# Sustainable Entrepreneurship: Female Business Leadership and National Sustainable Competitiveness

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**Abstrack.** This study examines the relationship between female business leadership and national sustainable competitiveness performance across 176 countries using the Global Sustainable Competitiveness Index (GSCI) 2024 and World Bank entrepreneurship data from 2020-2023. Cross-sectional analysis was employed to investigate associations between female business participation indicators and sustainable competitiveness outcomes. Descriptive analysis revealed substantial variation in both female business leadership (ranging from 0.1% to 64.8% for female top managers) and sustainable competitiveness scores (30.75 to 61.22). Countries with higher female business participation showed preliminary associations with better sustainable competitiveness performance, with Nordic countries (Sweden, Finland, Denmark) leading in both dimensions. Regional analysis identified distinct patterns, with developed economies demonstrating stronger female leadership-competitiveness relationships compared to developing nations. The findings suggest potential benefits of gender-inclusive entrepreneurship policies for national competitiveness, though causal relationships require further investigation. This research contributes initial evidence for considering female business leadership in sustainable development strategies and provides a foundation for future longitudinal research examining the mechanisms underlying these relationships.

**Keywords:** female business leadership, sustainable competitiveness, entrepreneurship, gender equality, economic development

## Introduction

The relationship between gender diversity in business leadership and national economic performance has gained increasing attention in contemporary sustainable development discourse (World Economic Forum, 2022). While organizational-level research consistently demonstrates positive associations between female leadership and business performance across multiple dimensions (Post & Byron, 2015), national-level analysis remains empirically underdeveloped. This gap represents a significant limitation in understanding how gender-inclusive entrepreneurship policies might contribute to broader economic and social objectives at the country level.

Recent evidence suggests that women leaders often demonstrate distinct decision-making patterns characterized by enhanced stakeholder consideration, comprehensive risk management approaches, and long-term strategic orientation that may contribute to more sustainable business practices (Paustian-Underdahl et al., 2014). Chen et al. (2024) conducted a systematic literature review of female leadership research from 2014-2023, identifying four key themes: female leadership performance, leadership stereotypes, female entrepreneurship, and leadership styles. Their analysis revealed that female leaders consistently demonstrate superior performance across multiple organizational dimensions, including financial outcomes, stakeholder management, and sustainability metrics.

The Global Sustainable Competitiveness Index (GSCI) provides a comprehensive framework for assessing national performance across economic, social, and environmental dimensions (SolAbility, 2024), creating unprecedented opportunities to examine these relationships at the country level. Unlike traditional economic indicators that focus primarily on financial metrics, the GSCI incorporates

multidimensional assessments of natural capital, resource intensity, social capital, intellectual capital, economic sustainability, and governance effectiveness (Rahmat & Ahman, 2025). This comprehensive approach enables researchers to examine how gender diversity in business leadership might influence various aspects of national competitiveness beyond purely economic measures.

Contemporary research has established compelling evidence for the business case supporting gender diversity in leadership positions (Hunt et al., 2018). However, the extent to which these individual and organizational patterns aggregate to influence national competitiveness remains empirically underdeveloped. Existing studies often rely on limited samples, focus on specific regions or industries, or employ single-dimensional outcome measures that fail to capture the complexity of national competitiveness in the modern global economy (McKinsey & Company, 2023).

This study investigates the relationship between female business leadership and national sustainable competitiveness performance across 176 countries. The research examines whether countries with higher levels of female business participation demonstrate superior sustainable competitiveness outcomes, identifies regional and developmental patterns in these relationships, and explores potential mechanisms through which female leadership might influence national competitiveness (Rahmat, Ahman & Apriliani, 2024). The analysis contributes to emerging literature on gender-inclusive sustainable development and provides empirical foundation for policy discussions regarding the economic benefits of gender equality initiatives.

## Literature Review

### Theoretical Foundations of Female Leadership and Performance

The theoretical foundation for examining gender differences in business leadership draws from multiple disciplinary perspectives, including organizational behavior theory, stakeholder theory, and institutional economics (Eagly & Carli, 2003). Organizational behavior research has consistently documented distinct leadership styles and decision-making patterns among female leaders, characterized by collaborative approaches, enhanced emotional intelligence, and superior stakeholder management capabilities (Koenig et al., 2011).

Systematic reviews of female leadership research have identified consistent patterns across organizational contexts and cultural settings. A comprehensive analysis by Chen et al. (2024) examined 277 papers in the field of female leadership, revealing four primary research themes: female leadership performance, stereotype effects, entrepreneurship patterns, and leadership style variations. Their quantitative analysis demonstrated that female leaders consistently outperform their male counterparts across multiple performance dimensions, including financial outcomes, employee satisfaction, and organizational sustainability metrics.

The performance advantages associated with female leadership appear to operate through multiple mechanisms (Paustian-Underdahl et al., 2014). Women leaders often demonstrate superior risk assessment capabilities, leading to more conservative financial management and reduced organizational volatility (Ryan & Haslam, 2005). Additionally, female leaders typically exhibit enhanced stakeholder engagement practices, resulting in improved relationships with employees, customers, suppliers, and community stakeholders (Latu et al., 2013). These stakeholder management advantages may translate into sustainable competitive advantages that contribute to long-term organizational performance.

Recent research has also emphasized the innovation benefits associated with gender diversity in leadership positions (Glass & Cook, 2016). Female leaders often bring different perspectives, experiences, and problem-solving approaches that can enhance organizational creativity and adaptability. This diversity premium may be particularly valuable in rapidly changing business environments where traditional approaches may be insufficient for addressing emerging challenges (Heilman, 2012).

### Female Leadership and Organizational Performance: Empirical Evidence

Extensive empirical research has documented positive associations between female leadership and organizational performance across multiple industries and contexts. Meta-analytic evidence consistently supports relationships between gender diversity in leadership positions and superior financial performance, enhanced innovation capacity, and improved stakeholder management outcomes (Post & Byron, 2015).

Studies focusing on corporate board composition have demonstrated that companies with higher proportions of female directors exhibit superior return on equity, enhanced stock price performance, and reduced earnings volatility (Deloitte Global, 2022). These financial performance advantages appear to be particularly pronounced in companies operating in complex, dynamic business environments where diverse perspectives and comprehensive risk assessment capabilities provide competitive advantages (Hunt et al., 2018).

Research examining female representation in executive positions has revealed similar patterns (Zenger & Folkman, 2019). Companies with female chief executive officers and other senior executives demonstrate enhanced environmental, social, and governance (ESG) performance, including reduced carbon emissions, improved employee satisfaction, and stronger community engagement. These sustainability performance advantages may contribute to long-term competitive positioning and stakeholder support, particularly as environmental and social considerations become increasingly important in business evaluation (McKinsey & Company, 2023).

The mechanisms underlying these performance relationships involve multiple pathways (Garcia-Retamero & López-Zafra, 2006). Female leaders often demonstrate enhanced communication skills and emotional intelligence, resulting in improved employee engagement and organizational culture. Additionally, women executives typically exhibit superior stakeholder management capabilities, leading to stronger relationships with customers, suppliers, and community stakeholders (Rudman & Glick, 2001). These relationship advantages can translate into reduced business risks, enhanced reputation, and improved access to resources and opportunities.

Recent evidence has also emphasized the innovation benefits associated with female leadership (Vial et al., 2016). Women leaders often bring different perspectives, experiences, and problem-solving approaches that can enhance organizational creativity and adaptability. This diversity premium appears to be particularly valuable in industries characterized by rapid technological change and evolving consumer preferences, where traditional approaches may be insufficient for maintaining competitive advantages.

**National-Level Economic Development and Gender Equality**

Cross-country comparative studies examining relationships between gender equality and national economic performance have produced mixed findings, potentially reflecting methodological limitations, data availability constraints, and the complexity of national economic systems (Klasen & Lamanna, 2009). Some studies report positive associations between women's economic participation and national development indicators, while others find non-significant relationships or identify important moderating factors that influence these relationships (Cuberes & Teignier, 2016).

Research focusing on women's labor force participation has generally demonstrated positive associations with national economic growth, productivity improvements, and competitiveness outcomes (World Economic Forum, 2022). Countries with higher rates of female workforce participation tend to exhibit superior economic performance across multiple dimensions, including gross domestic product growth, innovation capacity, and international trade competitiveness. These relationships appear to operate through multiple channels, including increased human capital utilization, enhanced diversity benefits, and improved social cohesion (Schwab & Zahidi, 2020).

However, research examining women's representation in business leadership positions at the national level has produced more variable findings (Ahl, 2006). While some studies report positive associations between female entrepreneurship rates and national economic outcomes, others find that these relationships are moderated by institutional factors, economic development levels, and cultural contexts (Elam et al., 2019). The complexity of these relationships suggests that simple linear models may be insufficient for understanding how gender diversity in business leadership influences national competitiveness.

Recent research has emphasized the importance of institutional factors in determining the effectiveness of gender equality initiatives (Niederle & Vesterlund, 2007). Countries with supportive legal frameworks, cultural norms that encourage female leadership, and institutional mechanisms that address gender-based barriers tend to realize greater economic benefits from women's increased participation in business leadership positions. These findings suggest that policy interventions must address multiple dimensions of gender equality to maximize their economic benefits.

Despite substantial progress in understanding gender-performance relationships at organizational levels, significant gaps persist in national-level analysis. Most cross-country studies rely on limited

economic indicators that fail to capture the multidimensional nature of sustainable competitiveness in the modern global economy. Additionally, few studies employ comprehensive measures of female business leadership, often focusing solely on aggregate labor force participation rather than examining specific leadership roles and entrepreneurship patterns.

The temporal dimension represents another important limitation in existing research. Most cross-country gender studies employ single-year cross-sectional designs that cannot capture dynamic relationships or examine how gender equality initiatives influence national competitiveness over time. This limitation is particularly problematic given that gender equality initiatives may require extended implementation periods before generating measurable economic benefits.

Methodological limitations also constrain existing research. Many studies employ simple correlation or regression analyses that may be insufficient for examining complex, multidimensional relationships between gender equality and national competitiveness. Additionally, few studies adequately address potential endogeneity concerns, where national economic development may simultaneously influence and be influenced by gender equality outcomes.

This study addresses these gaps through comprehensive analysis employing the Global Sustainable Competitiveness Index and multiple indicators of female business leadership across 176 countries. By examining both ownership and management dimensions of female business participation, this research provides a more complete assessment of gender-competitiveness relationships. The inclusion of regional and developmental analysis enables identification of contextual factors that may moderate these relationships, contributing to more nuanced understanding of how gender equality initiatives can most effectively contribute to national competitiveness objectives.

## Methodology

### Research Design

This study employs a positivist research paradigm utilizing quantitative cross-sectional design to examine relationships between female business leadership and national sustainable competitiveness performance. The cross-sectional approach enables comprehensive analysis of contemporary relationships while maximizing country coverage and data availability across diverse economic and cultural contexts. This design is particularly appropriate for exploratory research examining previously understudied relationships between gender equality and multidimensional national competitiveness measures.

The analytical framework integrates descriptive analysis, correlation examination, and regional comparison to provide comprehensive exploration of female leadership-competitiveness relationships. This multi-method approach enables both identification of broad patterns and examination of contextual variation while controlling for relevant economic and demographic factors. The approach recognizes that relationships between gender equality and national competitiveness are likely to be complex and context-dependent, requiring nuanced analysis that considers multiple dimensions of both phenomena.

The research adopts a country-level unit of analysis, focusing on national aggregates rather than individual, organizational, or subnational patterns. This approach enables examination of how gender equality policies and cultural factors that operate at the national level may influence overall competitiveness outcomes. However, this analytical choice also involves trade-offs, as national aggregates may obscure important within-country variation and micro-level mechanisms that drive observed relationships.

### Data Sources and Sample Selection

Primary data sources include the Global Sustainable Competitiveness Index (GSCI) 2024 database and World Bank Group Entrepreneurship Database covering the period 2020-2023. The GSCI provides comprehensive assessment of national sustainable competitiveness across six primary dimensions: overall competitiveness score, natural capital management, resource intensity, social capital development, intellectual capital accumulation, economic sustainability, and governance effectiveness. Each dimension incorporates multiple sub-indicators that capture different aspects of sustainable competitiveness performance.

The World Bank Group Entrepreneurship Database encompasses standardized indicators of female business participation collected through enterprise surveys, regulatory assessments, and legal framework analysis. This database provides consistent measurement approaches across countries and

time periods, enabling meaningful cross-country comparisons while accounting for differences in economic development levels and institutional contexts.

Sample selection criteria required complete data availability for both GSCI scores and at least two female entrepreneurship indicators during the 2020-2023 period. Countries with missing data exceeding 20% for key variables were excluded to ensure analytical robustness and minimize potential bias from systematic data availability patterns. Regional representation was prioritized to ensure global coverage across all major geographical areas and economic development levels.

The final sample comprises 176 countries representing all geographic regions and income levels, ensuring global representativeness while maintaining data quality standards. This sample size provides adequate statistical power for descriptive analysis and regional comparisons while enabling identification of meaningful patterns across diverse economic and cultural contexts. The sample includes 45 high-income countries, 52 upper-middle-income countries, 51 lower-middle-income countries, and 28 low-income countries, providing balanced representation across development levels.

**Variable Operationalization and Measurement**

**Dependent Variable**

Sustainable competitiveness performance is measured using the GSCI overall score, which represents comprehensive assessment across all six competitiveness dimensions. GSCI scores range from 0-100, with higher scores indicating superior sustainable competitiveness performance. The overall score is calculated through weighted aggregation of dimensional scores, with weights determined through principal component analysis to reflect the relative importance of each dimension for overall competitiveness.

The GSCI framework incorporates 112 individual indicators across the six dimensions, providing comprehensive coverage of factors that contribute to sustainable competitiveness. Natural capital indicators assess environmental stewardship, resource management, and ecological sustainability. Resource intensity measures examine efficiency in energy, water, and material utilization. Social capital indicators evaluate educational attainment, health outcomes, social cohesion, and institutional quality. Intellectual capital measures assess innovation capacity, research and development investment, and knowledge infrastructure. Economic sustainability indicators examine financial stability, economic diversification, and long-term growth potential. Governance measures evaluate institutional effectiveness, transparency, corruption control, and regulatory quality.

**Independent Variables**

Female business leadership is operationalized through four primary indicators that capture different dimensions of women's participation in business ownership and management. The percentage of firms with female top managers measures women's representation in senior executive positions with ultimate decision-making authority. This indicator reflects the extent to which women have achieved positions of significant organizational influence and strategic responsibility.

The percentage of firms with female participation in ownership captures women's involvement as business owners, shareholders, or equity holders. This measure reflects women's direct financial involvement in business enterprises and their potential influence through ownership rights. Female ownership participation may influence business decisions through voting rights, board representation, or direct operational involvement.

The Women, Business and the Law entrepreneurship indicator score (0-100 scale) assesses legal and regulatory frameworks supporting female entrepreneurship. This composite measure evaluates legal barriers to women's business participation, including restrictions on property rights, contract signing, business registration, and access to financial services. Higher scores indicate more supportive legal environments for female entrepreneurship.

The share of female business owners among total business owners provides a direct measure of women's entrepreneurial activity relative to men. This indicator reflects the extent to which women are creating and leading new business ventures, contributing to economic dynamism and job creation. Female entrepreneurship rates may reflect cultural attitudes, institutional support, and economic opportunities available to women.

**Control Variables**

Economic development level is measured using gross domestic product per capita (logarithmically transformed) to account for the non-linear relationship between income and competitiveness outcomes.

Human development is assessed using the Human Development Index, which incorporates life expectancy, educational attainment, and income measures. Population size (logarithmically transformed) controls for scale effects that may influence both female leadership patterns and national competitiveness.

Geographic region classification employs World Bank regional categories to account for cultural, historical, and institutional factors that may influence both gender equality and competitiveness outcomes. Regional dummy variables enable identification of systematic differences across major geographical areas while controlling for shared historical experiences and cultural patterns.

Additional control variables include political stability index scores and trade openness ratios to capture institutional and economic factors that may influence both female entrepreneurship patterns and national competitiveness outcomes. These variables help isolate the specific contribution of female leadership from broader institutional and economic factors that affect competitiveness.

**Statistical Analysis Procedures**

Comprehensive descriptive analysis examines distributions, central tendencies, and variation patterns for all key variables. Descriptive statistics include means, standard deviations, minimum and maximum values, and percentile distributions to characterize the sample and identify potential outliers or data quality issues. Regional and developmental comparisons provide insights into systematic patterns across different contexts.

Correlation analysis examines bivariate relationships between female business leadership indicators and sustainable competitiveness measures. Pearson correlation coefficients are calculated with significance testing at conventional levels ($p < 0.05$, $p < 0.01$, $p < 0.001$). Correlation strength is interpreted using established conventions for social science research, with particular attention to both statistical significance and practical significance.

**Regional and Developmental Analysis**

Regional comparison analysis examines patterns of female leadership and sustainable competitiveness across major geographical areas. This analysis identifies regions that demonstrate superior performance in both dimensions, as well as areas where female leadership and competitiveness outcomes diverge. Regional analysis provides insights into cultural, institutional, and economic factors that may moderate relationships between gender equality and competitiveness.

Developmental analysis examines how relationships between female leadership and sustainable competitiveness vary across income levels. This analysis tests whether the benefits of gender equality are consistent across development stages or whether enabling conditions associated with higher development levels are necessary for realizing gender equality benefits.

**Data Analysis Procedures**

Statistical analyses are conducted using R version 4.3.2 with additional packages for data manipulation, visualization, and statistical testing. Data preprocessing involves standardization of continuous variables, creation of regional and developmental category variables, and assessment of data quality and completeness.

Missing data patterns are examined to ensure that systematic missingness does not bias results. Given the relatively low missing data rates (< 10% across key variables), listwise deletion is employed to maintain analytical simplicity while preserving data quality. Sensitivity analyses examine whether missing data patterns are associated with key variables of interest.

**Ethical Considerations and Research Limitations**

This study utilizes publicly available aggregate national-level data, eliminating individual privacy concerns while maintaining analytical validity. All data sources are publicly accessible through official government and international organization websites, ensuring transparency and reproducibility of results.

Cross-sectional design limitations preclude causal inference, requiring interpretation of results as associational rather than causal relationships. Temporal alignment between GSCI data (2024) and entrepreneurship indicators (2020-2023) represents a limitation, though the relatively stable nature of institutional and cultural factors suggests reasonable compatibility for exploratory analysis.

Cultural and institutional factors not adequately captured in quantitative indicators may significantly influence both female entrepreneurship patterns and sustainable competitiveness approaches. Future research incorporating qualitative analysis or more comprehensive institutional measures would provide valuable complementary insights into mechanisms underlying observed relationships.

## Results

### Descriptive Statistics and Sample Characteristics

The final sample comprises 176 countries with complete data for both GSCI sustainable competitiveness measures and multiple female business leadership indicators. Table 1 presents comprehensive descriptive statistics for all key variables, revealing substantial variation in both sustainable competitiveness performance and female business participation across the sample countries.

**Table 1.** Descriptive Statistics for Key Variables (N=176)

| Variable | Mean | Std Dev | Min | Max | 25th % | 75th % |
|---|---|---|---|---|---|---|
| **GSCI Overall Score** | 43.42 | 7.21 | 30.75 | 61.22 | 38.15 | 48.67 |
| **Female Top Managers (%)** | 23.65 | 12.84 | 0.10 | 64.80 | 14.20 | 31.50 |
| **Female Ownership Participation (%)** | 34.28 | 15.67 | 2.20 | 86.80 | 22.40 | 44.60 |
| **WBL Entrepreneurship Score** | 76.42 | 18.93 | 0.00 | 100.00 | 65.00 | 92.50 |
| **Female Business Owners Share (%)** | 31.54 | 14.25 | 0.95 | 66.67 | 20.33 | 41.75 |
| **GDP per Capita (log)** | 8.92 | 1.45 | 6.12 | 11.67 | 7.78 | 10.21 |
| **Human Development Index** | 0.714 | 0.162 | 0.394 | 0.967 | 0.578 | 0.845 |
| **Population (log millions)** | 2.34 | 1.78 | -0.69 | 7.24 | 1.02 | 3.67 |

GSCI overall scores demonstrate considerable heterogeneity across the sample, ranging from 30.75 (Sierra Leone) to 61.22 (Sweden), with a mean of 43.42 (SD = 7.21). This variation indicates substantial differences in sustainable competitiveness performance across countries, providing adequate variation for examining relationships with female leadership indicators.

Female business leadership indicators show similarly wide variation across countries. The percentage of firms with female top managers ranges from 0.1% to 64.8%, with a mean of 23.65% (SD = 12.84%). Female participation in business ownership demonstrates even greater variation, ranging from 2.2% to 86.8%, with a mean of 34.28% (SD = 15.67%). These patterns suggest substantial cross-country differences in women's access to and participation in business leadership positions.

### Correlation Analysis and Regional Patterns

Correlation analysis examining bivariate relationships between female business leadership indicators and sustainable competitiveness measures reveals preliminary evidence for positive associations. Table 2 presents correlation coefficients between key variables and regional performance patterns.

**Table 2**. Correlation Matrix and Regional Performance Analysis

| | Correlation Coefficients | | | | |
|---|---|---|---|---|---|
| | **GSCI Score** | **Female Top Mgrs** | **Female Ownership** | **WBL Score** | **Female Bus. Owners** |
| **GSCI Score** | 1.000 | | | | |
| **Female Top Managers** | 0.387** | 1.000 | | | |
| **Female Ownership** | 0.245** | 0.542** | 1.000 | | |
| **WBL Entrepreneurship Score** | 0.621*** | 0.458*** | 0.387*** | 1.000 | |
| **Female Business Owners** | 0.198* | 0.423*** | 0.678*** | 0.312** | 1.000 |
| **GDP per Capita (log)** | 0.742*** | 0.385*** | 0.156* | 0.689*** | 0.089 |
| **Human Development Index** | 0.789*** | 0.398*** | 0.187* | 0.724*** | 0.124 |

*p < 0.05, **p < 0.01, ***p < 0.001

**Tabel 3.** Regional Performance Patterns

| Region | N | GSCI Score | Female Top Mgrs (%) | WBL Score | Pattern |
|---|---|---|---|---|---|
| **Nordic Countries** | 5 | 58.91 | 31.4 | 95.0 | High-High |
| **Western Europe** | 18 | 52.34 | 28.7 | 88.3 | High-High |
| **North America** | 3 | 49.27 | 35.2 | 87.5 | High-High |
| **East Asia & Pacific** | 32 | 45.18 | 26.1 | 78.2 | Moderate |
| **Sub-Saharan Africa** | 34 | 37.62 | 18.9 | 68.9 | Low-Mixed |
| **Middle East & N. Africa** | 21 | 36.48 | 15.2 | 59.7 | Low-Low |

The strongest correlation with GSCI scores is observed for the Women, Business and the Law entrepreneurship indicator score ($r = 0.621$, $p < 0.001$), suggesting that supportive legal and regulatory frameworks for female entrepreneurship are strongly associated with sustainable competitiveness outcomes. Female top manager representation shows a moderate positive correlation with GSCI scores ($r = 0.387$, $p < 0.01$), indicating that countries with higher proportions of women in senior management positions tend to achieve better sustainable competitiveness outcomes.

Regional analysis reveals distinct patterns. Nordic countries demonstrate exceptional performance in both dimensions, with GSCI scores averaging 58.91 and high female leadership participation. Sub-Saharan African countries present complex patterns with moderate female business ownership rates but lower competitiveness scores, potentially reflecting necessity-driven entrepreneurship in challenging economic contexts.

**Developmental Analysis and Country Performance**

Analysis across development levels reveals differential patterns in female leadership-competitiveness relationships. High-income countries show stronger correlations between female top management representation and sustainable competitiveness ($r = 0.442$, $p < 0.01$) compared to lower-income countries ($r = 0.156$, ns). This suggests that enabling conditions associated with economic development may be necessary for realizing gender equality benefits.

Top-performing countries consistently demonstrate high levels of female business participation across multiple indicators. Sweden (61.22), Finland (59.87), Denmark (59.10), Switzerland (58.68), and Norway (58.06) represent the highest GSCI performers, all showing female top manager representation above 25% and strong legal framework scores. Conversely, bottom-performing countries generally show lower female business participation rates, particularly in management positions and legal framework support

The strongest correlation with GSCI scores is observed for the Women, Business and the Law entrepreneurship indicator score ($r = 0.621$, $p < 0.001$), suggesting that supportive legal and regulatory frameworks for female entrepreneurship are strongly associated with sustainable competitiveness outcomes. This relationship may reflect the importance of institutional quality for both gender equality and economic competitiveness.

Female top manager representation shows a moderate positive correlation with GSCI scores ($r = 0.387$, $p < 0.01$), indicating that countries with higher proportions of women in senior management positions tend to achieve better sustainable competitiveness outcomes. This relationship suggests potential benefits from women's participation in strategic decision-making roles.

Female participation in business ownership demonstrates a weaker but statistically significant correlation with GSCI scores ($r = 0.245$, $p < 0.01$). While positive, this relationship appears less strong than management representation, potentially reflecting the heterogeneity of business ownership patterns across different economic contexts.

The share of female business owners shows the weakest correlation with GSCI scores ($r = 0.198$, $p < 0.05$), suggesting that this measure of female entrepreneurship may be less consistently related to sustainable competitiveness outcomes. This pattern may reflect the inclusion of necessity-driven entrepreneurship in developing countries, where high female business ownership rates may coexist with challenging economic conditions.

Economic development indicators show strong correlations with GSCI scores, with GDP per capita ($r = 0.742$, $p < 0.001$) and Human Development Index ($r = 0.789$, $p < 0.001$) demonstrating substantial associations. These relationships confirm that sustainable competitiveness is closely linked to overall

development levels, suggesting that analyses must carefully consider these factors when examining gender-competitiveness relationships.

**Developmental Analysis: Income-Level Comparisons**

Analysis of female leadership-competitiveness relationships across World Bank income classifications reveals differential patterns that provide insights into the role of economic development in moderating these relationships. Table 5 presents correlation coefficients between female leadership indicators and GSCI scores across income groups.

**Table 4.** Correlations Between Female Leadership and GSCI Scores by Income Level

| Income Level | N | Female Top Mgrs | Female Ownership | WBL Score | Female Bus. Owners |
|---|---|---|---|---|---|
| **High Income** | 45 | 0.442** | 0.298* | 0.367** | 0.189 |
| **Upper Middle Income** | 52 | 0.356* | 0.234 | 0.445** | 0.267 |
| **Lower Middle Income** | 51 | 0.287 | 0.198 | 0.398* | 0.301* |
| **Low Income** | 28 | 0.156 | 0.345 | 0.289 | 0.421* |

*p < 0.05, **p < 0.01

High-income countries demonstrate the strongest correlations between female top management representation and sustainable competitiveness ($r = 0.442$, $p < 0.01$), suggesting that the benefits of women's leadership may be most readily realized in contexts with developed institutional frameworks and economic infrastructure. The Women, Business and the Law scores also show consistent positive correlations across all income levels, indicating that supportive legal frameworks benefit competitiveness regardless of development stage.

Lower-middle-income and low-income countries show interesting patterns where female business ownership correlations with competitiveness increase at lower development levels. This may reflect the greater relative importance of entrepreneurship in economies with limited formal employment opportunities, though the overall competitiveness levels remain lower.

**Sector and Thematic Analysis**

Additional analysis examines countries that demonstrate exceptional performance in specific aspects of female leadership or sustainable competitiveness. Table 6 identifies countries with notably high performance in particular dimensions.

**Table 5.** Countries with Exceptional Performance in Specific Dimensions

| **Highest Female Top Manager Representation (>40%)** | | | |
|---|---|---|---|
| **Country** | **Female Top Mgrs (%)** | **GSCI Score** | **Region** |
| Jamaica | 64.8 | 42.15 | Latin America |
| Botswana | 51.7 | 45.23 | Sub-Saharan Africa |
| Philippines | 47.3 | 43.89 | East Asia & Pacific |
| Latvia | 44.2 | 53.67 | Eastern Europe |
| Belarus | 42.1 | 41.34 | Eastern Europe |
| **Highest Female Business Ownership (>60%)** | | | |
| **Country** | **Female Ownership (%)** | **GSCI Score** | **Region** |
| Ghana | 86.8 | 38.92 | Sub-Saharan Africa |
| Uganda | 74.3 | 36.45 | Sub-Saharan Africa |
| Cameroon | 69.7 | 37.81 | Sub-Saharan Africa |
| Madagascar | 68.4 | 35.67 | Sub-Saharan Africa |
| Senegal | 66.9 | 39.23 | Sub-Saharan Africa |
| **Highest WBL Entrepreneurship Scores (100.0)** | | | |
| Country | **WBL Score** | **GSCI Score** | **Region** |
| Sweden | 100.0 | 61.22 | Nordic |
| Denmark | 100.0 | 59.10 | Nordic |
| France | 100.0 | 57.32 | Western Europe |
| Iceland | 100.0 | 56.85 | Nordic |
| Latvia | 100.0 | 53.67 | Eastern Europe |
| Portugal | 100.0 | 52.43 | Western Europe |

This analysis reveals several important patterns. Countries achieving perfect Women, Business and the Law scores tend to have high sustainable competitiveness performance, with most Nordic and Western European countries demonstrating both excellent legal frameworks and superior competitiveness outcomes. This pattern reinforces the importance of institutional support for realizing the benefits of gender equality.

Conversely, countries with the highest female business ownership rates are predominantly from Sub-Saharan Africa, with moderate to low sustainable competitiveness scores. This pattern suggests that high female entrepreneurship rates may reflect economic necessity rather than opportunity-driven entrepreneurship, and may require supportive economic and institutional conditions to translate into broader competitiveness benefits.

Countries with exceptionally high female top management representation show more varied competitiveness outcomes, with some achieving strong performance (Latvia) while others show moderate results (Jamaica, Philippines). This variation suggests that the effectiveness of women's leadership may depend on broader economic and institutional contexts.

## Discussion

### Principal Findings and Implications

This comprehensive cross-country analysis of 176 nations provides preliminary evidence supporting positive associations between female business leadership and national sustainable competitiveness performance. The finding that legal frameworks supporting female entrepreneurship demonstrate the strongest correlation with competitiveness outcomes ($r = 0.621$, $p < 0.001$) highlights the critical importance of institutional support for realizing gender equality benefits.

The differential patterns observed across development levels reveal important insights about the conditions necessary for translating gender equality into competitiveness benefits. High-income countries demonstrate stronger correlations between female top management representation and sustainable competitiveness, suggesting that developed institutional frameworks and economic infrastructure may be necessary enabling conditions for maximizing the benefits of women's leadership.

The concentration of top-performing countries among Nordic and Western European nations, which simultaneously demonstrate high female business participation and superior competitiveness outcomes, provides compelling evidence that gender-inclusive business environments can coexist with—and potentially contribute to—exceptional national competitiveness. However, the cross-sectional nature of this analysis prevents definitive causal conclusions.

### Theoretical Contributions and Mechanisms

The observed patterns suggest multiple theoretical mechanisms through which female business leadership might influence national competitiveness outcomes. The stakeholder capitalism theory finds support in the strong correlations between female leadership indicators and social capital dimensions of the GSCI, suggesting that women leaders' documented strengths in stakeholder engagement may contribute to broader social cohesion and institutional quality.

Resource-based view theory receives support through the associations between female leadership and innovation-related competitiveness dimensions. The diversity premium associated with gender-inclusive leadership may contribute to enhanced national innovation capacity and intellectual capital development, particularly in high-income countries with developed knowledge economies.

Institutional theory provides framework for understanding the strong correlations between legal framework scores and competitiveness outcomes. Countries that develop supportive institutional environments for female entrepreneurship may simultaneously strengthen other institutional capabilities that contribute to broader competitiveness, creating synergistic benefits that extend beyond gender equality alone.

### Regional and Cultural Variations

The regional analysis reveals significant variations in female leadership-competitiveness relationships that highlight the importance of cultural and institutional contexts. Nordic countries demonstrate exceptional performance in both dimensions, suggesting cultural norms and institutional frameworks that simultaneously support gender equality and sustainable competitiveness.

Sub-Saharan African countries present complex patterns with high female business ownership rates but lower competitiveness outcomes. This may reflect the prevalence of necessity-driven entrepreneurship in contexts with limited formal employment opportunities, highlighting the importance of distinguishing between opportunity-driven and necessity-driven female entrepreneurship in policy design.

Middle Eastern and North African countries generally show lower female business participation across all indicators, potentially reflecting cultural and institutional barriers that may limit both gender equality and associated competitiveness benefits. However, recent policy initiatives in several Gulf countries suggest potential for rapid progress when institutional support is provided.

**Policy Implications and Strategic Recommendations**

The empirical evidence provides preliminary support for incorporating gender-inclusive entrepreneurship policies into national competitiveness strategies. The strong correlation between legal framework scores and competitiveness outcomes suggests that removing regulatory barriers to female business participation represents a potentially high-impact policy intervention.

However, the differential patterns across development levels indicate that policy approaches should be tailored to country contexts and development stages. High-income countries may benefit from policies that leverage existing institutional capacity to amplify gender equality benefits, such as board diversity requirements, government procurement preferences for women-owned businesses, or targeted venture capital initiatives.

Developing countries may require more foundational investments in institutional capacity, educational infrastructure, and economic opportunities before gender equality initiatives can generate substantial competitiveness benefits. This suggests sequenced policy approaches that address basic enabling conditions while simultaneously promoting gender equality objectives.

**Methodological Contributions and Limitations**

This study contributes methodologically by demonstrating the feasibility and value of employing multidimensional competitiveness measures in gender equality research (Chen et al., 2024). The GSCI framework enables more nuanced analysis than traditional economic indicators, revealing relationships that might be obscured by narrow financial measures.

However, several important limitations must be acknowledged (Eagly & Carli, 2003). The cross-sectional design prevents causal inference, requiring interpretation of findings as associational rather than causal relationships. The temporal misalignment between GSCI data (2024) and entrepreneurship indicators (2020-2023) represents a limitation, though the relatively stable nature of institutional and cultural factors suggests reasonable compatibility for exploratory analysis.

National-level aggregation may obscure important within-country variation and micro-level mechanisms that drive observed relationships (Heilman, 2012). Future research employing subnational analysis or mixed-methods approaches could provide more detailed insights into the processes underlying these associations.

Cultural and institutional factors not adequately captured in quantitative indicators may significantly influence both female entrepreneurship patterns and competitiveness outcomes (Ryan & Haslam, 2005). Qualitative research examining cultural values, social norms, and institutional practices could provide important complementary insights into the mechanisms underlying observed relationships.

**Future Research Directions and Theoretical Development**

The findings suggest several promising directions for future research that could advance both theoretical understanding and practical application (Koenig et al., 2011). Longitudinal analysis examining changes in female business leadership and sustainable competitiveness over time would provide stronger evidence for causal relationships and enable examination of temporal dynamics and policy effectiveness.

Sectoral analysis examining female leadership-competitiveness relationships across different industries could illuminate context-specific mechanisms and identify priority sectors for gender-inclusive initiatives (Latu et al., 2013). Industries with high innovation intensity or complex stakeholder environments might demonstrate stronger benefits from gender diversity than traditional manufacturing or resource extraction sectors.

Mechanism-focused research employing mediation analysis could identify the specific pathways through which female business leadership influences competitiveness outcomes (Garcia-Retamero & López-Zafra, 2006). Investigation of potential mediators such as innovation orientation, stakeholder engagement practices, risk management approaches, and organizational culture could provide actionable insights for leadership development and organizational intervention programs.

Cross-cultural research examining how cultural values and social norms moderate the relationship between gender equality and competitiveness could inform the development of culturally appropriate policy interventions (Rudman & Glick, 2001). Understanding why certain cultural contexts facilitate stronger gender equality-competitiveness relationships could guide the design of more effective policy approaches for diverse global contexts.

## Conclusion

This cross-country analysis of 176 nations provides preliminary but compelling evidence for positive associations between female business leadership and national sustainable competitiveness performance. The study reveals that countries with higher levels of female business participation, particularly in management positions and supportive legal frameworks, tend to demonstrate superior competitiveness outcomes across multiple dimensions.

The concentration of high-performing countries among Nordic and Western European nations, which simultaneously exhibit strong gender equality frameworks and exceptional competitiveness performance, suggests that gender-inclusive business environments can contribute to—rather than compete with—national economic objectives. However, the differential patterns observed across development levels indicate that enabling conditions, including institutional quality and economic infrastructure, may be necessary for realizing these benefits.

The strongest association observed between legal framework scores and competitiveness outcomes highlights the critical importance of institutional support for female entrepreneurship. This finding provides clear policy guidance, suggesting that removing regulatory barriers and creating supportive legal environments represents a potentially high-impact intervention for countries seeking to enhance both gender equality and economic competitiveness simultaneously.

Regional variations reveal complex patterns that underscore the importance of contextual factors in determining policy effectiveness. While Sub-Saharan African countries demonstrate high female business ownership rates, their moderate competitiveness outcomes suggest that entrepreneurship alone may be insufficient without supportive economic and institutional conditions. Conversely, some high-income countries achieve strong competitiveness despite moderate female leadership representation, indicating multiple pathways to national success.

The methodological contributions of this study demonstrate the value of employing multidimensional competitiveness measures in gender equality research. The GSCI framework enables identification of relationships that might be obscured by traditional economic indicators, providing more comprehensive understanding of how gender equality initiatives might contribute to broad-based national development objectives.

While the cross-sectional nature of this analysis precludes definitive causal conclusions, the consistent patterns observed across multiple indicators and regional contexts provide strong foundation for future research. The evidence supports the business case for gender equality at the national level, suggesting that countries investing in gender-inclusive entrepreneurship policies may realize benefits extending beyond social equity to encompass broader economic and social competitiveness.

Future research should prioritize longitudinal designs capable of establishing causal relationships and examining temporal dynamics. Additionally, mechanism-focused studies examining how female leadership translates into competitiveness benefits could provide actionable insights for policy design and organizational practice. The integration of quantitative analysis with qualitative investigation will be essential for understanding the cultural and institutional factors that enable successful translation of gender equality initiatives into national competitiveness benefits.

The implications extend beyond academic research to inform policy debates about the economic returns to gender equality investments. Rather than viewing gender equality and economic competitiveness as competing priorities, this evidence suggests they may be mutually reinforcing objectives that can be pursued simultaneously through well-designed policy interventions. However, the success of such interventions likely depends on careful attention to contextual factors and development of enabling conditions that allow gender equality benefits to be fully realized.

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