

Human Development Index: A Theory

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Abstract

Human Development Index was measured using the United Nation Developmental Plan tool. Malnutrition rate of a country was the proportion of the frequency malnutrition over the total population. This study explored what factor can countries be grouped by clusters and identified which factors had significance to the human development index of a country. The study made use of data mining to collect data on 15 selected countries out of the 175 countries of the world. Selection criteria was to select countries from each stratum of the level of human development index. Cluster analysis was used to explore what variable can group the 15 countries into three clusters. The process or the analysis revealed that among the five variables human developmental index was the factor that grouped the countries into clusters. There were similarities and differences of the characteristics of the countries as the bases to generate propositions that led into a theory. The health status of the people, the knowledge they learned, and their socio-economic conditions were crucial elements for human development of a nation, together with the stability of the governing body. The emergent theory of the study stated the theory on human developmental index based on the cluster analysis that the development of a country was mainly contributed by the knowledge of its people and stability of governance with the people's good health and economic condition.

Keywords: Human development index, UNDP, malnutrition, cluster analysis

Introduction

Human Development Index (HDI) of 2022 in its statistical updates constantly echo key developmental guide consistent with the analysis on human development. It showcases sketches of situations in the present time with leanings that continuously gauge for human development. The 2018 latest Human Development Index (HDI) ranking, there were fifteen (15) countries categorized as very high. These lists of countries were the following: Norway, Switzerland, Australia, Ireland, Germany, Iceland, Hongkong, China (SAR), Sweden, Singapore, Netherland, Denmark, Canada, United States, United Kingdom and Finland. A widespread numerical extension is the statistics, an indicator of the development in government all over the *world*.

However, this apprised the highpoints in progress which was also the insistent deficiencies and discrepancies. Overall, the *global* trend was pointing upwards through the categories on human development. Above all, among the 189 countries for which the calculations on 59 countries were very high in human development group. On the top list among these countries were Norway, Switzerland, Australia, Ireland, and Germany. Contrastingly, 38 nations dropped on as the low human development index group that included the countries of Niger, Central African Republic South Sudan, Chad, and Burundi. These countries were at the bottommost mark based on the nationwide accomplishments of HDI's measurement (United Nations Development Reports, Global Human Development Indicators).

The Association of Southeast Asian Nations (ASEAN) countries by *human development index* (HDI) classified countries as very high (VH), high (H) and medium (M). ASEAN countries like Brunei, Malaysia, and Singapore were VH. Thailand is H, Cambodia, Indonesia, Laos, Myanmar, *Philippines*, and Vietnam are classified as *Medium* (Wikipedia, List of ASEAN Countries by HDI).

Human Development Index was short listed into long term changes, and one was life since it relies deeply on how high the national wealth was spent and the inequality of economic welfare. There were factors that caused these limitations: these were war threats, pollution (levels of), accessibility to potable and clean drinking water could greatly affect the economic welfare of a country. HDI, then focused on the individuals' opportunities to be more 'liveable' and the greater opportunity for the provision of basic resources. It was only through human development index when a person could select numerous options and choices came from national policies.

Moreover, to distinguish two countries with equal Gross National Income (GNI), generates a gigantic difference between outcomes in development. With this, it was possible to shake a public scrutiny. Human Development Index measured the average development from its basic dimension namely, long, healthy life, knowledge and standard of living described as descent. Life expectancy and birth were the infant's lifespan. Years of schooling (mean); this was the average years in school and for people whose ages range from 25 and up; its conversion forms the levels of educational attainment, used the standard duration for each level. Years in school was the expected years (number); these were the years where at school entrance, the child's age was expected when patterns of age in enrolment prevails through the life of a child.

Therefore, human development index was a totality of how much progress human population did to develop at a certain degree or level: human development index was measured through the indexes of knowledge and understanding, healthy lifestyle, and descent living. Health was

measured by expected life span which was calculated at birth per country while education measured either by mean years where a child was in school and expected years in school where a child at an average age to start for school. The representation of standard of living, was the metric chosen through *Gross National Index* (GNP) based on *Producer Price Index* (PPI) or on the purchasing power parity, which was the metric used to get the average income.

Human capital was a propeller for economic growth for countries that were still developing and now seen to have a close gap with developed countries when it comes to attending school. Furthermore, research stresses the importance of cognitive skills is to attain growth in the economy. This changed the course especially on the issue of quality education in some developing countries that were found to be unsuccessful in knitting the gaps with countries who were developed. If the quality of education was jeopardized and not improving, it was difficult for developing countries to outsmart their performance at the economic level.

The younger adults by the year 2030 were those children who entered school in the year 2018. There were imminent changes because the level of difficulties was increasingly difficult to fix. Learners need to make up fast cost-effective, conservational, and collective modifications, for careers that had not been fashioned, for skills that have not yet been designed, and to unravel societal teething troubles that have not yet been predicted. Instruction can train students with the agency, the proficiencies and the sense of determination to profile their personal existence and add to the lives of others.

The major goal of the study was to explore what factor can group countries into clusters and identify which factors may have significance to the human development index of a country.

Specifically, this study was to find out the following.

1. What were the factors involved in a stable governance?
 - 1.1 People's health
 - 1.2 Economic condition

- 1.3 Characteristics, similarities, and differences of the countries
2. What were the relationships between cluster centers?
 - 2.1 Gaps between clusters
 - 2.2 Distances between clusters

Related Literature

The Learning Framework 2030

The Organization for Economic Co-operation and Development (OECD) offered their vision through its *Learning Framework 2030*. This learning framework offered a vision and underpinned its principles for *educational system* in the future. In 2021, shared vision of the Organization for Economic Cooperation and Development (OECD), children needed to abolish from their belief that wealth were unlimited and were misused; they will be necessitated to see the significance for what was in progress, continuity, and healthy lifestyle. Children needed to be liable and abled, assigning cooperation beyond separation, and rationale directly above short-range increase.

OECD Education 2030

Was this project mandated among those in representatives in the government and communal cohorts, to include the privileged, specialists, school setups and leaders, educators, learners and adolescent groups, parents, universities, local organizations, and social partners. United Nations Educational Scientific and Cultural Organization (UNESCO) aimed to develop admission to excellence in education on sustainable development at all levels and in all societal milieus, to change society by reorienting education and assist individuals improved awareness, expertise, standards, and behaviors needed for sustainable development. It was to include sustainable development matters, such as climate change and biodiversity into teaching and learning. Individuals were fortified to be in controlled actors who decide on tasks, respect traditional uniformity, and contribute to create a more sustainable domain. This was work in progress and a mutual development of a future-ready school for all.

The rising universal appreciation of Education for Sustainable Development as a vital component of excellence in education and a strategic enabler for sustainable development. The Sustainable Development Goals (link is external) (SDGs) implemented by the global community for the next 15 years include ESD. Goal 4.7 of SDG 4 on education addresses Education for Sustainable Development (ESD) and interrelated methodologies like Global Citizenship Education. UNESCO was accountable for the management of the Global Action Programme (GAP) on ESD (The Future of Education and skills Education 2030; United Nations Educational Scientific Organization, 2021).

New solutions in a rapidly changing world

The world was speedily and overwhelmingly shifting. The situation called for its first challenge, it's within global environment: climate transformation and the exhaustion of mother's nature requires pressing action and reworking. Climate Action Summit 2019; the focus of the summit was on the heart of the challenge. Regions that created the most emissions of harmful gases and radical elements and the areas where construction pliability made the biggest difference – as well as deliver frontrunners and partners their break to prove tangible environmental action and display their goals. The effect of climate change affected every country on every continent. It was upsetting nationwide economies and disturbing life's survival, estimating societies, populations, and nations profoundly at present and even more the future. Weather conditions were changing, oceanic heights were escalating, meteorological events were fetching extremely, and greenhouse fume radiations are at their peak intensities in history. Devoid of action, the world's average apparent high temperature is likely to surpass 3 degrees centigrade this century. The underprivileged and most defenseless people were the most affected. Reasonably, mountable answers were now accessible to empower nation state to spring frog to the cleanest and a more resilient economy.

The pace of change was speeding up as more people were turning to renewable energy and an array of new processes that diminished

emanations and increased adaptation efforts. Nevertheless, climate change was a worldwide defiance that did not respect coast-to-coast boundaries. It was a concern that requires resolutions that must be organized at the global level to help emerging countries move toward a low-carbon economy (UNESCO, Sustainable Goals, 2019; Nunez, National Geographic, 2019).

Good Health and Well-Being

It was indispensable to safeguard people's lives and promote their welfare for development to sustain. To increase life expectancy and to decrease some collective killers caused by child and maternal death, it was to achieve work with a target to lower down 70 maternal deaths per 100,000 live births by 2030 will have the need to improve the delivery care to be accomplished by skilled health workers. Premature deaths caused by communicable diseases was to lower down by 1/3 in 2030. This will entail more effective equipment for clean fuel in food preparation and in educating on the dangers of tobacco.

Voluminous efforts were necessary to wholly wipe out widespread of diseases and address diversity and emerging health issues. The focus was to provide additional resources in the health systems, upgraded cleanness and hygiene, greater contact to medical doctor and added tips on techniques to lessen pollution, substantial improvement to be done to help save millions of lives. The rise in HIV/AIDS cases increase where dismay and discrimination limit those in the grass roots capacity in receiving vital health services. What they need to live and breathe in healthy lifestyle and have useful lives (Wikipedia; Sustainable Development, 2019; UNESCO Development Goal 2030).

Zero Hunger: The goal was to put hunger into an end, food safety and nourishment will be improved and support maintainable agronomy. Life-threatening starvation and malnourishment were obstacles to viable progress and produces a ploy from which the general public effortlessly cannot defy. Food shortage and starvation mean fewer productive persons, and more predisposed to disease and are frequently incompetent to produce added income and increase their

incomes. Nearly 800 million people agonize from famine globally, and immensely held in emerging nations.

First-hand proof remains to indicate the total number of hungry people in the world was increasing, getting 821 million in 2021 or one in every nine people. In the past three years, hunger is on the rise, recurring to the levels it had a decade ago, to the same levels from a decade ago. This setback progressively propels a strong threat that must be done at once if the Zero Hunger Goal of the Sustainable Development Goal of is to be realized by 2030. The condition was deteriorating in South America and most regions of Africa. Why was it their multitude of hungry people even with sufficient food to nourish all in the planet? The practices in harvesting were poor, in fact wastage in food contributory to the scared food supply.

A negative impact due to wars like the current crisis brought about the war against covid-19 created a negative effect on why food was not available and steered to destroy the environment by which growing food become critical. It is time to rethink how we grow, share, and consume our food. If done right, agriculture, forestry and fisheries can provide nutritious food for all and generate decent incomes, while supporting people for rural development and protecting the environment. Right now, the soils, freshwater, oceans, forests, and biodiversity are being rapidly degraded.

Climate change was putting even more pressure on the resources we depend on, increasing risks associated with disasters, such as droughts and floods. Many rural women and men can no longer make ends meet on their land, forcing them to migrate to cities in search of opportunities. Poor food security was also causing millions of children to be stunted, or too short for the ages, due to severe malnutrition. A profound change of the global food and agriculture system was needed if we were to feed the 815 million people who were hungry and the additional 2 billion people, it was expected that by 2050, it was going to be this big number of people who were going to be hungry.

Funds for agriculture were critical to increase the size for rural production and it was necessary to

sustain system in food productivity were required to assist and improve the threats of hunger.

Methodology

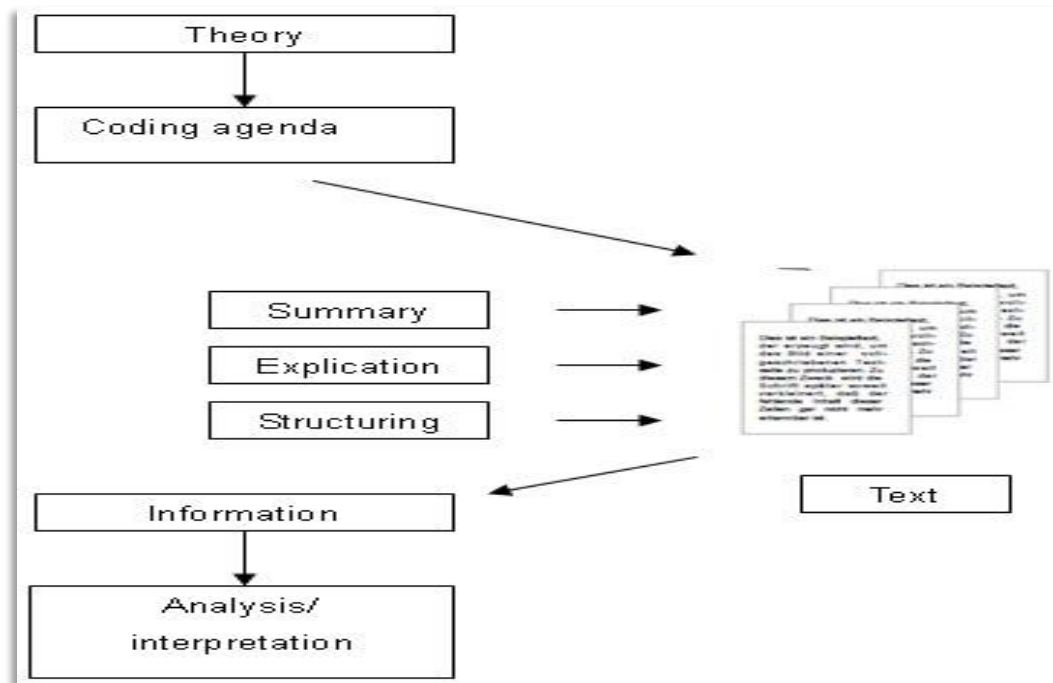


Figure 1. Flow Chart
Basic Process Flow for Design and Implementation of Data Mining in a Quantitative Research.

Developing a Theory

To develop a theory, it is common that it comes from patterns of isolated things. It is through exploring root causes of the events, and to envision things that will occur the next time. The seed of a theory in mind are those observable subjects of a certain idea. The next step is to gather information and to jot down open-ended questions. There are links in between causes and effects to be knitted together and this is created by making connections. A theory is an explanation that describes an observed phenomenon. The explanation of this phenomenon is called a theory (Ruff, Wiki How). *Coding:* Data collection is true to all research. To make sense of the data, it needs to be analyzed. The labelling of the data is the time where analysis begins. It labels data as to its source, how it was collected, the information it contains, etc. To work with an original data can be burdensome

because the data is huge and bulky, and it is the reason why data are often coded. Coding enables the research to minimize large quantities of information into its form which is easily ran particularly in computer programs. Since not all data need coding, there are content computer program that can do the analysis.

In this way, researchers code textual data for qualitative analysis. In the preparation for coding, it is important to know that programs in the computer have limits on way data can be entered, stored, and retrieved. These limits should be reflected in the codebook. For example, the names of the variables often cannot exceed eight characters. Use short variable names, preferably all letters. Data are to be stored in many ways. The most common form for variables is numeric data, consisting only of numbers. Data can also be stored as letters, called alpha-numeric format.

This allows the variable to be stored as either letters or numbers or a combination of the two (Cessda Training; PPA, 696 Research Methods). The study used *data mining* to collect data on 15 selected countries out of the 175 countries of the world. Countries coming from each level of strata in terms of human development index were chosen. Six countries were selected from the very high HDI, four from the high level, three from the medium level and six from the low level.

The data of the other four variables were taken from the United Nations Development Plan report. To measure human development index, the United Nation Development Plan tool is used to measure, and this tool investigated the malnutrition rate of any country. Malnutrition rate is the proportion of the frequency malnutrition over the total population of a certain country while literacy rate is the total number of populations; whose skills in reading and writing are developed with competence in comprehension. The denominator is the population age seven years or more.

Poverty incidence is the percentage of households living in poverty over the number of households. Political stability is measured through the socio-political environment. It is a hallmark sign of transformed growth and reduced poverty level. The relationship between a stable political arena and a peaceful condition of the region is accounted for by the nation's political democratization score, and economic performance are then measured through the Gross Domestic Product (GDP) per capita.

Data Processing Tool

This study used statistical software packages and these enabled bulk of data processed through analysis. These tools were first-rated software for managing bulk sized data because it agrees to a simple technique without countless methodological information. It was implemented from simple numerical calculations, descriptive figures, data justification to inferential or analytical measurements. This was deliberated in a simple and user-friendly approach since it did not require to practice intricate understanding to put it into code through quantitative data.

Software packages in statistics were the most user-friendly statistical analysis and data mining software because of the point-and-click crossing theme that created an easy to construct scripts for an imminent computerization and it moved to new areas like text analytics and big data makes it more useful. The statistical software packages output is the best to be used for publication quality tables. Relative to the projected statistics it consented a production of countless back up for making decision, specifically through the statistical simulations generated by the data being studied, thus it allowed to obtain models whose level of confidence can reach up to 95%.

Data Analyzing Tools

Statistical software packages were used in this study because it offered an excellent end user experience in the analysis methods. It helped since it explained doubts that covered in the study. The results provided by the software package were intended for capability analysis or hypothesis testing interpretation. It was very useful because it investigated the process and reported on the improvements based on any change. The data were easy to input because of the several different options were essential in 'auto-analyzing' the data through huge kinds of tools for statistic that was already in the program.

Summary, Explication and Structuring

Summary statistics were used to condense a set of observation so that the largest amount of information is communicated. These observations are commonly described in the measure of location, or central tendency like the arithmetic mean, statistical dispersion, and the shape of distribution, example, standard deviation.

Explication was data analysis and in quantitative research data analysis, it included calculating for frequencies in variables and to look for the differences between variables. In this study a qualitative approach was applied to find evidence to support or reject hypotheses formulated in the research process.

Structuring in quantitative research used large sets of data and data analyses were published with their data and software code. In this case, others validate the findings of these data. *Interpreting* text or data in this research was done by studying

Study Limitation: Data mining in qualitative research study was compared to sports, was not easy. The menu system was not natural, and selections were elaborated. After many times of working with it, it sometimes ended up searching for the test. The charts and graphs maybe extensively established in educational journals, books, and magazine, yet it's far behind those for commercial media. Tables were reworked to see if the criteria were essential for a superior reporting. These software packages in statistics did not have a notable look when it comes to the drawn charts coming from the data. Since it did not create an eye-catching data imagining. These tools helped visualize charts in software packages which were scarce, so when drawing a chart, one needs to reproduce the table of an analysed data from the software package to *excel* before drawing the chart

Results and Discussions

In the creation of Human development index (HDI), it was clear for people and their competencies are the definitive benchmarks used to assess the development of a country and not solely on economic growth. Human development index is used to inquire for national policy

the results of the different questions from the various information gathered from sets of data done by means of data mining. The results were numerically displayed in percentile form in the data table (Wikipedia; Investopedia).

choices, how two countries with the same level of Gross National Income (GNI) per capita ends up with different human development outcomes. It is a quantified summary of regular attainment in strategic scopes of human development: a *long and healthy life, knowledgeable* and *decent standard of living*.

The HDI is the geometric mean of normalized indices for each of the three dimensions. The assessment for health dimension is measured by mean of years of schooling for adults aged 25 years and more and feasible years of education for children of school age entrance. The existing facet is measured by gross national income per capita. The Human Development Index uses the logarithm of income, to expose dropping income with increasing Gross National Income. The scores for the three HDI dimension indices are then collected into a merged index using a well-organized mean. It does not reflect on inequities, shortage, human security, empowerment, etc. A packed picture of a country's level of human development call for analysis of other gauges and figures presented in the numerical annex of the report.

	Cluster		
	1 N=6	2 N=3	3 N=6
HDI	.944	.275	.682
Malnutrition	.01	.25	.08
Literacy	.99	.41	.80
Poverty incidence	.02	.25	.11
	.77	.99	.85

Table 1 Initial cluster centers

Initial Cluster Centers:

Clustering is a Machine Learning method that comprises the grouping of data points. Given a set of data points, a clustered algorithm is used to classify each data point into an explicit set. In theory, data points that are in the same group should have comparable properties and/or features, while data points in different groups should have highly dissimilar properties and/or features. Clustering is a method of unsupervised learning and is a common technique for statistical data analysis used in many fields (Seif Robert, 2019).

The theory on human development index (HDI) is based on the *cluster analysis* and the development of a country is largely contributed by the knowledge of its people. In addition, the stability of governance will depend more on the people's good health and economic condition. Cluster analysis was used to explore the variable that can do tremendous segregation to a huge group of countries into clusters and define their characteristics according to groupings.

Moreover, similarities and differences of the characteristics of these huge number of countries are the bases upon which will generate propositions that become the definitive process for theory generation. *Dendrogram*: The *Horizontal axis* of the dendrogram signifies the *distance* or *dissimilarity* between clusters. The *Vertical axis* represents the *objects and clusters*. It is simple to interpret the dendrogram. It is in the similarity and clustering. When it joins in (fusion), the two clusters are represented on the graph splits the line into two horizontal lines. The horizontal position of the split, shown by the short vertical bar gives the distance (dissimilarity) between the two clusters.

The three clusters as three branches occurs at about the same horizontal distance. Two outliers are fused randomly at a higher distance, and this is the interpretation. One compares the interpretation with an actual plot of the data. Unfortunately, this usually will not be possible because the data will consist of more than two variables (NCSS Hierarchical Clustering Dendrograms).

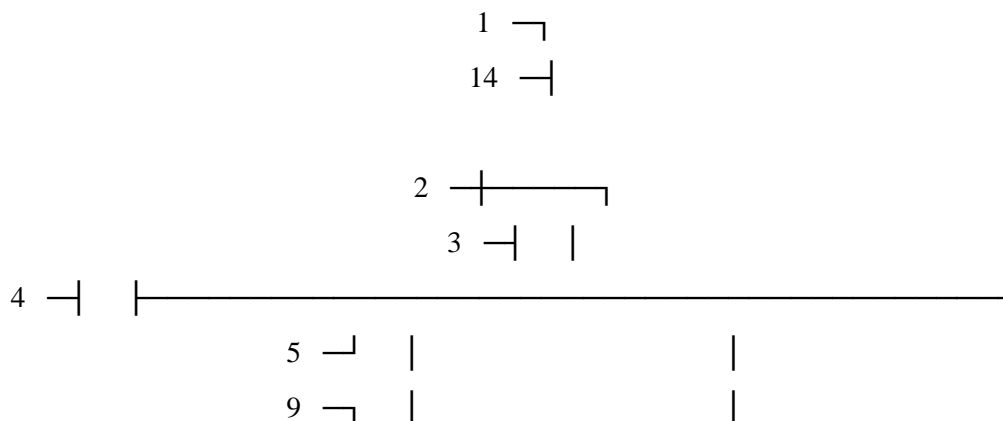
Dendrogram

*****HIERARCHICALCLUSTER ANALYSIS*****

Dendrogram using Average Linkage (Between Groups)

CASE 0 5 10 15 20 25

Label Number +-----+-----+-----+-----+-----+



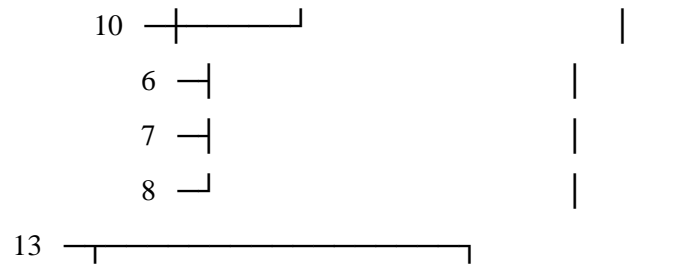


Figure 2. The Dendrogram

Clustering is also possible using Dendrogram: this figure shows that in the beginning, cases 1, 2, 3, 4, 5 and 14 were clustered. Figure 1. Is a Dendrogram and this process of clustering uses the hierarchical cluster analysis, it utilizes the average links between groups. It is called dendrogram, when it identifies the countries comparable to each other, then, this is the X axis. In the process of clustering, Y axis is a measure of closeness to that of the individual data points

or clusters, it represents the difference. The greater the height, the greater the difference. Dendrogram tells only a few stories on what is similar or different from these countries. But provides more information about which countries are better analysed from the point of the one who draws a significant conclusion. With this, it could provide, support or contradict several or more hypothesis regarding what is similar and different.

Distances between Final Cluster Centers

Cluster	1	2	3
*1		*.862	.306
*2	*.862		.566
3	.306	.566	

Table 2 Presents Distances between Final Cluster Centers

Table 2 presents distances between the final cluster centers. Based on the result, the finding tells when there are great gaps on the distances between clusters, these correspond to a greater disparity. Clusters 1 and 2 are identified as most different (.862). In cluster 3 is, it shows an approximate equal distance which is not different to clusters 1 and 2. There is a relationship between the clusters, as it is intuited from the final cluster centers, however, it becomes more challenging when and only if the number of

clusters and variables increase. The following propositions can be created from the results:

Proposition1. A healthy population could help in the development of a country

World Health Organization (WHO) defines health as, 'is the absence of disease, a status or a condition of wellbeing, both complete mentally and physically'. Better health equates to happiness, a greater sense of well-being, and it contributes to economic progress. If the

populations are healthy, they live a longer life, they are more productive, the cost is less expensive, and it saves more. It is the country's ability to implement and is consistent with quality health services for its people. The health departments are important lead, other government agencies and departments, and non-government resource linkages such as benefactors and donors, societies, and communities. The government is a vigilant counterpart to service; for faster transport of goods, it oversees that the construction of roads is of greater Investment because it could better improve and make health services accessible for all.

A roller coaster ride of inflation episodes can cause an eye sore and constrain health spending. Civil service continually helps give in to opportunities or limits to hiring more health workers. Health as well as development amplify healthy citizenry, and poverty reduction, creates a big impact on development policies, and the achievement of health goals.

The target is to invest more in health, and health is a priority over and above all other economic and development plans. 'Health and development' support health policies and responds to the needs of the marginalized sector of a society. Once communities produce abundant supplies on food sources, good nutrition is realized and sustained.

The measure of health condition of a person is his nutritional status. It is the healthy state of an individual that responds with food intake and utilization of its nutritional values. When the workforce becomes well-nourished, it could sustain tremendous challenges in the health care. It plays a critical role in human resource development; when the diet is poor it means poor health and eventually can cause poor performance.

Furthermore, when a child is hungry and malnourished, the child may suffer from mild to serious learning disabilities, this could result to performing poorly in school. If an individual is sick, he/she is classified under the category of either undernourished or malnourished, this individual does not respond well to treatment, long hours will be lost and can gradually eat up

the family's finances, the resources from mother-nature as well. Malnutrition undermines the budget on education and investments if it will continue to repel its course (The Role of Nutrition in Social and Economic Development 2019).

Proposition 2. Knowledge acquisition is a basic factor on nation's development

A status when the basic unit of the society, families in communities when they are well supported, develop their members into becoming healthy learners. They are identified as ready to participate and learn. The homes where they belong must create healthy condition of living in safe place, the provision of protection against the negative elements, where gender sensitivity is present, and the availability of comfort in the facilities.

Curriculum content should be relevant and align with the instructional materials for the reason of acquiring basic skills along language literacy, numeracy and life skills. The challenges in gender sensitivity, health and wellness, nutritional concerns, prevention and cure of HIV/AIDS and peace are resonated overtime.

Along these avenues, the Department of Education inculcated in the hidden curriculum on areas considered are factors to have caused societal and classroom problems. These are taken into consideration; the emphasis is on the implementation of this curricula in schools. Teachers are trained and adopt the child-centred teaching strategies and learning approaches if you mean what precisely is happening in well-managed classrooms and schools. It is important to possess skilful assessment in order that effective and active teachers could facilitate learning efficiently. In this manner, challenges could be reduced or not eliminate them over time.

Outcomes result to the acquired knowledge, developed skills and modified attitudes, and are all linked to the national goals for education. A positive and active participation in nation building, start with the vision and ends with an action. A quality higher education intertwines with all functions, teaching and academic programmes, doing research, earning

scholarship, hiring, and training staffs and learners, putting up buildings, purchasing and updating facilities and equipment, enhancing community and the academic services. Creating standards of quality with due recognition internationally, are to be defined. The department in tertiary education is to generate students' international academic relationships or students' network. New information technologies are the new tools included as an instructional material, and it is necessary because it gives impact to the delivery of knowledge acquisition (Philippine Education for all 2015).

Proposition 3. The socio-economic condition reveals much on the development of a nation

A well-nourished, healthy workforce have more to sustain towards progress. Malnutrition freezes people, leaving and crippling them with undeveloped standards of living, for a nation, it means unrealized development goals. Hence, it is recommended nutrition be at the centre of socio-economic development plans and strategies of all countries (FAO/WHO2019a).

In relation to the major objective on programmes promoting poverty alleviation, assisting communities in meeting their basic needs are the focus of its main goal. Those classified under the marginal sector of the society, food is pointed out as the first need identified by the impoverished because food on the table is not served at all. Projects in Nutrition are viewed as a good entry point in developing and creating poverty alleviation programmes.

Thailand is one a country with high success in their status, as a nation, in terms of earning an excellent nutritional status and poverty reduction projects. It all started in Thailand, in 2002: jobs were created in the rural setting, at the time when food supply was scarce because rain does not come in the country during the dry season. So, to augment the scarcity of household income, people remained in their respective homes, this was the time when Thai people stay put in their communities because they participate in developmental community activities. This was the involvement in the agricultural programmes where the production of nutritious crops was for

feeding young children and created rice and soil improvement projects. The observable benefits of these projects were income generation and household food security. When dryness spells the land, there were more activities in Thailand like village fishponds and safe water sources. There were areas that was drastically given more attention, these were raising of birds and other lucrative projects to bring home the bacon for family's income.

Also, what was utmost here was to help the rural poor, afforded them better health facilities, clean water supplies and other projects that centrally leaned on towards the rural poor who were in dire need of help. Thus, the aim was to improve economic situation and not to neglect that food must be brought on the table. There were services needed by the marginalized in the rural sector of the country and they were those who were in need of the following services; health clinics, municipal and regional hospitals, drinking water supplies, literacy and numeracy, nutritional and educational programmes (Tontisirin and Winichagoon 1977, Bilbao-Ubillos, Javier, 2011; Davison, Kirsten, Krahnstoeve, Ford, Earl S. and Cogswell, Mary, 2002; Inglehart, Ronald and Weizel, Christian, 2005; Anders, Ericsson K. and Smith, J. 1999; Rogoff, Barbara, 2003).

Proposition 4. The governance of a country propels its own growth and development

In countries with more advance economic status, analysts strongly agree to the idea that the main drivers of growth and prosperity in a very high and high economies, are the economic players who use variety of hats on their heads, it helps tell and describe what 'functions' are all about.

Firstly, there are indicators which predict and tell how much in the economy will be spend, produce and improve on human capital and could expand to a more continuous technological innovation. Technology, then will depend largely on research and development while investing in human capital with its best result, a higher productivity.

Secondly, the existence of the policies and legislations that allow offices both to purchase inputs and to produce goods and services with

stability, in turn are competitively driven, as well as provide for a transparent framework.

When the economy is good and development is progressive, prosperity is where progress readily redirect and connect to the course of history and destiny of a nation, and more importantly become the vital outcome for a country's growth and development. Finally, rapid growth development and financial stability will depend highly on a healthy social environment (Bilbao-Ubillos, Javier, 2011; Davison, Kirsten, Krahnstoeve, Ford, Earl S. and Cogswell, Mary, 2002; Inglehart, Ronald and Weizel, Christian, 2005; Anders, Ericsson K. and Smith, J. 1999; Rogoff, Barbara, 2003).

Human Development Index Theory

The theory on HDI based on the cluster analysis, that a country's development is mainly contributed by the knowledge of its people and the stability of governance with the people's good health and economic condition.

Conclusion

The major goal of the study is to explore what factor can group countries into clusters and identify which factors may have significance to the human development index of a country.

The theory on HDI is based on the cluster analysis and the development of a country is largely contributed by the knowledge of its people. In addition, the stability of governance will depend more on the people's good health and economic condition. Cluster analysis was used to explore the variable that can do tremendous segregation to a huge group of countries into clusters and define their characteristics according to groupings.

Moreover, similarities and differences of the characteristics of these huge number of countries are the bases upon which will generate propositions that become the definitive process for theory generation. Dendrogram is a process that uses hierarchical cluster analysis. It utilizes the average links between groups. It identifies the countries like each other, and this is called the X axis. In the process of clustering, Y axis is a

measure of closeness to that of the individual data points or clusters, it represents the difference.

The greater the height, the greater the difference. It tells only a few stories on what is similar or different from these countries. But provides more information about which countries are better analysed from the point of the one who draws a significant conclusion. With this, it could provide, support, or contradict several or more hypothesis regarding what is similar and different.

Based on the result, the finding tells when there are great gaps on the distances between clusters, these correspond to a greater disparity. Clusters 1 and 2 are identified as most different (.862). In cluster 3 is, it shows an approximate equal distance which is not different to clusters 1 and 2. There is a relationship between the clusters, as it is intuited from the final cluster centers, however, it becomes more challenging when and only if the number of clusters and variables increase.

The health status of the people, the knowledge they learned, and their socio-economic conditions are crucial elements for human development of a nation, together with the stability of the governing body. The emergent theory of this study states that the theory on HDI based on the cluster analysis that when the economy of a country becomes very high or highly developed, it is mainly contributed by the knowledge of its people and stability of governance with the people's good health and economic condition.

Recommendations

The major weakness or limitation of the study using data mining is the downside in privacy and ethical apprehensions. The question on how privacy is addressed but Data Mining is believed as neutrally ethical. However, the manner it is utilized at the current pace is a rise of the eyebrow. Since there are many means on how data mining finds middle ground privacy since it entails all-encompassing data preparation to disclose what is earlier unidentified information. The risk is when somebody gets access to the data, and the inability to identify these specific individuals. The future direction of research using data mining will be more meaningful, for

the future is an era. More and more data will be generated in every aspect one can think of. So, in everything one needs to research on, there's data downloaded. Societies, groups, association and governments have their ways of storing, processing and analysing data more than any time in history and this trend will continue to grow.

References

1. Ahmad, Muhammad Riaz et al; Factors Affecting the Students' Academic Performance, *Journal of Educational Research* (1027-9776); April 2010, Vol. 13 Issue 1, p 252, 2010.
2. Alcuizar, Rebecca M; Determinants of low academic performance for pupils in upland barangays, Iligan City, Philippines, P-ISSN: 2394-1685 E-ISSN:2394-1693 *Impact Factor (ISRA): 4.69*, 2016.
3. Furuoka, Fumita F; Population Growth and Economic Development: Empirical Evidence from the Philippines, *Philippine Journal of Development* Number 68, Volume XXXVII, No. 1 First Semester 2010.
4. Giguère, Sylvain; *the Drivers of Growth: Why Governance Matters*, 2005
5. *Global Human Development Indicators*, 2019.
6. Kodabakhshi, Akbar; *Relationship between GDP and Human Development Indices*
7. Kovacevic, M. *Review of HDI Critiques and Potential Improvements*, 2010
8. *List of ASEAN Countries by Human Development Index*, 2019.
9. Lacour, Misty & Tissington, Laura D; The effects of poverty on academic achievement, *Educational Research and Reviews* Vol. 6 (7), pp. 522-527, online at <http://www.academicjournals.org/ERR> ISSN 1990-3839 © Academi Journals 2011.
10. Miller, Jeffrey M. et al. *Philippines Transport Sector Assessment, Strategy, and Road Map*, © 2012 Asian Development Bank all rights reserved. Published & Printed in the Philippines in 2012.
11. Pelinescu, Elena: *Impact on human capital on economic growth*, 2015.
12. *Philippine Education for all: Review Report* 2015.
13. *Philippines Transport Sector Assessment, Strategy, and Road Map* 2012.
14. *The Future of Education and skills Education*, 2030.
15. *The Role of Nutrition in Social and Economic Development*, 1992 <http://www.fao.org/docrep/007/y5343e/y5343e04.htm>
16. Thompson, Bruce, *Factor Analytic Evidence for the Construct Validity of Scores: Historical Overview and some*
17. *Guidelines*, 1996.
18. Tuffery, Stephanie; *Data Mining Statistics for Decision Making*, 2010.
19. Ruff, Wiki How, 2019.
20. Stefanowski, M; *Supervised classification vs. clustering*, 2008
21. *Sustainable Development Goal Planning Calendar*, 2019
22. *United Nations Development Reports*, 2019.
23. *United Nations Educational Scientific Organization*, 2019
24. *UNESCO, Sustainable Goals*, 2019: Nunez, National Geographic