

Understanding the factors influencing the human development index of Asian nations using path analysis

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ABSTRACT

This study explores the factors influencing the Human Development Index (HDI) in Asian nations, focusing on Gross National Income (GNI) and the Gender Development Index (GDI) as key determinants. Using path analysis, the research analyzes secondary data from the United Nations Development Programme (UNDP) Human Development Report for 2021 - 2022. The findings indicate that GNI (economic growth) and GDI (gender equality) have significant positive impacts on HDI, emphasizing the importance of economic prosperity and gender parity in fostering human development across Asia. Grounded in Amartya Sen's capability approach, which prioritizes individual freedoms and choices, the study suggests region-specific policies. These include promoting economic diversification strategies tailored to emerging economies, enhancing technology and service sectors in middle-income countries, and expanding vocational training programs in lower-income nations to address skills gaps. For countries with significant gender disparities, robust policies that ensure equal access to education and employment for women are recommended. Additionally, prioritizing maternal and child healthcare improvements, particularly in less developed regions, can elevate overall well-being. By adopting these targeted strategies, Asian countries can achieve sustainable human development, creating societies where all individuals can lead fulfilling lives.

1. Introduction

Human development is a pivotal concern for Asian nations, where rapid economic growth, demographic shifts, and social transformations create unique challenges and opportunities. Despite notable progress in recent decades, the region faces significant development disparities, particularly in gender equality and economic opportunities. Countries like Japan and South Korea boast high Human Development Index (HDI) scores due to their advanced economies, comprehensive healthcare systems, and strong emphasis on education. Conversely, nations such as Afghanistan and Yemen rank among the lowest, struggling with persistent challenges like limited access to education, insufficient healthcare infrastructure, political instability, and significant gender inequalities (Doussard & Yenigun, 2024; Lakner et al., 2022). These disparities affect individual well-being and have far-reaching regional stability and growth implications.

The importance of understanding these disparities is highlighted by the need for tailored policies that can address the specific development challenges faced by Asian countries. The HDI measures a country's average health, education, and income achievements and is a valuable tool for identifying such difficulties. In Asia, the differences between high-ranking nations like Singapore (HDI of 0.93) and low-ranking countries like Yemen (HDI of 0.45) reveal the vast inequalities in living standards across the region (United Nations Development Programme, 2022). These variations underscore the necessity for targeted interventions, particularly in lower-income countries where economic growth and gender parity lag. Addressing these disparities is essential for ensuring that all populations within the region have access to the resources and opportunities needed to lead fulfilling lives.

A key focus of this study is the interplay between Gross National Income (GNI) and the Gender Development Index (GDI) in shaping the HDI of Asian nations. GNI, which measures the total domestic and foreign income earned by a nation's residents, is a crucial indicator of a country's economic strength and directly impacts its capacity to invest in education, healthcare, and infrastructure. Higher GNI levels often correlate with better access to these essential services, improving human development outcomes. On the other hand, the GDI provides insights into gender disparities, highlighting the extent to which men and women have equal access to opportunities in health, education, and income. In countries with significant gender disparities, such as Afghanistan (GDI of 0.68) and Yemen (GDI of 0.49), women's limited access to education and employment opportunities continues to hinder overall societal progress (United Nations Development Programme, 2022).

This study utilizes path analysis to explore the complex relationships between GNI, GDI, and HDI in the context of Asian nations. Path analysis is particularly suitable for this research as it examines direct and indirect effects between multiple variables. Unlike simpler regression methods, path analysis can model the intricate interactions between economic growth, gender equality, and human development, offering a more nuanced understanding of how these factors converge to influence HDI (Fathurahman, 2022; Tabri & Elliott, 2012). Using this method, the study aims to uncover the specific pathways through which economic and gender-related variables shape human development in Asia, providing valuable insights for policymakers seeking to implement more effective interventions.

Moreover, this research draws attention to the urgent need for evidence-based policy recommendations tailored to the unique needs of Asian countries. By examining recent data and trends, such as the high GNI per capita in countries like Qatar (USD 87,134.13) and Singapore (USD 90,918.64) compared to lower-income nations like Nepal (USD 3,877.31) and Cambodia (USD 4,078.69), the study highlights the economic diversity within the region (United Nations Development Programme, 2022; World Bank, 2020). It also emphasizes the role of gender equality in driving sustainable development, demonstrating how countries with higher gender parity, like the Philippines (GDI of 0.99), tend to achieve better human development outcomes. By comprehensively analyzing these dynamics, the study aims to contribute to the ongoing discourse on how Asian countries can foster more inclusive and sustainable human development. This approach not only aligns with the theoretical framework of Amartya Sen's capability approach but also ensures that development efforts are grounded in the specific realities of the Asian context.

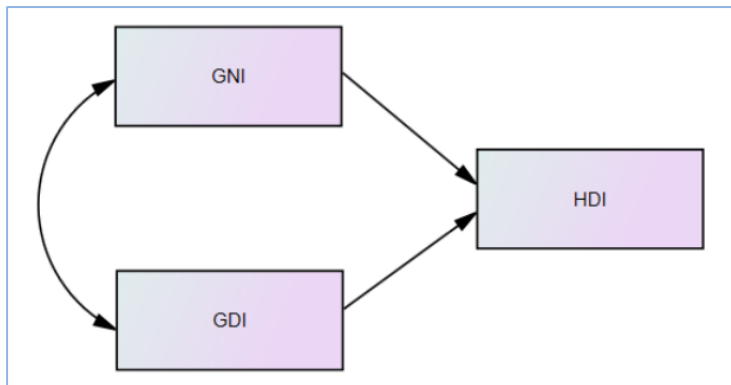
2. Conceptual framework of the study

This study aims to explore the interrelationships between GNI, GDI, and HDI in Asian nations using descriptive statistics and path analysis. By understanding these relationships,

policymakers can formulate more effective strategies to enhance regional human development. Following Sen’s theory of the Capability Approach (1999), the concept of the study is illustrated in Figure 1. The framework explains the interrelations between GNI and GDI as exogenous variables of the study and how they impact the endogenous HDI.

Figure 1

Conceptual Model of the Study

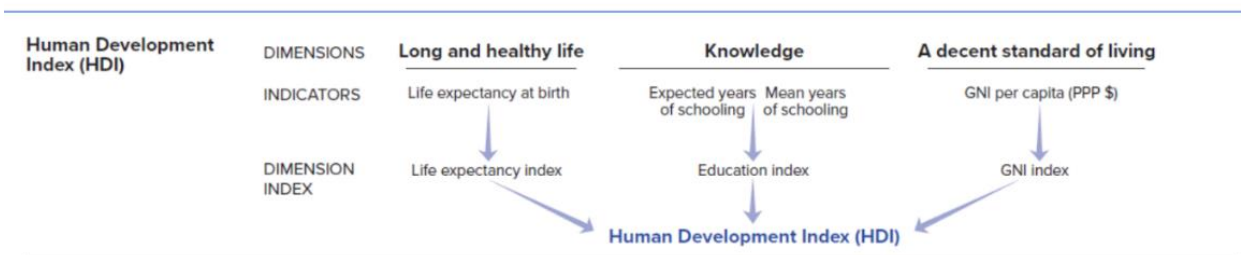


Note. The Authors

The endogenous variable in this study is the Human Development Index. The HDI is a composite measure that summarizes achievements in three key dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living (Bendavid et al., 2021; Casinillo et al., 2021; Doussard & Yenigun, 2024; Lakner et al., 2022). It is calculated as the geometric mean of normalized indices for each dimension. According to Kpolovie et al. (2017), the HDI is calculated as the geometric mean of normalized indices for these three dimensions, ensuring that equal weight is given to each aspect of human development. By considering multiple facets of development, the HDI provides a more nuanced and holistic view of the progress and challenges faced by different countries, making it a valuable tool for policy formulation and international comparison. Figure 2 demonstrates the dynamics of HDI.

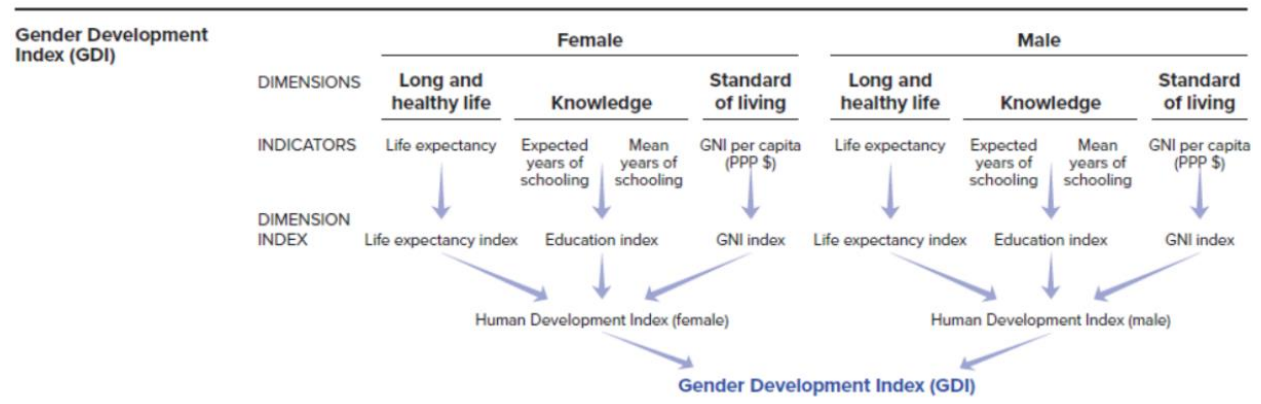
Figure 2

Graphical Presentation for Human Development Index



Note. The Authors

One of the exogenous variables in this study is the Gender Development Index, which measures gender inequalities across three key dimensions of human development. These dimensions include health, assessed by female and male life expectancy at birth; education, evaluated through female and male expected years of schooling for children and mean years of education for adults aged 25 years and older; and economic resources, measured by female and male estimated earned income (Herrero et al., 2019).

Figure 3*Graphical Presentation for Gender Development Index*

Note. The Authors

The GDI provides a comprehensive overview of gender disparities within a country, highlighting differences in longevity, educational attainment, and economic status between genders. By examining these inequalities, the GDI offers valuable insights into the impact of gender disparities on overall human development (Schüler, 2006). Figure 3 graphically explains GDI. The second exogenous variable is the Gross National Income per Capita. GNI per capita is the dollar value of a country's final income in a year divided by its population using Atlas methodology.

3. Research method

3.1. Research design

This study employed a quantitative research approach using a descriptive causal design. This approach is particularly suitable for exploring cause-and-effect relationships between variables, such as the impact of Gross National Income (GNI) and the Gender Development Index (GDI) on the Human Development Index (HDI) (Sreejesh et al., 2014). Path analysis was selected as the primary statistical technique to analyze these relationships. Path analysis extends multiple regression by examining direct and indirect effects between various variables, making it ideal for modeling the complex interactions between economic and social factors in this study (Fathurahman, 2022; Tabri & Elliott, 2012).

The study analyzed data from 49 Asian countries based on the availability of HDI, GNI per capita, and GDI data for 2021- 2022, as provided by the United Nations Development Programme (UNDP) (2022) Human Development Report. The selection criteria required countries to have complete data for the three primary variables (HDI, GNI per capita, and GDI) to ensure consistency in the analysis. Countries with missing or incomplete data were excluded from the study to maintain the integrity and reliability of the statistical analysis. Notably, North Korea and some smaller nations or territories with incomplete datasets, such as Bhutan and Maldives, were excluded due to data unavailability. This exclusion is essential for understanding the generalizability of the study's findings, which primarily apply to countries with accessible and consistent data.

3.2. Data collection process

The study utilized secondary data from the 2021-2022 Human Development Report (United Nations Development Programme, 2022), providing comprehensive human

development metrics across various dimensions. Secondary data allows for the analysis of large datasets and ensures consistency in the information used across countries (Phillips & Stawarski, 2008). Data for HDI, GNI per capita, and GDI were extracted directly from this report, providing reliable measures for the analysis.

3.3. Data management and analysis

For the data analysis, this study employed a multi-faceted approach. Firstly, descriptive statistics were utilized to summarize and describe the characteristics of the variables under investigation. Descriptive statistics allow researchers to comprehensively understand the data by calculating measures such as means, standard deviations, and frequencies (Marshall & Jonker, 2010). Additionally, the study tested the relationship using Spearman's rho correlation coefficient, a non-parametric measure of association suitable for assessing the strength and direction of relationships between variables. Spearman's rho is particularly useful when dealing with ordinal or non-normally distributed data (Myers & Sirois, 2014). This analysis was performed using JASP Software, which offers a user-friendly interface for statistical analysis. Finally, path analysis, a sophisticated statistical technique for examining complex causal relationships among variables, was conducted using the AMOS software. Path analysis allows researchers to model direct and indirect effects between variables and assess the overall fit of the proposed causal model to the data (Fathurahman, 2022). By employing these analytical methods, the study was able to thoroughly investigate the relationships between variables and provide valuable insights into the factors influencing HDI.

To ensure the robustness of the path analysis, the study addressed several key assumptions: Multivariate Normality: Path analysis assumes that the data follows a multivariate normal distribution. The study conducted the Shapiro-Wilk test for multivariate normality on the primary variables (HDI, GNI per capita, and GDI) to test this. The results indicated that the data did not strictly follow a normal distribution, as evidenced by significant p-values. However, given the sample size of 49 countries, the Central Limit Theorem suggests that the impact of deviations from normality may be minimized, making path analysis appropriate in this context.

According to Darlington and Hayes (2016), a linearity check is a pivotal requirement for the test of influence. The linearity of the relationships between the variables was examined through scatterplots of each pair of variables (HDI vs. GNI per capita, HDI vs. GDI, and GNI per capita vs. GDI). Visual inspection of the plots indicated that the relationships between these variables were approximately linear, which satisfies the assumption of linearity required for path analysis.

Multicollinearity can distort the results of path analysis, as it indicates that two or more variables are highly correlated (Sreejesh et al., 2014). The study calculated the Variance Inflation Factor (VIF) for GNI per capita and GDI to test for this. VIF values below 10 indicate an acceptable level of collinearity. The results showed VIF values below this threshold, suggesting multicollinearity was not a significant concern in the analysis.

The study evaluated the fit of the path analysis model using standard model fit indices such as CMIN/DF, RMSEA, and GFI. The model's CMIN/DF value was below 3.0, and the RMSEA was within the acceptable range, indicating an adequate fit. While some indicators, like the RMSEA, were on the higher end, this was considered acceptable given the complexity of the model and the sample size constraints (Tabri & Elliott, 2012).

By addressing these assumptions, the study ensures that the path analysis provides reliable insights into the relationships between GNI, GDI, and HDI. The methodological rigor enhances the study's contribution to understanding the dynamics of human development in Asian nations and ensures that the findings are grounded in a robust analytical framework.

4. Results and discussion

The following sections present the descriptive findings for HDI, GNI per capita, and GDI, followed by a detailed analysis and discussion of the results.

4.1. Descriptive findings

The HDI values show a wide range among Asian countries, with Singapore (0.93), Japan (0.92), and Israel (0.91) achieving high scores, indicative of strong health, education, and income levels. These countries benefit from comprehensive healthcare systems, high educational attainment, and robust economies. Conversely, countries like Afghanistan (0.47) and Yemen (0.45) struggle with low HDI scores, highlighting significant deficits in these areas. These findings suggest substantial disparities exist within Asia, necessitating focused efforts to improve basic services and economic opportunities in lower-ranking nations.

Table 1

Human Development Index of Nations in Asia

Nation	HDI
Afghanistan	0.47
Armenia	0.75
Azerbaijan	0.74
Bahrain	0.87
Bangladesh	0.66
Bhutan	0.66
Brunei Darussalam	0.82
Cambodia	0.59
China	0.76
Cyprus	0.89
Egypt	0.73
Georgia	0.80
India	0.63
Indonesia	0.70
Iran	0.77
Iraq	0.68
Israel	0.91
Japan	0.92

Nation	HDI
Jordan	0.72
Kazakhstan	0.81
Kuwait	0.83
Kyrgyzstan	0.69
Laos	0.60
Lebanon	0.70
Malaysia	0.80
Maldives	0.74
Mongolia	0.73
Myanmar	0.58
Nepal	0.60
Oman	0.81
Pakistan	0.54
Palestine	0.71
Philippines	0.70
Qatar	0.85
Russia	0.82
Saudi Arabia	0.87
Singapore	0.93
South Korea	0.92
Sri Lanka	0.78
Syria	0.57
Tajikistan	0.68
Thailand	0.80
Timor-Leste	0.60
Turkey	0.83
Turkmenistan	0.74
United Arab Emirates	0.91
Uzbekistan	0.72
Vietnam	0.70
Yemen	0.45

Note. The data are from “Human development report 2021 - 22: Uncertain times, unsettled lives: Shaping our future in a transforming world”, by United Nations Development Programme, 2022 (<https://hdr.undp.org/content/human-development-report-2021-22>)

The variation in HDI across Asia underscores the diverse development challenges faced by the region. Countries with higher HDI scores generally have better access to quality education, healthcare, and economic opportunities, which are critical for human development (Doussard & Yenigun, 2024; Lakner et al., 2022; Sen, 1999). In contrast, nations with lower HDI values often grapple with poverty, inadequate healthcare, and limited educational access, which hinder their development (World Bank, 2020). Addressing these disparities requires targeted policies to improve access to essential services and economic opportunities, particularly in the most disadvantaged regions (Alkire, 2002; French & Williams, 2021). The GNI per capita data indicates vast economic disparities among Asian countries. High-income countries like Singapore (USD 90,918.64) and Qatar (USD 87,134.13) boast strong economies and high living standards. In stark contrast, low-income countries such as Yemen (USD 1,314.27) and Afghanistan (USD 1,824.19) struggle with economic instability and limited resources. This economic disparity highlights the need for policies promoting sustainable economic growth and equitable income distribution.

Table 2*Gross National Income per Capita of Nations in Asia*

Nation	GNI per Capita (USD)
Afghanistan	1,824.19
Armenia	13,157.99
Azerbaijan	14,256.74
Bahrain	39,497.24
Bangladesh	5,472.10
Bhutan	9,437.54
Brunei Darussalam	64,489.53
Cambodia	4,078.69
China	17,504.39
Cyprus	38,188.42
Egypt	11,731.69
Georgia	14,664.16
India	6,589.98
Indonesia	11,466.06
Iran	13,000.71
Iraq	9,977.24
Israel	41,523.74
Japan	42,274.29
Jordan	9,923.71
Kazakhstan	23,942.81
Kuwait	52,919.76

Nation	GNI per Capita (USD)
Kyrgyzstan	4,566.30
Laos	7,699.57
Lebanon	9,525.83
Malaysia	26,657.94
Maldives	15,448.12
Mongolia	10,588.22
Myanmar	3,850.52
Nepal	3,877.31
Oman	27,054.32
Pakistan	4,623.70
Palestine	6,582.89
Philippines	8,920.42
Qatar	87,134.13
Russia	27,166.30
Saudi Arabia	46,111.55
Singapore	90,918.64
South Korea	44,500.93
Sri Lanka	12,578.22
Syria	4,191.93
Tajikistan	4,547.74
Thailand	17,030.15
Timor-Leste	4,460.86
Turkey	31,032.80
Turkmenistan	13,020.71
United Arab Emirates	62,573.59
Uzbekistan	7,916.78
Vietnam	7,867.37
Yemen	1,314.27

Note. The data are from “Human development report 2021 - 22: Uncertain times, unsettled lives: Shaping our future in a transforming world”, by United Nations Development Programme, 2022 (<https://hdr.undp.org/content/human-development-report-2021-22>)

Economic prosperity, as measured by GNI per capita, is crucial in enhancing human development. Higher-income levels generally lead to better access to healthcare, education, and other essential services, contributing to higher HDI values (Gabr, 2024; Sen, 1999). The significant economic disparities observed among Asian countries call for tailored economic policies that focus on inclusive growth and poverty alleviation (World Bank, 2020).

Infrastructure, education, and healthcare investments are essential to stimulate economic growth and improve living standards in low-income countries (Bendavid et al., 2021; Gabr, 2024). The GDI values reveal notable differences in gender equality across Asian countries. High GDI values in countries like Armenia (1.00), Georgia (1.00), and Mongolia (1.03) suggest near parity between men and women in access to resources and opportunities. Conversely, low GDI values in Afghanistan (0.68) and Yemen (0.49) indicate substantial gender disparities, which limit women's access to education, healthcare, and economic opportunities.

Table 3*Gender Development Index of Nations in Asia*

Nation	GDI
Afghanistan	0.68
Armenia	1.00
Azerbaijan	0.97
Bahrain	0.92
Bangladesh	0.89
Bhutan	0.93
Brunei Darussalam	0.98
Cambodia	0.92
China	0.98
Cyprus	0.97
Egypt	0.88
Georgia	1.00
India	0.84
Indonesia	0.94
Iran	0.88
Iraq	0.80
Israel	0.99
Japan	0.97
Jordan	0.88
Kazakhstan	0.99
Kuwait	1.00
Kyrgyzstan	0.96
Laos	0.95
Lebanon	0.88
Malaysia	0.98
Maldives	0.93

Nation	GDI
Mongolia	1.03
Myanmar	0.94
Nepal	0.94
Oman	0.90
Pakistan	0.81
Palestine	0.89
Philippines	0.99
Qatar	1.01
Russia	1.02
Saudi Arabia	0.92
Singapore	0.99
South Korea	0.94
Sri Lanka	0.95
Syria	0.83
Tajikistan	0.91
Thailand	1.01
Timor-Leste	0.91
Turkey	0.94
Turkmenistan	0.96
United Arab Emirates	0.95
Uzbekistan	0.94
Vietnam	1.00
Yemen	0.49

Note. The data are from “Human development report 2021 - 22: Uncertain times, unsettled lives: Shaping our future in a transforming world”, by United Nations Development Programme, 2022 (<https://hdr.undp.org/content/human-development-report-2021-22>)

Gender equality is a critical component of human development, as highlighted by the GDI values. Higher gender parity correlates with improved social and economic outcomes, contributing to overall human development (Duflo, 2012; Klasen & Lamanna, 2009). The significant gender disparities in countries like Afghanistan and Yemen underscore the need for policies that promote gender equality by ensuring equal access to education, healthcare, and employment opportunities (Bendavid et al., 2021). Addressing gender inequalities can substantially improve national development and well-being (Doussard & Yenigun, 2024; Lakner et al., 2022; Sen, 2000).

The analysis of HDI, GNI per capita, and GDI across Asian nations reveals significant variations that reflect the region's diverse economic and social landscapes. Countries such as Singapore (HDI of 0.93) and Japan (HDI of 0.92) rank among the highest in human

development, supported by their robust economies and advanced social services. In contrast, nations like Afghanistan (HDI of 0.47) and Yemen (HDI of 0.45) face substantial challenges in achieving higher levels of human development due to limited economic resources, political instability, and significant gender disparities (United Nations Development Programme, 2022). These findings underscore the need for tailored policy interventions that address the unique development challenges faced by different Asian countries.

4.2. Test of relationships

Before conducting the correlation analysis, it is essential to check the normality of the data. Normality checks were performed using the Shapiro-Wilk test, skewness, and kurtosis values for HDI, GNI per capita, and GDI. The results indicated that the data for these variables do not follow a normal distribution, as evidenced by significant p-values from the Shapiro-Wilk test and non-zero skewness and kurtosis values.

Table 4

Summary of HDI, GNI, and GDI Data

	HDI	GNI per capita	GDI
Valid	49	49	49
Missing	0	0	0
Mean	0.741	21177.190	0.929
Std. Deviation	0.117	21566.671	0.091
Skewness	-0.352	1.698	-2.715
Std. Error of Skewness	0.340	0.340	0.340
Kurtosis	-0.226	2.549	10.370
Std. Error of Kurtosis	0.668	0.668	0.668
Minimum	0.455	1314.270	0.496
Maximum	0.939	90918.645	1.031

Note. Authors' calculations (2024)

Given the non-normality of the data, Spearman's rho was chosen as the appropriate statistical method for correlation analysis. Spearman's rho is a non-parametric measure of rank correlation, which does not assume a normal data distribution. It assesses how well the relationship between two variables can be described using a monotonic function. This makes Spearman's rho suitable for ordinal data or data that does not meet the assumptions of parametric tests.

Table 5

Shapiro-Wilk Test for Bivariate Normality

	HDI	Shapiro-Wilk	p
HDI	-	GNI per Capita	0.737
HDI	-	GDI	0.767
GNI per Capita	-	GDI	0.754

Note. Authors' calculations (2024)

The table below presents Spearman’s rho correlation coefficients and p-values for the relationships between GNI per capita, GDI, and HDI.

Table 6

Spearman’s Correlation Matrix

Variable		HDI	GNI per Capita	GDI
HDI	Spearman’s rho	1	-	-
	p-value	1.000	-	-
GNI per Capita	Spearman’s rho	0.960	1	-
	p-value	< .001	1.000	-
GDI	Spearman’s rho	0.541	0.537	1
	p-value	< .001	< .001	1.000

Note. Authors’ calculations (2024)

The significant positive relationship between GNI and HDI (Spearman’s rho = 0.960, $p < 0.001$) indicates that countries with higher gross national income per capita tend to have higher human development index scores. This is consistent with the theory that economic prosperity enables better access to healthcare, education, and other critical services that contribute to human development (Sen, 1999). Similarly, the positive correlation between GDI and HDI (Spearman’s rho = 0.541, $p < 0.001$) suggests that gender equality significantly contributes to human development. Countries with higher gender development index scores, which reflect greater gender parity in health, education, and economic status, tend to have higher human development scores. This supports the idea that empowering women and ensuring equal opportunities for all genders enhance societal development (Doussard & Yenigun, 2024; Lakner et al., 2022).

Furthermore, the strong correlation between GNI and GDI (Spearman’s rho = 0.537, $p = 0.001$) indicates that countries with higher economic output tend to have better gender equality. This suggests that economic development and gender equality are mutually reinforcing, as improved economic conditions can provide more resources for promoting gender equality, and greater gender equality can contribute to economic growth through increased workforce participation and productivity (World Bank, 2020). These findings emphasize the need for integrated policies addressing economic and gender disparities to foster sustainable human development. Policymakers should consider strategies that simultaneously promote economic growth and gender equality to maximize the positive impacts on human development (Alkire, 2002; French & Williams, 2021).

4.3. Path analysis

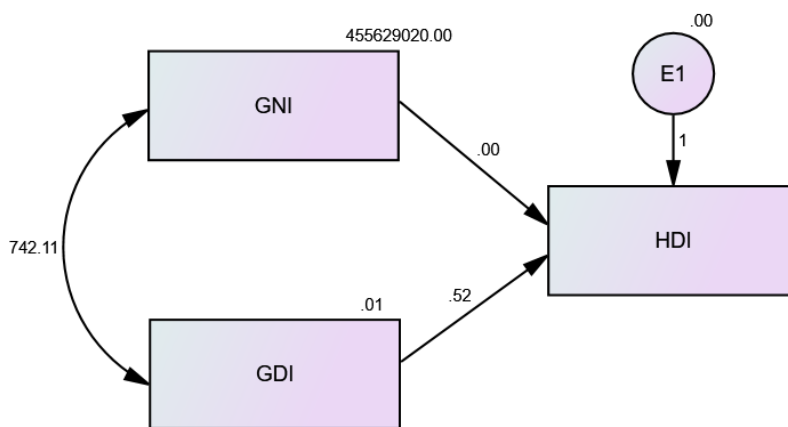
The path analysis conducted for the HDI in this study provides crucial insights into the relationships between GNI, GDI, and HDI in Asian nations. The model fit measures in Table 7 reveal a CMIN/DF value of 23.972, GFI of 1.000, PCLOSE of .000, RMSEA of .692, and an AIC of 12.000.

Table 7*Model Fit Measures*

Criteria	Values
CMIN/DF	23.972
GFI	1.000
PCLOSE	.000
RMSEA	.692
AIC	12.000

Note. Authors' calculations (2024)

These indicators suggest a complex model that adequately captures the interactions between the variables despite the high RMSEA value, indicating potential room for model improvement.

Figure 4*Human Development Index Model*

Note. The Authors

The regression weights presented in Table 8 demonstrate the direct effects of GNI and GDI on HDI. GNI has a significant positive impact on HDI (estimate = .000, C.R. = 7.674, $p < .001$), indicating that increases in economic output directly enhance human development. Similarly, GDI shows a substantial positive impact on HDI (estimate = .522, C.R. = 5.098, $p < .001$), highlighting the critical role of gender equality in advancing overall human development. These findings align with the literature emphasizing the importance of economic prosperity and gender parity as fundamental drivers of human development (Duong & Flaherty, 2023; Lakner et al., 2022; Sen, 1999).

Table 8*Regression Weights*

			Estimate	S.E.	C.R.	P	Label
HDI	<---	GNI	.000	.000	7.674	***	par_1
HDI	<---	GDI	.522	.102	5.098	***	par_2

Note. Authors' calculations (2024)

Further analysis of the standard regression weights in Table 9 indicates that GNI and GDI have substantial standardized effects on HDI, with estimates of .615 and .408, respectively. This underscores the relative importance of these variables in predicting human development outcomes. The strong influence of GNI corroborates the theory that higher income levels facilitate better access to essential services such as healthcare, education, and nutrition, thereby enhancing human development (Sen, 2000). On the other hand, the significant impact of GDI underscores the importance of gender equality in ensuring equitable access to resources and opportunities, which in turn fosters societal development (Duong & Flaherty, 2023; Lakner et al., 2022; World Bank, 2020).

Table 9

Standard Regression Weights

			Estimate
HDI	<---	GNI	.615
HDI	<---	GDI	.408

Note. Authors' calculations (2024)

In the context of Asian nations, the path analysis results provide valuable insights into regional development dynamics. Asian countries exhibit diverse economic landscapes and varying levels of gender equality, significantly impacting their human development trajectories. For instance, nations with higher GNI per capita, such as Japan and South Korea, tend to have higher HDI scores, reflecting their advanced economic development and robust social systems (World Bank, 2020). Conversely, countries with lower GNI per capita, such as Nepal and Bangladesh, face challenges in achieving higher HDI due to limited economic resources and social inequalities (World Bank, 2020). The positive relationship between GDI and HDI emphasizes the critical role of gender equality in promoting human development in Asian nations. Countries that have made significant strides in improving gender parity, such as the Philippines and Sri Lanka, show higher HDI scores, indicating that gender-inclusive policies contribute to overall development (United Nations Development Programme, 2019). These findings are consistent with studies that highlight the benefits of gender equality for economic growth and social well-being (Duflo, 2012; Klasen & Lamanna, 2009).

Moreover, the varying impacts of GNI and GDI across different Asian countries highlight the need for tailored development policies. While economic growth is essential for human development, it must be complemented by efforts to address gender disparities to achieve sustainable progress. Policymakers in Asian nations should consider integrated strategies promoting economic development and gender equality to enhance human development outcomes (Doussard & Yenigun, 2024; World Bank, 2020). Overall, the path analysis highlights the interconnectedness of economic and gender development with human development. These results suggest that policies to improve economic conditions and promote gender equality can synergistically enhance human development. Policymakers should prioritize integrated strategies that address economic and gender disparities to achieve sustainable development goals (Alkire, 2002; French & Williams, 2021). This study contributes to the existing body of knowledge by providing empirical evidence on the significant roles of GNI and GDI in shaping human development outcomes in Asian nations, reinforcing the need for comprehensive development policies encompassing economic growth and gender equity.

The path analysis confirms that GNI per capita and GDI significantly positively affect HDI in Asian countries. Specifically, GNI was found to have a more substantial direct effect on HDI (standardized estimate = 0.615), highlighting the importance of economic growth in facilitating access to healthcare, education, and other services that drive human development (Lakner et al., 2022; Sen, 1999). Similarly, the GDI has a substantial positive impact on HDI (standardized estimate = 0.408), emphasizing the role of gender equality in promoting equitable access to opportunities and resources for all genders (Duflo, 2012; Klasen & Lamanna, 2009). These findings align with existing literature but add value by examining the interplay between these factors in the specific context of Asian nations.

A deeper analysis reveals that the effects of GNI and GDI on HDI vary significantly across different subregions and types of economies within Asia. In high-income countries like Singapore and South Korea, the relationship between GNI and HDI is relatively stable. These nations have already achieved high levels of human development, and further increases in GNI result in incremental improvements in HDI due to the already high baseline of access to quality healthcare, education, and infrastructure. For instance, Singapore's high GNI per capita (USD 90,918.64) is complemented by a strong emphasis on innovation and a well-established social safety net, contributing to its high HDI (United Nations Development Programme, 2022).

In contrast, low-income countries such as Nepal (HDI of 0.60; GNI per capita of USD 3,877.31) and Bangladesh (HDI of 0.66; GNI per capita of USD 5,472.10) exhibit a stronger relationship between GNI and HDI. In these contexts, increases in GNI directly translate to better human development outcomes because they are often used to fund critical services like basic healthcare, education, and otherwise underdeveloped infrastructure. The study's findings suggest that economic growth strategies in these countries should focus on inclusive growth that ensures the gains from increased GNI reach vulnerable populations, thereby boosting overall HDI.

The impact of GDI on HDI also varies by country context, reflecting differences in gender dynamics across Asian nations. In countries with higher GDI values, such as the Philippines (GDI of 0.99) and Thailand (GDI of 1.01), gender equality has a pronounced effect on human development outcomes. In these nations, policies that promote gender parity in education and employment have contributed to higher HDI scores by enabling a more significant portion of the population to participate in economic activities and access essential services. For instance, the Philippines' focus on women's empowerment in rural and urban areas has facilitated more inclusive economic growth, improving overall well-being (Duflo, 2012).

Conversely, in countries with lower GDI values, such as Afghanistan (GDI of 0.68) and Yemen (GDI of 0.49), the impact of gender equality on HDI is more constrained by systemic barriers. In these contexts, cultural norms, political instability, and limited access to education and healthcare for women significantly restrict the positive effects of GDI on HDI. As such, improvements in gender equality could yield substantial gains in human development if paired with targeted policies that address structural barriers, such as improving access to secondary education for girls and creating economic opportunities for women in male-dominated sectors (Klasen & Lamanna, 2009).

The findings of this study offer important implications for policymakers in Asian countries. First, the evidence suggests that strategies for improving HDI should be tailored to the specific needs of different economic contexts. High-income countries should focus on sustaining their human development achievements through innovation and investment in social services. In contrast, low-income countries could benefit from targeted economic

policies to expand basic services like healthcare and education. Additionally, the study highlights the critical role of gender equality in driving sustainable development, particularly in regions where gender disparities remain stark.

By providing a context-specific analysis of the relationships between GNI, GDI, and HDI, this study makes a valuable contribution to existing knowledge on human development in Asia. It extends the understanding of how economic and social factors intersect to shape development outcomes, emphasizing the need for integrated policies that simultaneously promote economic growth and gender equality. This nuanced perspective is particularly relevant for development planning in Asia, where countries exhibit diverse economic conditions and social structures.

5. Conclusion and economic policy recommendations

The findings of this study underscore the critical roles of economic prosperity and gender equality in enhancing human development within Asian nations. Grounded in Amartya Sen's capability approach, the theoretical framework emphasizes that development should be assessed by the fundamental freedoms people have to pursue lives they value. The significant positive effects of GNI and the GDI on the HDI reveal that higher income levels and gender equality are fundamental to expanding individuals' capabilities. Economic growth provides necessary resources for better healthcare, education, and living standards, while gender equality ensures these benefits are equitably distributed, enabling all individuals to realize their potential. The implications of the capability approach theory are profound. It suggests that human development goes beyond economic metrics and must include measures of freedom and opportunity. By demonstrating the robust influence of GNI and GDI on HDI, this study highlights the need for policies that drive economic growth and promote gender parity. Countries that integrate these dual strategies, such as Japan and South Korea, exhibit higher HDI scores, showcasing the efficacy of this holistic approach. These insights call for comprehensive development policies that prioritize economic and gender-related factors to foster sustainable progress and improve their populations' overall quality of life. Given the findings of the study, the following are recommended:

(1) *Economic Diversification Initiatives.* To promote sustainable growth and reduce economic vulnerability, Asian nations should implement targeted programs to diversify their economies. Developing sectors like technology, manufacturing, and services can create more job opportunities and stabilize economies against global market fluctuations. Starting with pilot projects in regions with an existing industrial base and scaling up through public-private partnerships and international development grants will ensure these initiatives are both attainable and feasible.

(2) *Gender Equality Policies.* Enforcing robust gender equality policies is essential for fostering a more inclusive society. This includes ensuring equal pay, combating gender-based violence, and promoting female participation in education and the workforce. Setting measurable targets, such as increasing female labor force participation by 10% over five years, will help monitor progress. Collaborating with NGOs and international bodies will enhance the effectiveness of these policies, making them attainable and feasible. These efforts will not only advance gender equality but also significantly contribute to overall human development.

(3) *Education and Skills Development.* Developing vocational training programs tailored to market needs, particularly for women and underrepresented groups, can bridge the skills gap and enhance employability. Introducing these programs in urban and rural areas to

train 100,000 individuals annually will significantly boost human capital. Utilizing existing educational infrastructure and partnering with local businesses for training and employment opportunities will make these programs attainable and feasible. Improved education and skills development will empower individuals and drive economic growth.

(4) *Healthcare Improvement Programs*. Increasing healthcare funding to improve maternal and child health services and ensuring universal access is crucial for enhancing human development. Setting a goal to reduce maternal and infant mortality rates by 20% within five years provides a clear target. Leveraging international health grants and national budgets to enhance healthcare infrastructure and services will make this goal attainable and feasible. Improved healthcare will improve health outcomes, contributing to higher HDI scores and overall societal well-being.

NO CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflict of interest.

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