysis by implementing fixed effects models. Specifically, we will employ a two-stage least squares regression with fixed effects (2SLS) to control for any unobserved, time-invariant heterogeneity at the firm level, further ensuring the reliability of our results. The first-stage regressions as shown in Table 6 indicate that female governance (GEN_F) is significantly associated with a reduction in firm size indicators. Specifically, firms led by women show a reduction of 0.276 in the number of board members ($p < 0.001$), 0.095 in total assets ($p < 0.05$), and 0.308 in number of employees

TABLE 4 | OLS linear regression model with ROA (stepwise backward approach).

Variables	Model 1 Dependent variable *ROA*	Model 2 Dependent variable *ROA*
Governance variables		
N_EX	−0.245***	−0.245***
GEN_F	0.037	—
EMP	0.001	—
Control variables		
TA	0.339***	0.336***
IA	−0.002***	−0.002***
MA	0.000	—
PATENTS	0.001	—
CR	0.001***	0.001***
TE	0.0003	
DB	−0.0005***	−0.0005***
YEARS	0.005	—
REG_Basilicata	0.370	0.378
REG_Calabria	0.420	0.433
REG_Campania	0.466	0.470
REG_Emilia-Romagna	−0.370	−0.368
REG_Friuli-Venezia G.	−0.282	−0.289
REG_Lazio	−0.561	−0.556
REG_Liguria	−0.654	−0.654
REG_Lombardia	−1.195***	−1.191***
REG_Marche	−0.218	−0.221
REG_Molise	0.224	0.243
REG_Piemonte	−1.155***	−1.155***
REG_Puglia	−0.033	−0.033
REG_Sardegna	−0.195	−0.193
REG_Sicilia	0.391	0.398
REG_Toscana	−0.487	−0.484
REG_Trentino-Alto A.	−0.782*	−0.785*
REG_Umbria	−0.223	−0.223
REG_Valle d'Aosta	−0.374	−0.370
REG_Veneto	−0.413	−0.407
SET_Marketing &Web	−0.669**	−0.667**
SET_Prod. & Commercio	−1.037***	−1.037***
SET_R&D e Design	−0.140	−0.141
SET_Servizi IT & Softw.	−0.245	−0.247
SET_Other Sectors	−0.554**	−0.553**
RSE	3.03	3.028
R^2	0.094	0.093
R^2_Adjusted	0.088	0.088
F-Statistic	16.62***	20.01***

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Source: Authors' elaboration.

($p < 0.05$), suggesting that gender plays a meaningful role in shaping the structural dimensions of startups. Control variables such as intangible assets (IA) and debt (DB) exhibit consistently positive and highly significant effects across all three endogenous variables. For example, a one-unit increase in DB is associated with an increase of 0.373 in N_EX, 0.801 in TA, and 2.066 in EMP (all $p < 0.001$). This confirms that financial leverage is closely tied to firm expansion capacity. Regionally, firms in Lombardia and Veneto display significantly higher board sizes (+0.523 and +0.440, respectively) and total assets, while Southern regions like Calabria and Sicilia exhibit strong negative associations with the number of employees (−1.452 and −0.817, respectively), pointing to territorial asymmetries. In terms of sector, IT and Software services show a positive association with employees (+0.640; $p < 0.01$), reinforcing the importance of digital industries in job creation.

In the second stage (Table 7), the fitted values from the first-stage regressions are used to estimate the impact on performance outcomes. The number of employees (fitted_EMP) shows a positive and significant effect on all three metrics: +0.114 on sales growth ($p < 0.01$), +0.327 on EBITDA margin ($p < 0.001$), and +0.292 on ROA ($p < 0.01$). This indicates that expanding the workforce leads to significant performance improvements, underscoring the crucial role of human capital in scaling innovative ventures. In contrast, total assets (fitted_TA) have a negative association: −0.193 on sales growth (weakly significant), −0.314 on EM ($p < 0.05$), and −0.477 on ROA ($p < 0.01$), suggesting diminishing returns or inefficiencies related to capital intensity. The number of board members (fitted_N_EX) positively influences sales growth (+0.385; $p < 0.05$), but negatively affects EM and ROA (−2.409 and −1.661, respectively, both $p < 0.001$), highlighting the possible cost or coordination burden of larger governance bodies.

TABLE 5 | OLS linear regression model on EBITDA margin (stepwise backward approach).

Variables	Model 1 Dependent variable *EM*	Model 2 Dependent variable *EM*
Governance variables		
N_EX	−0.318***	−0.327***
GEN_F	0.181	—
EMP	−0.016	—
Control variables		
TA	0.356***	0.350***
IA	−0.001***	−0.001***
MA	0.0001	—
PATENTS	0.0002	—
CR	0.001***	0.001***
TE	−0.0002*	−0.0002**
DB	−0.001***	- 0.001***
YEARS	0.179***	0.179***
REG_Basilicata	0.873	0.904
REG_Calabria	0.430	0.437
REG_Campania	0.565	0.559
REG_Emilia-Romagna	−0.386	−0.382
REG_Friuli-Venezia G.	−0.144	−0.137
REG_Lazio	−0.491	−0.482
REG_Liguria	−0.806	−0.803
REG_Lombardia	−1.258***	−1.257***
REG_Marche	−0.362	−0.350
REG_Molise	0.135	0.130
REG_Piemonte	−1.320**	−1.319**
REG_Puglia	0.162	0.160
REG_Sardegna	−0.003	−0.001
REG_Sicilia	0.422	0.425
REG_Toscana	−0.314	−0.309
REG_Trentino-Alto A.	−0.659	−0.670
REG_Umbria	0.076	0.074
REG_Valle d'Aosta	−0.073	−0.058
REG_Veneto	−0.570	−0.566
SET_Marketing &Web	−0.855**	−0.863**
SET_Prod. & Commercio	−1.322***	−1.319***
SET_R&D e Design	−0.317	−0.303
SET_Servizi IT & Softw.	−0.276	−0.298
SET_Other Sectors	−0.656**	−0.653**
RSE	3.889	3.888
R^2	0.084	0.084
R^2 _Adjusted	0.079	0.079
F-Statistic	14.9***	16.71***

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Source: Authors' elaboration.

6 | Discussion of the Results

6.1 | Governance and Firm Performance

The analysis underscores the pivotal role of governance structure and firm size in influencing the economic performance of innovative start-ups. The economic control variables—Total Assets (TA), Intangible Assets (IA), and Total Equity (TE)—demonstrate consistent effects across the estimated models, suggesting that resource availability supports business development. However, the results indicate that start-ups may struggle to convert both tangible and intangible investments into short-term performance gains. This finding somewhat contrasts with Sciarelli et al. (2021), who report a negative relationship between total assets and revenue growth in university spin-offs in Southern Italy, suggesting that excessive resources can hinder efficiency in certain contexts. In terms of governance structure, the findings reveal that increasing the size of the management board does not necessarily lead to improved firm performance. Larger governance teams may create coordination challenges, slow decision-making processes, and diminish organizational agility, ultimately jeopardizing start-up survival. This evidence aligns with previous research highlighting the trade-off between managerial capacity and coordination costs in young firms (Qian 2018; Eisenhardt 2013). Overall, the effectiveness of governance appears to rely more on the quality and coherence of managerial decisions than on the mere expansion of governance structures.

6.2 | Gender and Start-Up Performance

The results demonstrate a positive correlation between female leadership and start-up performance, particularly regarding profitability and sustainability. Female-led start-ups often employ strategic approaches that favor lower risk tolerance and a

TABLE 6 | 2SLS linear regression model first stage, with instrumental variables IV: N_EX, TA, EMP.

Instrumental variables	N_EX	TA	EMP
Governance variables			
GEN_F	−0.276***	−0.095*	−0.308*
Control variables			
IA	0.0003***	0.001***	0.002***
MA	−0.0002**	0.0004***	−0.001***
PATENTS	0.00001	0.0001	−0.001
CR	−0.0002***	−0.0002***	0.001***
TE	0.0003***	0.0002***	0.0014***
DB	0.0003***	0.001***	0.002***
Valle d'Aosta	0.696	−0.555	−2.077
Basilicata	0.109	−0.086	−1.021
Calabria	−0.053	−0.181	−1.452**
Campania	0.0342	0.093	−0.562
Emilia-Romagna	0.378**	0.209	−0.960*
Friuli-Venezia G.	0.556**	0.028	−1.418**
Lazio	0.203	−0.024	−1.128**
Liguria	0.576***	−0.042	−1.309*
Lombardia	0.523***	0.303**	−1.064**
Marche	0.394*	0.078	−0.988*
Molise	0.053	−0.179	−0.459
Piemonte	0.518***	0.079	−1.365***
Puglia	0.0005	−0.087	−0.983*
Sardegna	0.258	−0.008	−0.588
Sicilia	0.171	−0.078	−0.817*
Toscana	0.507***	0.048	−1.168**
Trentino-Alto A.	0.546***	0.238	−0.625
Umbria	0.225	0.001	−0.907
Veneto	0.439***	0.115	−1.488***
Marketing and Web	−0.165	−0.136	0.086
Servizi IT & Software	−0.114	0.011	0.640**
Other sectors	−0.180*	0.213**	0.106
Prod. and Commercio	−0.338**	−0.032	−0.284
R&D e Design	−0.067	0.091	−0.572*
Years	−0.067	0.173***	0.280***
RSE	1.365	1.163	3.902
R^2	0.118	0.399	0.382
R^2_Adjusted	0.108	0.396	0.378
F-Statistic	22.106***	117.2***	109.1***

Note: $*p < 0.05$; $**p < 0.01$; $***p < 0.001$.
Source: Authors' elaboration.

focus on long-term goals, prioritizing organizational stability, employee well-being, and sustainable value creation over short-term financial gains. These findings align with previous research indicating that gender diversity in founding teams promotes prudent management and long-term sustainability, ultimately enhancing economic performance (Colombelli et al. 2024; Guzmán and Kacperczyk 2019; Taferner and Leitner 2025). Additionally, female-led start-ups show a stronger alignment with ESG objectives, supporting earlier evidence that women in leadership roles encourage socially responsible strategies and stakeholder-oriented governance (Justo et al. 2015; Sarhan et al. 2025). Despite this study not directly observing ESG outcomes, prior literature suggests that the strategic orientation often linked to female leadership—characterized by long-term planning, risk aversion, and stakeholder awareness—may indirectly foster more sustainable business practices.

This broader strategic focus may enhance resilience and sustainable growth, particularly in uncertain and competitive environments. However, the analysis also reveals ongoing structural disadvantages for female entrepreneurs. The initial stage of the 2SLS estimation indicates that female-led firms typically have leaner governance structures, fewer employees, and lower asset endowments, reflecting challenges related to access to financial capital, investor trust, and entrepreneurial networks. While OLS estimates suggest a weaker gender effect, the 2SLS approach addresses endogeneity, confirming that gender-related disparities are not entirely endogenous to firm performance. This reinforces the robustness of the observed relationship between gender and performance.

6.3 | Regional Context and Performance

The territorial dimension significantly influences start-up performance, revealing patterns that partially diverge from established literature. While Northern Italian regions are typically linked to stronger entrepreneurial ecosystems, better resource access, and higher success rates (Fasano et al. 2023), our findings indicate that certain Southern regions—such as Abruzzo, Calabria, and Campania—provide relatively favorable conditions for female-led start-ups. However, analysis of EBITDA Margin shows that operating profitability remains lower in these Southern areas, likely due to ongoing structural challenges

TABLE 7 | 2SLS linear regression model second stage, with independent variables IV: N_EX, TA, EMP.

Instrumental variables	ΔREV	EM	ROA
fitted_N_EX	0.385*	−2.409***	−1.660***
fitted_TA	−0.193	−0.313*	−0.476***
fitted_EMP	0.114**	0.327***	0.291***
R^2	0.008	0.040	0.039
Adjusted R^2	0.008	0.039	0.038
F-statistic	16.26***	78.95***	76.7***

Note: $*p<0.05$; $**p<0.01$; $***p<0.001$.
Source: Authors' elaboration.

related to resource management, infrastructure quality, and market access. This contrasts with previous studies that report a much higher likelihood of success for firms in Northern Italy, suggesting that regional disparities are more complex than previously thought. One potential explanation is the relatively young innovative start-up ecosystem in Southern Italy, which has recently benefited from targeted public policies, tax incentives, and funding programs designed to encourage entrepreneurship. These initiatives may create early-stage advantages that are not yet fully reflected in profitability metrics but could have long-term impacts as investments in research and development progress. Additionally, the interaction between gender and region, particularly evident in the 2SLS estimates, indicates that geography independently limits organizational capacity, with female-led firms in Southern regions facing compounded disadvantages.

6.4 | Sectoral Differences in Performance

Sectoral heterogeneity is a crucial factor influencing start-up performance. The findings indicate that start-ups in marketing, production, and trade face significant challenges in achieving positive economic outcomes, likely due to fierce competition, narrow profit margins, and limited opportunities for differentiation. Female-led start-ups in these sectors are particularly at risk, as resource limitations may hinder their capacity to cope with competitive pressures. This contrasts with previous research suggesting that enhanced marketing and digital engagement can positively impact financial performance (Sciarelli et al. 2020; Tetrevova et al. 2019). Conversely, the consulting and professional services sector presents a substantial growth opportunity, particularly for female entrepreneurs. The sector's flexibility, lower capital intensity, and increasing demand for specialized knowledge-based services align with existing literature that highlights its potential for innovative start-ups. Furthermore, the 2SLS results indicate stronger and more consistent sectoral effects than the OLS estimates. Notably, IT and digital services demonstrate a positive relationship with employment structures, indicating lower capital requirements and a greater reliance on human capital. These trends are less pronounced in OLS models, suggesting that endogeneity may obscure sector-specific dynamics when governance and performance are considered together.

6.5 | Methodological Insights: OLS Versus 2SLS Estimates

The comparison of OLS and 2SLS estimations reveals key methodological insights into the factors influencing start-up performance. OLS results indicate positive relationships between firm size, assets, and performance. However, the 2SLS approach, which accounts for endogeneity and reverse causality, alters the interpretation of these connections. In particular, while total assets seem advantageous in OLS models, the 2SLS findings show that they may correlate with weaker or even negative performance effects, suggesting that excessive capital intensity can lead to inefficiencies in young firms. In contrast, employment levels are identified as a strong driver of profitability and growth in the second stage of the 2SLS model, emphasizing the critical importance of human capital in scaling innovative start-ups. Unlike OLS estimates, which may inflate coefficients due to simultaneity bias, the instrumental approach offers a more reliable causal interpretation. Overall, the 2SLS methodology indicates that some factors typically linked to performance may be overstated in simpler models, while others—such as workforce expansion—are essential for achieving sustainable success.

7 | Conclusions and Implications

The results of this study reveal several important implications for Italian start-ups and their supporters, including investors, policymakers, and institutions. From a broader perspective, the Italian case provides insights that extend beyond national borders. Countries with uneven regional development and ongoing gender imbalances in entrepreneurship may experience similar dynamics, making our findings relevant for policymakers and scholars focused on fostering inclusive and territorially balanced innovation systems.

The negative correlation observed with board size (N_EX) suggests that larger governance teams can impede the speed and efficiency of decision-making. Start-ups are advised to maintain lean boards composed of members with complementary skills, avoiding excessive numbers that could hinder business dynamics. A streamlined governance structure can facilitate quicker decision-making and greater adaptability in competitive environments. The literature indicates that women tend to adopt leaner board compositions, with studies suggesting performance measures tailored to these sizes, particularly since female-led businesses are often smaller than those led by men (Robb and Watson 2012). Additionally, the positive correlation with Total Assets (TA) and net worth highlights that start-ups with a solid capital foundation can operate more efficiently and tackle operational challenges more effectively. Thus, start-ups should prioritize strengthening their capital structure through targeted investments and rigorous capital management strategies. For investors, this implies that supporting start-ups with robust capital resources can enhance the likelihood of long-term success.

The 2SLS model offers a more nuanced interpretation of governance and firm structure effects on performance by addressing endogeneity. While OLS may overstate the advantages of larger

boards or total assets due to omitted variable bias, the 2SLS results indicate that these features could actually be linked to reduced profitability or operational efficiency once endogeneity is controlled. The Marketing and Web and Production and Commerce sectors appear particularly vulnerable to low operating profit margins, indicating a need for more aggressive strategies to improve margins or explore new business models. Start-ups in these sectors should consider expanding into niche markets or integrating high-value-added services to mitigate structural challenges.

Interestingly, start-ups in Southern Italy, such as those in Calabria and Campania, show signs of positive growth compared to their counterparts in traditionally more advantageous northern regions. This presents an opportunity to continue investing in regional development policies that promote innovation and support start-ups, as less developed areas can serve as fertile ground for entrepreneurship. While the study did not reveal significant differences in economic performance between male-led and female-led start-ups—aside from a slight revenue growth advantage for female-led ones—the literature indicates that women often face greater challenges in accessing funding. From a policy perspective, the lack of significant performance differences suggests that support measures for female-led start-ups should not be based on the assumption of higher returns. Instead, they should focus on addressing ongoing structural barriers related to access to capital, networks, and scaling opportunities. The inclusion of a 2SLS model reinforces the interpretation of these dynamics by addressing potential endogeneity that may have skewed relationships within the OLS framework. Unlike OLS, the 2SLS results clarify the causal effects of governance and structural characteristics on performance. For example, what appeared as a neutral or slightly positive impact of female governance in OLS reveals itself as a more complex structural feature in the 2SLS framework, where women-led start-ups tend to be associated with smaller, leaner organizations and more cautious financial profiles—factors that do not necessarily translate into higher performance but reflect systemic barriers. Similarly, the perceived advantage of larger boards in the OLS analysis disappears when simultaneity is considered, emphasizing that agility and cohesion in decision-making may be more critical than sheer size. These findings underscore the need for institutional efforts to eliminate structural constraints—especially those affecting access to capital for female entrepreneurs—and to adopt policies that cater to the diverse needs of start-ups across regions and sectors. Introducing dedicated financing tools for female entrepreneurs is recommended to dismantle structural barriers and promote greater equity in growth opportunities. The study finds a positive correlation between female leadership and enhanced start-up performance characterized by sustainability, resilience, and comprehensive definitions. This has two significant implications. First, from a scientific perspective, it calls for a reevaluation of current theoretical models. Gender diversity should be viewed not as a social peripheral factor but as a central strategic element influencing strong ESG outcomes. This perspective connects Upper Echelons theory with the resource-based view of the firm, challenging the narrow focus on purely financial success metrics. Second, practically, this evidence provides a compelling, data-driven call to action for key ecosystem players. Investors and venture capitalists should incorporate gender metrics into their due diligence processes as indicators of prudent risk management and long-term value. Founders are encouraged to build diverse leadership teams as a strategic imperative for fostering innovation and attracting talent.

7.1 | Limitations and Further Research

This study acknowledges several methodological and data-related limitations. First, it relies on a registry-based sample, which may introduce reporting biases and fails to capture informal governance practices or strategic decisions not documented in official records. Second, firm performance is evaluated over a relatively short observation period using accounting-based indicators, which may not adequately reflect long-term value creation, especially for early-stage and innovation-driven start-ups. Third, governance characteristics are assessed using broad proxies that overlook qualitative elements such as leadership style, managerial abilities, or internal decision-making processes. Lastly, while the stepwise modeling approach is appropriate for exploratory analysis, it may impact model stability and the robustness of variable selection. The use of accounting-based performance indicators like EBITDA margin and ROA offers only a limited view of economic performance. This limitation is particularly significant for early-stage start-ups that often focus on research and development investments and may not achieve immediate financial returns. Consequently, their long-term growth potential and innovation-driven value creation might be underestimated. Future research should consider broader performance measures, including innovation outcomes, human capital development, and international market expansion. This study exclusively examines financial performance indicators, meaning any implications related to CSR or ESG dimensions should be viewed as indirect and exploratory. The findings are intended to identify potential avenues for future research rather than provide direct empirical evidence on the relationship between CSR, ESG practices, and firm performance.

Additionally, the exclusive focus on quantitative data neglects qualitative factors that may clarify performance differences among start-ups. Aspects such as corporate culture, leadership style, and the quality of human capital are critical governance dimensions that can significantly impact innovation capacity and organizational resilience. Future studies should integrate qualitative or mixed-method approaches to gain deeper insights into how internal governance dynamics shape economic and social outcomes. The study does not consider the professional and educational background of the highest-ranking individual within the firm, despite evidence suggesting that managerial experience and academic training influence strategic orientation, decision-making processes, and risk management capabilities (Sciarelli et al. 2021). Including variables related to leadership backgrounds could enhance the understanding of start-up success dynamics. Furthermore, the emphasis on traditional sectors may restrict the generalizability of the findings to emerging industries such as green technologies, biotechnology, or fintech, which have unique innovation trajectories, regulatory environments, and investment cycles. Future research should investigate how governance structures and performance drivers vary across sectors with different levels of technological intensity and sustainability orientation.

Finally, although the model accounts for regional differences within Italy, a more detailed analysis of local contexts could provide additional insights. Local economic conditions, access to financial resources, and the availability of support infrastructures, such as incubators, accelerators, and TTOs, are crucial in shaping start-up performance. Future studies should incorporate ecosystem-level variables to better understand the interactions between start-ups, governance structures, and regional environments.

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Data Availability Statement

Data will be made available on request.

References

Aladwan, M., H. Samara, O. Alsinglawi, A. A. Elamer, and M. W. Moustafa. 2025. "Do Women on Boards Drive Corporate Sustainability? Evidence From the European Union." *Corporate Social Responsibility and Environmental Management* 32: 1–17.

Algieri, B., A. Aquino, and M. Succurro. 2013. "Technology Transfer Offices and Academic Spin-Off Creation: The Case of Italy." *Journal of Technology Transfer* 38, no. 4: 382–400.

Antonietti, R., and F. Gambarotto. 2018. "The Role of Industry Variety in the Creation of Innovative Start-Ups in Italy." *Small Business Economics* 54: 561–573.

Arayakarnkul, P., P. Chatjuthamard, and S. Treepongkaruna. 2022. "Board Gender Diversity, Corporate Social Commitment and Sustainability." *Corporate Social Responsibility and Environmental Management* 29, no. 5: 1706–1721.

Balata, M., G. Mandras, and E. Tola. 2016. "Innovation Policies, Start-Up Companies and Support Entities." *European Journal of Innovation Management* 24, no. 1: 2–23.

Barilli, F. 2015. "Italia Startup Association: The Italian Startup Ecosystem." *Symphonya. Emerging Issues in Management* 3: 87–93.

Barney, J. B. 1991. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17: 99–120.

Barra, C., and R. Zotti. 2018. "The Contribution of University, Private and Public Sector Resources to Italian Regional Innovation System (In) Efficiency." *Journal of Technology Transfer* 43: 432–457.

Barron, O., D. Byard, C. Kile, and E. Riedl. 2002. "High-Technology Intangibles and Analysts "Forecasts"." *Journal of Accounting Research* 40, no. 2: 289–312.

Beckman, C., M. Burton, and C. O'Reilly. 2007. "Early Teams: The Impact of Team Demography on Vc Financing and Going Public." *Journal of Business Venturing* 22, no. 2: 147–173.

Bouncken, R., A. Brem, and S. Kraus. 2016. "Multi-Cultural Teams as Sources for Creativity and Innovation: The Role of Cultural Diversity on Team Performance." *International Journal of Innovation Management* 20, no. 01: 1–34.

Burkhardt, K., P. Nguyen, and E. Poincelot. 2020. "Agents of Change: Women in Top Management and Corporate Environmental Performance." *Corporate Social Responsibility and Environmental Management* 27: 1591–1604.

Capozza, C., S. Salomone, and E. Somma. 2020. "Micro-Econometric Analysis of Innovative Start-Ups: The Role of Firm-Specific Factors and Industry Context in Innovation Propensity." *Industrial and Corporate Change* 29, no. 4: 935–957.

Cavallo, A., A. Ghezzi, A. Colombelli, and G. L. Casali. 2018. "Agglomeration Dynamics of Innovative Start-Ups in Italy Beyond the Industrial District Era." *International Entrepreneurship and Management Journal* 16, no. 1: 239–262.

Chen, M., X. Mi, J. Xue, Y. Li, and J. Shi. 2023. "The Impact of Entrepreneurial Team Psychological Capital on Innovation Performance: The Mediating Role of Knowledge Sharing and Knowledge Hiding." *Frontiers in Psychology* 14: 1–14.

Colombelli, A., A. D'Ambrosio, and C. Ravetti. 2024. "Women in Innovative Start-Ups and Regional Inclusiveness: 'green' and Socially-Responsible Companies." *Regional Studies* 59, no. 1: 1–14.

Colombelli, A., E. Paolucci, E. Raguseo, and G. Elia. 2023. "The Creation of Digital Innovative Start-Ups: The Role of Digital Knowledge Spillovers and Digital Skill Endowment." *Small Business Economics* 62: 917–937.

Colombo, M. G., E. Piva, and F. Rentocchini. 2012. "The Effects of Incubation on Academic and Non-Academic High-Tech Start-Ups: Evidence From Italy." *Economics of Innovation and New Technology* 21, no. 5–6: 505–527.

Dai, Y., G. Byun, and F. Ding. 2018. "The Direct and Indirect Impact of Gender Diversity in New Venture Teams on Innovation Performance." *Entrepreneurship Theory and Practice* 43, no. 3: 505–528.

Debrulle, J., J. Maes, and E. Gardiner. 2021. "New Ventures: How Team Motivation Affects Financial Outcomes." *Journal of Business Strategy* 42, no. 6: 367–373.

Demartini, P. 2018. "Innovative Female-Led Startups. Do Women in Business Underperform?" *Administrative Sciences* 8, no. 4: 70.

Dezsö, C. L., and D. G. Ross. 2012. "Does Female Representation in Top Management Improve Firm Performance? A Panel Data Investigation." *Strategic Management Journal* 33, no. 9: 1072–1089.

Ebersberger, B., and C. Pirhofer. 2011. "Gender, Management Education and the Willingness for Academic Entrepreneurship." *Applied Economics Letters* 18, no. 9: 841–844.

Eesley, C. E., D. H. Hsu, and E. B. Roberts. 2014. "The Contingent Effects of Top Management Teams on Venture Performance: Aligning Founding Team Composition With Innovation Strategy and Commercialization Environment." *Strategic Management Journal* 35, no. 12: 1798–1817.

Eisenhardt, K. 2013. "Top Management Teams and the Performance of Entrepreneurial Firms." *Small Business Economics* 40, no. 4: 805–816.

Ewens, M., and R. R. Townsend. 2020. "Are Early Stage Investors Biased Against Women?" *Journal of Financial Economics* 135, no. 3: 653–677.

Fahreza, M., D. T. Alamanda, U. Zuhdi, G. Anggadwita, D. M. Kurniati, and E. S. Soegoto. 2024. "Enhancing Startup Business Performance Through Iterative Strategies and Lean Programs: Insights From Capital Cities in Indonesia to Unlock Central Asia's Potential." *Australasian Accounting, Business and Finance Journal* 18, no. 4: 165–183.

Fairlie, R. W., and A. M. Robb. 2009. "Gender Differences in Business Performance: Evidence From the Characteristics of Business Owners Survey." *Small Business Economics* 33: 375.

Fasano, F., M. La Rocca, A. Cariola, and M. Passarelli. 2023. "Banking Relationship and Research Spin-Offs' Life Cycle: The Italian Experience." *Research in International Business and Finance* 65: 1–17.

Forbes, D., P. Borchert, M. Zellmer-Bruhn, and H. Sapienza. 2006. "Entrepreneurial Team Formation: An Exploration of New Member Addition." *Entrepreneurship Theory and Practice* 30, no. 2: 225–248.

Frenken, K., F. Van Oort, and T. Verburg. 2007. "Related Variety, Unrelated Variety and Regional Economic Growth." *Regional Studies* 41, no. 5: 685–697.

Ghio, N., M. Guerini, and C. Rossi-Lamastra. 2016. "University Knowledge and the Creation of Innovative Start-Ups: An Analysis of the Italian Case." *Small Business Economics* 47, no. 2: 293–311.

Gloor, P., A. Colladon, F. Grippa, B. Hadley, and S. Woerner. 2020. "The Impact of Social Media Presence and Board Member Composition on New Venture Success: Evidences From Vc-Backed u.s. Startups." *Technological Forecasting and Social Change* 157: 1–10.

Graafland, J. 2020. "Women in Management and Sustainable Development of SMEs: Do Relational Environmental Management Instruments Matter?" *Corporate Social Responsibility and Environmental Management* 27: 2320–2328.

Guzmán, J., and A. Kacperczyk. 2019. "Gender Gap in Entrepreneurship." *Research Policy* 48, no. 7: 1666–1680.

Hambrick, D. C., and P. A. Mason. 1984. "Upper Echelons: The Organization as a Reflection of Its Top Managers." *Academy of Management Review* 9, no. 2: 193–206.

Helm, R., O. Mauroner, and M. Dowling. 2010. "Innovation as Mediator Between Entrepreneurial Orientation and Spin-Off Venture Performance." *International Journal of Entrepreneurship and Small Business* 11, no. 4: 472–491.

Henderson, D. A., and D. R. Denison. 1989. "Stepwise Regression in Social and Psychological Research." *Psychological Reports* 64, no. 1: 251–257.

Hernandez, A. K. L., A. Fernández-Mesa, and M. Edwards-Schachter. 2018. "Team Collaboration Capabilities as a Factor in Startup Success." *Journal of Technology Management & Innovation* 13, no. 4: 13–23.

Imes, M., M. West, J. West, and S. Yan. 2024. "Board Gender Diversity, CEO Turnover, and Firm Performance in Entrepreneurial Firms." *Journal of Entrepreneurial Finance* 26, no. 1: 1–29.

Justo, R., D. R. DeTienne, and P. Sieger. 2015. "Failure or Voluntary Exit? Reassessing the Female Underperformance Hypothesis." *Journal of Business Venturing* 30: 775–792.

Lev, B. 2000. *Intangibles: Management, Measurement, and Reporting*. Brookings Institution Press.

Maji, S. G., and R. Saha. 2021. "Gender Diversity and Financial Performance in an Emerging Economy: Empirical Evidence From India." *Management Research Review* 44, no. 12: 1660–1683.

Mousa, S. 2024. "Examining Dual-Moderation of Structure Racism, Economic Fragility, High Tech Startup's Team Diversity and Performance." *Irasd Journal of Management* 5, no. 4: 260–278.

Myers, R. H. 1990. *Classical and Modern Regression With Applications*. Vol. 2. Duxbury Press.

Neffke, F., M. Henning, and R. Boschma. 2011. "How Do Regions Diversify Over Time? Industry Relatedness and the Development of New Growth Paths in Regions." *Economic Geography* 87, no. 3: 237–265.

Neill, S., M. Lynn, and J. L. York. 2015. "Seeing What Others Miss: A Study of Women Entrepreneurs in High-Growth Startups." *Entrepreneurship Research Journal* 5, no. 4: 293–322.

Nguyen, N., I. Hideg, Y. Engel, and F. Godart. 2023. "Benevolent Sexism and the Gender Gap in Startup Evaluation." *Entrepreneurship Theory and Practice* 48, no. 2: 506–546.

Nicotra, M., M. Romano, M. Del Giudice, and C. E. Schillaci. 2018. "The Causal Relation Between Entrepreneurial Ecosystem and Productive Entrepreneurship: A Measurement Framework." *Journal of Technology Transfer* 43, no. 3: 640–673.

Østergaard, C. R., B. Timmermans, and K. Kristinsson. 2011. "Does a Different View Create Something New? The Effect of Employee Diversity on Innovation." *Research Policy* 40, no. 3: 500–509.

Paoloni, P., and G. Modaffari. 2018. "Female-Owned Innovative Startups in Italy: Status Quo and Implications." *Administrative Sciences* 8, no. 4: 1–31.

Passaro, R., I. Quinto, P. Rippa, and A. Thomas. 2020. "Evolution of Collaborative Networks Supporting Startup Sustainability: Evidences From Digital Firms." *Sustainability* 12, no. 22: 9437.

Qian, Y. 2018. "New-Born Startups Performance: Influences of Resources and Entrepreneurial Team Experiences." *International Business Research* 11, no. 2: 1–15.

Ramaciotti, L., and U. Rizzo. 2017. "The Determinants of Academic Spin-Off Creation by Italian Universities." *R and D Management* 45, no. 5: 501–514.

Rehman, S., R. P. Orij, and H. Khan. 2020. "The Search for Alignment of Board Gender Diversity, the Adoption of Environmental Management Systems, and the Association With Firm Performance in Asian Firms." *Corporate Social Responsibility and Environmental Management* 27, no. 5: 2161–2175.

Robb, A. M., and J. Watson. 2012. "Gender Differences in Firm Performance: Evidence From New Ventures in the United States." *Journal of Business Venturing* 27: 544–558.

Sarhan, A., P. Bwanya, and C. Cowton. 2025. "Beyond the Board: Does Female Leadership Make a Difference to Corporate Sustainability Performance, Disclosure and Assurance?" *Business Strategy and the Environment* 35, no. 1: 329–350.

Schumpeter, J. A. 1989. *Essays: On Entrepreneurs, Innovations, Business Cycles and the Evolution of Capitalism*. Routledge Taylor & Francis Group.

Sciarelli, M., G. C. Landi, L. Turriziani, and M. Tani. 2021. "Academic Entrepreneurship: Founding and Governanced Eterminants in University Spin-Off Ventures." *Journal of Technology Transfer* 46, no. 4: 1083–1107.

Sciarelli, M., M. Tani, G. Landi, and L. Turriziani. 2020. "CSR Perception and Financial Performance: Evidences From Italian and UK Asset Management Companies." *Corporate Social Responsibility and Environmental Management* 27, no. 2: 841–851.

Shane, S. 2001. "Technology Opportunities and New Firm Creation." *Management Science* 47, no. 2: 205–225.

Taferner, J., and K. Leitner. 2025. "Founding Team Gender Diversity and Social Entrepreneurship: Implications for Venture Growth and Equity Acquisition." *International Journal of Entrepreneurial Behavior and Research* 31, no. 11: 92–113.

Tenner, I., and J. Hörisch. 2021. "Diversity Matters: The Influence of Gender Diversity on the Environmental Orientation of Entrepreneurial Ventures." *Journal of Business Economics* 91, no. 7: 1005–1023.

Tetrevova, L., M. Patak, and I. Kyrylenko. 2019. "Web-Based CSR Communication in Post-Communist Countries." *Applied Economics Letters* 26, no. 10: 866–871.

Wang, C., C. Zhang, and Z. Wang. 2017. "The Impact of Top Management Team Heterogeneity on the Performance of Technology Start-Ups." *Eurasia Journal of Mathematics, Science and Technology Education* 13, no. 12: 8057–8065.

Weinzimmer, L. G., P. C. Nystrom, and S. J. Freeman. 1998. "Measuring Organizational Growth: Issues, Consequences and Guidelines." *Journal of Management* 24, no. 2: 235–262.

Welsh, D. H. B., E. Kaciak, and N. Thongpapanl. 2016. "Influence of Stages of Economic Development on Women Entrepreneurs' Startups." *Journal of Business Research* 69, no. 11: 4933–4940.

Woo, C. Y., G. E. Willard, and U. Daellenbach. 1992. "Spin-Off Performance: A Case of Overstated Expectations?" *Strategic Management Journal* 13, no. 6: 433–447.