How to Cite:
Mehra, K., Dogga, S., & Kuruva, M. B. (2022). The state of human capital for Indian states: An empirical evidence from health and education performance. *International Journal of Health Sciences*, *6*(S7), 2210–2223. https://doi.org/10.53730/ijhs.v6nS7.11843

The state of human capital for Indian states: An empirical evidence from health and education performance

Kishor Mehra*
Department of Economics, Central University of Rajasthan, Ajmer, Rajasthan, India - 305817; +918058421361
Email: kkmehra.iitj@gmail.com.

Satyanarayanamurty Dogga
Department of Economics, Central University of Rajasthan, Ajmer, Rajasthan, India
Email: satyanarayana_eco@curaj.ac.in

Mahendra Babu Kuruva
Department of Business Management, H.N.B.Garhwal University, Srinagar Garhwal, Uttarakhand. India
Email: mahendrababu3687@gmail.com

***Abstract*---**Using composite index method, the present study attempts to construct Human Capital Index (HCI) for Indian states by multiplying the contributions of three major components- survival, health, and education. The study reveals that Kerala, Goa, and Chandigarh occupy the top three ranks. In contrast, the other states, like Uttar Pradesh, Bihar, and Madhya Pradesh occupied the bottom three positions. The study has key policy implications and calls for a Human Capital centric approach towards economic growth, which will help India build the edifice of its growth story, on the strong foundations of productive human capital.

***Keywords*---**Human Capital Index, Using composite index, Chandigarh occupy.

Introduction

It is believed that a country rich in natural resources grows at a faster rate than a country with scarcity in such resources (Anthes, 2018; OECD, 2011; Wood, 1999). Yet, the empirical evidence indicates that the presence of natural resources is neither necessary nor sufficient condition to achieve a higher and steady economic growth (Gylfason, 2001; Gylfason, Herbertsson, & Zoega, 1999;

Manuscript submitted: 9 April 2022, Manuscript revised: 18 June 2022, Accepted for publication: 27 July 2022

Gylfason & Zoega, 2006)[*]. Rather, it depends on how such natural resources tend to perform well in terms of major development indicators, such as life expectancy, education, child mortality, or human capital progress (Bulte, Damania, & Deacon, 2005; Ross, 2001). Given the fact that the natural resources are mostly managed by people who are capable of creating a complete ecosystem that could put them into effective use, in the larger interest of the economy, human capital[†] plays a pivotal role in economic prosperity and progress. Thus the human capital can be treated as a fundamental source of economic growth, where the human ingenuity can increase the factor's productivity, supported by technological advancement or by better use of existing technology (Barro, 1991; Lucas, 1988; Mankiw, Romer, & Weil, 1992; Romer, 1986, 1990). In fact, it is the difference in the rate of progress of human capital, which largely contributes to the growth differentials between developed and developing nations (Chatzimichael & Tzouvelekas, 2014). The same is evident from the Human Capital Index (HCI) released by the World Bank as part of the World Development Report-2019.While most developed countries like Japan, South Korea, Hong Kong, Australia, etc. are in the top 10 in the HCI index, the developing countries like India, Nepal, and South Africa are ranked above 100. On the other hand, the least developed countries like South Sudan, Niger, Mali, etc. had to stay in the lower rung of the HCI ladder(World Bank, 2018a).

India secured the 115th position among 157 countries in the HCI index 2019, released by the World Bank, with an HCI value of 0.44. This simply meant that, at the age of 18, a child born today will have 44 percent productivity of what it should have been if proper education and health facilities were provided to him/her. India's performance on HCI does not fall in tandem with the demographic dividend it has today, which could have attributed to human capital development. On the other hand, there are methodological problems as well as data gaps issues that further brought down India's HCI ranking. For instance, UNESCO enrolment rates were used for quantity purposes, related to the schooling parameter. And for quality assessment, the harmonic test score of the top nine assessment tests have been used. However, it is to be noted that none of the tests cover more than 100 countries, which limits the coverage. On the other hand, almost a decade-old assessment of PISA 2009 has been used in the Indian context, and that too was conducted for only two states (Tamil Nadu and Himachal Pradesh).In addition to this, other indicators used in the index are changing very slowly like stunting, mortality, etc. as compared to indicators used in other indices like 'ease of doing business' by the World Bank itself. Along with these, the index has not taken into account various programs by the Government of India like *Samagra Shiksha Abhiyan, Ayushman Bharat, Swachh Bharat*

---

[*] e.g., Japan, is resource-scarce, on the other hand, some countries with ample caught by Dutch disease or resource curse like Botswana and Sierra Leone (Gylfason et al., 1999; Gylfason & Zoega, 2006)

[†] Human capital is the stock of knowledge, personal attributes including creativity and managerial skills embodied in labor's ability to perform and produce economic value (Goldin, 2016)

Mission, which are largely contributing for a rapid growth of human capital in the country(PIB, 2018).

It is in this backdrop, the present study is an attempt to provide a Human Capital Index for India by improving upon the limitations in the methodology of the World Bank, which could help the policy elite to get a better picture on the ground. For each state, the Human Capital Index is constructed using a composite index method. Three sub-indices, namely survival index, health index, and education index constructed for the same purpose. Survival Index is based on the chance of survival for an individual to become a human capital for the country. Using Principal Component Analysis, the health index is constructed based on various proxies of health. Education Index is calculated using Quality Adjusted Expected Years of Schooling and returns to education. Eventually, a composite index is created by multiplying all three indices.

The rest of the study is structured as follows. First, we discuss the employed methodology and the underlying data used in the study. The final two sections cover the discussion of the results and the conclusion of the study, respectively.

Data and Methodology

A summary measure of human capital development for 36 Indian States and Union Territories has been created, and the collection of required data and techniques used for this purpose are discussed in this section.

Depending on the education and health status of each Indian state, the Human Capital Index (HCI) can be defined as the productivity of an individual until the age of eighteen. HCI is a combination of three sub-indicators - the Survival Index, the Health Index, and the Education Index. HCI value is given as 1 benchmark when someone gets a complete education and perfect health before his 18th birthday. Therefore, the calculated final value of HCI is between 0 and 1. The value of 0.5 indicates that a child born today is 50% productive for children with complete education and perfect health care (Kraay, 2018). The value of HCI, multiplied by 100, gives the percentage of productivity obtained.

The composite index of HCI is expressed as follows.

$$\text{HCI} = \text{Survival Index}\, x\, \text{Health Index}\, x\, \text{Education Index} \quad (1)$$

To reach out the above equation (1), the above mentioned three sub-indices of the composite index are formally defined and created separately as below.

Survival Index

The Key motive behind the inclusion of survival rate in capturing human index is that every child born today may not be able to survive until the age of five. Survival index perfectly captures all such individuals who are entering into an age where the accumulation of human capital starts (i.e., beginning of formal education). Hence it is an exclusion criterion for population which will never become part of Human Capital. The survival index is often used as a benchmark for the quality of human capital over an indefinite period of time, and is strongly allied with other population metrics such as mortality rates etc. The present study, therefore, used ‘under five’ mortality rates as a proxy of survival index. Except for Chandigarh, data on under-five mortality rates for all other Indian states, union territories were collected from the NFHS-4 state-wise reports. The same data for Chandigarh were collected from the NFHS-4 national report.

Health Index

There is a growing body of literature (Becker, 2007; Bloom & Canning, 2003; Kalemli-ozcan, Ryder, & Weil, 2000) emphasizing the importance of including health in measuring the status of human capital progress, as it increases returns to education by increasing the longevity of the workforce in the future, which will, further, increase the investment in human capital and contribute to better returns on physical capital.

Quantifying health is still a challenging task due to the unavailability of a single metric. Hence, it is measured using various indicators of health which includes Infant Mortality Rate (IMR), Total fertility rate (TFR), Immunization (Imz), Average out of pocket expenditure for healthcare(AOPEH), Institutional deliveries(ID), stunting, wasting, Under-Weight (UW), and Life Expectancy(LE). In the present study, data for IMR, TFR, Imz, ID, Stunting, Wasting, and UW are collected from state and UT wise reports of NFHS-4. Similarly, data on AOPEH are collected from Health Care Financing Division (2014), and the population census (2011) is used to create a common standard data from gender-segregated data. Data on life expectancy is collected from the Office of the Registrar General and Census Commissioner, India. Data on life expectancy is available only for bigger states and Delhi. Hence, the data on life expectancy for smaller states and UTs have been generated using the regression analysis method given by Swanson (1989), which uses population (65+) and CDR as input variables.

Data on population is taken from census 2011, while data on CDR is collected from the SRS bulletin, September 2017.

$$LE = b_0 + b_1\, x\, CDR + b_2\, x\, \ln(Population\ 65+) \quad (2)$$

Result obtained after running regression for bigger states is

$$LE = 61.92439 - 3.073766\, x\, CDR + 15.65026\, x\, \ln(Population\ 65+) \quad (2a)$$

Above equation (2a) is used to calculate life expectancy data for other states

Despite these efforts, there are some limitations to the data collection. For instance, data for most of the health indicators have been extracted from NFHS-4, which was conducted in 2015-16, while population data from census 2011 is used for calculating life expectancy. Hence, there is a difference in data, although the latest available data has been used. Data for Chandigarh was not complete in the state-factsheet of NFHS-4. Therefore, the value of IMR and the Under-five mortality rate was taken from the national report of NFHS-4.

As there is a different unit of measurement for variables as well as wide variability among them, data for every variable is scaled down between 0 and 1to make it standard. For variable which has a positive effect on health as well as human capital

$$S_{ij} = \frac{V_{ij} - \mathrm{Min}(\mathrm{V_{ij}})}{Max(V_{ij}) - Min(V_{ij})} \quad (3)$$

On the other hand, variable which has an adverse effect on health as well as human capital

$$S_{ij} = \frac{\mathrm{Max}(\mathrm{V_{ij}}) - V_{ij}}{Max(V_{ij}) - Min(V_{ij})} \quad (4)$$

Principal Component Analysis is used to create health index as discussed above; the technique involves converting a set of correlated variables to a set of linearly uncorrelated variables called principal components. Before proceeding for generating health index using PCA, the present study performs the KMO test to measure the sampling adequacy for each variable and Bartlett's test of Sphericity to check whether the collected data is suitable for factor analysis or not. As the estimated KMO value for two variables, including AOPEH and wasting, is less than 0.6, which indicates inadequate sampling, the present study dropped these two variables. Table-1 presents the estimated KMO value, i.e., 0.793 for the whole model after dropping the above two variables. Similarly, Bartlett's test of sphericity signifies that the collected data is suitable for factors analysis as its p-value is statistically significant (p=0.00).

Table 1: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.793
Bartlett's Test of Sphericity	Approx. Chi-Square	163.601
	df	21
	Sig.	.000

Source: Author's calculation

The construction of the Health Index is expressed as follow:

$$Health\ Index = b_1 IMR + b_2 TFR + b_3 Imz + b_4 ID + b_5 Stunting + b_6 UW + b_7 LE \quad (5)$$

In the above equation, b_0, $b_1 \ldots b_7$ are weights of the variables extracted by principal component analysis. PCA components are extracted using a correlation matrix of standard variables, which means variance for every variable is equal to one, and all variable combined give variance equal to the number of variables. Extracted components are rotated using **Varimax** (Orthogonal) rotation to make components easier to interpret (Manly & Alberto, 2017).

After calculating PCA, the rotated component matrix for Health Index is obtainend and five principal components are extracted, which explains 96.55 percent of the total variation of data. Communalities for every variable is more than 0.9, meaning that principal components are explaining more than 90 percent of variation for each variable. From the first component, TFR and ID showing strong loadings of 0.845 and 0.884 respectively and accounted for 57.85 percent of the variance, which shows the importance of the first component. The second component shows strong loadings for stunting and UW of 0.798 and 0.948, respectively, and accounted for 18.66 percent of the variance. The third component shows a strong loading of 0.901 for Imz and accounted for 8.47 percent of the variance. The fourth component shows a strong loading of 0.905 for LE and accounted for 6.58 percent of the variance. And last, the fifth component shows a strong loading of 0.852 for IMR and accounted for 5.98 percent of the variance. Components obtained from PCA are given in Table – 2.

Table – 2: Rotated Principal Components

Eigenvectors(PC_k) Variables	PC1	PC2	PC3	PC4	PC5
IMR	0.255	0.420	0.125	0.119	0.852
TFR	0.845	0.319	0.196	0.240	0.149
IMZ	0.347	0.122	0.901	0.199	0.112
ID	0.884	-0.016	0.289	0.176	0.190
Stunting	0.368	0.798	0.153	0.173	0.333
UW	-0.003	0.948	0.054	0.154	0.183
LE	0.280	0.227	0.199	0.905	0.109
% of Variance	57.851	76.517	84.990	91.572	96.550
Eigenvalues	4.050	1.307	0.593	0.461	0.348

Source: Author's calculation

After substituting respective loadings for each variable (b_i's) in the above equation, the formula for Health Index will be:-

$$Health\ Index = (0.852)IMR + (0.845)TFR + (0.901)Imz + (0.884)ID + (0.798)Stunting + (0.948)UW + (0.905)LE \qquad (5a)$$

The health index for each State will be calculated using the above formula by putting values of each variable viz IMR, TFR, Imz, ID, Stunting, UW, and LE for that State.

Education Index

Education is one of the most widely used measures of human capital (Becker, 1964; Diebolt & Hippe, 2019). The number of expected years of schooling is often used as a standard measure of education. However, it is argued that the number of expected years of schooling represents only a quantitative aspect of education and does not measure quality (Pritchett, 2013; World Bank, 2018b). It is further believed that the number of years of schooling often lacks learning-based education. Rather it emphasizes only on formal education status irrespective of acquisition of skills and knowledge. The Annual Status of Education Report (ASER Centre, 2017) by Pratham, a Non-Government Organization (NGO), found poor learning outcomes with most students in 26 districts across 24 states in India. Hence, an alternative and more versatile measure of education, which represents both quantitative and qualitative aspect of education, is Quality-Adjusted Expected Years of Schooling (QAEYS). QAEYS is a simple multiplication of expected years of schooling and learning parameters, which measures the quality of education. It is easy to comprehend and, at the same time, a robust mean for cross country comparison as it is adjusted for learning using different assessments like PISA, TIMSS, and NAS, etc.

Education Index is obtained by multiplying QAEYS with returns to education for every additional year to existing years of schooling. The education index is calculated as follows

A. **Expected years of schooling (EYS)**: It is calculated using the summation of enrolment at every age (age-specific enrolment rates) between 6 to 17 years. Data on age-specific enrolment rate is collected from "U-DISE FLASH STATISTICS 2016-17" by NIEPA.

B. **Quality of education in schools:** The quality of education is based on learning parameters using NAS scores. Data on NAS score is collected from the National achievement survey 2017 conducted by NCERT.

C. **Returns to education:** returns to education used in the current study is 8 percent for every additional year, as given by the World Bank.

Education is measured using expected years of schooling based on age-wise enrolment rates and adjust it for quality using NAS scores. Expected years of schooling is the sum of age-specific enrolment rates for the age group 6-17 years.

$$EYS = \sum_{k=6}^{17} \mathrm{ENR_k}$$

Where $\mathrm{ENR_k}$ is the age-specific enrolment rate for children of age k. Data is not available for each age but in cohorts like 6-10, 11-13, 14-15, and 16-17. Expected years of schooling are adjusted for quality using the NAS score, where classes 3, 5, 8, and 10 each given equal weight, which is further divided into subjects like maths, language, etc. If data is not available for any class for a state, then weights of that class distributed among other classes for which the NAS score is available. NAS score is averaged for each state. This NAS score is divided by the best-performing state to get a single NAS score (Filmer et al., 2018). QAEYS are calculated by multiplying single NAS scores and EYS for each state.

$$QAEYS = single\ NAS\ score\ x\ EYS$$

After getting QAEYS, the Education index, which shows the contribution of education for Human Capital, is calculated as **returns to education times QAEYS**.

$$Education\ Index\ =\ returns\ to\ education\ x\ QAEYS \qquad (6)$$

Finally, using the three indices mentioned above, the Composite Index of Human Capital was constructed and its results are discussed in the following section.

Result and Discussion

Table-3: Human Capital Index: State wise

STATE	Survival Index	Education Index	Health Index	Human Capital Index	Rank
Kerala	0.99	0.87	0.94	0.81	1
Goa	0.99	0.79	0.86	0.67	2
Chandigarh	0.96	0.84	0.75	0.61	3
Manipur	0.97	0.84	0.67	0.55	4
Tamil Nadu	0.97	0.74	0.76	0.54	5
Sikkim	0.97	0.68	0.82	0.54	6
A & N Islands	0.99	0.67	0.80	0.53	7
West Bengal	0.97	0.83	0.65	0.53	8
Himachal Pradesh	0.96	0.78	0.69	0.52	9
Tripura	0.97	0.76	0.68	0.50	10
Puducherry	0.98	0.62	0.82	0.50	11
Karnataka	0.97	0.85	0.60	0.49	12
Delhi	0.96	0.75	0.68	0.49	13
Punjab	0.97	0.64	0.80	0.49	14
Mizoram	0.95	0.77	0.64	0.47	15
Lakshadweep	0.97	0.61	0.77	0.46	16
Maharashtra	0.97	0.76	0.61	0.45	17
Telangana	0.97	0.70	0.63	0.43	18

Andhra Pradesh	0.96	0.72	0.62	0.42	19
Uttarakhand	0.95	0.76	0.56	0.41	20
Jammu & Kashmir	0.96	0.53	0.74	0.38	21
Rajasthan	0.95	0.82	0.46	0.36	22
Odisha	0.95	0.66	0.56	0.35	23
Haryana	0.96	0.64	0.57	0.35	24
Gujarat	0.96	0.71	0.50	0.34	25
Daman & Diu	0.97	0.53	0.65	0.33	26
Assam	0.94	0.78	0.42	0.31	27
Dadra & Nagar Haveli	0.96	0.72	0.40	0.28	28
Chhattisgarh	0.94	0.71	0.41	0.28	29
Nagaland	0.96	0.64	0.44	0.27	30
Jharkhand	0.95	0.78	0.32	0.24	31
Arunachal Pradesh	0.97	0.63	0.37	0.23	32
Meghalaya	0.96	0.72	0.33	0.22	33
Madhya Pradesh	0.94	0.65	0.36	0.22	34
Bihar	0.94	0.71	0.29	0.19	35
Uttar Pradesh	0.92	0.64	0.27	0.16	36
All India	0.95	0.71	0.49	0.33	

Source: Author's Calculation

Table - 3 suggests that Kerala bagged the top position in all three sub-indices. Survival Index, which is an indicator of survival for an individual to enter into the human capital acquiring phase, shows a better performance in all States, and Union Territories, with a value of greater than 90 percent. Madhya Pradesh, Bihar, and Uttar Pradesh lie at the bottom.

Kerala's relatively better performance in the education index is the result of the efforts that have been put in by successive governments in Kerala, since independence on this front. In addition to this, the role of the Travancore family (Ponmelil, n.d.) as well as Christian missionaries during the British regime, in shaping the ecosystem that governs Kerala's education system, is worth remembering in this context (Mathew, 1999). Recent schemes of having smart classrooms for primary schooling made the dropout rate near zero in the state (KITE, n.d.). Jammu and Kashmir (now a Union Territory) lie at the bottom in the education index due to factors like less involvement of civil society, schooling not running smoothly, lack of staff, etc., (Shah, 2018). Haryana and Punjab also did not perform well in terms of education despite having high per capita income; these states need better approaches to increases returns from education. It can also be due to inequality in opportunities available to people of various states, as observed by Asadullah & Yalonetzky (2012) using multiple indices, like especial Gini. Kerala is the most balanced state in terms of opportunity for education, while states like Uttar Pradesh, Bihar, etc. have high inequality, which also hampers the quantity and quality of education in these states. This inequality can be gender-based (both oppressive as well as low sex ratio), or caste-religion based.

Health Index is calculated using various proxies of health like IMR, TFR, Imz, AOPEH, ID, stunting, wasting, UW, and LE. PCA method is applied to get weight for each variable. Five components explained 96.55 percent of the variance of data. This shows the importance of chosen variables for index. KMO is used to check multicollinearity of data to verify the adequacy of data and has the value of 0.793, which signals data is adequate for PCA and hence for creating Health Index

As observed from the table-1**,** there is a lot of variation in human capital across Indian states. The study reveals that as per the value of HCI, states like Kerala, Goa, and Chandigarh are found to be placed at the top three ranking states. In contrast, the other states like Uttar Pradesh, Bihar, and Madhya Pradesh occupied the bottom three positions. Kerala's success can be attributed to successful schemes like Kudumbshree, etc. On the other hand, states of Uttar Pradesh and Bihar lies at the bottom due to lack of better health facilities. A high population density in these states also deprives people of getting better health care. The state like West Bengal performs relatively well on all the three indicators, despite low per capita income (MoSPI, 2015). Another interesting fact is that though the performance of some states like Jharkhand, Bihar in terms of Survival index and Education index is commendable than many other top rankings states, their overall rank is above 30 among 36 Indian states, and union territories. This is mainly due to their worst performance in health metrics (infant mortality rate, total fertility rate, immunization, stunting, etc.).

A top-performing state like Kerala has an HCI value of 0.807; on the other hand, Uttar Pradesh lies on the bottom with an HCI value of 0.158. This huge gap between them can be attributed to various reasons. The success of Kerala is due to the role of civil society in promoting essential services like quality education, widespread availability of healthcare, land reform, and active role played by women in society (Ramachandran, 2018). On the other hand, the reason for Uttar Pradesh lagging in this regard can be attributed to the neglect of these services (Drèze & Gazdar, 1997). In addition to these factors, there are various other factors which could explain this significant gap. Firstly, the difference between the literacy rates of Kerala (especially female literacy) and Uttar Pradesh. Second, gender discrimination is very prevalent in Uttar Pradesh and has a long history of illtreating women, while Kerala has a relatively more equitable society. Third, a well-established and efficiently working public services like quality schooling, healthcare, vaccination, etc. in Kerala, while these are neglected in Uttar Pradesh. Fourth, civil society participation in Kerala, along with efforts of state, which ensured the well-functioning of an ideal governance system for essential services, active role in societal affairs, etc.; however, there is little evidence of the same in Uttar Pradesh. Finally, the mass literacy of Kerala helped in creating a more equitable society, while social division is still enormous in the case of Uttar Pradesh (Dreze & Sen, 1995). All these underlying factors are clearly depicted in the huge contrast between Uttar Pradesh and Kerala, in the HCI developed by the present study.

There are also some interesting insights regarding the relationship between HCI and the per capita incomes of the States. It is a general perception that states with higher per capita income are generally able to acquire better human capital. However, the evidence suggests that one could not draw a generalized conclusion in this regard. For instance, a state like Goa has high HCI as well as per capita income, Kerala is on top in HCI but not in the case of per capita income. Despite being lower in per capita income, Manipur bagged the fourth position in terms of HCI while the state of Uttar Pradesh and Bihar in the lowest place in both HCI and per capita income (MoSPI, 2015).

Conclusion

Human capital is considered one of the key variable that determines the economic growth of a country. Even the World Bank started “The Human Capital Project” to encourage the countries around the world towards greater investment in their respective country’s education and health, in order to enhance productivity, flexibility, and innovative ability of the workforce. In the backdrop of the growing realization of the pertinence of this important variable, the present study attempted to develop a Human Capital Index for Indian states. HCI value 1 is given as a benchmark when someone gets complete education and perfect health before his 18th birthday, so the value of HCI varies from 0 to 1. In fact, HCI is a combination of three sub-indices viz. Survival Index, Health Index, and Education Index. The survival index is measured using the complement of the under-five mortality rate. Health index is a measure for health and constructed using principal component analysis using proxies like IMR, TFR, ID, etc. Education index is constructed using both quantitative as well as qualitative measures. Eventually, HCI is obtained by the multiplication of these sub-indices.

The HCI developed in the present study had brought forward the large scale variation in human capital across Indian states. The study reveals that as per the value of HCI, states like Kerala, Goa, and Chandigarh are found to be placed at the top three ranks with HCI values of (0.807), (0.672), and (0.607) respectively. In contrast, the other states like Uttar Pradesh, Bihar, and Madhya Pradesh have occupied the bottom three positions with HCI values of (0.158), (0.194), and (0.221) respectively.

These findings offer valuable policy insights, given the fact that India is in its early stage of Demographic Dividend (proportion of labor force out of the total population is high, age group 15-64) by 2030 (Aiyar & Mody, 2011). Whether it will promote growth or turn into a curse will depend on our human capital acquired by its citizens (Utsav, 2010). It is a matter of concern that the value of the Human Capital Index is very low for states like Uttar Pradesh, Bihar, etc. There is an urgent need to increase the Human Capital Index score policy interventions that promote investment in their healthcare system, quality education system, vocational training, and creating jobs. These efforts not only improve their respective HCI scores but also helps foster economic growth and mitigate poverty. On the other hand, an improvement on this front would also promote more inclusive societies, whose logical derivative would be a higher and inclusive economic growth. Given the size of the population in these states, the suggested policy initiatives would also help them to reap the benefit of the demographic dividend. On the other hand, states like Kerala with high Human Capital Index value need has the prerogative to create more opportunities for this human capital and put it to effective use, which is a challenge in itself. These policy interventions could be made, irrespective of the per-capita incomes of the states, as it is more to do with the policy interventions and the efficacy of their executions, to attain the desirable results that matters, rather than mere per-capita income. This Human Capital centric approach towards economic growth will help India build the edifice of its growth story on the strong foundations of productive human capital.

References

Aiyar, S., & Mody, A. (2011). The Demographic Dividend: Evidence From the Indian States. *IMF Working Papers*, *11*(38). https://doi.org/10.5089/9781455217885.001

Anthes, D. (2018). The importance of natural resources for the global economy. Retrieved March 10, 2020, from Sustainability Ninja website: https://www.sustainability-ninja.com/single-post/2014/11/25/The-importance-of-natural-resources-for-the-global-economy

Asadullah, M. N., & Yalonetzky, G. (2012). Inequality of Educational Opportunity in India: Changes Over Time and Across States. *World Development*, *40*(6), 1151–1163. https://doi.org/10.1016/j.worlddev.2011.11.008

ASER Centre. (2017). *Annual Status of Education Report (Rural) 2016*. https://doi.org/10.1016/S1570-7946(09)70037-9

Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics*, *106*, 407–443.

Becker, G. S. (1964). *Human Capital: A theoretical and empirical analysis, with special reference to Education*. Chicago: University of Chicago Press.

Becker, G. S. (2007). Health as human capital: Synthesis and extensions. *Oxford Economic Papers*, *59*(3), 379–410. https://doi.org/10.1093/oep/gpm020

Bloom, D., & Canning, D. (2003). Health as Human Capital and its Impact on Economic Performance. *Geneva Papers on Risk and Insurance: Issues and Practice*, *28*(2), 304–315. https://doi.org/10.1111/1468-0440.00225

Bulte, E. H., Damania, R., & Deacon, R. T. (2005). Resource intensity, institutions, and development. *World Development*, *33*(7), 1029–1044. https://doi.org/10.1016/j.worlddev.2005.04.004

Chatzimichael, K., & Tzouvelekas, V. (2014). Human capital contributions to explain productivity differences. *Journal of Productivity Analysis*, *41*(3), 399–417. https://doi.org/10.1007/s11123-013-0355-x

Diebolt, C., & Hippe, R. (2019). The long-run impact of human capital on innovation and economic development in the regions of Europe. *Applied Economics*, *51*(5), 542–563. https://doi.org/10.1080/00036846.2018.1495820

Drèze, J., & Gazdar, H. (1997). Uttar Pradesh: The Burden of Inertia. In J. Dreaze & A. Sen (Eds.), *Indian Development: Selected Regional Perspectives*. https://doi.org/10.1093/acprof

Dreze, J., & Sen, A. (1995). *India Development and Social Opportunity*. New York: Oxford University Press.

Goldin, C. (2016). Human Capital. In C. Diebolt & M. Haupert (Eds.), *Handbook of Cliometrics*. Heidelberg, Germany: Springer Verlag.

Gylfason, T. (2001). Economic Growth : What Is the. *Business*, 25–26.
Gylfason, T., Herbertsson, T. T., & Zoega, G. (1999). A mixed blessing: Natural resources and economic growth. *Macroeconomic Dynamics*, *3*(2), 204–225. https://doi.org/10.1017/S1365100599011049
Gylfason, T., & Zoega, G. (2006). Natural resources and economic growth: The role of investment. *The World Economy*, *29*(8), 1091–1115. https://doi.org/10.1111/j.1467-9701.2006.00807.x
Kalemli-ozcan, S., Ryder, H. E., & Weil, D. N. (2000). Mortality decline , human capital investment , and economic growth. *Journal of Development Economics*, *62*, 1–23.
KITE. (n.d.). Hi -Tech School. Retrieved October 20, 2019, from Kerala Infrastructure and Technology for Education website: https://kite.kerala.gov.in/KITE/index.php/welcome/ict/1
Kraay, A. (2018). Methodology for a World Bank Human Capital Index. World Bank, (September 2018). Retrieved from http://www.worldbank.org/research.%0Ahttp://documents.worldbank.org/curated/en/300071537907028892/Methodology-for-a-World-Bank-Human-Capital-Index
Kumar, S. (2020). Relevance of Buddhist Philosophy in Modern Management Theory. Psychology and Education, Vol. 58, no.2, pp. 2104–2111.
Allugunti V.R (2022). A machine learning model for skin disease classification using
convolution neural network. International Journal of Computing, Programming and Database
Management 3(1), 141-147
Lucas, R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22, 3–42.
Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, *107*, 407–437.
Manly, B. F. J., & Alberto, J. A. N. (2017). *Multivariate Statistical Methods A Primer*. Boca Raton, FL: CRC Press.
Mathew, E. T. (1999). Growth of literacy in Kerala: State intervention, missionary initiatives and social movements. *Economic and Political Weekly*, *34*(29), 2811–2820.
MoSPI. (2015). *GDP per capita*. New Delhi.
OECD. (2011). *The Economic Significance of Natural Resources: Key Points for Reforms in Eastern Europe, Caicasis amd Central Asia*. Paris, France.
PIB. (2018). World Bank's Human Capital Index released. Retrieved December 20, 2018, from Press Information Bureau, Government of India website: https://pib.gov.in/Pressreleaseshare.aspx?PRID=1549460
Ponmelil, V. A. (n.d.). Education in Kerala. Retrieved February 10, 2020, from https://kerala-info.newkerala.com/Kerala/Education-in-Kerala.html
Pritchett, L. (2013). *The Rebirth of Education_ Schooling Ain't Learning-Center for Global Development*. Washington, D.C.: Center for Global Development.
Ramachandran, V. K. (2018). Economic planning in Kerala. *Critical Asian Studies*, *50*(1), 155–163. https://doi.org/10.1080/09548963.2017.1421746
Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, *94*, 1002– 1037.
Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, *98*(5), S71–S102.

Ross, M. L. (2001). Does Oil Hinder Democracy? *World Politics*, *53*(3), 325–361. https://doi.org/10.1353/wp.2001.0011

Shah, H. (2018). School Education in Jammu and Kashmir : Issues and Concerns. *Educational Quest*, *9*(1), 107–113. https://doi.org/10.30954/2230-7311.2018.04.15

Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2022). Post-pandemic health and its sustainability: Educational situation. *International Journal of Health Sciences*, *6*(1), i-v. https://doi.org/10.53730/ijhs.v6n1.5949

Utsav, K. (2010). India's Demographic Transition: Boon or Bane? A State-Level Perspective. *MPRA Paper No. 24922*. https://doi.org/10.1227/01.NEU.0000349921.14519.2A

Wood, A. J. B. (1999). Natural Resources, Human Resources and Export Composition: A Cross-Country Perspective. In J. Mayer, B. Chambers, & A. Farooq (Eds.), *Development Policies in Natural Resource Economies*. Cheltenham, UK: Edward Elgar.

World Bank. (2018a). The Human Capital Project - presentation. Retrieved August 10, 2019, from https://openknowledge.worldbank.org/handle/10986/30498

World Bank. (2018b). *World Development Report 2018: Learning to Realize Education's Promise*. Washington, DC.