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WOMEN EMPOWERMENT AND ECONOMIC CONTRIBUTION: STATISTICAL ANALYSIS WITH THE CHI-SQUARE TEST

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ABSTRACT

The study examines the relationship between women's labor for participation and a country's economic classification through statistical analysis. As the data set is publicly available, an evaluation is done to find whether income level categories (low, lower middle, upper middle, high) affect women's engagement in the labor force and to what extent. By conducting a Chi-square test on dependency, the findings reflect a strong association between income group and participation rate category. This indicates an underlying need for economic policy interventions.

Keywords: Women Empowerment, Female Labor Force Participation, Chi-Square Test, Gender Gap, Economic Contribution, Income Groups, HDI Rank, Statistical Analysis, Gender Inequality, Workforce Inclusion

1. INTRODUCTION

Women's empowerment seems like a human rights issue only, but it is a critical aspect of economic growth. In the fields of innovation, social development, and growth, the role of women has increased tremendously on a large scale. Women's participation in the labor force shows that it is not only a significant economic inclusion but a dynamic turn in society. Despite the inclusion and the progress, disparity still exists in women's labor force participation. Some of the economic, educational, and policy-driven factors affect women's participation in organized/formal employment opportunities. In low and middle-income countries, to earn a livelihood, women may engage themselves in informal sectors with vulnerable and poor working conditions. On the other hand, in high-income Nations, formal employment is accessible, but challenges like gender gaps exist.

Some studies show that increasing female participation in the labor force is somehow related to higher GDP, improved family health outcomes, and better education systems. Economic benefits such as health, GDP, infrastructure, and mobility of countries have been quantified by global reports provided by the World Bank, UNDP, and McKinsey Global Institute. These figures provide insights into a country's development factors and show how gender economics play a significant role. Considering two factors - the country's income classification and the level of female labor force participation, a statistical relationship can be identified between the two. Chi-square test of independence and visual analytics can be used in further study to determine the fact whether the national income levels are related to the female participation in the labor force. Also, by examining gender gaps and reasonable trends, insights for policy making and development interventions can be determined.

1.1. REQUIREMENT OF THE STUDY

The need for the study arises from a perception of whether gender equality is being achieved, and whether there still exist gender disparities in economic activities. Global policies glorify the concept of gender inclusivity and responsive development, while consistent reports show a link between income classification and labor force participation. The study will show whether the women's environment in the workforce coordinates with the nation's economic factors and to what extent. Further analysis and research will highlight the policy intervention that would be needed to attain gender equality in the economic context.

2. LITERATURE REVIEW

There have been numerous studies that have shown undermining factors affecting female participation at work, which include education, cultural norms, fertility rates, and accessibility to opportunities. Reports provided by the World Bank and the International Labor Organization put emphasis on the connection between two aspects: female participation and the economic development.

Countries that have overall better economic performance tend to have a higher level of gender equality. Taking the example of Klasen and Lamanna (2009), in a developing country, Gender inequality in the workforce leads to slower or steeper economic growth. Similarly, the global gender cap report by the World Economic Forum (2022) shows that reducing the gender gap in the labor force leads to an increase in national productivity and economic growth.

Vacancy Global Institute 2016 reported that boosting gender equality in labor markets could add $12 trillion to global GDP by 2025. Research by Seguino also indicates a positive link between gender equity in employment and heightened tent national income.

Somehow, there have been limited quantitative reports that show the intersection between income classification and female workforce participation using the Chi-square test. The study will help in seeking the gap between the two reinforcing aspects through a statistical analysis.

3. RESEARCH OBJECTIVES

- To classify countries by income group (low, lower middle, upper middle, high) and abstract their female participation rate.
- To perform a statistical test to determine whether income classification is related to labor force participation levels.
- To visualize the distribution of women's participation levels across specific economic groups.
- To suggest policy measures based on the findings.

4. METHODOLOGY

4.1. DATASET DESCRIPTION

The dataset used in this study was sourced from Kaggle (https://www.kaggle.com/datasets/iamsouravbanerjee/labour-force-participation-rate). It comprises country-wise male and female labor force participation rates from 1990 to 2022. To minimize the variances due to the pandemic-related labor (2020 onwards), 2019 values were selected for the study. Metadata such as HDI rank and continent are included in each data set.

4.2. VARIABLES USED

- Independent Variable: Income Group (derived from HDI rank)
- Dependent Variable: Female Labor Force Participation Rate (2019)
- Additional Variable: Male Labor Force Participation Rate (2019)
- Derived Metric: Gender Gap = MaleRate - FemaleRate

4.3. CATEGORIZATION

Participation Rate was categorized into:

- High (>= 60%)
- Medium (40%-59.9%)
- Low (< 40%)

Income Group was inferred from HDI Rank as:

HDI Rank ≤ 60: High income

- 61–120: Upper middle income
- 121–160: Lower middle income
- 160: Low income

4.4. STATISTICAL METHOD

A contingency table was created to assess the relationship between the income group (Independent Variable) and Female Labor Force participation rates (Dependent Variable), and a Chi-Square Test of Independence was conducted. Further, the gender gap was calculated and visualized.

4.5. RESEARCH FLOW CHART

- **Data Acquisition:** gathering data on global labor force participation rates of both male and female from Kaggle.
- **Data Cleaning**: Removing missing values and merging relevant sheets.
- **Variable Selection and Categorization**: The variables being selected are the income group (Independent Variable) and Female Labor Force participation rates (Dependent Variable). Selecting 2019 participation rates as mentioned and categorizing them into High, Medium, and Low groups. The income group was inferred using the HDI rank.
- **Contingency Table Generation:** Creating a cross-tab between income groups and female participation categories.

- **Chi-Square Test of Independence**: Testing whether a significant relation exists between income group and female participation.
- **Gender Gap Analysis**: Calculating the gender gap(male-female) participation rate difference.

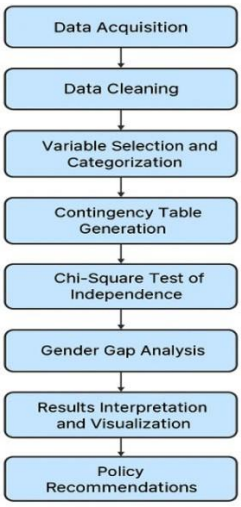


Fig: Flowchart illustrating the research step for analyzing women's labor force participation and gender gap across income groups

A contingency table was created showing the distribution of female participation categories across income groups:

Contingency Table:

Income Group	High	Low	Medium
High income	**10**	**6**	**44**
Low income	**18**	**9**	**8**
Lower middle income	**14**	**14**	**12**
Upper middle income	**7**	**24**	**29**

The Chi-Square test yielded the following results:

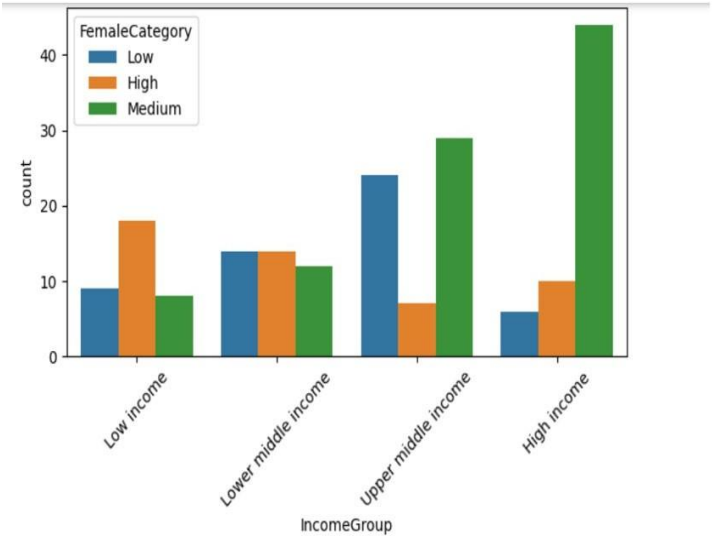
Chi-square value: 43.72

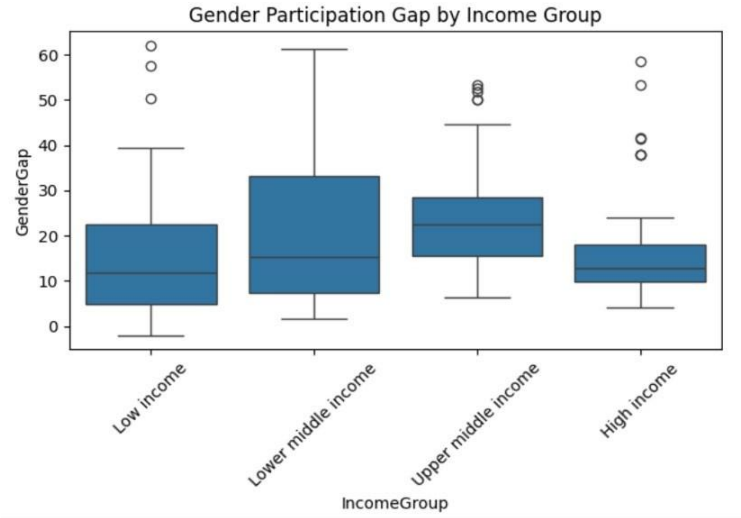
Degrees of freedom: 6

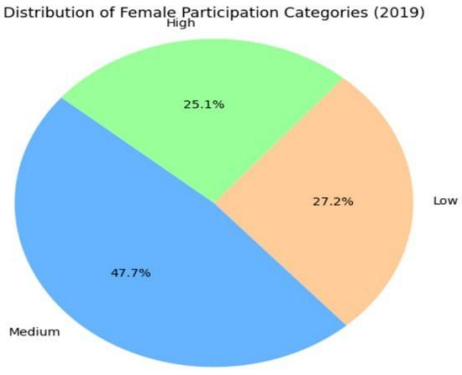
p-value: 0.0000

Since the p-value is less than 0.05, the null hypothesis of independence is rejected, indicating a statistically significant relationship between income group and women's participation rate category.

Visualizations:







These visualizations illustrate how high-income countries skew towards 'Medium' participation, while low-income countries show a wider spread, including a substantial 'High' category share.

5. DISCUSSION

The Chi-Square test produced a value of 43.72 with 6 degrees of freedom and a p-value of 0.000, confirming a statistically significant relationship between income group and female participation category. High-income countries tend to show medium levels of female participation, while low-income nations displayed more variation, including more females employed in the labor force—likely driven by economic necessity rather than choice.

After the gender gap analysis, more disparities are shown. Even in nations with high female participation, a significant gap is reflected when compared to male rates. This builds an imperative that absolute participation can also highlight and underline gender inequalities at work. Moreover, social culture factors like patriarchal society, low access to education, and infertility rates affect women's ability to participate in formal employment more than men. All of these factors hinder the females working in low-income religions more than the females working in the formal sector in higher-income countries.

As analyzed and the factors being discussed, it is crucial to implement relevant policies to rectify the inequity in upper and lower middle-income growth, where female participation is often suppressed due to the factors discussed. Suitable measures like flexible working conditions, safe transportation, better infrastructure for efficient mobility, educational training, and skill development programs to encourage female participation and reduce the gender gap.

Encouraging such measures and policies can show a gradual progress in National labor markets with Sustainable Development Goal 5- gender equality and SDG 8-decent work and economic growth. Furthermore, organizations and partnerships such as NGOs and international development agencies can also help implement reforms based on the analyzed empirical data.

6. CONCLUSION

The analysis confirms the clear link between the two variables selected- income group and women's participation in the labor force, along with the persistent gender disparities as computed by the gender gap. After the empirical research, we can emphasize the importance of responsive policy making and executing them to overcome the factors that build gender inequity in the workforce. The study reveals the value of understanding every social, cultural, and educational factor behind the issue and the need to uncover the structural or traditional patterns in labor market participation. The statistical methods chosen in the analysis made it easier to categorize and analyze participation levels, income groups and to compute the gender gap. This made it easier to guide policymakers and monitor progress over time. Also, future research could be expanded by including other variables related to post-pandemic labor shifts, changes in trends, urbanization, and education levels.

CONFLICT OF INTERESTS

None.

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REFERENCES

World Bank. (2020). Women in the Workforce: Challenges and Opportunities.
International Labour Organization (ILO). (2021). Global Employment Trends for Women.

Kaggle Dataset: Labour Force Participation Rate. https://www.kaggle.com/datasets/iamsouravbanerjee/labour-force-participation-rate

United Nations Development Programme (2020). Gender Equality and Women's Empowerment.

Buvinic, M., & King, E. M. (2007). Smart Economics: Investing in Women as a Development Strategy.

Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal. Gender & Development, 13(1), 13–24.

Klasen, S., & Lamanna, F. (2009). The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries. Feminist Economics, 15(3), 91–132.

McKinsey Global Institute. (2015). The Power of Parity: How Advancing Women's Equality Can Add $12 Trillion to Global Growth.

Seguino, S. (2000). Gender Inequality and Economic Growth: A Cross-Country Analysis. World Development, 28(7), 1211–1230.