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FEMALE ENTREPRENEURSHIP AND STARTUP PERFORMANCE ACROSS 56 ECONOMIES: A SUSTAINABILITY ACCOUNTING PERSPECTIVE

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Abstract

Gender equality indicators in ESG reporting, particularly GRI 405 and ESRS S1, often use aggregate female entrepreneurship participation ratios as proxies for productive gender equality, although this assumption has limited cross-national empirical support. This study examines whether the Female/Male Total Early-Stage Entrepreneurial Activity (TEA) Ratio predicts export intensity and expected job creation growth among early-stage firms across 56 economies from 2009 to

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2020. Using system GMM estimation on an unbalanced GEM panel, the results show a significant negative association between the Female/Male TEA Ratio and both performance outcomes in the full sample and in developed economies. In emerging economies, the association is weaker and becomes positive, consistent with the opportunity–necessity distinction in entrepreneurship theory. To the authors' knowledge, this is the first cross-national panel study to test this relationship empirically, providing evidence for context-sensitive gender KPIs under GRI 405, CSRD, and ESRS S1.

Keywords: Female/Male TEA Ratio, women's entrepreneurship, gender equality indicators, sustainability accounting, legitimacy theory, export intensity

1. INTRODUCTION

Gender equality in entrepreneurship is one of the most discussed issues at the international level. Despite the gradual increase in female participation in the business world over the last decades, international evidence shows that parity remains distant (Raman et al., 2022; Beloskar et al., 2024). According to the Global Entrepreneurship Monitor (GEM) 2020/2021 Global Report (GEM, 2021), women start-up entrepreneurs represent on average 60–80% of their male counterparts in developed economies, while in several developing countries this inequality is even more pronounced. This discrepancy cannot be attributed solely to individual choices. Instead, it appears to reflect systematic imbalances in access to finance, networks and institutional support (Akter et al., 2022; Corrêa et al., 2024).

The development of ESG (Environmental, Social, Governance) reporting standards has elevated gender equality from an ethical aspiration to a critical and measurable indicator of corporate sustainability. The European Corporate Sustainability Reporting Directive (CSRD, 2022/2464/EU; European Parliament and Council, 2022) and Global Reporting Initiative (GRI) Standard 405 (GRI, 2021) are now used to provide quantified information on gender representation, making empirical measurement of the phenomenon directly relevant to accounting practice. However, the implementation of these standards reveals notable discrepancies between economies. These reflect deeper asymmetries in institutional readiness and in the structural conditions under which female entrepreneurship operates.

GEM measures early-stage entrepreneurial activity through the Total Early-Stage Entrepreneurial Activity (TEA) index, defined as the percentage of adults aged 18–64 actively involved in starting or running a new business. The Female/Male TEA Ratio - the ratio of the female to the male TEA rate - is precisely the type of aggregate gender participation metric that GRI 405 and European Sustainability Reporting Standard (ESRS) S1 (European Commission, 2023) propose as a standard for gender equality measurement at the ecosystem level. However, before such a metric can function as a reliable accountability instrument, its empirical relationship to actual business performance outcomes must be

established across diverse institutional contexts. Without this evidence base, sustainability accountants risk designing gender key performance indicators (KPIs) that measure participation without measuring what participation actually delivers. This paper provides that evidence.

In this context, this research utilizes GEM data for 56 countries and applies dynamic econometric analysis through the one-step System GMM estimator to examine the effect of the Female/Male TEA Ratio on both export intensity and growth expectations of early-stage firms, across economies representing different levels of institutional development. The analysis tests the expectation that a higher Female/Male TEA Ratio is negatively associated with the export intensity (H1) and the growth expectations (H2) of early-stage firms, and that both associations weaken or reverse in emerging economies where necessity-driven entrepreneurship prevails (H1a, H2a; see Section 2.5).

The study makes three contributions from an accounting perspective. First, it provides, to the best of the authors' knowledge, the first cross-national panel analysis of the Female/Male TEA Ratio as a determinant of startup internationalization and growth ambitions. In accounting terms, this serves as a validity test for a measure that reporting frameworks already employ. Second, it documents meaningful regional heterogeneity. The negative association observed in the full sample and in developed economies weakens or reverses in emerging economies, consistent with the opportunity–necessity distinction in entrepreneurship theory. For preparers and assurance providers, this heterogeneity implies that the materiality of gender indicators differs across reporting contexts. Third, it offers sustainability accountants and standard-setters an empirical basis for the context-sensitive calibration of gender KPIs under GRI 405, CSRD and ESRS S1. In doing so, the paper joins conversations already hosted by this journal on the psychological and institutional conditions of entrepreneurial activity (Grčić Fabić et al., 2025; Kryeziu, 2026), on the barriers that restrict women's professional advancement (Szczepańczyk, 2026) and on the use of dynamic panel models in cross-country research (Škrabić Perić et al., 2025).

2. THEORETICAL BACKGROUND

This section develops the theoretical basis of the study in four steps. Section 2.1 reviews the literature on women's entrepreneurship in general and in emerging economies, since the contrast between the two settings motivates the sub-group analysis. Section 2.2 presents the three theoretical lenses, resource-based, human capital and institutional, that explain the gender gap in export activity and inform the selection of control variables. Sections 2.3 and 2.4 connect these strands to the regulatory framework of ESG reporting and to sustainability accounting, where the Female/Male TEA Ratio serves as a gender equality benchmark. Section 2.5 draws on this material to state the research hypotheses.

2.1. Women's Entrepreneurship

2.1.1. Women's Entrepreneurship: International Bibliography

The literature on female entrepreneurship has evolved in four distinct phases: a) 1970–1990, with an emphasis on the recording and visibility of the phenomenon, b) 1990–2005, with comparative analyses of performance between male and female entrepreneurial activity, c) 2005–2015, with a clear shift towards institutional and cultural interpretations, and d) post-2015, with the integration of the ESG agenda, sustainability and equality policies (Brush et al., 2009; Jennings & Brush, 2013). Recent systematic reviews and bibliometric studies confirm this trajectory: Cardella et al. (2020) map the rapid expansion of the field after 2010, Raman et al. (2022) document the growing link between women's entrepreneurship and the sustainable development agenda, and Beloskar et al. (2024) show that work on gender equality is now organized largely around Sustainable Development Goal 5 (SDG 5). At the same time, Akter et al. (2022) find that international entrepreneurship research still lacks an established gender-aware framework, so the institutional interpretation of the gap remains an open question. The central findings of the literature highlight the existence of a stable gender gap. However, this inequality is not solely attributable to biological differences. Instead, it appears to reflect complex interactions between social culture, institutional framework, access to finance, and human capital (Minniti & Naudé, 2010).

Langowitz & Minniti (2007) document that women perceive entrepreneurship less favorably regardless of country, attributing the discrepancy to perceptual factors and not necessarily to objective obstacles. In this context, the interpretation of the phenomenon acquires particular importance. In the field of export activity, particularly, Orser et al. (2010) in a sample of Canadian business units revealed that female-owned firms have lower chances of exporting, a result that is mainly attributed to systemic differences such as smaller firm size, lower orientation to R&D, and limited activity in export sectors. The moderating role of firm size in the export-performance relationship has been further documented at the firm level, with evidence that the performance impact of export activity varies significantly with both size and prevailing economic conditions. In contrast, Amoros et al. (2016) in a cross-country analysis of GEM data did not identify a consistent negative effect of female entrepreneurship on exports across countries, which suggests the importance of the institutional framework in the country where the business operates.

Social feminist theory (Ahl, 2006) argues that women and men undergo different socialization processes, which lead them to different entrepreneurial motivations, strategies, and growth expectations. From this perspective, the difference in behavior is not predetermined. This explains why even in countries with high levels of institutional equality, women entrepreneurs tend to choose a smaller scale of business activity.

2.1.2. Women's Entrepreneurship in Emerging Economies

Female entrepreneurship in emerging and developing economies presents qualitatively different characteristics in comparison with developed countries - a distinction of particular importance for its interpretation and measurement. Data from successive GEM Global Reports (GEM, 2021) show that countries such as Indonesia, Ecuador and Thailand have consistently high rates of female entrepreneurship. However, this does not necessarily translate into high levels of institutional gender equality. This reflects the structural peculiarities of these economies.

In many emerging economies, women enter entrepreneurship primarily as a response to economic necessity - defined here as the absence of viable alternative sources of income - rather than as a means of exploiting a development opportunity (Minniti & Nardone, 2007; Kelley et al., 2010; Kirkwood, 2009). The distinction between opportunity-driven and necessity-driven entrepreneurship is therefore analytically indispensable. The social feminist approach (Ahl, 2006) and a number of empirical studies, including those of Gupta et al. (2009), highlighted that gender norms, limited financing opportunities and insufficient institutional support shape lower growth expectations and constrain the potential for business scaling-up, a conclusion that recent reviews of female entrepreneurship in emerging and developing countries continue to support (Corrêa et al., 2024). Evidence published in this journal points the same way: social prejudices continue to restrict women's professional development in European labour markets (Szczepańczyk, 2026). However, even necessity-driven female entrepreneurship can contribute to economic resilience, by creating local markets and stimulating domestic demand (Amorós et al., 2016). The growing weight of resilience in entrepreneurship research is documented in a recent bibliometric analysis in this journal (Grčić Fabić et al., 2025). This dynamic is further supported at the firm level, where the performance impact of export activity has been shown to vary significantly with both firm size and prevailing economic conditions (Kalogera et al., 2023), a finding consistent with the structural constraints that characterize necessity-driven female entrepreneurship in emerging economies

In this context, Sustainability Accounting (examined in detail in Section 2.4) plays a crucial role in capturing the real institutional situation, allowing for the distinction between quantitative participation and qualitative empowerment - a distinction that is particularly relevant in emerging market start-ups, where transparency in terms of board composition, remuneration and equality policies serves not only as an accountability mechanism, but also as an indicator of institutional maturity and investment credibility. Therefore, the study of female entrepreneurship in the context of emerging markets is inextricably linked to ESG criteria. This is because the reliability and quality of data directly affect both sustainability assessments and the design of policy strategies. In this context, the emerging economies in the sample, and in particular Indonesia, Malaysia and Thailand, based on GEM data, serve as the empirical basis for the emergence of the necessity mechanism described in hypotheses H_{1a} and H_{2a} (see Section 2.5). These countries were selected because they combine a high ratio of female to male

entrepreneurship with structural obstacles to export dynamics and growth prospects that are qualitatively different from the corresponding characteristics of developed economies. (Minniti & Nardone, 2007; Kelley et al., 2010).

However, significant heterogeneity exists within the emerging economies sub-cluster. South Korea and Japan present a structurally different profile, with the Female/Male TEA Ratio remaining well below parity, reflecting deep-rooted institutional and cultural barriers including rigid corporate structures and social norms that associate primary care responsibilities with women (Kelley et al., 2010; Minniti & Naudé, 2010). By contrast, in Indonesia, Malaysia and Thailand - where necessity-driven female entrepreneurship is prevalent - a high Female/Male TEA Ratio coexists with lower export intensity and more modest growth expectations. This internal variation reinforces the need for a development-sensitive calibration of sustainability reporting standards.

2.2. Theoretical Interpretations of the Gender Gap in Export Entrepreneurship

International literature utilizes three central theoretical pillars for explaining gender differences in export activity and entrepreneurial dynamism, including Resource Theory, Human Capital Theory and Institutional Theory.

Firstly, within the framework of the Resource-Based Theory View (RBV), Barney (1991) highlighted that the competitiveness of a business is based on the possession of rare and valuable resources. Coleman and Robb (2012) further highlighted that women entrepreneurs face structural constraints in terms of access to critical capital. Limited access to financial tools, international networks and technological infrastructures acts as a deterrent, given that exports require high capital intensity and a degree of networking that often remains male-dominated.

Second, within the framework of Human Capital Theory, Becker (1975) and Brush (1992) focused on skills and knowledge as central drivers of business success. Although the educational gap tends to be eliminated in modern societies, the qualitative differentiation of student orientations remains critical. The under-representation of women in STEM fields - comprising Science, Technology, Engineering and Mathematics - creates inequality in technical knowledge and innovation capacity, both of which are indispensable for penetrating international markets.

Third, Institutional Theory (North, 1990; Welter, 2011) argues that the business environment is not neutral but is shaped by formal and informal institutions, including laws, property rights, social norms and stereotypes. Care structures and traditional gender role perceptions exert a significant influence on time availability and risk-taking behaviour - two dimensions of particular relevance for the internationalization of women-owned businesses. Yet this form of structural inequality is not automatically addressed by economic growth; the gender gap in export performance varies drastically depending on the level of social development of each country, in a manner that neoclassical models systematically fail to account for.

These three pillars also guide the selection of control variables in the empirical model. The resource-based view points to the availability of financing and of commercial and professional infrastructure as preconditions for internationalization. Human capital theory motivates the inclusion of perceived capabilities and innovation, while institutional theory supports the use of the indicators on taxes and bureaucracy, government support, market openness and market dynamics drawn from the GEM National Experts Survey. Finally, the motivational index captures the balance between opportunity-driven and necessity-driven activity, which Section 2.1.2 identifies as the key structural difference between developed and emerging economies. Full variable definitions are given in Section 3.2.

2.3. ESG Gender Equality: The Modern Regulatory Framework

Gender equality has evolved from an ethical commitment to a critical and measurable ESG indicator, embedded in major international sustainability reporting standards. This study focuses on a number of institutional and regulatory requirements, such as the GRI 405 standard, the European CSRD Directive, SDG Target 5 and Directive 2022/2381 on equal representation in boards of directors. However, the implementation of these rules shows significant differences between Member States. These differences are not only bureaucratic, but also reveal deep asymmetries in institutional maturity and political will to achieve true equality – a deficit that is strongly highlighted in the contemporary accounting literature (Mehnaz & Yang, 2025).

In particular, GRI 405 (Diversity and Equality) requires the systematic recording of the composition of staff and management levels based on gender and age. The variable "Women/Men TEA Ratio" examined here serves as an external analogue of this approach, by transferring the demand for inclusion from the micro-level of the company to the macro-level of the startup ecosystem. At the same time, the CSRD (2022/2464/EU) introduces the strict ESRS criteria, which require the publication of data on pay gaps and ratios in management (from 2024 for large entities and from 2026 for SMEs). In the same way, the Sustainable Development Goals address female entrepreneurship as a key pillar of economic empowerment (UN Women, 2020), while Directive 2022/2381 sets a target of 40% for the under-represented gender in boardrooms by 2026.

In contrast to the older regime of voluntary initiatives, this new framework establishes a clear shift towards measurable accountability, implicitly acknowledging that market self-regulation has not delivered as expected. Indeed, recent research shows that such structural mechanisms, combined with specialized sustainability committees, significantly reduce controversy around ESG issues (Muhammad & Farooq, 2025). This reinforces the view that legislative enforcement absolutely needs the support of an appropriate internal corporate governance architecture to be effective.

2.4. Sustainability Accounting and the Quantification of Gender Equality

The convergence of accounting science with gender issues represents a dynamic and rapidly evolving research field that is reshaping the boundaries of corporate accountability. As early as 1992, Gray highlighted (Gray, 1992) that conventional financial accounting - due to its one-dimensional focus on monetary dimensions - fails by design to incorporate social externalities. Today, Sustainability Accounting provides the necessary methodological arsenal for the systematic measurement and disclosure of non-financial dimensions (Schaltegger & Burritt, 2010). Indeed, Adams (2004), Dando and Swift (2003), and Tariq (2025) unveiled a significant gap between corporate rhetoric in sustainability reporting and actual organizational change - a gap that regulatory frameworks have assumed to be addressable through disclosure requirements alone.

The gap identified by Adams (2004), Dando and Swift (2003), and Tariq (2025) finds theoretical grounding in Legitimacy Theory (Suchman, 1995), which holds that organizations adopt reporting practices not primarily for informational purposes but for securing social acceptance within their institutional environment. From this point of view, the adoption of gender equality metrics in ESG reporting constitutes a legitimation strategy - a demonstration of conformity with prevailing social expectations regarding inclusion, irrespective of whether the reported ratios reflect genuine economic empowerment. This distinction between symbolic and substantive accountability is of direct relevance to the present analysis. When a uniform gender ratio is utilized as an ESG benchmark across institutionally heterogeneous contexts, the same numerical value may carry fundamentally different informational content - a form of measurement decoupling that Sustainability Accounting is uniquely positioned to identify and address. Yet the legitimacy of an indicator does not, of itself, guarantee its cross-contextual validity, which is precisely the argument that the empirical findings of this study are designed to demonstrate.

The European CSRD Directive is designed for bridging this gap, transforming voluntary disclosure into a regulatory obligation from 2024 onwards. Through the ESRS standard S1 (Own Workforce), business entities are required to present verifiable and comparable indicators - specifically Gender-disaggregated KPIs - making gender equality an object of external control and institutional verification. From an accounting perspective, the utilization of the Female/Male TEA Ratio as an indicator in the present research goes beyond statistical analysis, given that it intersects three critical accounting dimensions such as Social Accounting, Management Accounting and Accounting Governance. The first, in terms of its scope, concerns Social Accounting (GRI 405), which is utilized for quantifying gender participation in the business base and objectively measuring inclusion. The second concerns Management Accounting and Decision Making, by linking gender indicators to strategic performance measures. The third concerns Accounting Governance and Tax Policy (GRI 207), examining how the institutional and taxation framework disproportionately affects female entrepreneurship and the allocation of resources at the national level.

Empirical support for this linkage between gender representation and KPI disclosure quality has been provided by Boujelben (2025), whose findings confirm that female board directorship is positively associated with the quality of voluntary KPI reporting in family-controlled firms.

This three-pronged approach highlights the extent to which gender equality has shifted from the realm of corporate social responsibility to the centre of professional accounting responsibility and transparency - a shift that amounts to a fundamental reconceptualization of the boundaries of financial reporting.

The integration of gender equality indicators into corporate reporting is further reinforced by the emergence of Integrated Reporting (IR) as a global disclosure paradigm. The International Integrated Reporting Council (IIRC) framework - now progressively aligned with the sustainability disclosure standards of the International Sustainability Standards Board (ISSB) - positions human and social capital as core dimensions of value creation, within which gender inclusion constitutes a measurable component. However, a critical distinction must be drawn between descriptive and transformative sustainability accounting. Descriptive approaches limit themselves to the quantification and reporting of gender ratios in compliance with regulatory requirements. Transformative approaches, on the other hand, utilize accounting measurement as an instrument for identifying structural inequalities and informing policy change - precisely the orientation that Carnegie et al. (2024) advocated in their framework for accounting as a mechanism for shaping a better world, encompassing dimensions such as gender equality, social inclusion, institutional accountability and sustainable value creation. This study aligns with the transformative tradition, utilizing the empirical analysis of gender KPI performance across 56 economies as a basis for evaluating - and ultimately improving - the design of gender equality disclosure frameworks.

The sustainability accounting frameworks described above (GRI 405, ESRS S1, CSRD) share a common assumption: that aggregate gender participation ratios at the ecosystem level are reliable proxies for productive gender equality in business. This assumption has not been empirically tested across institutionally diverse economies. The present study addresses this gap directly, utilizing the Female/Male TEA Ratio as the empirical operationalization of the very gender metric that these frameworks propose, and testing its relationship to two firm-level performance outcomes, export intensity and growth expectations, across 56 countries. In doing so, the analysis moves sustainability accounting from descriptive compliance toward the transformative accountability that Carnegie et al. (2024) advocate: using cross-national panel evidence to evaluate, and ultimately improve, the design of gender KPIs that are currently calibrated on assumption rather than evidence.

2.5. Research Hypotheses

Based on the preceding theoretical analysis, the following research hypotheses are formulated to guide the empirical investigation:

Prior evidence motivates the direction of each hypothesis. At the country level, Orser et al. (2010) report a lower export propensity for women-owned firms, while Amorós et al. (2016) find that this pattern varies with the institutional setting rather than holding uniformly across countries. The first pair of hypotheses follows:

H_1: A higher Female/Male TEA Ratio is negatively associated with the export intensity of early-stage businesses.

H_{1a}: This negative association is expected to weaken or reverse in emerging economies, where necessity-driven entrepreneurship moderates the relationship between gender participation and export activity.

With respect to growth ambitions, Minniti and Nardone (2007) and Kelley et al. (2010) document that necessity-driven entry, which characterizes much female entrepreneurship in emerging economies, is associated with more modest scaling plans, and Estrin and Mickiewicz (2011) show that institutional constraints weigh on the growth aspirations of female entrepreneurs in particular. The second pair of hypotheses follows:

H_2: A higher Female/Male TEA Ratio is negatively associated with the growth expectations of early-stage businesses.

H_{2a}: This negative association is expected to weaken or reverse in emerging economies, where female entrepreneurship functions primarily as a mechanism for economic resilience rather than as a pursuit of ambitious growth.

Taken together, H_1/H_{1a} and H_2/H_{2a} address a central empirical void in sustainability accounting practice: whether the Female/Male TEA Ratio, currently embedded in GRI 405 and ESRS S1 as a gender equality benchmark, actually predicts the firm-level performance outcomes that gender equality is assumed to generate. The institutional heterogeneity captured by the sub-hypotheses directly informs the context-sensitive calibration of gender KPIs that CSRD requires but does not yet empirically ground.

3. DATA AND METHODOLOGY

3.1. GEM Database

The GEM is the primary global source of startup data. Data collection is conducted annually through two research tools, including the APS (Adult Population Survey), which collects responses from a sample of 2,000 adults per country and the NES (National Experts Survey), which is used to evaluate institutional factors of entrepreneurship by national experts.

The GEM covers up to 120 economies annually, representing over 75% of the world's population and 90% of global GDP, making it the only global tool for comparing business activity. Institutional factors assessed under the NES

include R&D Transfer, Commercial and Professional Infrastructure, Internal Market Openness, and Internal Market Dynamics.

Our final unbalanced panel consists of 56 distinct economies, representing a diverse range of geographic regions and development stages. By aggregating annual GEM data across 12 years (2009-2020), the sample yields 258 country-year observations, allowing for a robust analysis of entrepreneurial framework conditions over time. In terms of geographical distribution, the first group includes countries in Europe and North America i.e. developed economies with high levels of institutional gender equality, including Denmark, Finland, Germany and the USA. On the other hand, the second group includes other countries in Asia, Africa, Latin America and the Caribbean i.e. emerging and developing economies with high heterogeneity in the institutional framework of gender equality, such as Brazil, India, Malaysia and Indonesia (Table 1). The distinction reflects differences in the structure of business activity and in the allocation of resources between the two groups. Within the second group, the emerging economies sub-cluster (Malaysia, Indonesia, Thailand, South Korea and Japan) receives particular attention, given its weight in the GEM dataset and its relevance to the conclusions of the study.

Table 1 Regions & respective Countries included in the Study

Region	**Country**
Africa	Egypt, South Africa
Asia and Oceania	Australia, China, India, Indonesia, Iran, Israel, Japan, Malaysia, Saudi Arabia, South Korea, Taiwan, Thailand, Turkey, United Arab Emirates
Europe and North America	Belgium, Bosnia and Herzegovina, Canada, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States
LatAm and Caribbean	Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Jamaica, Mexico, Panama, Peru, Puerto Rico, Uruguay

Source: Authors' own work.

GEM data reveal significant geographical asymmetries in female entrepreneurship. For readability, Figure 1 presents a heat map of four key variables for twenty economies selected to span the range of the sample; the complete heat map covering all 56 economies and all study variables is provided in Appendix A (Figure A1). Female entrepreneurship is most encouraged in economies such as Brazil, Ecuador, Indonesia, Malaysia, Mexico, Panama, Peru and Thailand, where the Female/Male TEA Ratio approaches or reaches parity (0.9–1.0). The high rates of activity in these countries should be read against the distinction between necessity-driven and opportunity-driven entrepreneurship. In contrast, particularly low ratios (0.3–0.4) are recorded in Egypt, Iran, Korea, North

Macedonia and Turkey, pointing to the influence of the institutional and cultural context on female entrepreneurial behaviour.

Figure 1 Heat map of key variables, selected economies: country means, 2009–2020.

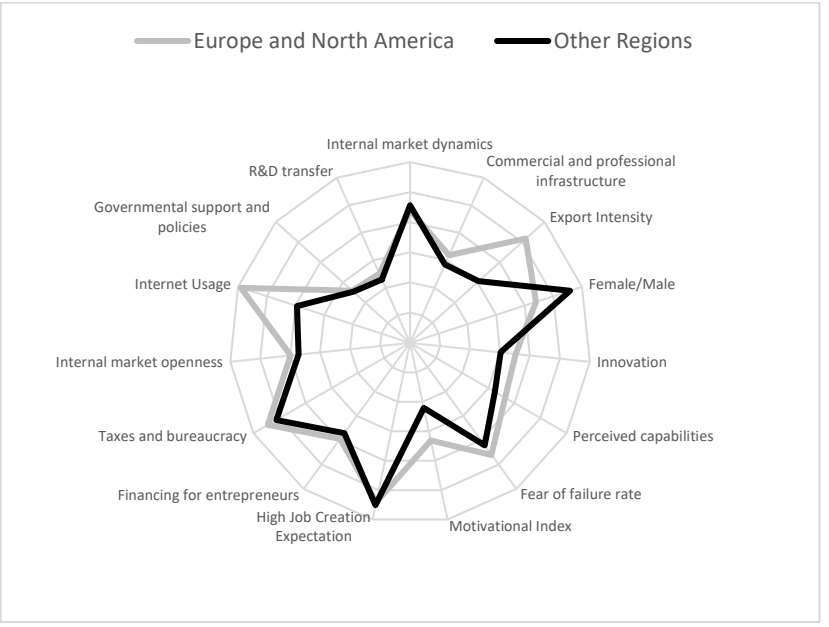
Country	TEA Activity	Export Intensity	High Job Creation Expectation	Female/ Male TEA
Thailand	19.3	4.5	12.4	1.0
Indonesia	16.4	5.7	3.7	1.0
Ecuador	27.2	5.0	10.3	0.9
Peru	25.6	8.1	19.3	0.9
Brazil	16.2	1.8	10.0	0.9
Panama	15.0	16.4	8.2	0.9
Malaysia	7.4	7.0	8.3	0.9
Mexico	13.3	7.5	15.5	0.8
Colombia	22.1	11.4	42.8	0.7
United States	11.3	13.5	30.6	0.7
Greece	6.9	17.7	8.3	0.6
Germany	4.7	17.5	19.8	0.6
United Kingdom	7.3	17.8	22.5	0.5
Japan	4.1	11.5	29.3	0.5
Iran	12.6	4.5	22.1	0.4
Turkey	9.6	15.9	38.8	0.4
Korea	8.2	14.7	20.1	0.4
North Macedonia	8.1	24.1	25.2	0.4
Norway	7.1	15.2	18.0	0.4
Egypt	10.5	13.8	28.3	0.3

Note: The twenty economies shown comprise those discussed in the text and seven comparators, sorted by the Female/Male TEA Ratio. Cell shading is scaled within each column; darker cells indicate higher values. The complete heat map for all 56 economies and all study variables is presented in Appendix A, Figure A1.

Source: GEM Database, authors' calculations.

Figure 2 illustrates the quantitative differences between early-stage firms in Europe & North America and Other Countries. Developed-economy entrepreneurs record markedly higher export intensity, internet usage, and opportunity-driven motivation, while early-stage businesses from Asia, Africa, Latin America, and the Caribbean show a substantially higher Female/Male TEA Ratio - a pattern that motivates the sub-group analysis in Section 4.2.

Figure 2 Mean normalized values of the GEM framework indicators, Europe & North America versus Other Regions, 2009–2020.



Note: Indicators measured in different units (percentages, ratios and National Experts Survey scores) are normalized to a common scale to allow direct comparison across the two groups of economies.

Source: GEM Database, authors' calculations.

3.2. Variables

The main independent variable is the Female/Male TEA Ratio (Eq.1, Eq.2) (defined in Section 1), drawn from the GEM Adult Population Survey (APS). A value of 1 indicates complete gender parity; values below 1 reflect male dominance; values above 1 indicate female dominance. This ratio constitutes the primary gender participation metric proposed by GRI 405 and ESRS S1 for ecosystem-level gender equality measurement.

Two dependent variables are modelled, each capturing a distinct dimension of early-stage firm performance. The first, Export Intensity (Eq.1), is the proportion of early-stage entrepreneurs who report that at least 25% of their customers are located outside their home country; a direct measure of startup internationalization (Hessels & Terjesen, 2010). The second, High Job Creation Expectation (Eq.2), is the proportion of early-stage entrepreneurs who expect to create six or more new jobs within the next five years, capturing growth ambition at the country level (Autio & Acs, 2010). Both variables are sourced from the APS.

The control variables are drawn from two GEM instruments and selected on the basis of their established theoretical relevance to startup internationalization and growth ambitions. From the APS: the Motivational Index (ratio of opportunity-driven to necessity-driven TEA - Eq.1 & Eq.2), which is theoretically central to H_{1a} and H_{2a} since in necessity-driven economies the gender–performance relationship is expected to differ structurally (Reynolds et al., 2001; Hessels & Terjesen, 2010); Perceived Capabilities (proportion of adults who report having the skills to start a business - Eq.1 & Eq.2), capturing human capital readiness (Langowitz & Minniti, 2007); Fear of Failure (proportion who cite fear of failure as a barrier to starting a business - Eq.2), which prior evidence documents as a disproportionate deterrent for female entrepreneurship in emerging economies (Cacciotti & Hayton, 2015); and Innovation (proportion of early-stage entrepreneurs offering products new to at least some customers), included in Eq.2 only as product innovation is more directly linked to growth ambitions than to export propensity at the aggregate level. Finally, Internet Usage (proportion of adults aged 18–64 who report using the internet in the last 3 months), included in Eq.1 only as digital connectivity is theoretically linked to export market access and international business development at the country level.

From the National Experts Survey (NES), scored on a 1–9 scale where lower values indicate more favorable conditions for entrepreneurship: R&D Transfer (extent to which national research is transferred into commercial opportunities -Eq.1), Commercial and Professional Infrastructure (availability of accounting, legal and financial services - Eq.1), Taxes and Bureaucracy (regulatory and tax burden on new firms - Eq.1 & Eq.2), Internal Market Dynamics (year-to-year market volatility - Eq.1 & Eq.2), Financing for Entrepreneurs (availability of equity and debt financing - Eq.1 & Eq.2), Governmental Support and Policies (extent of public support for entrepreneurship - Eq.2), and Internal Market Openness (freedom of new firms to enter existing markets - Eq.1 & Eq.2). Year dummies are included in all specifications to control for common time-varying shocks.

3.3. Econometric Methodology: One-Step System GMM

The empirical investigation of the relationship between the Female/Male TEA Ratio and startup performance across 56 institutionally diverse economies requires an estimator that can simultaneously address three structural econometric challenges inherent in the data: dynamic persistence, endogeneity, and unobserved country-level heterogeneity. These are not merely technical concerns; they are directly connected to the research gap this study addresses. If gender participation metrics such as the Female/Male TEA Ratio are to serve as credible sustainability accounting indicators under GRI 405 and ESRS S1, the empirical relationship between these metrics and firm performance must be estimated consistently, free from the biases that standard static estimators would introduce. The one-step System GMM estimator (Blundell & Bond, 1998) satisfies this requirement on all three dimensions.

The first challenge is dynamic persistence. Entrepreneurial performance variables, export intensity and growth expectations, exhibit strong temporal autocorrelation: a country's export profile at time t is substantially determined by its profile at t-1. Incorporating the lagged dependent variable on the right-hand side of the regression is therefore theoretically necessary. However, as Nickell (1981) demonstrated, including a lagged dependent variable in a fixed-effects model introduces a systematic bias of order O(1/T) that does not diminish with larger cross-sectional samples and becomes particularly severe in short-T panels such as the present one (T = 12 years). This "Nickell bias" makes OLS and fixed-effects estimators structurally inconsistent for this type of data, rendering them unsuitable for drawing reliable conclusions about the gender–performance relationship across institutional contexts.

The second challenge is endogeneity. The relationship between the Female/Male TEA Ratio and startup performance is not unidirectional: institutional environments that support female entrepreneurship also tend to produce stronger export ecosystems, creating bidirectional causality that renders the main independent variable correlated with the error term. Similarly, several NES institutional variables are plausibly jointly determined with the performance outcomes. System GMM addresses this by exploiting the time structure of the panel itself - using lagged values of endogenous variables as internal instruments - without requiring the identification of external instruments that are rarely available in cross-national entrepreneurship research (Roodman, 2009).

The third challenge is unobserved heterogeneity. The 56-country panel encompasses deep institutional, cultural and regulatory differences that are not directly measurable but systematically affect both female entrepreneurship participation and firm performance. System GMM eliminates these time-invariant country-specific effects through its system of moment conditions, combining first-difference and levels equations (Blundell & Bond, 1998; Bond, 2002). Dynamic panel models of this kind are also an established tool in recent cross-country work published in this journal (Škrabić Perić et al., 2025).

The choice of the one-step estimator over the two-step alternative rests on three grounds. First, Judson and Owen (1999) document that the one-step estimator minimizes bias and produces more reliable standard errors in panels of the present size. Second, Roodman (2009) establishes that the one-step estimator is the predominant methodological choice in comparable cross-national panel studies, while the two-step estimator's theoretical efficiency gains are offset by finite-sample bias in the standard errors. Third, the institutional and technological heterogeneity of the 56-country sample, spanning factor-driven, efficiency-driven and innovation-driven economies, is precisely the condition under which System GMM delivers more robust estimates than Difference GMM, as Van Biesebroeck (2007) demonstrates. Furthermore, System GMM is recognized as the methodological standard for empirical accounting research in leading journals including JAR, TAR, EAR and MAR, where its capacity to address persistence, endogeneity and unobserved

heterogeneity simultaneously is considered a minimum validity requirement for panel-based analysis (Flannery & Hankins, 2013).

Models are estimated in Stata using the xtabond2 command with the collapse option to prevent instrument proliferation and robust standard errors to correct for heteroskedasticity and autocorrelation. The instrument count is maintained strictly below the number of country groups in all specifications. The validity of the instrument set is confirmed through the Hansen J test, with p-values maintained within the [0.10–0.27] range recommended by Roodman (2009). Serial correlation is assessed via the Arellano–Bond AR(2) test; non-rejection confirms the absence of second-order autocorrelation in levels and validates the moment conditions (Arellano & Bond, 1991). All models are estimated three times - for the full 56-country sample, for Europe and North America, and for Other Countries - to capture the geographic heterogeneity that is central to the study's sustainability accounting implications.

The models are specified as follows, with all variables as defined in Section 3.2. The export intensity model (Eq.1) is:

$$Y_{i,t} = c_i + \beta_1 Y_{i,t-1} + \beta_2 Female/Male_{i,t} + \beta_3 High\ Job\ Creation\ Expectation_{i,t} + \beta_4 Motivational\ Index_{i,t} + \beta_5 Perceived\ Capabilities_{i,t} + \beta_6 R\&D_{i,t} + \beta_7\ Commercial\ Infrastructure_{i,t} + \beta_8 Taxes\&Bureaucracy_{i,t} + \beta_9 Internal\ market\ dynamics_{i,t} + \beta_{10} Financing\ for\ entrepren \beta_{11} Internet\ Usage_{i,t} + \beta_{12} Internal\ market\ openness_{i,t} + Yeardummies_t + \varepsilon_{i,t} \quad \text{(Eq 1)}$$

Moreover, the growth expectations model (Eq.2) is specified as follows:

$$Y_{i,t} = c_i + \beta_1 Y_{i,t-1} + \beta_2 Female/Male_{i,t} + \beta_3 Export\ Intensity_{i,t} + \beta_4 Motivational\ Index_{i,t} + \beta_5 Perceived\ Capabilities_{i,t} + \beta_6 Innovation_{i,t} + \beta_7\ Fear\ of\ failure_{i,t} + \beta_8 Taxes\&Bureaucracy_{i,t} + \beta_9 Internal\ market\ dynamics_{i,t} + \beta_{10} Financing\ for\ entreprene \beta_{11} Governmental\ support_{i,t} + \beta_{12} Internal\ market\ openness_{i,t} + Yeardummies_t + \varepsilon_{i,t} \quad \text{(Eq 2)}$$

4. EMPIRICAL RESULTS

4.1. System GMM Results

Table 2 presents the findings from the estimation of the two models (Eq.1 and Eq.2).

Table 2 One - Step Results System GMM - Female/Male TEA Ratio Effect to the Export Intensity (Eq.1) and Growth Expectations (Eq.2)

Eq.1 - Dependent: Export Intensity			
Variable	**General Population (N=258)**	**Europe & North America (N=136)**	**Other Countries (N=91)**
L.Export Intensity	+0.391*** (0.099)	+0.315** (0.153)	+0.445*** (0.150)
Female / Male TEA	-13.910* (7.522)	-8.801 (15.614)	+3.312 (19.731)
High Job Creation Expectation	+0.153* (0.079)	+0.548** (0.235)	-0.010 (0.275)
Motivational Index	-1.061** (0.425)	-0.489 (0.988)	-2.375 (2.221)
Perceived capabilities	+0.029 (0.163)	-0.242 (0.294)	-0.080 (0.249)
R&D Transfer	+9.746* (5.916)	+21.728* (12.735)	+17.049** (8.578)
Commercial Infrastructure	+13.774** (6.356)	+10.692 (13.746)	-7.124 (6.632)
Taxes & Bureaucracy	+1.460 (3.251)	-5.625 (4.631)	+9.300* (5.384)
Internal Market Dynamics	+0.896 (2.601)	+5.207 (4.783)	-5.669* (3.065)
Financing for entrepreneurs	-3.052 (4.090)	-6.862 (8.031)	+1.543 (6.123)
Internet Usage	-0.008 (0.053)	-0.030 (0.205)	-0.004 (0.095)
Internal Market Openness	-10.508* (5.822)	-7.340 (9.665)	-12.562 (12.580)
AR(2) p-value	0.339	0.455	0.756
Hansen p-value	0.271	0.205	0.246

Eq.2 - Dependent: High Job Creation Expectation			
Variable	**General Population (N=232)**	**Europe & North America (N=129)**	**Other Countries (N=119)**
L.High Job Creation Expectation	+0.490*** (0.130)	+0.377** (0.156)	+0.862*** (0.297)
Female / Male TEA	-14.118*** (3.696)	-12.724** (5.785)	+3.338 (13.295)
Export Intensity	+0.196* (0.104)	+0.259** (0.122)	+0.117 (0.330)
Motivational Index	+0.256 (0.630)	-0.188 (0.685)	+0.142 (1.997)
Perceived capabilities	+0.115 (0.243)	0.224 (0.284)	-0.092 (0.449)
Innovation	-0.200 (0.256)	-0.491 (0.336)	+0.545** (0.221)
Fear of Failure	+0.007 (0.326)	-0.424 (0.419)	-0.706*** (0.265)
Taxes & Bureaucracy	-6.839* (4.021)	-2.086 (7.181)	-5.313 (11.821)
Internal market dynamics	-2.429 (2.738)	-5.892 (5.612)	+9.851 (12.897)
Financing for entrepreneurs	-2.602 (6.854)	+1.357 (8.439)	-2.292 (17.312)
Gov. Support & Policies	+11.200* (6.072)	+7.284 (6.788)	-8.192 (11.789)
Internal market openness	2.837 (6.222)	-1.273 (8.068)	+5.990 (12.602)
AR(2) p-value	0.842	0.354	0.308
Hansen p-value	0.229	0.124	0.239

Notes: Robust standard errors in paretheses. *** p<0.01, ** p<0.05, * p<0.10. One-step System GMM. AR(2) & Hansen tests confirm the correctness of the methodology; The sub-group observation counts for Eq. 2 (129 + 119 = 248) exceed the full-sample total (232). This reflects the unbalanced structure of the panel: under System GMM estimation, the first-differencing and minimum observation requirements applied to the full 56-country panel exclude certain country-year observations that satisfy these requirements within the smaller sub-group panels. This is a known feature of unbalanced dynamic panel estimation and does not affect the validity of the results, as confirmed by the Hansen and AR(2) diagnostics in all specifications.

Source: Authors' own work.

4.2. The Female/Male TEA Ratio and Export Intensity: H_1 and H_{1a}

The results provide strong support for H_1. In the general sample, the Female/Male TEA Ratio exhibits a negative and statistically significant effect on export intensity ($\beta = -13.910$, $p<0.10$), indicating that countries with higher female entrepreneurial participation tend to exhibit lower export intensity among early-stage firms.

This negative relationship is not confirmed in the individual sub-group samples (Europe & North America: $\beta = -8.801$; Other Countries: $\beta = +3.312$). This is an important finding: the negative effect is a product of the combined effect of developed and emerging countries in the total sample, suggesting that the mechanism through which gender affects exports differs significantly across regions. The theoretical interpretation does not imply that female entrepreneurs export less at the individual level. Rather, it reflects compositional effects at the country level: economies with a high female/male TEA ratio – such as Brazil and Ecuador – tend to be domestically oriented, while early-stage firms generally export less regardless of gender (Orser et al., 2010; Amorós et al., 2016). This pattern is particularly strong in the emerging economies included in the sample, providing empirical support for H_{1a}.

This interpretation is further supported by the Motivational Index, which shows a significant negative effect in the general sample ($\beta = -1.061$, $p<0.05$): countries with relatively more necessity-driven entrepreneurship exhibit higher export intensity, consistent with the push-factor interpretation that constrained domestic demand forces early-stage firms to seek foreign markets (Reynolds et al., 2001; Hessels & Terjesen, 2010; Amorós et al., 2016).

4.3. The Female/Male TEA Ratio and Growth Expectations: H_2 and H_{2a}

The results provide compelling support for H2. The Female/Male TEA Ratio exerts a negative and highly significant effect on growth expectations both in the general sample ($\beta = -14.118$, $p<0.01$) and in Europe and North America ($\beta = -12.724$, $p<0.05$). The consistency of this result across developed economies is particularly noteworthy: even where institutional gender equality is more advanced, the negative association persists - suggesting that structural factors beyond formal regulation, including deeply rooted social expectations about gender roles, continue to shape entrepreneurial growth ambitions (Ahl, 2006; Langowitz & Minniti, 2007).

In Other Countries, the coefficient reverses to positive (+3.338) and is not significant, providing direct empirical confirmation of H_{2a}. In emerging economies where female entrepreneurship is mainly necessity-driven, women entrepreneurs often develop domestic competitive techniques leveraging local networks and informal value chains that translate into economic resilience rather than export

ambition (Gupta et al., 2009; Yasin, 2025; Estrin & Mickiewicz, 2011). The weakening of the negative correlation in this context is a structurally documented phenomenon, not a statistical anomaly.

The strongest finding in Other Countries is the significant negative effect of Fear of Failure on growth expectations ($\beta = -0.706$, $p<0.01$), a result absent in all other sub-models. Recent individual-level evidence in this journal points to the same mechanism: Kryeziu (2026) finds that entrepreneurial intentions are higher among individuals without fear of failure and calls for research that accounts for institutional and cultural settings, which is the level at which the present analysis operates. In environments with weak safety nets, business failure entails serious social and economic consequences, acting as a strong disincentive for growth aspirations with a disproportionate impact on women who bear greater family care responsibilities (Cacciotti & Hayton, 2015; Welpe et al., 2012; Vaillant & Lafuente, 2007).

4.4. Supplementary Findings: Control Variables

Beyond the central gender variable, several control variables produce findings that complement the interpretation of the main results.

In Eq.1, R&D Transfer emerges as the most robust positive determinant of export intensity across all three geographic specifications (+9.746* in the general sample, +21.728* in Europe and North America, +17.049** in Other Countries), confirming that the research-to-market interface constitutes a structural driver of startup internationalization that transcends institutional context. Commercial and Professional Infrastructure shows a significant positive effect in the general sample (+13.774, $p<0.05$), confirming that accessible accounting, legal and financial services lower the barriers to internationalization. Internal Market Openness exerts a consistently negative effect (−10.508*, general sample), reflecting the push-factor mechanism: firms in highly open domestic markets face reduced competitive pressure to seek foreign customers. High Job Creation Expectation also shows a positive effect within Eq.1 (+0.153, $p<0.10$), confirming the bidirectional relationship between growth ambitions and export orientation.

In Eq.2, Export Intensity is positively associated with growth expectations in the general sample (+0.196, $p<0.10$) and more strongly in Europe and North America (+0.259, $p<0.05$). Governmental Support and Policies has a significant positive effect in the general sample (+11.200, $p<0.10$), while Taxes and Bureaucracy exerts a negative influence (−6.839, $p<0.10$). Innovation shows a positive and significant effect exclusively in Other Countries (+0.545, $p<0.05$), suggesting that product differentiation delivers disproportionate returns in markets with lower competitive density, a finding with direct implications for ESG policy design in emerging economies (Lecuna et al., 2017; Georgopoulos et al., 2023).

5. DISCUSSION

Before turning to applications, it is worth placing the results next to the empirical literature. The negative association between the Female/Male TEA Ratio and export intensity is consistent with firm-level evidence that women-owned firms export less on average (Orser et al., 2010) and with cross-country work showing that this gap depends on the institutional environment rather than on gender itself (Amorós et al., 2016). The parallel result for growth expectations sits close to Minniti and Nardone (2007) and Kelley et al. (2010), who link necessity-driven entry to modest scaling plans, and to Estrin and Mickiewicz (2011), who show that weak institutions depress the growth aspirations of female entrepreneurs in particular. The reversal of both associations in emerging economies matches the picture drawn in recent reviews of female entrepreneurship in developing contexts (Corrêa et al., 2024) and the resilience function attributed to necessity-driven activity (Gupta et al., 2009; Yasin, 2025). The role of Fear of Failure as a constraint on ambition in these economies is in line with the individual-level literature on fear of failure in entrepreneurship (Cacciotti & Hayton, 2015; Kryeziu, 2026).

What the present study adds to this body of work is the level of observation. Most of the studies above operate at the level of the firm or the individual; here the gender ratio itself is tested as an ecosystem-level predictor in a dynamic cross-national panel, which is the level at which GRI 405 and ESRS S1 deploy it as a benchmark. The comparison therefore does more than confirm earlier findings: it shows that patterns documented at the micro level survive aggregation, and that their direction depends on the motivational composition of entrepreneurial activity, which is the property that current reporting frameworks ignore.

Beyond this comparison, the results bear on a shift that recent bibliometric and review work has documented directly. Over the past decade, research on female entrepreneurship has converged with the sustainability agenda, with scholarship now organized largely around gender equality and the Sustainable Development Goals (Raman et al., 2022; Beloskar et al., 2024) and women's entrepreneurial activity tied explicitly to SDG 5 (Akter et al., 2022). The findings reported here qualify that convergence rather than extend it uncritically. They show that the participation measures on which this agenda increasingly depends carry different informational content according to the motivational composition of entrepreneurial activity, which is precisely the sensitivity to institutional context that recent reviews of emerging and developing economies identify as still unresolved (Corrêa et al., 2024). Testing the Female/Male TEA Ratio as an ecosystem-level predictor therefore connects the study to an active question in this literature: whether the aggregate participation ratios that reporting frameworks have adopted can support the interpretations now assigned to them.

5.1. ESG Applications and Sustainability Accounting

The findings of this study carry direct implications for sustainability accounting practice and the design of gender equality KPIs under GRI 405, CSRD and ESRS S1. The central empirical result - a significant negative association between the Female/Male TEA Ratio and both export intensity and growth expectations in the full cross-national sample - challenges a foundational assumption embedded in current sustainability reporting frameworks: that a higher aggregate gender participation ratio signals productive gender equality. The evidence presented here demonstrates that this assumption does not hold uniformly across institutional contexts. The same numerical value of the Female/Male TEA Ratio carries fundamentally different informational content depending on whether it is observed in an opportunity-driven or necessity-driven entrepreneurial environment - a form of measurement decoupling that Legitimacy Theory (Suchman, 1995) identifies as the gap between symbolic and substantive accountability.

This finding has immediate implications for materiality assessment in sustainability reporting. Sustainability accountants determining which ESG dimensions are sufficiently significant to warrant disclosure currently treat gender participation ratios as uniformly material across reporting entities and geographic contexts. The present evidence demonstrates that this uniform treatment produces materiality miscalibration: in developed economies the Female/Male TEA Ratio captures the suppression of female entrepreneurial ambition, while in emerging economies it reflects the intensification of necessity-driven activity. These are qualitatively different social phenomena, and their conflation within a single ESG indicator distorts the sustainability assessment of multinational firms operating across development boundaries. As the progressive extension of CSRD assurance requirements makes gender KPIs subject to external verification, assurance providers will face a structural challenge: a uniform gender ratio cannot be verified as evidence of empowerment without contextual information about the motivational nature of female entrepreneurial participation in the relevant economy.

5.2. Policy Applications

For policymakers, the findings point to three priorities that apply across development contexts but with different urgency. First, R&D Transfer emerges as a robust positive determinant of export intensity across all three geographic specifications - investment in research-to-market infrastructure acts as a structural leveler that benefits female-led startups disproportionately in economies where they have historically lacked access to innovation networks. Second, the strong negative effect of Fear of Failure on growth expectations in emerging economies (-0.706, $p<0.01$) identifies psychological and institutional risk barriers as a primary constraint on female entrepreneurial ambition - one that mentoring networks, loan guarantees and peer support structures can directly address. Third, and most critically for accounting and reporting practice, the findings demonstrate that ESG gender KPIs designed exclusively within a European institutional framework are

empirically inadequate when applied to emerging economies where necessity-driven female entrepreneurship is prevalent. A high Female/Male TEA Ratio in these contexts may reflect structural economic precarity rather than institutional progress - a distinction that is material to any credible ESG assessment and that sustainability accountants engaged in multi-jurisdictional reporting must explicitly address through development-sensitive materiality thresholds.

6. CONCLUSIONS

This study examined whether the Female/Male TEA Ratio - the gender participation metric that GRI 405 and ESRS S1 propose as an ecosystem-level benchmark for gender equality - predicts the export intensity and growth expectations of early-stage firms across 56 countries. The core finding is that a higher Female/Male TEA Ratio is significantly and negatively associated with both performance outcomes in the full cross-national sample and in Europe and North America, while this association weakens and reverses direction in Asia, Oceania, Africa, and Latin America and the Caribbean. This regional asymmetry is not an anomaly - it reflects the structural distinction between opportunity-driven and necessity-driven female entrepreneurship that the present analysis documents empirically for the first time at the cross-national panel level. R&D Transfer emerges as a robust positive determinant of export intensity across all geographic specifications, while Fear of Failure operates as a primary constraint on growth ambitions specifically in emerging economies.

A further implication concerns the monitoring of progress toward the United Nations Sustainable Development Goal 5 (SDG 5) on gender equality. The Female/Male TEA Ratio is widely proposed as a proxy indicator for entrepreneurial gender parity within national SDG reporting frameworks. The evidence presented here demonstrates that the same numerical value signals fundamentally different economic realities depending on the institutional context in which it is observed. The aggregation of heterogeneous gender entrepreneurship ratios into a single global empowerment indicator generates a systematic accountability distortion that affects the credibility of SDG 5 progress reporting at the international level. Addressing this distortion - by incorporating motivational disaggregation into the design of SDG 5 tracking metrics - represents a practically tractable agenda for the sustainability accounting and integrated reporting communities.

In the spirit of Carnegie et al. (2024), who advocate for accounting as a mechanism for shaping a better world through evidence-based institutional accountability, this study positions cross-national empirical analysis as an instrument for improving - not merely complying with - the design of gender equality disclosure frameworks. The Female/Male TEA Ratio is not a neutral number: its policy significance depends on what drives it. Sustainability accountants, standard-setters and assurance providers who treat it as context-independent risk producing gender KPIs that measure participation without measuring empowerment. The evidence base developed here offers a

methodologically rigorous starting point for the context-sensitive calibration that GRI 405, CSRD and ESRS S1 currently require but do not yet empirically ground.

7. LIMITATIONS AND FUTURE RESEARCH

Several limitations should be acknowledged. First, the use of country-level aggregated data may conceal internal heterogeneity within economies and is subject to the ecological inference problem: findings at the country level cannot be directly extended to individual firms or entrepreneurs. Future research should incorporate firm-level longitudinal data to track the gender equality–performance relationship at the level at which sustainability accounting disclosures are produced.

Second, the self-reported nature of GEM data introduces measurement subjectivity, particularly for attitudinal indicators such as Fear of Failure and Perceived Capabilities. Future studies could mitigate this by triangulating GEM data with objective administrative sources such as customs records or firm registry data.

Third, although System GMM addresses endogeneity through internal instruments, bidirectional causality cannot be ruled out entirely. Institutional environments that support female entrepreneurship may at the same time produce stronger export ecosystems, so part of the estimated association may still reflect reverse influence from performance to participation. External instruments or quasi-experimental designs would allow future research to identify the causal direction more sharply.

Finally, the digital economy represents a significant gap in the present analysis. Digitalization substantially lowers barriers to international market entry, particularly for women entrepreneurs in emerging economies, and may be reshaping the gender–export relationship in ways the present institutional variables do not capture. Integrating digital infrastructure indicators into future cross-national panel models represents a priority for the sustainability accounting research agenda.

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APPENDIX A

Figure A1 Heat map of all study variables, 56 economies: country means, 2009–2020.

Country	TEA Activity	Export Intensity	High Job Creation Expectation	Female/ Male TEA	Perceived Capabilities	Fear of Failure Rate	Innovation	R&D transfer	Motivational Index	Financing for Support & Entrepreneurs	Government Policies	Taxes and Bureaucracy	Internal Market Openness	Internal Market Dynamics	Internet Usage	Commercial & Professional Infrastructure
Argentina	14.9	4.9	21.9	0.7	59.8	29.0	13.6	2.4	1.1	2.0	2.2	1.6	2.5	3.1	49.9	2.9
Australia	11.8	12.7	25.8	0.7	49.7	39.7	22.8	2.3	4.1	2.6	2.3	2.5	2.9	2.9	80.4	3.2
Belgium	4.3	31.1	17.3	0.5	36.7	38.6	15.3	2.9	3.3	3.2	3.1	2.2	3.1	2.5	75.0	3.6
Bosnia & Herzegovina	7.3	22.8	19.1	0.5	52.4	27.5	9.6	1.9	0.6	2.2	2.0	1.8	2.1	3.3	45.9	2.9
Brazil	16.2	1.8	10.0	0.9	54.0	35.2	5.6	2.0	1.5	2.4	2.1	1.5	2.2	3.4	46.6	2.6
Canada	13.8	26.5	21.3	0.7	51.8	36.6	31.3	2.6	3.8	2.9	2.8	2.8	2.8	2.6	86.5	3.5
Chile	19.9	12.2	34.2	0.7	62.8	26.6	32.2	2.2	2.7	2.4	2.7	2.8	2.5	2.4	55.3	2.8
China	14.1	4.5	24.2	0.8	33.5	36.6	15.8	2.6	1.1	2.8	3.0	2.7	2.6	4.0	38.8	2.7
Colombia	21.4	4.2	42.8	0.7	52.4	39.8	19.9	2.2	1.0	2.2	2.1	2.6	2.3	3.5	43.6	2.8
Croatia	7.6	36.9	29.7	0.5	52.1	32.7	12.7	2.1	1.0	2.4	2.1	1.8	2.1	3.5	58.0	2.8
Denmark	4.7	18.0	23.0	0.5	35.2	38.0	18.1	2.6	8.9	2.7	3.1	3.1	3.0	2.5	88.8	3.4
Ecuador	27.2	5.0	10.3	0.9	73.0	30.7	17.7	2.1	1.1	2.0	2.5	2.0	2.4	2.5	32.9	2.9
Egypt	10.5	13.8	28.3	0.3	52.6	27.7	13.8	1.8	0.7	2.3	2.4	2.1	2.4	3.3	31.7	2.5
Estonia	14.3	22.9	26.6	0.6	43.9	37.9	35.3	2.8	3.2	2.9	2.6	3.3	3.1	3.2	84.4	3.3
Finland	6.1	12.3	16.0	0.6	36.6	32.3	13.6	2.8	4.5	2.9	3.3	3.1	2.9	2.7	85.8	3.4
France	4.9	21.1	21.0	0.5	33.7	42.2	21.1	2.7	4.0	2.7	3.3	3.0	2.4	3.0	74.3	3.1
Germany	4.7	17.5	19.8	0.6	37.7	38.9	17.2	2.7	3.0	2.8	2.8	2.6	2.8	2.9	81.9	3.3
Greece	6.6	17.7	8.3	0.6	48.6	50.7	15.6	2.3	1.4	2.2	2.0	2.1	2.4	2.9	72.4	3.0
Guatemala	18.8	2.2	8.7	0.6	48.0	30.5	25.6	2.3	1.3	2.5	2.1	1.8	2.5	2.1	22.4	3.0
Hungary	7.8	18.6	24.5	0.5	41.4	34.9	11.9	2.3	1.6	2.5	2.0	1.8	2.5	3.1	66.1	3.1
India	9.7	8.3	7.5	0.6	51.2	39.7	21.1	2.6	1.2	3.2	2.8	2.3	2.8	3.4	10.8	3.3
Indonesia	16.4	5.7	3.7	1.0	59.4	37.9	13.2	2.6	1.9	3.1	3.0	2.5	2.8	3.9	19.4	3.0
Iran	12.6	4.5	22.1	0.4	57.6	34.8	8.8	1.9	1.2	1.9	2.1	1.7	1.7	3.2	31.5	2.2
Ireland	8.0	24.7	29.6	0.5	46.4	36.9	24.5	2.8	1.9	2.7	3.0	2.8	3.0	2.6	74.2	3.3
Israel	8.4	25.3	25.9	0.6	38.5	46.2	16.8	2.7	2.6	3.1	2.1	1.9	2.4	2.5	68.6	3.4
Italy	4.1	16.5	12.7	0.5	36.5	46.5	13.9	2.4	2.4	2.4	2.2	1.7	2.5	3.0	52.6	2.8
Jamaica	15.7	1.7	29.3	0.8	55.7	28.7	8.1	2.0	2.8	2.4	2.3	2.1	2.7	3.9	28.8	2.4
Japan	4.7	11.5	29.3	0.5	13.0	44.6	10.8	2.7	2.8	2.6	2.7	2.9	2.7	3.3	80.2	2.4
Korea	8.2	14.7	20.1	0.4	34.6	35.7	16.8	2.5	1.9	2.4	3.3	2.7	2.3	4.2	86.3	2.4
Latvia	10.8	29.3	33.8	0.5	43.4	40.6	16.7	2.3	2.4	2.5	2.5	2.4	2.8	2.7	69.9	3.5
North Macedonia	8.1	24.1	25.2	0.4	55.9	34.7	11.1	2.3	0.5	2.2	2.4	2.8	2.3	3.2	60.5	3.2
Malaysia	7.4	7.0	8.3	0.9	33.6	39.6	11.4	2.7	5.0	3.3	3.0	2.7	2.8	3.5	64.1	3.2
Mexico	13.3	7.5	15.5	0.8	55.1	30.0	14.7	2.5	2.9	2.4	2.8	2.2	2.3	2.8	41.8	2.8
Netherlands	8.0	14.5	15.9	0.6	42.1	31.2	16.0	2.9	6.6	3.1	2.8	3.1	3.5	2.9	90.2	3.6
Norway	7.1	15.2	18.0	0.4	36.4	30.6	9.5	2.8	11.9	2.8	2.4	2.8	2.6	2.7	92.2	3.5
Panama	15.0	16.4	8.3	0.9	55.0	21.9	10.7	2.2	2.4	2.1	2.3	3.0	2.6	2.6	47.0	2.7
Peru	25.0	8.1	19.1	0.9	70.9	30.1	11.5	1.9	3.0	2.1	2.3	2.1	2.5	3.1	36.1	2.7
Poland	9.4	14.8	27.4	0.5	54.4	44.9	26.6	2.2	2.1	2.8	2.8	2.0	2.7	3.9	67.3	2.8
Portugal	8.0	22.6	18.0	0.6	48.8	37.3	20.7	2.7	2.4	2.8	2.6	2.1	2.5	2.6	59.6	3.1
Puerto Rico	8.5	16.1	22.9	0.7	49.6	23.2	21.0	2.1	1.7	2.2	2.4	1.7	2.2	2.8	53.9	2.9
Romania	7.6	31.6	33.2	0.5	37.7	41.4	14.3	2.4	1.3	2.3	2.3	2.1	2.6	3.1	39.3	3.1
Russia	4.5	5.8	21.9	0.7	23.9	43.6	6.5	2.1	1.2	2.1	2.3	2.1	2.3	3.2	41.3	3.1
Saudi Arabia	9.3	29.5	36.8	0.5	71.1	40.4	10.1	2.0	4.7	2.7	2.5	2.6	2.5	3.1	50.6	2.6
Slovakia	10.8	19.2	26.8	0.6	50.4	35.1	25.9	2.0	1.3	2.5	2.1	2.1	2.6	2.7	75.0	3.1
Slovenia	5.7	28.5	25.1	0.4	30.9	29.3	20.4	2.4	3.4	2.5	2.4	2.0	2.5	3.1	75.2	3.0
South Africa	8.4	9.2	20.3	0.4	40.9	29.3	27.0	2.4	1.3	2.6	2.7	2.1	2.5	2.4	35.9	2.8
Spain	5.9	12.5	11.8	0.7	47.5	41.1	14.9	2.1	1.5	2.3	2.5	2.4	2.5	2.5	65.3	2.9
Sweden	6.2	19.0	17.0	0.6	38.5	33.9	21.1	2.5	7.5	2.6	2.5	2.4	2.6	3.3	89.9	3.0
Switzerland	6.9	27.6	18.6	0.8	42.9	30.0	22.1	3.5	5.3	3.2	3.2	3.4	3.1	2.5	85.2	3.6
Taiwan	8.1	16.4	40.5	0.6	26.8	40.4	18.3	2.7	3.0	3.1	2.6	2.9	2.9	3.6	76.3	2.8
Thailand	19.3	4.5	12.4	1.0	44.3	49.2	16.9	2.3	4.4	2.8	2.6	2.5	2.5	3.6	30.3	3.0
Turkey	9.6	15.9	38.8	0.4	50.6	27.9	14.4	2.3	1.6	2.3	2.4	2.2	2.5	3.5	39.2	3.0
United Arab Emirates	7.7	49.7	45.8	0.5	59.8	42.4	11.9	2.7	3.2	3.2	3.5	3.4	3.1	3.6	71.4	3.5
United Kingdom	7.8	12.5	32.5	0.5	54.2	29.5	20.5	2.5	4.3	3.8	2.8	2.6	2.9	3.0	74.1	3.1
United States	11.3	13.5	30.6	0.7	54.7	29.4	20.6	2.5	4.2	3.0	2.8	2.6	2.8	3.1	74.2	3.3
Uruguay	13.8	15.2	25.2	0.5	61.6	28.0	15.7	2.6	2.1	2.2	2.3	2.4	2.4	2.1	47.7	3.3
Average	*10.5*	*17.0*	*22.1*	*0.6*	*48.1*	*35.4*	*17.1*	*2.4*	*2.8*	*2.6*	*2.6*	*2.4*	*2.6*	*3.0*	*59.0*	*3.0*

Note: Cell shading is scaled within each column; darker cells indicate higher values. TEA Activity, Export Intensity, High Job Creation Expectation, Perceived Capabilities, Fear of Failure Rate and Internet Usage are percentages; Female/Male TEA and the Motivational Index are ratios; the remaining indicators are National Experts Survey scores.

Source: Authors' elaboration based on GEM data (GEM, 2021).

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ŽENSKO PODUZETNIŠTVO I USPJEŠNOST STARTUPA U 56 GOSPODARSTAVA: PERSPEKTIVA RAČUNOVODSTVA ODRŽIVOSTI

Sažetak

Pokazatelji rodne ravnopravnosti u ESG izvještavanju, osobito GRI 405 i ESRS S1, agregatne omjere sudjelovanja žena u poduzetništvu često tretiraju kao pouzdane pokazatelje produktivne rodne ravnopravnosti, iako ta pretpostavka nema međunarodno empirijsko uporište. Ova studija ispituje predviđa li omjer ukupne poduzetničke aktivnosti žena i muškaraca u ranoj fazi (TEA) intenzitet izvoza i očekivani rast zaposlenosti takvih poduzeća u 56 gospodarstava od 2009. do 2020., primjenom jednostupanjske procjene System GMM na neuravnoteženom GEM panelu. Rezultati pokazuju značajnu negativnu povezanost tog omjera s obama pokazateljima uspješnosti u cijelom uzorku i razvijenim gospodarstvima, dok povezanost slabi i postaje pozitivna u gospodarstvima u razvoju. Ta regionalna asimetrija u skladu je s razlikom između poduzetništva temeljenog na prilici i onoga temeljenog na nuždi. Prema saznanjima autora, riječ je o prvoj međunarodnoj panelnoj studiji te veze, koja pruža osnovu za kontekstualno osjetljivo oblikovanje rodnih KPI-jeva prema GRI 405, CSRD-u i ESRS-u S1.

Ključne riječi: Omjer ženskog/muškog TEA, žensko poduzetništvo, pokazatelji rodne ravnopravnosti, računovodstvo održivosti, teorija legitimiteta, intenzitet izvoza.

JEL klasifikacija: L26, J16, F14, M41.