A COMPARISON OF TURKEY WITH THE MEMBERS OF ASSOCIATION OF SOUTHEAST ASIAN NATIONS WITH REGARDS TO HUMAN CAPITAL PERFORMANCE BY CRITIC AND COPRAS METHODS

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Abstract: This study aims at using the CRITIC (Criteria Importance Through Intercriteria Correlation) and COPRAS (Complex Proportional Assessment) techniques to evaluate the members of Association of Southeast Asian Nations according to the performance of human capital. In the analysis, a hybrid technique was applied. The CRITIC and COPRAS methodologies are combined in this integrated model. The objective weights of the criteria were determined using the CRITIC approach. For the purpose of ranking the countries according to human capital performance, the COPRAS technique was utilized. Countries' human capital is measured using the infant mortality rate (per 1,000 live births), unemployment rate (percentage of the total labor force), average life expectancy at birth, total (years), labor force participation rate (percentage of the total population aged 15-64), current health expenditure (percentage of GDP), internet users (percentage of the total population), and population aged 15-64 (percentage of the total population). The data covers the years of 2016, 2017 and 2018. According to the results, Thailand has the best performance from the point of human capital in all examined period. Indonesia has the worst performance in 2016 and Lao has the worst performance in 2017 and 2018. Turkey has a performance in ninth rank in all periods.

Keywords: human capital, multi-criteria decision making techniques, COPRAS method, CRITIC method, ASEAN countries

1   INTRODUCTION

Human capital refers to people's knowledge and abilities, which can be used to generate economic value. The endowment of a country's human capital can be virtually as essential as all other factors in determining long-term economic success. A country's national income can be raised by properly developing and benefiting from human capital capacity. Because

human capital is critical to society's productivity as well as the functioning of political, social, and civil institutions. (WEF, 2016, p.1). Less developed and developing countries can improve their human capital as well as their physical capital to increase their economic growth potential in the future. For the improvement of human capital in these countries, educated and healthy individuals are required. Human capital investment has several positive consequences on the economy, according to empirical studies. For example, it boosts agricultural and industrial productivity, contributes to more equitable income distribution, creates job possibilities, and reduces regional disparities, among other things (Eser and Gökmen, 2009, p.42). The current level of a country's human capital can be used to estimate and comprehend the growth potential of a country that will occur in the future. A comparison of a country's human capital to that of other similar countries will help determine its rank among the countries in the same group.

In this paper, human capital performance of Turkey and ASEAN members will be compared by using the CRITIC (Criteria Importance Through Intercriteria Correlation) and COPRAS (Complex Proportional Assessment) method. This hybrid model is made up of a combination of CRITIC and COPRAS methods. The importance of human capital criteria has been determined by CRITIC method. There are many Multi-Criteria Decision Making (MCDM) techniques such as TOPSIS, ELECTREE, ARAS, COPRAS, etc. The alternatives are often graded according to their performance for a particular time in research employing MCDM methodologies. This study looked at data from three separate years to assess how far countries have progressed over the time under consideration. For the countries, the data is for the years 2016, 2017, and 2018. The introduction, the literature review and conclusion have been written by A. Inkaya. Methodology, and implementation of CRITIC and COPRAS methods have been written by M. Masca.

2   THE LITERATURE REVIEW

Some studies using COPRAS method can be summarized as follows.

Zavadskas, Kaklauskas, Kvendeyte (2001) proposed the COPRAS method for determining the best alternative by evaluating building life cycles. Vilutien and Zavadskas (2003) used this method to identify the most efficient type of home maintenance work and its results. Using the COPRAS method, Zavadskas, Kaklauskas, Banaitis, Kvederyte (2004) created a housing credit access model. This strategy was utilized by Andrukevicius (2005) to select the best contractor for the development of a trade and entertainment center. Kaklauskas, Zavadskas, Raslanas, Ginevicius, Komka, Malinauskas (2006) used this method to evaluate the contractors for replacing windows in the main building of Vilnius Gediminas Technical University. For evaluating the sustainability of residential neighborhoods in Vilnius City, Viteikien and Zavadskas (2007) used the COPRAS approach. The COPRAS approach was utilized by Banaitiene, Banaitis, Kaklauskas, and Zavadskas (2008) to calculate the life cycle of a structure. Mulliner, Smallbone, Maliene (2013) considered economic, environmental, and social factors when determining the affordability of various housing locations. Using the COPRAS approach, Adalı and Işık (2016) selected an air conditioner. Patel, Jha, Soni, Fuse (2020) chose electric motorcycles using the CRITIC-COPRAS method.

3   METHODOLOGY

To estimate the weights of criteria and rank the nations based on human capital performance, the CRITIC and COPRAS techniques are utilized in this study. The COPRAS approach has been used to evaluate the countries' human capital performance ranks based on the defined criteria importance levels, and the CRITIC method has been utilized to estimate the criteria weights.

The following are some of the benefits of the CRITIC method: (Zardari, Ahmed, Shirazi, Yusop, 2015)

- The weights calculated account for both contrast intensity and conflict, both of which are included in the structure of the decision problem.
- The created method is based on analyzing the evaluation matrix to extract all of the information provided in the evaluation criteria.
- The method can be simply converted to an algorithmic version.

It is revealed that the weights obtained from the CRITIC technique encapsulate the information conveyed by all of the criteria in the multi-criteria problem.

The COPRAS method has the following advantages (Aksoy, Ömürbek, Karaatlı, 2015):

- The COPRAS approach is significantly easier to use than other methods such as AHP and TOPSIS since it requires far less calculation.
- Both maximizing and minimizing criteria can be calculated using the COPRAS approach.
- The capacity to calculate both qualitative and quantitative criteria is improved with this method.
- The capacity to illustrate utility degree is the COPRAS method's key benefit over other multi-criteria decision-making methods. When alternatives are compared, it can reveal which one is superior or inferior.

The World Bank website was used to obtain data on countries' human capital. Countries' human capital performance is measured using Current health expenditure (percentage of GDP), internet users (percentage of total population), labor force participation rate (percentage of total population aged 15-64), life expectancy at birth, total (years), mortality rate, infant (per 1,000 live births), population aged 15-64 (percentage of total population), unemployment rate (percentage of total labor force), and School enrollment, primary (% gross). These criteria are commonly employed in empirical human capital research, and the majority of them are recognized as indicators of human capital by international organizations such as the World Bank, the United Nations, and the Organization for Economic Cooperation and Development. (Yu, 2015, p.163)

4 CRITIC METHOD FINDINGS

The CRITIC technique was developed to measure the importance levels of criteria used in measuring countries' human capital performance in an objective manner. The CRITIC method's importance levels are shown in Table 1. The importance of criteria varies from year to year. The most important criterion was primary school enrollment in 2016, but the unemployment rate was in 2017 and 2018. For all years studied, people aged 15-64 criterion was the least important.

Table 1. Importance levels of criteria

| Criteria | Weights | | | | | |
	2016	Rank	2017	Rank	2018	Rank
CHE (% of GDP)	0,1211	4	0,1362	2	0,1285	3
IU (% of population)	0,1267	3	0,1323	4	0,1272	5
LFPR, total	0,1104	6	0,1244	5	0,1281	4
LE, total (years)	0,1011	7	0,1058	7	0,1058	7
MR, infant	0,1172	5	0,1232	6	0,1226	6
PA 15-64	0,0942	**8**	0,0976	**8**	0,0996	**8**
UN, total	0,1405	2	0,1477	**1**	0,1522	**1**
SE, primary	0,1889	**1**	0,1328	3	0,1361	2

CHE: Current Health Expenditure, IU: Internet Users, LFPR: Labor Force Participation Rate, LE: Life Expectancy, MR: Mortality Rate, PA: Population Aged, UN: Unemployment Rate, SE: School Enrollment

5   COPRAS METHOD FINDINGS

Table 2 shows the scores and rankings of countries based on the human capital performance across the years examined.

Table 2. Scores and Rankings of Counties

Countries	Scores					
	2016	Rank	2017	Rank	2018	Rank
Brunei	67,917	7	65,525	7	64,280	7
Cambodia	76,637	5	79,643	4	80,969	4
Indonesia	58,996	**11**	59,717	10	59,293	10
Lao PDR	59,376	10	59,237	**11**	58,258	**11**
Malaysia	79,425	4	79,335	5	77,146	5
Myanmar	63,992	8	63,886	8	64,047	8
Philippines	69,889	6	69,776	6	68,159	6
Singapore	84,593	2	84,248	2	84,496	3
Thailand	100,00	**1**	100,00	**1**	100,00	**1**
Turkey	61,336	9	60,768	9	60,182	9
Vietnam	81,679	3	83,030	3	87,406	2

The results show that the country with the best performance is Thailand in all examined years. Indonesia in 2016 and Lao in 2017, and 2018 are the worst countries in regards to human capital. Turkey has the ninth ranking in all examined years.

6   CONCLUSION

Human capital has gradually become the key driver of economic growth and productivity. To grow and enhance per capita product and expenditure, and so raise the standard of living,

a country's productivity must be raised. The requirement for productivity development becomes even more pressing in a globalized world where economies fight for resources and markets. Because the development and deployment of new technology is becoming increasingly dependent on productivity growth, public policy must be geared toward the growth of human capital, the enhancement of its quality, and the efficiency at which it is put to use (Yu, 2015).

The ASEAN counties are compared using an approach that combines CRITIC and COPRAS. Using the CRITIC approach, the "primary school enrollment" is determined as the most crucial criterion in 2016 and "unemployment rate" in 2017 and 2018. According to the COPRAS approach, Thailand is country, which has the best performance as regards to human capital for all examined periods. While Indonesia has the worst performance in 2016, Lao has the worst performance in 2017 and 2018. Turkey's performance is on the ninth ranking in all studied years.   It is noted that this is a comparison of countries with regard to human capital not total economic performance.

Low-performing countries in terms of human capital must implement macroeconomic policies, particularly to reduce unemployment and enhance labor force participation. In addition, for a healthier generation, a lower mortality rate, and a longer lifespan, the proportion of GDP spent on health care should be increased.

It is possible to implement the following recommendations to provide the human capital development in the ASEAN countries. (ASEAN, 2019, p.2)

Countries should commit to increasing public and multisectoral investments in nutrition and healthy diets, as well as increasing cooperation through mutual pursuit of initiatives.

It should be centered on learning outcomes, skills, and competencies in the education sector

to ensure that education fosters students' adaptability, critical thinking, collaborative attitude, and entrepreneurship.

Countries should create chances and environments in which people of all ages may thrive and contribute to the future economy and national competitiveness by being part of a productive and adaptable workforce.

It is important to encourage public-private collaboration and policy initiatives in the health-care, education, and employment sectors to guarantee that human capital development outputs are appropriate for market demand and can be sustained through strong partnerships.

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