



# Do Digitalization, Human Development, and Democracy Reduce Gender Inequality? Panel Evidence from Selected Asian Countries

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**Abstract.** This study aims to analyze the effects of digital technology adoption (Information and Communication Technology – ICT), human development (Human Development Index – HDI), democracy index, and population growth on gender inequality across 37 Asian countries. Using a Random Effect Model with panel data, the estimation results reveal that ICT has a negative and statistically significant effect on the Gender Inequality Index (GII), indicating that greater digital adoption correlates with lower levels of gender inequality. Broader digital access enables women to participate more actively in the digital economy, particularly through micro-enterprises, online trade, and creative industries. Furthermore, HDI also shows a negative and significant effect on GII, confirming that human development, especially through women’s education and health serves as a key determinant of gender equality. Meanwhile, the democracy index has a negative but statistically insignificant effect, suggesting that formal democracy does not necessarily translate into gender equality without strong institutions and affirmative policies. Population growth shows a positive but insignificant relationship, implying that demographic impacts are context-dependent and mediated by socio-economic factors. Overall, the findings emphasize that digital transformation and human development are fundamental drivers in reducing gender inequality in Asia. The study offers strategic policy implications for developing countries to strengthen digital inclusion, women’s education, and gender equality institutions in pursuit of Sustainable Development Goal (SDG) 5 – Gender Equality.

**Keywords:** Digital Technology, Gender Inequality, Human Development, Democracy, Asia.

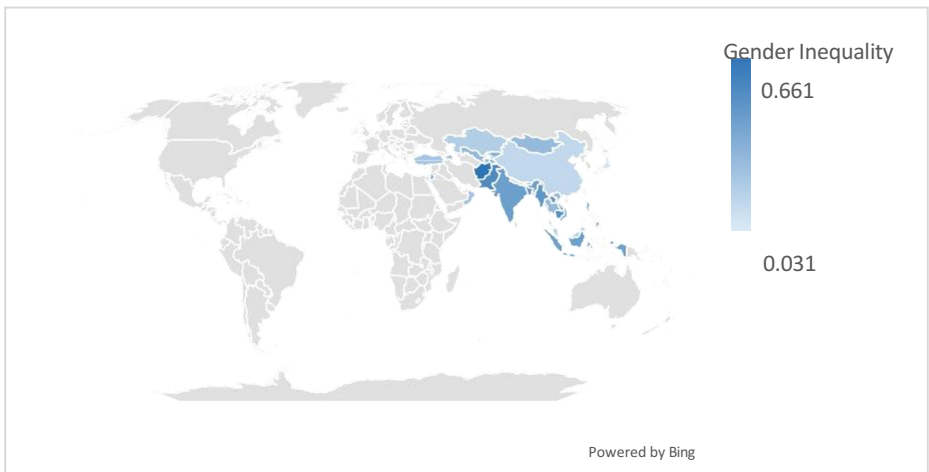
## 1 Introduction

### 1.1 A Subsection Sample

Gender inequality remains a global issue that must be urgently addressed, both in developed and developing countries. Inequality between men and women in accessing resources, in participating in development, in decision-making, and in obtaining the

benefits of development has negative impacts on overall progress. In general, women are the ones who experience the greatest negative impact from these disparities. Yet, women also have tremendous potential to contribute to accelerating development.

Based on data collected from the Gender Equality Database for 30 selected countries in Asia (Figure 1), only three countries have the lowest gender gap index such as Japan, Singapore, and Israel—with scores below 0.1. Meanwhile, countries such as Afghanistan, Cambodia, and Myanmar have extremely high gender gap indices, approaching one. This fact shows that the dream of achieving gender equality is still far from reality. In the context of economic transformation, digital-based technological advancements are expected to enable both men and women to more easily access information and enhance their productivity, thereby contributing equally to development.



Sources: World Bank, data processed

**Fig. 1.** Gender Gap Index in Asia

The relationship between economic transformation in the form of technology and information adoption and the reduction of gender inequality is quite strong. This is in line with UNDP [1] which states that digital technology provides opportunities and participation for various groups, including women, to engage in broader economic activities.

A study conducted by Genz, S., Schnabel, C. [2] found that digitalization has led to greater job losses for women compared to men. Digitalization, however, can have a positive impact on women if it is reinforced by their capabilities. In this regard, education becomes a key factor in enhancing women's capacity to compete and take advantage of digital technology [3].

Nevertheless, in many countries, women's education levels are still equivalent to lower secondary school or only around eight years of schooling. This contributes to the widening of the gender gap. Investment in human capital through government spending

on education and health can reduce gender inequality in developed countries [4]. Government spending in the education sector can reduce gender inequality at the primary, secondary, and tertiary levels.

Women's education is closely related to labor productivity, which has positive implications for advancing gender equality [5]. Thus, through social transformation policies in the education sector, gender inequality can be effectively addressed.

Another transformative policy that can address gender inequality is institutional quality [6]. One of the key aspects of government institutional quality is democracy. Women's participation in legislatures and public institutions strengthens decision-making that favors women's empowerment in various areas of development [7]. Andersen,

T.B. [8] found that democracy enhances gender equality. In contrast, Wang, Q. et al. [9] argued that democracy does not reduce gender inequality in authoritarian countries; rather, the expansion of education plays a more crucial role.

Previous empirical studies have generally examined transformative policy variables in a partial manner with respect to gender inequality, and the results remain contested. This study aims to combine the influence of three transformative policy variables namely digital technology, the Human Development Index, and the Democracy Index on gender inequality through panel data analysis in 38 selected Asian countries. The integration of these three proxies of transformative policies is highly relevant to global developments in addressing social issues, including gender inequality.

## 2 Literature Review

The relationship between transformative policy variables including digital technology, the Human Development Index, and the Democracy Index and gender equality has been examined by several previous studies, yet the findings continue to generate extended debate [10], [11]. Whitehead, A. [12] found that technology can improve the living conditions of rural women. This aligns with Naicker and Mbengo's findings in selected universities in South Africa. Similarly, African women's participation in digital technology in the USA was shown to empower women through primary data analysis [13]. ICT has been found to promote gender equality, including in the logistics and transportation sectors [14]. However, not all forms of digital access improve gender equality. Patón-Romero, J.D. [15] revealed that technology adoption does not automatically benefit women.

Amid the ongoing technological revolution, all development activities are inseparable from the use of digital technology. However, one of the greatest challenges faced by many countries, particularly developing and least developed countries, is the limitation of human capital capacity. Digital technology contributes positively to development, including promoting gender equality, when accompanied by strong human capital. Investment in human capital plays a crucial role in this regard [16]. Bastian, L. [17] found that education is the key to reducing gender inequality. With access to education, women are able to expand their use of technology and increase labor productivity [18]. Tokal, P. [19] further found that education has a statistically significant impact on gender inequality in emerging markets.

Gender equality is also strongly influenced by the quality of government institutions, particularly through democratic practices. Democracy is believed to provide broader political participation opportunities for women, thereby enhancing gender equality [7]. Andersen, T.B. [8] found that a one-standard-deviation increase in democracy contributes to a three-fifths standard deviation increase in gender equality, consistent with Högström, J. [7] findings, which highlight the positive impact of democracy, especially in civilian dictatorships. However, more recent studies provide contrasting results. [20] reported that the democracy index generally does not have a significant effect on gender equality, although aspects of political participation and government effectiveness do contribute meaningfully to improving gender equality.

In addition to the three transformative policy variables, economic growth ideally should foster a labor market that is more responsive to gender equality, particularly by expanding opportunities for women [21]. According to Akinwande, T.S. et al. [22], economic growth can expand women's access to higher education, enhance gendersensitive participation in the digital economy, and strengthen policy frameworks that support equality. Thus, inclusive growth has the potential to achieve better gender outcomes, which in turn contribute to more equitable income distribution [23], [24], [25], [26]. However, previous studies such as Nandan, A., Mallick, H. [27] found inconsistent relationships between economic growth and gender equality using an Autoregressive Distributed Lag (ARDL) model in Ethiopia.

Taken together, prior empirical research has predominantly analyzed digital technology, human development, and democracy in isolation, leading to fragmented and often contradictory findings. Furthermore, most existing studies are conducted in African or Western contexts, while Asia, a region undergoing both rapid technological change and institutional transformation, remains relatively underexplored. Another limitation is methodological: the reliance on cross-sectional or country-specific analyses often overlooks temporal dynamics and cross-country heterogeneity.

This study addresses these gaps by applying panel data analysis for 37 Asian countries during the period 2011–2023, allowing for a simultaneous examination of digital technology, human development, and democracy. By integrating these three transformative policy dimensions within a comparative regional framework, the study contributes to both the academic literature and policy discourse on how to design inclusive strategies for advancing gender equality.

## 3 Methodology

### 3.1 Research Design

This study adopts a quantitative research design using secondary data. The dataset consists of a panel of 37 selected Asian countries covering the period 2011–2023. The selection of 38 countries is based on three main considerations (i) Diversity in the level of development: the sample includes advanced, emerging, and least developed economies. This variation is important for examining whether the effects of ICT, human development, and democracy differ across development stages. (2) Data availability: not

all Asian countries provide complete and consistent data for the key variables throughout 2011–2023. Only 38 countries met the requirement of having continuous observations across all variables studied. (3) Relevance to economic and institutional transformation: most of the selected countries are undergoing structural changes in their economies, societies, and governance systems, making them particularly relevant for analyzing the determinants of gender inequality.

### 3.2 Data Sources and Variables

The data were collected from reputable sources, including World Bank's World Development Indicators (WDI), United Nations Development Programme (UNDP) Human Development Reports, Economist Intelligence Unit (EIU) Democracy Index, and World Inequality Database. Secondary data such as ICT (Information and Communication Technology indicators, e.g., internet penetration), HDI (Human Development Index), Dem (Democracy Index), Population Growth (Pg).

### 3.3 Model Specification

The empirical analysis employs a multiple regression model in panel form, specified as:

$$GII_{it} = \alpha_1 + \alpha_2 ICT_{it} + \alpha_3 HDI_{it} + \alpha_4 Dem_{it} + \alpha_5 Pg + \varepsilon_{1it} \quad (1)$$

Where,

- $GII_{it}$  = Gender Inequality Index for country  $i$  at time  $t$ ,
- $ICT_{it}$  = Information and Communication Technology indicator,
- $HDI_{it}$  = Human Development Index,
- $Dem_{it}$  = Democracy Index,
- $Pg$  = Population growth,
- $\varepsilon_{it}$  = error term,
- $i$  = country,
- $t$  = year (2011–2023).

Panel regression techniques (Fixed and Random Effects) are employed, with robustness checks using heteroskedasticity-robust standard errors.

## 4 Results

This study employs panel data covering 37 selected Asian countries over the period 2011–2023, resulting in a total of 481 observations. In panel data analysis, there are three primary estimation models that can be applied: the Fixed Effects Model (FEM), the Random Effects Model (REM), and the Common Effects Model (CEM). The appropriate model was determined through a series of specification tests to ensure that the estimated results are efficient, unbiased, and consistent. Based on the model specification tests, this study adopts the Random Effects Model to examine the impact of digital

technology, the Human Development Index (HDI), and the Democracy Index on gender inequality in the 38 selected Asian countries. Nevertheless, to ensure the robustness of the empirical findings, the study additionally reports estimates based on the Fixed Effects Model for comparison.

Table 1 presents the descriptive statistics of the variables used in this study. The Gender Inequality Index (GII) serves as the dependent variable, with an average value of 36.339 and a standard deviation of 16.566 across the sample countries. A lower GII value indicates that women's positions in various dimensions of development have improved. In the health sector, for instance, a decline in maternal mortality rates reflects better access to reproductive health services. In education, an increasing proportion of women attaining higher education and managerial positions suggests improved empowerment. In the economic domain, higher female labor force participation and better wage equality illustrate progress toward economic inclusion.

Interestingly, the GII ranges from a minimum value of 3.0 to a maximum of 83.9, indicating substantial cross-country variation in gender inequality levels. Some countries have achieved relatively high gender equality, while others continue to experience pronounced disparities. Hence, a lower GII value reflects a higher level of justice and equality in the distribution of opportunities and outcomes between men and women. Such variation in gender equality outcomes is closely linked to the extent of transformational policies implemented by individual countries.

Among the key transformational variables, digital technology adoption plays a pivotal role in addressing gender inequality. As shown in Table 1, digital adoption levels vary considerably across countries, ranging from 3.1 to 100, with an average of 55.128. This indicates a substantial digital divide within the region. The disparity in technology use is strongly associated with differences in human capital quality and access to information infrastructure.

Regarding the Human Development Index (HDI), the disparities are less pronounced than for the previous variables. The average HDI among the 38 countries is 72.611, with values ranging between 42.4 and 94.9, suggesting that these countries share relatively similar levels of human development overall.

The Democracy Index (DI) records an average of 4.415 with a standard deviation of 1.89, ranging from 0.26 to 8.24. This wide range illustrates the spectrum from authoritarian to highly democratic regimes in Asia. Meanwhile, population growth averages 1.753% per year, with a standard deviation of 1.689, ranging from -4.319% to 10.838%. This substantial heterogeneity across countries underscores the diversity of the Asian region. Consequently, the use of panel data estimation methods is justified to capture these variations comprehensively and provide more robust and representative empirical findings.

**Table 1.** Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Gender Inequality Index	481	36.339	16.566	3	83.9
ICT	481	55.128	28.581	3.1	100

HDI	481	72.611	11.941	42.4	94.9
Democracy Index	481	4.415	1.896	0.26	8.4
Population Growth	481	1.753	1.689	-4.319	10.838

Source: Authors, 2025

Table 2 presents the estimation results of the effects of digital technology, the Human Development Index (HDI), and the Democracy Index (DI) on gender inequality reduction using panel data analysis models, namely Fixed Effects (FE) and Random Effects (RE). Nevertheless, this study focuses primarily on the estimation results obtained from the Random Effects model, following the specification test recommendations for panel data analysis. The total number of observations is 481, covering 37 selected Asian countries over a 13-year period. Both models provide consistent empirical evidence regarding the determinants of gender inequality (GII) across the selected countries in Asia. The results indicate a strong relationship pattern between technological development, human development, democratic governance, and the dynamics of gender inequality.

For the Information and Communication Technology (ICT) variable, the Random Effects model records a coefficient value of  $-0.0729$ , statistically significant at the 1% level. This suggests that every 1 percent increase in the use of communication technologies such as the internet reduces gender inequality by approximately 0.07 points. Expanding internet accessibility benefits women in various aspects of development, including health, the economy, political participation, and labor force involvement. This finding reinforces the arguments of modernization theory and the digital gender inclusion literature, which posit that the adoption of digital technology opens greater access for society to development opportunities. In other words, ICT functions not only as an economic instrument but also as a driver of social transformation that helps reduce structural gender inequality. The strength of this relationship is further supported by the Random Effects estimation, which also shows a negative and statistically significant coefficient of  $-0.08$  at the 1% level.

Similarly, the Human Development Index (HDI) exhibits a negative and significant relationship with GII at the 1% level, with a coefficient of  $-0.877$  in the Random Effects model. This means that a one-point increase in the HDI is predicted to enhance gender equality or reduce gender inequality by approximately 0.9 points. The magnitude of this coefficient highlights the crucial role of human development in narrowing gender disparities. Compared to ICT, the effect of human development appears to be larger, confirming that the dimensions of human development, particularly education, health, and living standards, are fundamental determinants of gender equality. In comparison, the Fixed Effects model produces a similar pattern for ICT, which remains statistically significant at the 5% level.

Conversely, the Democracy Index (DI) variable, despite having a negative coefficient in both panel data models ( $-1.099$  in FE and  $-0.914$  in RE), is statistically insignificant. This finding implies that improvements in governance quality, as proxied by political participation, do not necessarily guarantee a reduction in gender inequality. Women's involvement in politics does not automatically translate into significant changes in the socioeconomic status of either men or women. This weak relationship

between democracy and gender inequality may be attributed to the influence of stronger social, economic, cultural, and country-specific policy factors that shape women's positions in society more profoundly than political structures alone.

The Population Growth (Pg) variable, included as a control, was hypothesized to contribute to gender inequality reduction under the assumption that population growth stimulates innovation as a reflection of human development quality. However, the results suggest otherwise, population growth tends to exacerbate gender inequality if it is not accompanied by improvements in human capital quality. This is consistent with the findings of this study, which show a positive coefficient in both the Random Effects and Fixed Effects models (1.689 and 1.710, respectively), although not statistically significant. The positive direction indicates that faster population growth is associated with higher gender inequality, albeit with a weak effect.

The large and significant constant terms (94.89 in FE and 105.2 in RE) indicate a high baseline level of gender inequality that remains unexplained by the model, even after controlling for the independent variables. This underscores the importance of unobserved structural and cultural factors, such as social norms, religion, and patriarchal traditions, that likely play a substantial role in sustaining gender inequality. The adjusted  $R^2$  values of approximately 0.30 in both the RE and FE models indicate that only about 32–34% of the variation in GII is explained by ICT, HDI, DI, and population growth, while the remaining variation stems from more complex institutional and social factors, including persistent patriarchal norms prevalent in many developing countries, particularly in Indonesia.

Classical assumption tests were also conducted, particularly for the Fixed Effects and Random Effects models, including tests for autocorrelation, heteroskedasticity, and multicollinearity. The results confirm that all classical assumptions are met—no autocorrelation, no heteroskedasticity, and no multicollinearity were detected.

**Table 2.** Estimation Results of the Effect of ICT, HDI, DI, and Population Growth on Gender Inequality

Gender Inequality Index (GII)	Fixed Effects	Random Effects
ICT	-0.0832*** (0.0263)	-0.0729*** (0.0233)
HDI	-0.717** (0.275)	-0.877*** (0.143)
Democracy Index (DI)	-1.099 (0.782)	-0.914 (0.600)
Population Growth (Pg)	1.689 (1.278)	1.710 (1.207)
Constant	94.89*** (18.46)	105.2*** (8.269)
<i>N</i>	481	481
adj. $R^2$	0.347	0,320

Robust Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5 Discussion

The estimation results based on the Random Effect Model indicate a strong and negative relationship between digital technology adoption (ICT) and the Gender Inequality Index (GII). The negative and statistically significant ICT coefficient in this study suggests that, across the 37 Asian countries analyzed, an increase in digital technology adoption correlates with a decrease in gender inequality. One relevant example can be seen in the micro, small, and medium enterprise (MSME) sector, where most entrepreneurs are women. Broader internet access among economic actors can have a positive impact on business development, ultimately generating higher income for women.

These findings are consistent with previous research asserting that technology can improve women's living conditions, particularly in rural areas Naicker, V., Mbengo, I. [11], Whitehead, A. [12], Vishkaie, R. [13] and expand women's participation across various sectors such as logistics and transportation [14].

The linkage between information and communication technology development and the reduction of gender disparities illustrates that digital economic transformation in selected countries holds substantial potential for fostering broader social inclusion. Several countries, such as Malaysia, Indonesia, Vietnam, and Thailand, have successfully encouraged women to adopt digital technologies in developing creative industries and online trade. Many modern women have become active participants in the digital economy through platforms such as Shopee, Tokopedia, and GrabFood, which enhance economic access and reduce structural gender-based barriers [14].

A similar context can be observed in China, which serves as an illustrative case of massive digitalization through various platforms that have successfully increased women's economic participation. The high involvement of women in China's digital entrepreneurship sector demonstrates that technological transformation, when accompanied by pro-women government policies, can effectively reduce gender inequality in the labor market. A comparable situation is found in Mongolia, where relatively high literacy and educational equality in Central Asia contribute to similar outcomes, as greater digital access supports women's participation in small and medium enterprises as well as community-based social activities [16].

However, several other studies contradict these findings. For instance, Genz, S., Schnabel, C. [2] found that technological digitalization can deepen gender inequality due to the emergence of a new digital divide that prevents women from fully utilizing economic opportunities [3]. Countries such as India, Pakistan, and even Indonesia, particularly in island regions and remote rural areas, experience this digital divide. Women in these countries often have lower internet access and fewer digital devices, which limits their ability to benefit from digital economic opportunities. The contradictory evidence regarding the relationship between technological digitalization and gender inequality reinforces the view that the transformational potential of digital technology

can only be realized when accompanied by adequate human capital development and institutional strengthening.

Open access to digital technology positively affects women's income levels when supported by higher education attainment. This can be further analyzed through the Human Development Index (HDI). The results indicate that HDI has a negative and statistically significant effect on gender inequality across several Asian countries. This finding underscores that human development is a key determinant of gender equality. It aligns with Amartya Sen's human capability theory and is supported by recent empirical studies emphasizing the importance of education in reducing gender disparities [17], [19]. Furthermore, the results reinforce the findings of Plaksiuk, O. et al. [16], showing that investment in human development enhances the benefits of digital technology for gender equality. Thus, human capital functions not only as a direct determinant but also as a moderator in the relationship between ICT and gender inequality.

Countries with high HDI levels generally exhibit more gender-inclusive social and institutional systems, where women have greater opportunities for economic and political participation. This study's findings are supported by data showing that several Asian countries—such as Japan, Malaysia, and Oman achieve both high HDI and high gender equality. This indicates that government investment in education and health in these countries has successfully built a strong and gender-balanced human capital base. Conversely, countries with low HDI levels, such as Afghanistan and Pakistan, display persistently high gender inequality, as women in these societies face major barriers in accessing education and the labor market due to social, cultural, and political constraints.

Low female literacy and limited social mobility suggest that unequal human development can become a fundamental source of persistent gender inequality. The importance of women's education, as highlighted by Schober, T., Winter-Ebmer, R. [5], is consistent with the findings of this study that policies emphasizing human development, particularly through women's education and health, are strategic measures to reduce gender inequality across Asia.

The Democracy Index, used as a proxy for governance quality, was hypothesized to contribute to reducing gender inequality. However, the results show a negative but statistically insignificant coefficient, indicating that more democratic political systems do not necessarily correlate with higher gender equality. This finding is consistent with the perspectives of Wang, Q. [9], Singh, A., Chaudhry, A. [20], who argue that democracy does not automatically reduce gender inequality, particularly in countries with weak institutions and patriarchal social norms. Turkey, Pakistan, and Jordan, for example, possess democratic political systems yet still face limitations in women's representation in parliament and government institutions. In Pakistan, despite women's voting rights and parliamentary quotas, their participation in decision-making remains constrained by conservative culture and structural barriers.

Therefore, it can be concluded that formal democracy status does not always translate into tangible improvements in gender equality across Asia. Institutional quality, affirmative policies, and socio-cultural factors play more decisive roles. In many cases, procedural democracy has not been followed by substantive policies promoting gender equality. This may result from variations in institutional quality, patriarchal political

culture, or weak enforcement of gender equality laws in some democratic states. These findings suggest that democratization without strengthening gender equality institutions has yet to create a truly gender-inclusive social transformation.

The findings of this study contrast with those of Höglström, J. [7], Andersen, T.B. [8], who argue that democracy expands women's political participation and contributes to greater gender equality. For instance, Malaysia and Oman demonstrate that political stability and strong governance quality can strengthen the role of democracy in broadening opportunities for women. The diversity of empirical findings further reinforces the notion that political democracy can have a positive impact on women's empowerment in parliament when accompanied by effective and high-quality government institutions.

The population growth variable shows a positive but statistically insignificant relationship with the Gender Inequality Index (GII). This indicates that there is no uniform pattern between demographic dynamics and gender inequality. The finding is consistent with previous studies that have also reported cross-country variations. In some contexts, high population growth may exacerbate gender inequality through increased pressure on public services and labor markets. In contrast, demographic transitions such as declining fertility rates—can create greater opportunities for women's education and economic participation. Theoretically, rapid population growth can intensify pressure on public resources, reduce women's access to education and health services, and worsen socio-economic inequality. However, the statistically insignificant result suggests that the demographic influence on gender equality is contextual and may be mediated by other factors such as social policies, urbanization levels, and economic structures. Thus, the relationship between demography and gender equality is context-dependent and shaped by national policy and economic frameworks.

This study aligns with Akinwande, T.S.

Akinwande, T.S. et al. [22], who argue that population growth does not automatically lead to inclusive growth, particularly when not accompanied by improvements in human capital quality. Countries such as India and Pakistan, with high population growth rates, face significant challenges in providing education, employment, and social services for women, which in turn widens gender disparities. Conversely, Japan characterized by slow population growth, but high educational quality demonstrates better gender equality outcomes. This strengthens the understanding that demographic quality is more important than population quantity in determining the direction of gender-equitable development.

Overall, the findings of this study reaffirm that transformative policies encompassing digitalization, human development, and democratization play complementary roles in advancing gender equality. However, the effectiveness of these policies depends heavily on the social, cultural, and institutional context of each country. ICT and HDI are proven to be the primary variables in narrowing gender inequality at the global level. Public policies should therefore prioritize improving women's access to digital technology, higher education, and reproductive health, as these factors demonstrate stronger effects compared to political or demographic variables. The democracy index yields positive outcomes only when accompanied by strong institutions and active female participation in the political process [20].

Asia, composed of countries with diverse socio-economic backgrounds such as China, Mongolia, Vietnam, Thailand, India, Pakistan, Afghanistan, Oman, Jordan, Azerbaijan, Malaysia, and Indonesia, demonstrates that there is no single policy model for reducing gender inequality. Nonetheless, a general pattern emerges robust human development and inclusive digital transformation constitute the foundational pillars for achieving sustainable gender equality in the region [16], [17].

Therefore, this study not only enriches the empirical literature on gender and development but also provides strategic policy implications for developing countries striving to accelerate progress toward Sustainable Development Goal (SDG) 5: Gender Equality.

## 6 Conclusion and Recommendation

Economic and social transformation policies, particularly those focused on strengthening digital technology and human development, are key variables in addressing gender inequality across 37 selected Asian countries. The adoption of digital technology shows a negative and significant relationship with the Gender Inequality Index in these countries. This indicates that increasing digital adoption and human development contributes to reducing gender disparities, primarily by enhancing women's economic participation in digital sectors such as micro-enterprises, creative industries, and online platforms.

The Democracy Index does not exhibit a significant negative effect on gender inequality reduction. This finding suggests that political democracy and population growth do not necessarily correlate directly with improvements in gender equality. Factors such as institutional quality, patriarchal culture, and weak enforcement of affirmative policies continue to hinder women's participation in politics and public decision-making in many Asian countries.

Population growth also shows no significant influence on gender equality. Population expansion that is not accompanied by improvements in women's education and supportive social policies fails to contribute to reducing gender inequality. Countries with high population growth but low education quality tend to experience greater gender disparities.

Several important implications emerge for public policy. First, expanding access to digital technology has proven promising in reducing gender inequality, but it must be accompanied by investment in human development, particularly in women's education and health. Second, strengthening formal democracy alone is insufficient, governments must enhance institutional quality and promote gender-responsive public policies, including labor market programs, parental leave, childcare support, and affirmative action for political representation. Third, given the significant cross-country variations in ICT adoption, HDI levels, democratic quality, and demographic dynamics, gender equality policies must be contextually designed, integrating digital inclusion with educational and economic reforms while safeguarding against potential negative effects of digitalization that could exacerbate inequality.

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