

AN ASSESSMENT STUDY OF SOME ASIAN COUNTRIES ON THE BASIS OF PHYSICAL QUALITY OF LIFE INDICATORS

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Abstract:

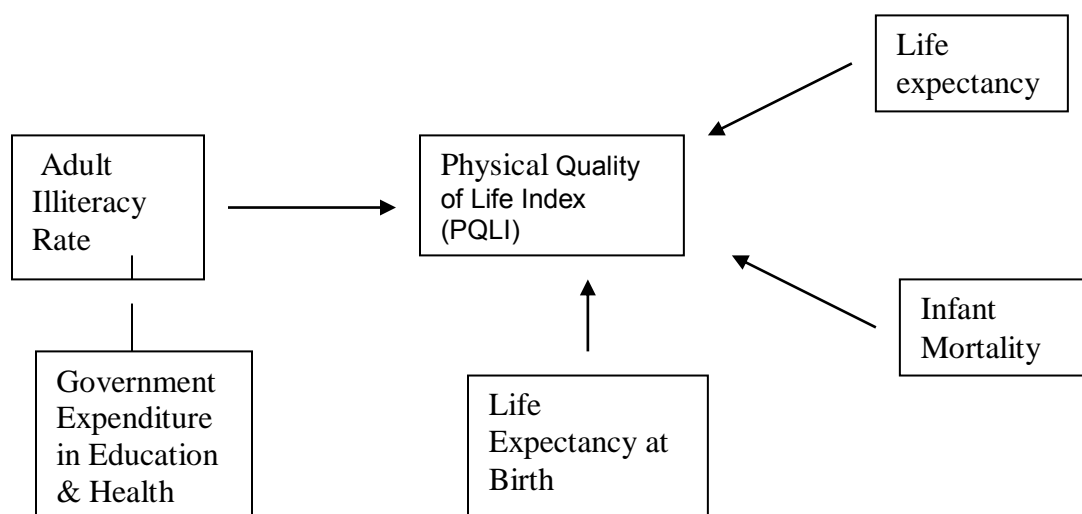
The physical quality-of-life index (PQLI) is an attempt to measure the quality of life or well-being of a country. The value is a single number derived from basic literacy rate, infant mortality, and life expectancy at age one. Quality of life is an umbrella concept that refers to all aspects of a person's life, including physical health; psychological well-being; social well-being; financial well-being; some approaches to quality of life emphasizes the social and psychological aspects of life, and contrast quality of life with quality of care. The growing attention to quality of life and the desire to minimize the negative effects of disease and health care on this quality reflects the highest of public health aspirations. Adult literacy has also risen from 46-70%. Developing world today is healthier, better fed and better educated. But program has been far from even. The no. of people living in poverty continues to grow. There is almost no improvement IMR & in education. In poor countries South Asia's IMR today are about the same in early 1970. So I think there exist some relation between socioeconomic conditions & health status. In a country, WHO has listed these two indicators 1. Health Indicators and 2. Physical Quality of

Life Indicator. Among those here I want to consider only the following as social indicators: Y: 1. IMR 2. Adult illiteracy & X: 1. Public exp. on education. % GNP 2. Public expo on health % GDP. I have taken a linear combination of expenditure on education % GNP (Y1) & expenditure on health % GDP (Y2) as U to represent a economic (welfare) condition of a country against this I have taken a linear combination of IMR per 1000 (X1) and adult illiteracy % rate (X2) as V to represent PQL of a country. After using Canonical correlation I have reached a conclusion that the increase of expenditure on health and education purpose implies decrease of IMR & illiteracy. In 1st Quadrant contains only Saudi Arabia whose expenditure on health and education is high but illiteracy rate also high (exceptional one). And 2nd Quadrant contains those countries whose expenditure on health and education is high illiteracy rate and IMR is low. The 4th Quadrant contains those countries whose expenditure is lower and illiteracy rate is higher comparatively. Here Iraq Pakistan , Bangaladesh and Nepal lie. There is no country in 3rd quadrant whose expenditure is less and illiteracy is also low. After concrete analysis and from the graph we can rank the 14 Asian Countries according to their better Physical Quality of Life as follows: 1. Japan 2. Korea Republic 3. Mongolia 4. Malaysia 5. Srilanka 6. Viatnam 7. China 8. Iran 9. India 10. Iraq 11. Pakistan 12. Bangaladesh 13. Nepal 14. Saudi Arabia

Keywords: *Physical Quality of Life, Health Indicators, physical quality-of-life index, IMR, GNP, GDP.*

INTRODUCTION:

The Overseas Development Council (then under the leadership of Jim Grant) developed and publicized a measure of (physical) quality of life many years ago. It combines literacy rate, infant mortality rate, and life expectancy, using scales from the lowest to the highest values in the global system. It weights the three scales equally. The literacy rate is, in turn, a function of the per capita spending levels on education, estimated cross-sectionally.



The physical quality-of-life index (PQLI) is an attempt to measure the quality of life or well-being of a country. The value is a single number derived from basic literacy rate, infant mortality, and life expectancy at age one.

The term "quality of life" has different meanings to different people. For some researchers and clinicians, quality of life means almost anything beyond information about death and death rates. For others quality of life is an umbrella concept that refers to all aspects of a person's life, including physical health; psychological well-being; social well-being; financial well-being; some approaches to quality of life emphasize the social and psychological aspects of life, and contrast quality of life with quality of care.

By the same token, characteristics of a person, such as income, health status, mental health status, disease profiles, educational level, and housing situation can be summed to create an overall quality-of-life measure.

The growing attention is on the quality of life and the desire to minimize the negative effects of disease and health care. Quality reflects the highest of public health aspirations.

According to WHO report (1976) it was recognized that in both developed and developing countries the standard of health services the public expected was not being provided. Against this background the 30th world health assembly resolves in May 1977 that the main social target of Govt. and W.H.O. is to provide them to lead a socially and economically productive life by the year 2000.

On the verge of the 21st century, dramatic, political, social and economic changes have overtaken the world. Living standards have risen over the past 25 years. Despite an increase in population from 2.9 billion people in 1970 to 4.8 billion in 1996 per capita income growth in developing countries has averaged about 1.3% a year. IMR have fallen from 104 per thousand in 1970 to 59 in 1996. On average, life expectancy has risen by 4 months each year since 1970.

Adult literacy has also risen from 46-70%. Developing world today is healthier, better fed and better educated. The no. of people living in poverty continue to grow. There is almost no improvement in education. In poor countries South Asia's IMR today are about the same as in early 1970. So I think there exists some relation between socioeconomic conditions & health status in a country.

WHO has listed these two indicators as follows:

Health Indicators are:

1. Public expenditure on education. % GNP
2. Public expenditure on education. % GDP
3. Expenditure On social activity
4. Income distribution.
5. Popu. Growth rate
6. Work condition.
7. GNP or GDP

Physical Quality of Life Indicator:

1. IMR
2. Adult illiteracy rate
3. Human poverty Index
4. MMR
5. Nutrition status of children
6. Life expectancy at birth
7. Low birth weight

Table-1 Showing characteristics of development indicators

Indicators	IMR(per 1000)	Adult illiteracy % rate	Expenditure on Education % GNP	Expenditure on Health % GDP
Country	Y1	Y2	X1	X2
Japan	11	1	3.8	7.2
China	1722	18.5	2.3	3.8
Korea Rep.	14	2	3.7	5.4
India	3671	48	3.5	5.6

Malaysia	13	16.5	5.3	2.5
Saudi Arabia	33	37.2	5.5	3.1
Srilanka	11	9.8	3.1	1.9
Nepal	145	72.5	2.9	5
Mongolia	8	17.1	5.6	6.7
Bangladesh	537	61.9	2.3	2.4
Pakistan	819	62.2	3	3.5
Vietnam	157	6.3	2.7	5.2
Iraq	1	42	3.5	1.5
Iran	189	21.4	4	4.8
Data Source: World Development Indicator & Human Development Report.				
AVG =	522.214	29.7429	3.65714	4.18571

Literacy Rate:-The percentage of people who can with understanding both Read & write a short, simple statement on their everyday life. Literacy rate 111 a sound Indicator of social development.

METHODOLOGY:

In this problem we define Y_1, Y_2 & X_1, X_2 as

Y_1 = children dying before age 1. (IMR)

Y_2 =adult illiteracy rate.

X_1 = Public expenditure on education. % GNP

X_2 = Public expenditure on health % of GDP

Here I observe Y_1, Y_2 & X_1, X_2 are Correlated.

To find a correlation between $Y = (Y_1, Y_2)$ & $X = (X_1, X_2)$ we can use canonical correlation.

Here we take a linear combination of Y_1, Y_2 & X_1, X_2 as

$V = L_1Y_1 + L_2Y_2$ & $U = K_1X_1 + K_2X_2$ (say)

We choose L_1, L_2 & K_1, K_2 s.t Correlation. Coefficient between U & V maximum and this Correlation. Coefficient is the Canonical Correlation between U & V .

To find L_1, L_2 & K_1, K_2 we do the following:

1. Find the variance covariance matrix of X & Y and represent it by Q.

$$2. \text{ We do partition } Q = \begin{pmatrix} Q_{11} & Q_{12} \\ Q_{21} & Q_{22} \end{pmatrix}$$

$$A = \text{inv}(Q_{11})Q_{12} \text{ inv}(Q_{22})Q_{21} \quad \&$$

$$B = \text{inv}(Q_{22})Q_{21} \text{ inv}(Q_{11})Q_{12}$$

3. Find Eigen values of A & B corresponding Eigen vectors. Let the Eigen value of

A are $\lambda_1 > \lambda_2 > \lambda_3$ then Eigen vector corresponding to λ_1 say a will be our k

Then the Eigen value of B are $\mu_1 > \mu_2 > \mu_3$ then Eigen vector corresponding to μ_1 say b will be our l. Root of maximum (λ_1, μ_1) is the Correlation between U & V.

We calculate λ_1 or μ_1 & corresponding eigen vector by Power Method.

1. Set $k=1$ let $Y_0 =$ any orthonormal vector.

$$2. Z_k = A Y_{(k-1)}$$

3. Find norm of Z_k ie. Cardinality (Z_k)

$$4. Y_k = Z_k / \text{norm}(Z_k)$$

5. If $Y_k \approx Y_{(k-1)}$, then $\text{norm}(Z_k)$ is the largest Eigen value & Y_k is the Corresponding Eigen vector.

6. If Y_k not equal to $Y_{(k-1)}$, increase k by 1 & repeat the procedure until

$$Y_k = Y_{(k-1)}$$

RESULTS AND DISCUSSION:

Table-2 Showing Averages

Indicators	Y1	Y2	X1	X2
AVG =	522.214	29.7429	3.65714	4.18571

$$Q = \begin{bmatrix} 13658742 & 91682.97 & -4289.37 & 3372.943 \\ 91682.97 & 7529.214 & -94.0643 & -168.831 \\ -4289.37 & -94.0643 & 15.97429 & 4.091429 \\ 3372.943 & -168.831 & 4.091429 & 41.21714 \end{bmatrix}$$

$$Q11 = \begin{bmatrix} 13658742 & 91682.97 \\ 91682.97 & 7529.214 \end{bmatrix} \quad Q22 = \begin{bmatrix} 15.97429 & 4.091429 \\ 4.091429 & 41.21714 \end{bmatrix}$$

$$Q21 = \begin{bmatrix} -4289.37 & -94.0643 \\ 3372.943 & -168.831 \end{bmatrix} \quad Q12 = \begin{bmatrix} -4289.37 & 3372.943 \\ -94.0643 & -168.831 \end{bmatrix}$$

$$A1 = \begin{bmatrix} -0.00025 & 0.000433 \\ -0.00944 & -0.02769 \end{bmatrix} \quad A2 = \begin{bmatrix} -297.029 & -4.9656 \\ 111.3181 & -3.60322 \end{bmatrix}$$

$$\text{INV}(Q11) = \begin{bmatrix} 0.079708 & -0.9707 \\ -0.9707 & 0.000145 \end{bmatrix} \quad \text{INV}(Q22) = \begin{bmatrix} 0.064234 & -0.00638 \\ -0.00638 & 0.02480 \end{bmatrix}$$

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$$A = A1 * A2 = \begin{bmatrix} 0.122638 & -0.00031 \\ -0.27865 & 0.146668 \end{bmatrix}$$

$$B1 = \begin{bmatrix} -297.029 & -4.9656 \\ 111.3181 & -3.60322 \end{bmatrix}$$

$$B2 = \begin{bmatrix} -0.00025 & 0.000433 \\ -0.00944 & -0.02769 \end{bmatrix}$$

$$B = \begin{bmatrix} 0.121335 & 0.008953 \\ 0.006114 & 0.147971 \end{bmatrix}$$

$$Z = A * Y0 \quad Y0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$\text{NORM}(Z) = \text{CARDINALITY}(Z) = \text{CAR}(Z)$ (say)

$$B = \begin{bmatrix} 0.121335 & 0.008953 \\ 0.006114 & 0.147971 \end{bmatrix}$$

$$Y0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$$Z1 = B * Y0 = \begin{bmatrix} 0.121335 \\ 0.006114 \end{bmatrix}$$

$$\text{NORM}(Z1) = 0.121489$$

$$Y1 = Z1/\text{CAR}(Z1) = \begin{bmatrix} 0.998733 \\ 0.050324 \end{bmatrix}$$

$$Z1 = \begin{bmatrix} 0.122638 \\ -0.27865 \end{bmatrix} \quad \text{CAR}(Z1) = 0.304441$$

$$Z2 = A*Y1 = \begin{bmatrix} 0.049691 \\ -0.24649 \end{bmatrix}$$

$$\text{NORM}(Z2) = 0.251447$$

$$Y2 = Z2/\text{CAR}(Z2) = \begin{bmatrix} 4.197618 \\ -0.98028 \end{bmatrix}$$

$$Z3 = A*Y2 = \begin{bmatrix} 0.024544 \\ -0.19884 \end{bmatrix}$$

$$\text{NORM}(Z3) = 0.20035$$

$$Y3 = Z3/\text{CAR}(Z3) = \begin{bmatrix} 0.122507 \\ -0.99247 \end{bmatrix}$$

$$Z4 = A*Y3 = \begin{bmatrix} 0.015337 \\ -0.1797 \end{bmatrix}$$

$$\text{NORM}(Z4) = 0.180352$$

Finally we get $\text{MAX}(\text{NORM}(Z_k)) = 0.152696$ where

$$K2 = -0.99982, K1 = 0.019206 \text{ and}$$

$$L1 = 0.31762, L2 = 0.948218$$

Therefore,

$$U = K1(Y1 - \text{MEAN}(Y1)) + K2(Y2 - \text{MEAN}(Y2))$$

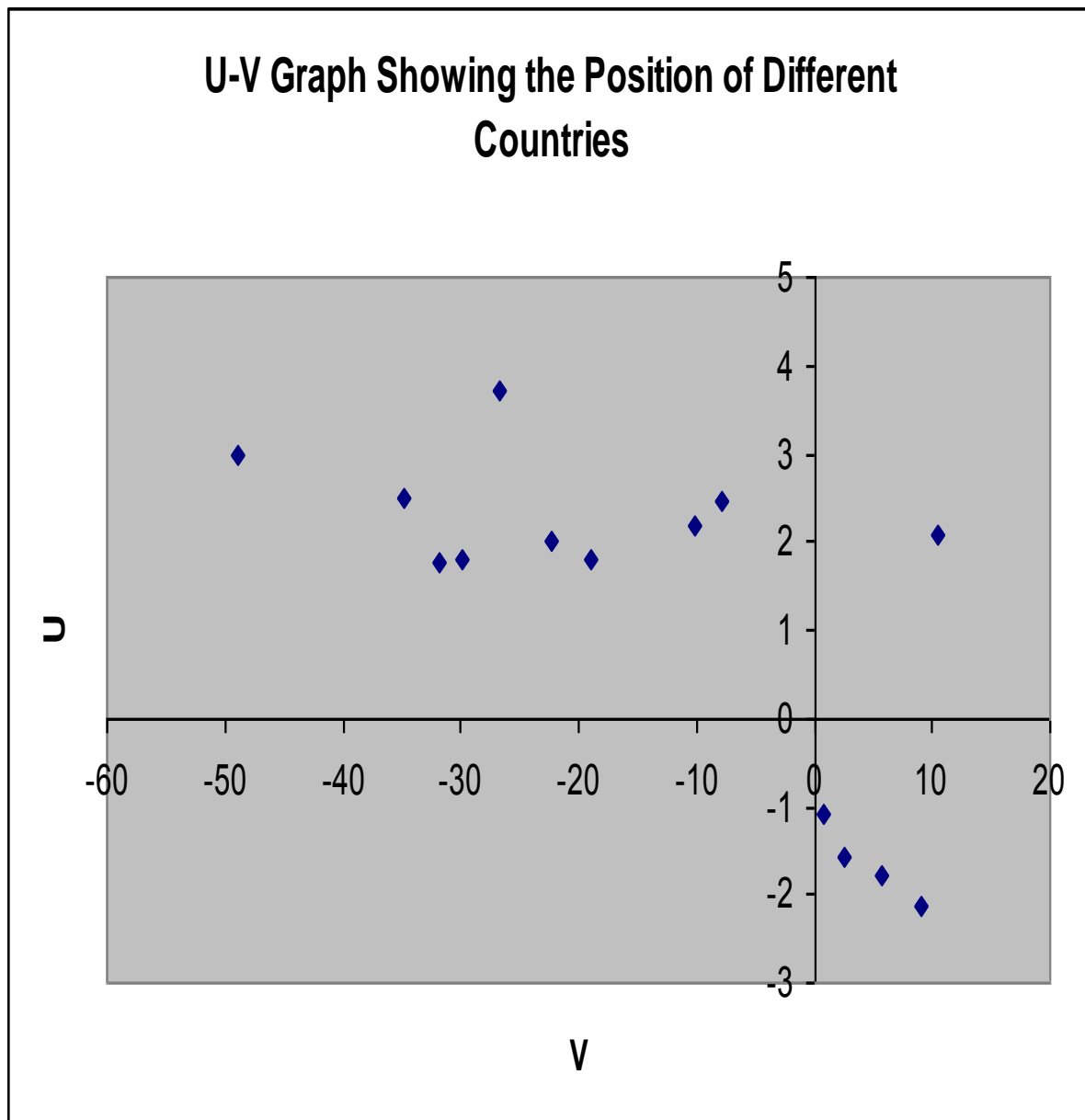
$$V = L1(X1 - \text{MEAN}(X1)) + L2(X2 - \text{MEAN}(X2))$$

Table 3: Showing Different countries and their U, V values

Sl. No.	Country	u	v
1	Japan	-48.9842	2.9835
2	China	-18.9789	1.7917
3	Korea Rep.	-34.8732	2.4937
4	India	-7.8328	2.4517
5	Malaysia	-29.934	1.8013
6	Saudi Arabia	10.4806	2.0719
7	Sri Lanka	-26.7572	3.7243
8	Nepal	9.0143	-2.134
9	Mongolia	-31.8674	1.7513

10	Bangladesh	5.7981	-1.7832
11	Pakistan	2.5515	-1.5893
12	Vietnam	-22.3018	1.9983
13	Iraq	0.7958	-1.103
14	Iran	-10.1347	2.1735

Graph1 : Showing Position of different countries



CONCLUSIONS:

I have taken a linear combination of expenditure on education % GNP (Y1) & expenditure on health % GDP (Y2) as U to represent a economic (welfare) condition of a country against this I have taken a linear combination of IMR per 1000 (X1) and adult illiteracy % rate (X2) as V to represent PQL of a country. After using Canonical correlation I have reached a conclusion that the increase of expenditure on health and education purpose implies decrease of IMR & illiteracy.

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There is no country in 3rd quadrant whose expenditure is less and illiteracy is also low.

After concrete analysis and from the graph we can rank the 14 Asian Countries according to their better Physical Quality of Life as follows:

1. Japan
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4. Malayasia
5. Srilanka
6. Viatnam
7. China
8. Iran
9. India
10. Iraq
11. Pakistan
12. Bangaladesh

13. Nepal

14. Saudi Arabia

The 'r' value has come 0.397.

After using Canonical correlation I have reached a conclusion that the increase of expenditure on health and education purpose implies decrease of IMR & illiteracy.

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