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Influence of World Development Indicators on Human Development: A Multiple Linear Regression and PSI Ranking Approach

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ABSTRACT

This study investigates the influence of World Development Indicators (WDI) on the Human Development Index (HDI) within the regional context of Asian countries. Understanding the interaction between these indicators and HDI holds strategic relevance for enhancing the formulation of evidence-based development policies. The analysis focuses on five key indicators: population growth, voice and accountability, government effectiveness, GDP per capita growth, and control of corruption. These variables represent essential dimensions of governance and socioeconomic advancement. The dataset comprises information from 46 Asian countries sourced from the World Bank. The methodological framework integrates multiple linear regression to evaluate the magnitude of each variable's contribution to HDI. The Preference Selection Index (PSI) is utilized to establish a performance-based ranking of countries grounded in the selected indicators. Results demonstrate that population growth and government effectiveness have significant impacts on HDI outcomes, while the remaining variables exhibit no statistically significant effects. Comparative analysis using PSI reveals inconsistencies between development indicator values and actual HDI positions. South Korea shows the highest consistency between quantitative rankings and HDI classification. These findings offer practical insights for policy prioritization by identifying the most influential determinants of human development in the region. The study emphasizes the importance of tailored development strategies and encourages future research to strengthen model robustness through control variable inclusion, sensitivity analysis, and non-linear modeling approaches.

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1. INTRODUCTION

Development Indicators (WDI) is a collection of data published by the World Bank that provides comprehensive and reliable data on various aspects of development in countries around the world. This includes indicators related to economic, social, and environmental development, such as GDP, poverty rates, educational participation rates, health indicators, and many more [1]. The WDI data can be obtained directly from the World Bank via Graphical User Interface (GUI) available on the site [2]. WDI is widely used by researchers, policy makers, and analysts to monitor and analyse global development trends and to inform decision making processes [3]. The analysis that was carried out through the data provided contributes to degrade the gaps that exist in society [4], [5]. From the many indicators provided in the world bank database, researchers chose several variables that tend to give impact on development itself.

Among the indicators available, there are several that are expected to influence human development itself. Population growth is considered to have an impact on a country's development [6], [7]. The safe space provided for freedom of speech and accountability will also have an impact on development [8]. The relationship between effective government and control of corruption also has an impact on the development of the country itself [9], [10)], [11]. The most popular is the impact of GDP on development [12], [13].

HDI and WDI partially influence and can be used together to understand human development [14], [15], [16]. The Human Development Index (HDI) is a comprehensive measure that measures the quality of life and human improvement of a country [17]. The data needed to calculate the HDI often comes from various sources, including national statistical data and data that is compiled by international organizations such as the United Nations (UN) and World Bank [18]. World Development Indicators (WDI), which is published by the World Bank, is a collection of data that includes various economic, social, and environmental indicators that are relevant for development and policy analysis to increase the value of the human development index itself [19].

This paper will analyse how the relationship of the variables studied to HDI using multiple linear regression methods. The relationship between these variables will help researchers map problems and find solutions to improve human development. Although previous studies have discussed the influence of various WDI components on development, there remains a lack of comprehensive analysis that simultaneously examines the impact of specific variables such as control of corruption and GDP per capita on the Human Development Index (HDI). Furthermore, few studies have considered how the influence of WDI indicators may vary across regions or countries, particularly in the Asian context [20]. This research attempts to fill that gap by not only employing a multiple linear regression approach but also incorporating a ranking mechanism using the PSI method to evaluate the comparative performance of Asian countries. The ranking obtained from the PSI method will then be compared with the HDI rankings to explore potential discrepancies and insights.

Based on the identified research gap, this study aims to answer the research question: To what extent do selected World Development Indicators (population growth, voice and accountability, government effectiveness, GDP per capita growth, and control of corruption) significantly influence the Human Development Index (HDI) across Asian countries? The hypothesis proposed is that government effectiveness and population growth will exhibit statistically significant relationships with HDI, while other indicators may vary in impact.

The focus on Asian countries is intentional due to the region's developmental heterogeneity, ranging from highly developed nations such as Japan and Singapore to emerging economies like Bangladesh and Cambodia. This diversity provides a fertile ground for comparative analysis, enabling policymakers to draw context-specific lessons and identify leverage points across contrasting socio-political environments. Furthermore, Asia's strategic role in global economic and demographic transitions makes it an important case for regional development modeling [17], [18], [19].

Understanding these relationships is not only academically significant but also practically important for informing policy formulation across Asian countries. Identifying which development indicators most strongly influence HDI can help governments and international organizations prioritize interventions that effectively enhance human development outcomes. Moreover, this research provides valuable insights for addressing development disparities across regions by highlighting which countries are lagging behind and what factors contribute to such gaps [21]. Consequently, the findings of this study can serve as a strategic reference for designing inclusive and targeted development policies in Asia.

2. RESEARCH METHOD

2.1. Theoretical Foundation

The methodological approach employed in this study integrates multiple linear regression and the Preference Selection Index (PSI), both of which are appropriate and relevant to achieve the research objectives. Variables such as healthcare or education expenditures were excluded due to data availability inconsistencies across the sampled Asian countries, aligning with suggestions in recent development data studies [22]. Multiple linear regression facilitates a quantitative analysis of the influence of key World Development Indicators (WDI) on the Human Development Index (HDI), while the PSI method enables the construction of a comparative performance ranking among countries using the same indicators.

Although the application of these methods is conceptually sound, several technical aspects warrant further clarification. The treatment of multicollinearity among independent variables was addressed through the use of Variance Inflation Factor (VIF) and Tolerance values, ensuring that no substantial intercorrelations distort the regression coefficients. The normality assumption for residuals was evaluated using the Kolmogorov-Smirnov test, and homoscedasticity was verified through the Glejser test, both of which confirmed the statistical validity of the regression model.

The implementation of the PSI method was structured into a clear sequence: construction of the decision matrix, classification of criteria as benefit or cost, normalization of scores, computation of average performance, deviation analysis, and derivation of final preference values. This structured process yields an objective, non-subjective ranking that complements the regression analysis.

Despite these strengths, the model does not yet incorporate control variables that could isolate the effects of contextual differences across countries, such as regional classifications or governance regimes. Moreover, the study has not yet included sensitivity analysis, which could be employed to test the robustness of the model outcomes under different weighting assumptions or data perturbations.

To enhance the validity and precision of future analyses, additional modeling techniques such as stepwise regression, hierarchical modeling, or Bayesian inference could be explored. Incorporating non-linear approaches or interaction terms may also provide deeper insights into the structural dynamics between development indicators and human development outcomes.

2.2. Multiple Linear Regression

Although the World Bank WDI dataset contains a wider array of indicators such as public expenditure on education and healthcare, these variables were excluded due to issues with data completeness and comparability across countries. In particular, many Asian countries lack consistent and recent records for these indicators, which would reduce the reliability and validity of cross-country regression modeling [23], [24]. Moreover, this study emphasizes governance-related and economic performance variables which have demonstrated direct links with HDI in previous literature [5], [10], [14].

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \cdots + b_nX_n \tag{1}$$

The is the general form of a multiple linier regression model, where $\hat{Y}$ is the estimated value of the dependent variable (HDI), b_0 is the intercept, and b_1, b_2, ..., b_n are regression coefficients indicating the effect of each independent variable X_1, X_2, ..., X_n on HDI.

To find the value of $b_0, b_1, b_2, \cdots, b_n$, n data pairs $(X_1,\ X_2, \cdots, X_n)$ are required and can be presented in the following table:

Table 1. Paired variables

Respondent	Y	X_1	X_2	$\cdots$	X_5
1	Y_1	X_{11}	X_{21}	$\cdots$	X_{51}
2	Y_2	X_{12}	X_{22}	$\cdots$	X_{52}
3	Y_3	X_{13}	X_{23}	$\cdots$	X_{53}
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\cdots$	$\vdots$
N	Y_{46}	$X_{1\,46}$	$X_{2\,46}$	$\cdots$	$X_{5\,46}$

This table 1 presents the paired values of independent (WDI) and dependent (HDI) variables for each country. It forms the basis for regression analysis.

From table 1 we can see that Y_1 pairs with $X_{11}, X_{21}, \cdots, X_{51}$, data Y_2 pairs with $X_{12}, X_{22}, \cdots, X_{52}$ and up to data Y_{46} pairs with $X_{1\,46}, X_{2\,46}, \cdots, X_{5\,46}$.

$$Y_i = \beta_0 + \beta_1X_{i1} + \beta_1X_{i2} + \cdots + \beta_{p-1}X_{i,p-1} + \varepsilon_i \tag{2}$$

where:

Y_i is a dependent variable for the *i* number of observations, for $i = 1,2, \cdots, n$. $\beta_0, \beta_1, \beta_2, , \beta_{p-1}$ are parameters, $X_{i1},\ X_{i2}, \cdots, X_{i,p-1}$ are independent variables and ε_i is the remaining (error) for the *i* number of observation assumed to be normally distributed which are mutually independent and identical with an average of 0 (zero) and variant of σ^2. Equation (2) when written in matrix notation can be seen in 3

$$Y = \beta X + \varepsilon \tag{3}$$

with:

$$Y = \begin{pmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_n \end{pmatrix}, \quad X = \begin{pmatrix} X_{11} & X_{12} & \cdots & X_{1,p} \\ X_{21} & X_{22} & \cdots & X_{2,p} \\ \vdots & \vdots & \ddots & \vdots \\ X_{n1} & X_{2n} & \cdots & X_{n,p} \end{pmatrix}, \quad \beta = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_p \end{pmatrix}, \text{ and } \quad \varepsilon = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{pmatrix}$$

The method used to estimate the parameters of the multiple linear regression model is the Ordinary Least Square (OLS) method. The first step that needs to be done is to minimize the value of $\boldsymbol{J}$.

$$J = \varepsilon\varepsilon' \tag{4}$$

$$J = \varepsilon\varepsilon' = (Y - \beta X)'(Y - \beta X) = (Y' - \beta' X')(Y - \beta X) = YY' - \beta XY' - \beta' X' Y + \beta\beta' XX'$$

Since $X\beta Y'$ is a scalar, so $\beta XY' = (\beta XY')' = \beta' X' Y$ we obtain:

$$J = YY' - 2\beta' X' Y + \beta\beta' XX' \tag{5}$$

To obtain the value of $b = [b_0, b_1, \cdots, b_p]'$ which is the estimator of $\beta = [\beta_0, \beta_1, \cdots, \beta_p]'$ that is by finding the partial derivative of $\boldsymbol{J}$ to β and equating to zero

$$\left.\frac{\partial J}{\partial \beta}\right|_{\hat{\beta}} = -2X'Y + 2XX'B \tag{6}$$

By converting all parameter β with estimator b we can obtain a normal equation:

$bXX' = X'Y$,

then

$$b = (XX')^{-1} X' Y \tag{7}$$

The next step is to measure the proportion of total diversity of the Human Development Index variable through all indicators used in the world development indicator variable.

$$R^2 = \frac{SSR}{STS} = \frac{\Sigma_{i=1}^{n} (\hat{Y}_i - \bar{Y})^2}{\Sigma_{i=1}^{n} (Y_i - \bar{Y})^2} \tag{8}$$

SSR and STS is sum of square regression and sum of total squares respectively. The value of R^2 that is getting closer to 1 indicates that there is a match between the model and the data, on the contrary, if it is closer to 0 the match between the model and the data is considered poor.

The test used to assess how strong the influence of all variables in the world development indicators simultaneously to the human development index is Test F which equation can be seen as follows.

$$F_{count} = \frac{\frac{\Sigma(\hat{Y}_i - \bar{Y})^2}{k}}{\frac{\Sigma(Y_i - \hat{Y}_i)^2}{(n-k-1)}} \tag{9}$$

To determine whether there is an influence by looking at the values obtained, if $F_{count} > F_{table}$ then it can be concluded that all world development indicators used simultaneously have an influence on the HDI value in Asian countries. And vice versa

$$t_{count} = \frac{r\sqrt{n-k-1}}{\sqrt{1-r^2}} \tag{10}$$

To determine the relationship between variables from world development indicators partially to the human development index, use the t test. If $t_{count} > t_{table}$ then it can be concluded that the independent variable does not have a significant influence on the human development index variable.

$$VIF_j = \frac{1}{1-R_j^2} \tag{11}$$

2.3. Preference Selection Index

Maniya and Bhatt have developed a multi-criteria decision-making (MCDM) technique [19], [20], which has gained recent traction in comparative development ranking studies, particularly across Asian nations [19], [20].. Unlike the other techniques, this MCDM does not require subjective weighting from researchers. In this research, the PSI method was used to rank Asian countries through the development indicators used and then compare them with the HDI rankings.

The first step that must be done is to make a decision matrix as follows.

$$X = [x_{ij}]_{mn} = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \tag{12}$$

Where m is an alternative or in this research referred to as an Asian country and n is the decision criteria or world development indicator chosen.

In the decision matrix normalization, we need to choose whether the criteria is the benefit or cost type. The benefit criteria shows the development indicators used, if it has a higher value, the better.

$$\bar{X}_{ij} = \frac{x_{ij}}{x_{ij}^{max}} \tag{13}$$

Meanhile the cost criteria shows the development indicator used, if it has a lower value, the better.

$$\bar{X}_{ij} = \frac{x_{ij}^{max}}{x_{ij}} \tag{14}$$

Next we determine the average value of performance that is normalized by

$$PV_j = \frac{1}{n}\Sigma_{i=1}^{m}(X_{ij} - PV_j)^2 \tag{15}$$

Where n is the number of Asian countries identified to have all the values of the indicators to be used.

$$\emptyset_j = \Sigma_{i=1}^{m}(X_{ij} - PV_j)^2 \tag{16}$$

Where $\emptyset_j$ is the preference variation values for each attribute.

$$\Omega_j = 1 - \emptyset_j \tag{17}$$

After the value of Ω_j is obtained, as the preference deviation value for each attribute which will then be added up to be divided by the preference variation value as in the following equation to get the criterion distribution value w_j.

$$w_j = \frac{\emptyset_j}{\Sigma_{j=1}^{n}\Omega_j} \tag{18}$$

The preference value for each country through all world development indicators will be obtained as the following equation.

$$\xi_j = \Sigma_{j=1}^{n}\bar{X}_{ij}w_j \tag{19}$$

The next step is to sort the Asian countries by preference value from largest to smallest.

To enhance reader understanding of the Preference Selection Index (PSI) method, this section provides a simplified illustrative example using normalized indicator values from one country Bhutan. The goal is to demonstrate how the PSI method operationalizes development indicators into a composite performance score that can be compared across nations.

The following table presents the normalized values for five selected World Development Indicators (WDI) for Bhutan:

Table 2. Indicator (Normalized)

Indicator (Normalized)	Value
Population Growth (X_1)	0,24
Voice and Accountability (X_2)	0,65
Government Effectiveness (X_3)	0,80
GDP per Capita Growth (X_4)	0,60
Control of Corruption (X_5)	0,75

First, the average normalized performance across all indicators for Bhutan is computed. This represents the baseline preference value (P)

$$P_{\text{Bhutan}} = \frac{0{,}24 + 0{,}65 + 0{,}80 + 0{,}60 + 0{,}75}{5} = 0{,}608$$

Next, the deviation from the average for each indicator is calculated and summed. This reflects the level of disparity among Bhutan's individual indicator performances compared to its own average:

$$D_{\text{Bhutan}} = \overset{j=1}{\underset{5}{\Sigma}} \left|x_j - P_{\text{Bhutan}}\right| = |0{,}24 - 0{,}608| + |0{,}65 - 0{,}608| + \cdots + |0{,}75 - 0{,}608| \approx 0{,}802$$

Finally, the preference value (PV) is derived by combining the average score and the deviation using the PSI formula. A higher PV indicates a more consistent and stronger overall performance across all indicators:

$$PV_{\text{Bhutan}} = \frac{P_{Bhutan}}{1 + D_{\text{Bhutan}} \frac{0{,}608}{1 + 0{,}802}}$$

This result reflects a balanced, though moderate, level of development performance. Despite having a strong score in government effectiveness and corruption control, Bhutan's relatively lower score in population growth affects its aggregated ranking. This step-by-step calculation illustrates how PSI synthesizes multidimensional indicators into a singular index that supports fair cross-country comparisons.

Such an example also aids policymakers and analysts in understanding the mechanics behind country ranking outcomes ensuring transparency and reinforcing the utility of PSI as a decision-support tool for regional development assessments.

3. RESULT AND ANALYSIS

This study uses five World Development Indicators: population growth (X_1), voice and accountability (X_2), government effectiveness (X_3), GDP per capita growth (X_4), and control of corruption (X_5). All data were obtained from the World Bank for 46 countries in Asia as shown in table 3. These indicators serve as independent variables in the multiple linear regression analysis with HDI as the dependent variable.

Table 3. World Development Indicator Data Tabulation

Country	World Development Indicator					Country	World Development Indicator				
	X_1	X_2	X_3	X_4	X_5		X_1	X_2	X_3	X_4	X_5
AFG	2,85	-1,57	-1,63	-22,93	-1,14	**LBN**	-1,25	-0,63	-1,29	-5,83	-1,23
BGD	1,15	-0,77	-0,63	5,72	-0,96	**OMN**	-0,51	-1,19	-0,12	3,62	0,09
BTN	0,64	0,23	0,80	3,42	1,55	**SAU**	-0,13	-1,59	0,50	4,06	0,31
IND	0,80	0,11	0,28	8,18	-0,29	**QAT**	-2,65	-1,17	1,11	4,32	0,81
MDV	1,36	-0,24	0,39	39,84	-0,37	**SYR**	2,62	-1,92	-1,74	1,30	-1,78
NPL	2,31	-0,09	-0,87	2,44	-0,53	**ARE**	0,83	-1,19	1,40	3,05	1,18
PAK	1,83	-0,84	-0,40	4,55	-0,79	**YEM**	2,14	-1,68	-2,30	4,00	-1,65
ARM	-0,52	0,06	-0,25	6,25	0,07	**PSE**	2,46	-1,11	-0,77	4,41	-0,74
AZE	0,44	-1,53	0,25	5,15	-0,83	**BRN**	0,82	-0,85	1,45	-2,40	1,25
KGZ	1,69	-0,61	-0,73	4,39	-1,12	**CHN**	0,09	-1,64	0,84	8,35	0,05
KAZ	1,30	-1,14	0,06	2,95	-0,24	**IDN**	0,69	0,16	0,38	2,99	-0,43
RUS	-0,43	-1,10	-0,18	5,18	-0,90	**JPN**	-0,46	1,08	1,40	2,61	1,57
TJK	2,14	-1,71	-0,59	7,08	-1,34	**KHM**	1,17	-1,44	-0,42	1,83	-1,18
TUR	0,76	-0,86	-0,09	10,51	-0,39	**KOR**	-0,18	0,93	1,41	4,33	0,76
TKM	1,45	-1,91	-0,93	6,20	-1,42	**LAO**	1,43	-1,68	-0,62	1,07	-1,04
UZB	1,98	-1,40	-0,20	5,30	-0,81	**MYS**	1,12	-0,15	0,99	1,94	0,17
LKA	1,08	-0,07	-0,08	2,40	-0,33	**MNG**	1,61	0,32	-0,47	0,01	-0,53
BHR	-0,97	-1,50	0,72	3,67	0,17	**MMR**	0,70	-1,66	-1,41	-18,48	-1,03
ISR	1,61	0,68	1,29	6,88	0,86	**PHL**	1,49	-0,15	0,07	4,15	-0,51
IRQ	2,27	-0,96	-1,29	-0,70	-1,25	**SGP**	-4,17	-0,14	2,29	13,52	2,17
IRN	0,72	-1,47	-0,86	3,97	-1,10	**THA**	0,18	-0,79	0,25	1,31	-0,46
JOR	1,99	-0,80	0,23	0,21	0,05	**TLS**	1,60	0,46	-0,76	3,62	-0,05
KWT	-2,56	-0,70	-0,04	3,94	-0,03	**VNM**	0,84	-1,30	0,28	1,70	-0,29
	C	B	B	B	B		C	B	B	B	B

Source : World Bank

This table 2 displays the raw values for the five WDI variables across the 46 Asian countries analyzed in this study. These values serve as input for both regression and PSI computations.

All variables are identified to see their impacts on HDI scores of Asian Countries. A series of multiple linear regression testing is using SPSS software. The tabulat ion of data from all the tests can be seen in table 3.

Table 2. Multiple Linear Regression Analysis

	b	Std. Error	β	t	P_t	Tolerance	VIF	G
Constant	0,749	0,018		41,592	0,000			
Population Growth (X1)	-0,022	0,009	-0,271	-2,426	0,020	0,647	1,546	0,572

Voice and Accountability: Estimate (X2)	-0,001	0,016	-0,009	-0,077	0,939	0,652	1,533	0,909
Government Effectiveness: Estimate (X3)	0,091	0,027	0,745	3,392	0,002	0,167	5,998	0,726
GDP per capita growth (X4)	0,001	0,001	0,046	0,445	0,659	0,767	1,303	0,500
Control of Corruption: Estimate (x5)	-0,017	0,03	-0,13	-0,564	0,576	0,152	6,582	0,488
	$R = 0,823$		$R^2 = 0,678$	$F = 16,840$	$P_F = 0,000$	$KS = 0,094$		

Source : Processed by Researchers Using SPSS

This table 3 provides detailed output from the regression analysis. It includes coefficient estimates, standard errors, t-values, significance levels (p-values), as well as tolerance and VIF values to assess multicollinearity. The results identify which indicators have statistically significant effects on HDI.

There are several test parameters that must be considered passed to be able to analyse the influence and magnitude of the variable constants of each indicators on the HDI value. The results of the Kolmogorov-Smirnov (KS) normality test with a value of 0,094 which is greater than 0,05 show that all world development indicators data are normally distributed. The tolerance value of all the WDI variables used is also greater than 0,1 and the VIF value is less than 10. Thus, there is no correlation between the independent variables used. To find out the homogeneity of the data, it can be seen from the Glejser test (G) where all the variables have a value greater than 0,5, so they are considered passed [24], [25].

Interestingly, although theoretically relevant, several indicators such as voice and accountability (X_2), GDP per capita growth (X_4), and control of corruption (X_5) were found to have no statistically significant influence on the Human Development Index (HDI), as shown by their high p-values (0.939, 0.659, and 0.576 respectively). This raises critical questions regarding the adequacy of the current model. For instance, while GDP per capita is often used as a proxy for economic well-being, it may fail to fully capture other critical aspects of human development such as education quality, healthcare access, and social equity [10], [14], [15]. Similarly, the insignificance of voice and accountability suggests that democratic freedom and transparency alone may not lead to improved living standards unless supported by strong institutional implementation [7], [8]. Therefore, future research should consider incorporating socio-cultural variables or composite governance indices to better capture latent factors influencing HDI.

The multiple linear regression equation of the relationship between world development indicators used on the human development index can be seen as follows

$$Y = 0,749 - 0,022X_1 - 0,001X_2 + 0,091X_3 + 0,001X_4 - 0,017X_5$$

Furthermore, the MCDM preference selection index technique is used to rank all Asian countries through the WDI value used and then compare it with the HDI ranking. Data tabulation from the data processing includes the number of normalized values for each ($\Sigma\bar{x}_{ij}$), the mean of normalized value of attribute j (PV_j), the number of preference values for each attribute ($\Sigma\emptyset_j$), deviation of preference values (Ω_j) and the total amount ($\Sigma\Omega_j$) as well as the distribution of the criteria for each attribute of the world development indicators (w_j).

Table 3. PSI Data Processing

	X_1	X_2	X_3	X_4	X_5
$\Sigma\bar{x}_{ij}$	-86,1192	-32,99649	-0,988933	4,01874772	-6,310949
PV_j	-1,872157	-0,717315	-0,021499	0,08736408	-0,137195
$\Sigma\phi_j$	-5049,439	-23,63779	-6,999811	-0,8562467	-6,787694
Ω_j	-5049,439	-23,63779	-6,999811	-0,8562467	-6,787694
$\Sigma\Omega_j$	-5087,721				
w_j	0,9924757	0,004646	0,0013758	0,0001683	0,0013341

Source : Processed by Researchers Using Microsoft Excel

This table illustrates the intermediate calculations required to compute PSI scores, including normalized values, preference deviation, and aggregate criterion scores. These values are essential for generating the final country rankings.

After obtaining all the parameters as in table 3, the preference values for each country through all the world development indicators used can be obtained.

Table 4. PSI And HDI Rankings

Country	ξj	PSI Rank	HDI Rank	Country	ξj	PSI Rank	HDI Rank
AFG	-1,4601	12	45	LBN	3,3095	8	28
BGD	-3,6055	32	36	OMN	8,1759	5	13
BTN	-6,4387	43	35	SAU	31,8692	1	6
IND	-5,1913	38	37	QAT	1,5588	10	8
MDV	-3,0550	29	21	SYR	-1,5892	13	43
NPL	-1,7916	15	40	ARE	-4,9615	36	5
PAK	-2,2610	21	44	YEM	-1,9457	18	46
ARM	7,9146	6	20	PSE	-1,6902	14	27
AZE	-9,3881	44	22	BRN	-5,0344	37	11
KGZ	-2,4581	22	32	CHN	-46,3802	46	19
KAZ	-3,1900	30	14	IDN	-5,9571	42	29
RUS	9,5324	3	12	JPN	9,0051	4	2
TJK	-1,9386	17	34	KHM	-3,5595	31	41
TUR	-5,4660	39	9	KOR	23,4677	2	2
TKM	-2,8602	27	22	LAO	-2,8961	28	38
UZB	-2,1016	20	25	MYS	-3,6959	33	15
LKA	-3,8491	34	17	MNG	-2,5710	24	24
BHR	4,2786	7	6	MMR	-5,9276	41	42
ISR	-2,5659	23	4	PHL	-2,7703	26	31
IRQ	-1,8299	16	33	SGP	0,9947	11	1
IRN	-5,7336	40	18	THA	-23,6082	45	16
JOR	-2,0841	19	26	TLS	-2,5878	25	38
KWT	1,6119	9	10	VNM	-4,9086	35	30

Source : Processed by Researchers Using Microsoft Excel

To provide a clearer comparison between countries' PSI scores and their actual HDI rankings, a visual representation is presented below. This helps highlight any notable discrepancies or alignments across selected Asian countries.

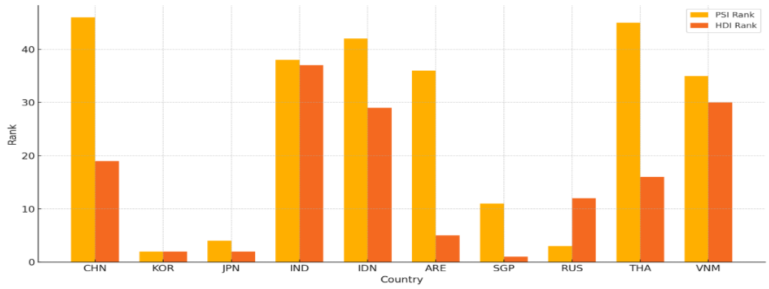

Figure 1. Comparison of PSI and HDI Ranks for Selected Countries

Figure 1 visualizes the rank comparison between PSI and HDI for a selection of Asian countries. Countries such as South Korea and Japan show near-perfect alignment between their development indicator-based (PSI) ranks and human development outcomes (HDI ranks), while China reveals a pronounced discrepancy ranking 46th by PSI despite holding the 19th position in HDI. Such divergence suggests that quantitative governance indicators (e.g., voice and accountability, corruption control) used in PSI may not fully reflect the lived socioeconomic outcomes measured by HDI [14], [15].

This table 5 compares the ranking of countries based on their PSI scores with their actual HDI rankings. It highlights discrepancies between perceived development performance (based on WDI indicators) and achieved human development outcomes.

A particularly striking example is China, which ranks lowest in PSI (46th), yet holds a mid-range HDI rank (19th). This anomaly may be attributed to its high performance in education, infrastructure, and life expectancy components emphasized in HDI but less favorable evaluations in governance-related indicators such as voice and accountability (-1.64) and control of corruption (0.05), both included in PSI. As observed by Su et al. [14] and Law et al. [11], authoritarian regimes may yield measurable socioeconomic progress while exhibiting weak institutional transparency, leading to apparent inconsistencies across measurement frameworks.This gap emphasizes the need for a more holistic evaluation approach that balances economic output with inclusive governance and quality of life measures. In contrast, South Korea shows perfect alignment between PSI and HDI rankings, highlighting its successful integration of effective development indicators with actual human development performance [14].

While this study provides useful insights, it is important to acknowledge certain limitations. First, discrepancies between PSI and HDI may be influenced by data quality issues, including missing or outdated values in WDI sources especially in low-income or politically unstable countries [21], [22]. Second, a temporal mismatch between WDI reporting years and HDI calculations may also distort associations, as PSI is calculated from the most recent available WDI metrics, whereas HDI often reflects trailing averages over several years. These gaps should be addressed in future studies through data harmonization techniques or longitudinal analyses.

4. CONCLUSION

This study contributes to the understanding of how specific World Development Indicators (WDI) influence the Human Development Index (HDI) in the Asian context, offering a novel integration of multiple linear regression with the Preference Selection Index (PSI) ranking approach. Unlike prior studies, this research combines statistical estimation with multicriteria decision analysis to reveal discrepancies between indicator-based development performance and actual human development outcomes.

The findings show that among the five selected WDI variables, only population growth and government effectiveness exert statistically significant effects on HDI, while voice and accountability, GDP per capita growth, and control of corruption do not. The use of PSI further enabled the identification of countries with mismatched rankings such as China which performed well in HDI but poorly in PSI due to governance-related indicators. In contrast, countries like South Korea demonstrate consistency across both dimensions.

From a policy perspective, the study provides practical implications for prioritizing development levers that directly support human well-being. Emphasizing governance quality and institutional capacity appears more impactful than focusing solely on economic growth metrics. Policymakers should consider enhancing transparency, civic freedoms, and service delivery to improve development outcomes sustainably.

For future research, the inclusion of specific control variables such as political regime type, public health index, and educational attainment scores may help explain additional variance in HDI across countries. Moreover, employing non-linear models including interaction terms or decision-tree-based algorithms could capture more complex dynamics between governance indicators and human development. Longitudinal or panel data analyses may also help mitigate time-lag effects and improve causal inference.

Overall, this study advances the literature by highlighting the disconnect between development indicator scores and human development outcomes, and offers a replicable methodological framework for policymakers and scholars in development economics.

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