Comparative Study of Human Capital Performance among West Asian Countries: A TOPSIS Method

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Human capital has been long proven as one of the important significant determinant of economic growth across the world. Thus making the development of human capital as one of the vital job of country's policymaker. This has become a pressing necessity especially for oil-dependent economies as the oil reserves is rapidly declining over time. This study aims to compare the performance of human capital development among countries in West Asian region. Applying the multi-criteria decision analysis method: TOPSIS, comparative study will be done for the year 1990, 2000 and 2010. The results demonstrate that Armenia is the top in the ranking while Yemen is on the bottom of the table. Further comparison with developed countries and Asia as benchmark indicates a wide gap among them.

Keywords: *Oil-dependent economies, human capital, comparative, TOPSIS, ranking*

Modal manusia merupakan salah satu faktor penentu yang penting kepada pertumbuhan ekonomi dan menjadikan pembangunan modal manusia sebagai tugas penting bagi pembuat dasar sesebuah negara, terutamanya dalam kalangan negara yang bergantung kepada penghasilan minyak mentah dan gas asli memandangkan simpanan sumber semulajadi itu semakin berkurangan. Kajian in bertujuan mengkaji pembangunan modal menusia dalam kalangan negara Asia Barat secara perbandingan dengan mengaplikasikan kaedah TOPSIS bagi tahun 1990, 2000 dan 2010. Keputusan menunjukkan negara Armenia adalah terbaik dalam pembangunan modal manusia manakala Yemen menduduki kedudukan paling bawah. Kajian ini turut dilanjutkan dengan membuat perbandingan dengan negara maju di Asia sebagai penanda aras.

Kata Kunci**:** Ekonomi berasaskan minyak, modal manusia, perbandingan, TOPSIS, kedudukan

INTRODUCTION

Human capital is a term created by a Nobel Prize winning economist, Theodore William Schultz on 1960s. He believed that human capital is the same with others capital, which it can be invested through education and training, resulting in improvement of quality and output level. Abilities, experiences and education poses by labours have economics value

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to the employer and economic collectively. Human capital has been the focus of economist since the introduction of endogenous growth theory by Lucas (1988). This theory states that human capital accumulation as an endogenous source of long run economic growth. Lots of study on different countries in different region have confirmed the significant and positive impact of human capital on economic growth. Study on developing nations' human capital development is essential to ensure a sustainable growth (Suri et al. 2011). Shortage in human capital accumulation is identified as one of the causes of low growth rate (Kosempel 2004). A study by Agiomirgianakis et al. (2002) on 93 countries indicates education has positive and significant impact on economic growth. Ranis et al. (2000) and Baldacci et al. (2008) confirmed the causal relationship between human capital and economic growth. Gross Domestic Product (GDP) is commonly used as the indicator of economic performance of a country and also commonly used as dependent variables in economic researches.

There is an issue for the case where GDP of the country is not mainly related to human capital. This is the case especially for countries where the economies are dependent on natural resources such as oil and gas. According to Organization of the Petroleum Exporting Countries (OPEC), 81.5 percent of the world's proven crude oil reserves are located in OPEC Member Countries, with the bulk of OPEC oil reserves in the Middle East, amounting to 65.5 percent of the OPEC total. Gulf Cooperation Council (GCC)[1] countries which consists of six Middle Eastern countries: Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman are among the countries with high shares of crude oil reserves (of OPEC) in 2016: Saudi Arabia (21.9 percent), Iraq (12.2 percent), Kuwait (8.3 percent) and United Arab Emirates (8.0 percent) are among the highest. These nations are oil dependent economies where oil revenue being the major part in GDP. Kuwait's oil revenue as percentage of GDP is the highest in year 2014 (53.04 percent), other countries include Iraq (41.36 percent), Saudi Arabia (38.71 percent), Qatar (19.50 percent) and United Arab Emirates (18.98 percent). Crude oil is non-renewable resource and its reserves is declining over time. A growing consensus of geologists, oil industry consultants, scientists and oil industry players believes that world oil production will begin declining in near future (Weber, 2011). Therefore, it is the time for oil-dependent economies to diversify their economy into so-called knowledge based economies which includes sectors like investment, finance, manufacturing, tourism, services and construction. This diversification process acquires providing training and education to the people with the needed knowledge and skills. Since the natural resources (oil and gas) are rapidly declining, economic diversification has become a pressing necessity for policymakers in oil-dependent economies. Human capital development has become the priority of policymakers. The essential step in developing human capital is understanding a nation's level of human capital compared with other countries in the same region and making the country with better performance as benchmark. Therefore, the objective of this paper is to study and compare the performance of human capital among West Asian (oil dependent economies) countries for year 1990, 2000 and 2010. The rest of the paper is organized as follows. Section 2 demonstrates some background of West Asian countries in this study, Section 3 will discuss briefly on previous related studies, Section 4 provides the explanation on methodology and variables, Section 5 reports the results and discussion, and Section 6 summarizes and concludes.

BACKGROUND STUDY

Petroleum is the major industry in the West Asian region, as more than half of the world's oil reserves and around 40 percent of the world's natural gas reserves are located in the region.

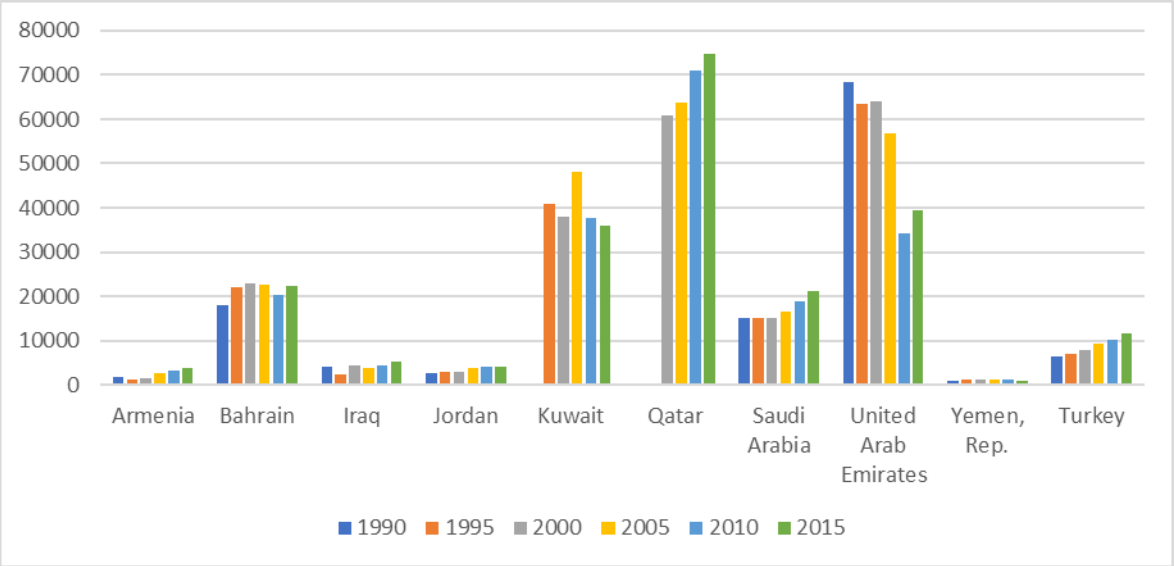

Figure 1: GDP per capita (constant 2010 USD) for West Asian countries.
Source: World Bank 2017.

Figure 1 demonstrates GDP per capita (constant 2010 USD) for West Asian countries. Qatar is the major economy in the region followed by United Arab Emirates.According to definition of high-income countries by World Bank, A high-income economy is defined as a country with a gross national income per capita above US$12,475 in 2015, calculated using the Atlas method. Fig. 2 shows the GNI per capita (in current USD) for West Asian countries. Oil-rich countries: Bahrain, Kuwait, Qatar, Saudi Arabia and United Arab Emirates are all high-income countries.

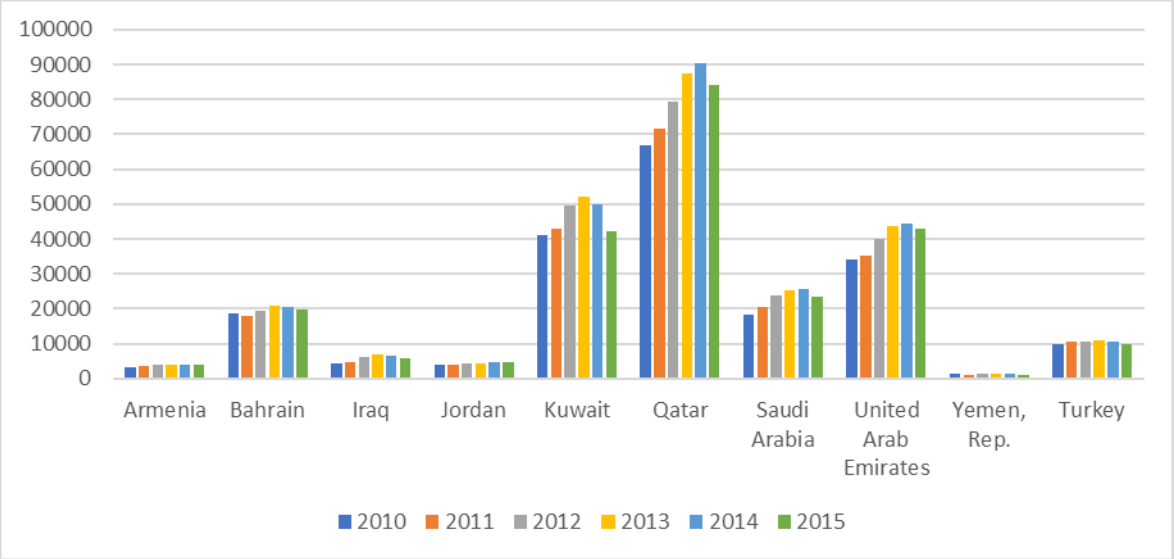

Figure 2: GNI per capita of West Asian countries, 2010-2015.
Source: World Bank 2017.

Education is the most important pillar in human capital. It is commonly measured by enrolment rates and educational attainments: average years of schooling. In this paper, average years of primary, secondary and tertiary schooling of the population aged 15 and above, which is regarded as human capital stock will be used for comparative study of human capital performance among West Asian countries. Fig. 3 demonstrates average years of total schooling for West Asian countries. The average years of primary schooling

is below 6 years for all countries and there is an increasing trends. Jordan, Qatar and United Arab Emirates are countries with bigger average years of primary schooling.

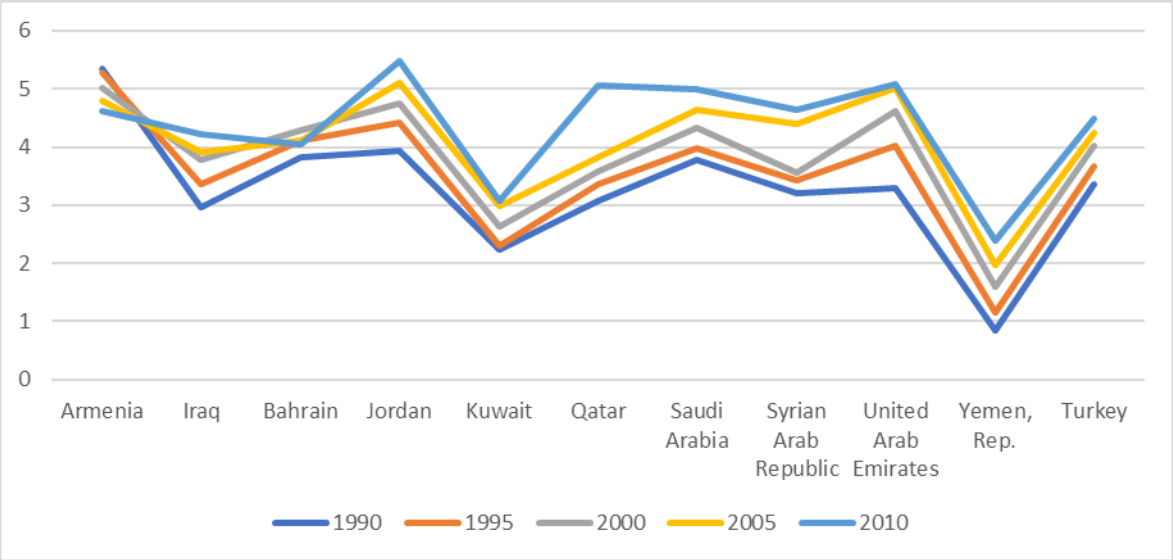

Figure 3: Average years of primary schooling.
Source: World Bank 2017.

Fig. 4 shows that average years of secondary schooling is below 4 years for all countries except Armenia and there is also an increasing trends. Yemen and Syrian Arab Republic are countries with fewer average years of secondary schooling.

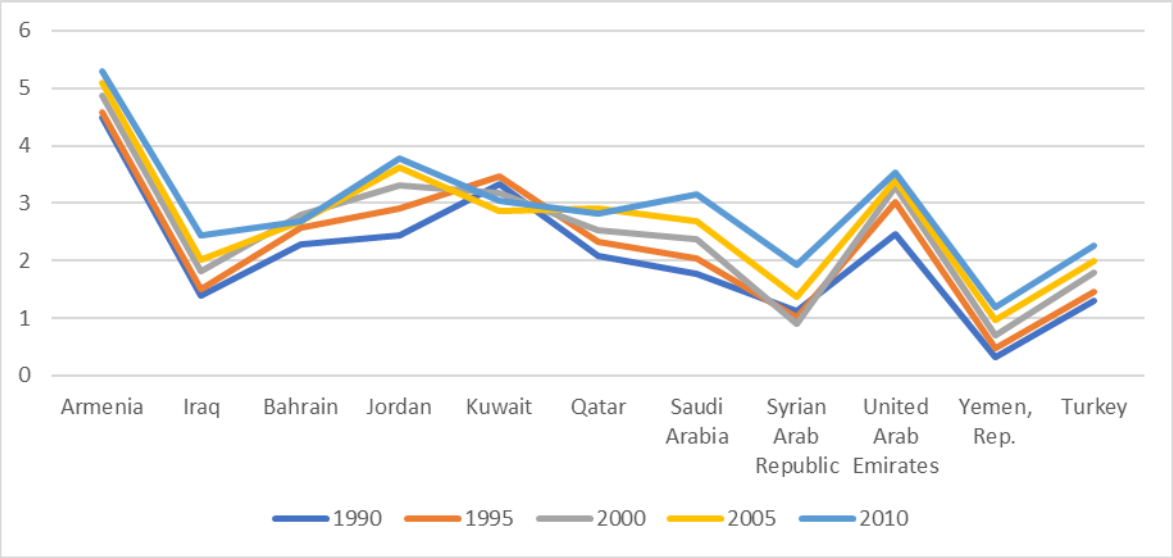

Figure 4: Average years of secondary schooling.
Source: World Bank 2017.

Fig. 5 shows that average years of tertiary schooling is below 0.7 years for all countries except Armenia in year 2010. It is a low figure as average period for tertiary education is 3 years. Yemen and Syrian Arab Republic are countries with fewer average years of secondary schooling.

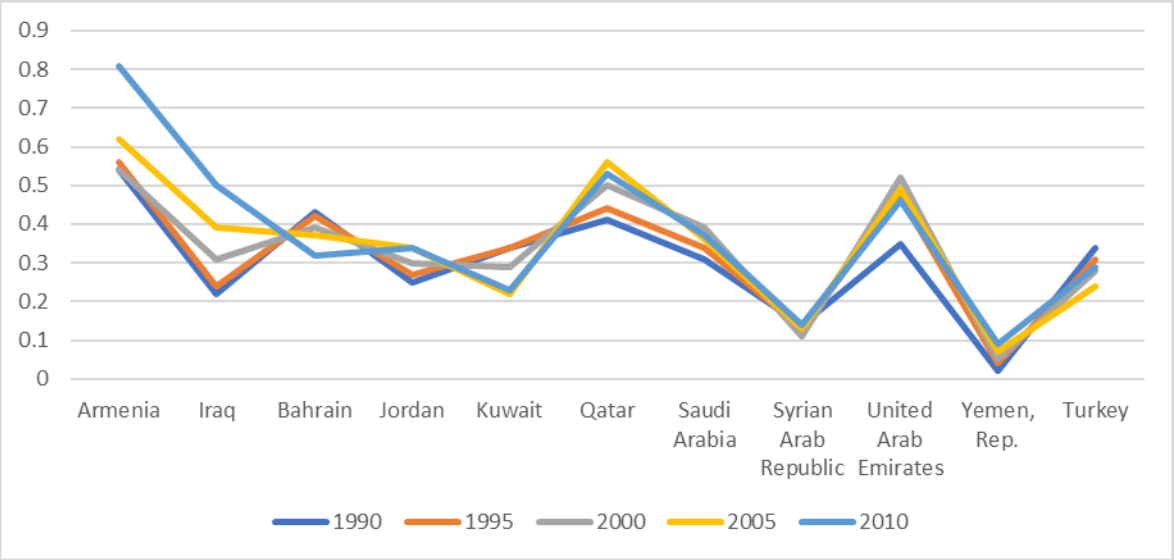

Figure 5: Average years of tertiary schooling.
Source: World Bank 2017.

Health and wellness is the second pillar of human capital. In this paper, life expectancy and mortality are the chosen as indicators for health and wellness. Fig. 6 shows the life expectancy of people in West Asian countries. Life expectancy for all countries are below 80 years and shows an increasing trend. Yemen and Turkey are countries with lower life expectancy.

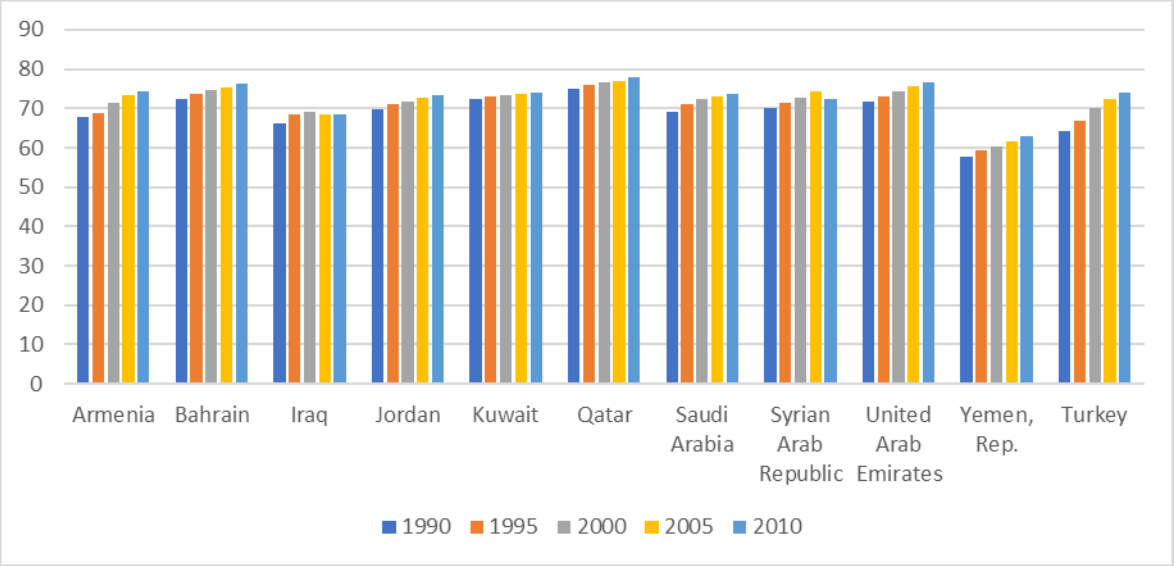

Figure 6: Life expectancy.
Source: World Bank 2017.

The third pillar of human capital is workforce and employment. Labor force participation rate is chosen in this study due to the availability of the data. Fig. 7 demonstrates labor force participation rates for West Asian countries. Qatar has the highest labor force participation rate, followed by United Arab Emirates.

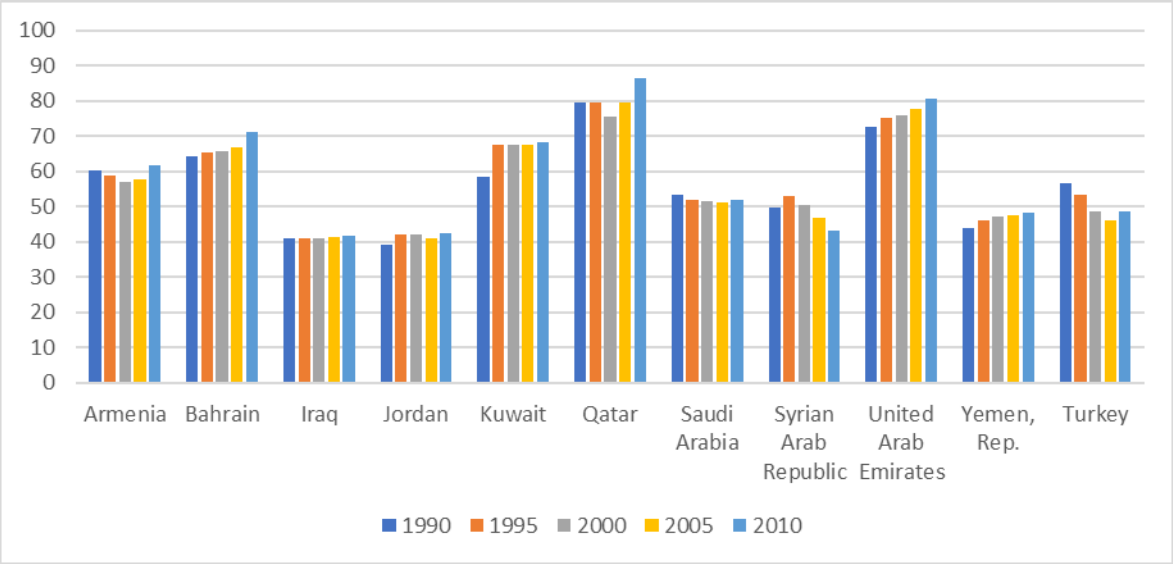

Figure 7: Labor force participation rates.
Source: World Bank, 2017

LITERATURE REVIEW

Comparative studies on human capital among countries in West Asian region are limited. However, there are few reports on human capital and human development released by international research organizations. Among them is the Human Capital Report released by World Economic Forum, the International Organization for Public-Private Cooperation, which engages the foremost political, business and other leaders of society to shape global, regional and industry agendas. The purpose of The Human Capital Report is to provide a holistic, long term overview on how well countries are leveraging their human capital and establishing workforces that are prepared for the demands of competitive economies. The Human Capital Report first introduced in 2013 which ranked 122 countries worldwide according to computed Human Capital Index for each country. In the latest report, it ranks 130 countries on how well they are developing and deploying their talent. Table 1 demonstrates the ranking of countries in West Asian region involved in this study for year 2013, 2015 and 2016. In year 2013, Qatar ranked 18th, which was the best among West Asian countries followed by United Arab Emirates at 24th place. However, Armenia became the best among West Asian countries in year 2015 and 2016. Yemen ranked lowest for year 2013, 2015 and 2016 while Syrian and Iraq was not ranked. The computed human capital index does not give direct comparison among countries of interest. This shortcoming will be overcome in this study. Besides Human Capital Report, there is Human Development Index published by Pakistani economist Mahbub ul Haq and published by the United Nations Development Programme. The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.

Table 1: Ranking of West Asian Countries in Human Capital Reports 2013-2016.

Country	2013		2015		2016	
	Ranking	Score	Ranking	Score	Ranking	Score

Armenia	73	-0.218	43	72.50	37	75.39
Bahrain	40	0.232	-	-	46	72.69
Qatar	18	0.834	56	69.04	66	68.64
United Arab Emirates	24	0.610	54	69.39	69	68.25
Turkey	60	-0.065	68	67.09	73	67.57
Jordan	52	0.005	76	65.59	81	64.70
Saudi Arabia	39	0.245	85	61.38	87	63.69
Yemen	122	-1.395	124	40.72	129	42.98
Syrian	-	-	-	-	-	-
Iraq	-	-	-	-	-	-

The HDI is the geometric mean of normalized indices for each of the three dimensions and is used to rank countries worldwide. A country scores higher HDI when the lifespan is higher, the education level is higher, and the GDP per capita is higher. The Human Development Index ranked a total of 188 countries since year 2000, a bigger number of countries compared to Human Capital Report. Table 2 reports the ranking and Human Development Index for West Asian countries in this study for year 1990, 2000, 2013 and 2015. According to HDI index, Qatar ranked 28th worldwide and was the best among West Asian countries in year 1990. Qatar remains the best for the year 2000, 2013 and 2015. Saudi Arabia was the second after Qatar in year 2013 and 2015. Based on HDI, Qatar, Saudi Arabia, United Arab Emirates, Bahrain and Kuwait are classified as very high human development; Turkey, Armenia and Jordan are classified as high human development; Iraq is medium human development while Syrian Arab Republic and Yemen are low human development.

Table 2: Ranking of West Asian Countries in Human Development Index.

Country	**1990**		**2000**		**2013**		**2015**	
	Ranking	**Score**	**Ranking**	**Score**	**Ranking**	**Score**	**Ranking**	**Score**
Armenia	69	0.634	92	0.644	85	0.739	84	0.743
Bahrain	29	0.745	34	0.794	46	0.820	47	0.824
Qatar	28	0.754	30	0.809	32	0.854	33	0.856
United Arab Emirates	37	0.726	33	0.798	43	0.832	42	0.840
Turkey	89	0.576	88	0.653	75	0.759	71	0.767
Jordan	74	0.62	62	0.706	87	0.737	86	0.741
Saudi Arabia	51	0.698	48	0.742	39	0.841	38	0.847
Yemen	116	0.405	135	0.444	158	0.500	168	0.482
Syrian	94	0.556	109	0.589	139	0.575	149	0.536
Iraq	92	0.572	101	0.607	120	0.658	121	0.649
Kuwait	41	0.713	35	0.786	58	0.787	51	0.800

In addition to the ranking reports provided by World Economic Forum and United Nations Development Programme, there are reports on human capital quality produced by individual researchers. Nadir and Hatidje (2007) introduced their own method to produce the Qualitative Indicators of Human Capital (QIHC) of 105 countries for year 1964 to year 2005. The ranking and QIHC among West Asian countries involved in this paper is demonstrated in Table 3. According to QIHC, Armenia is the best among the West Asian countries in this study, followed by Bahrain. The QIHCs for the rest of the West Asian countries are not calculated.

Table 3: Ranking of West Asian Countries according to QIHC

Ranking	**Country**	**QIHC Score**

1	Armenia	79.39
2	Bahrain	71.03
3	Jordan	67.30
4	Kuwait	64.88
5	Saudi Arabia	61.87

Literature reviews demonstrate that ranking for countries in term of human capital can be produced by using or creating certain mathematical formulae. Different formulae and different indicators chosen for human capital will produced different ranking. Despite the advantage of the indexes as an indicator of level of human capital for a country, they do not demonstrate the actual gap (statistically) among the countries. Therefore, this paper apply a mathematical technique to rank and demonstrate the gap among West Asian countries in term of human capital.

METHODOLOGY AND DATA

The analysis method for comparative study in this paper applies the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS hereafter). TOPSIS is a multi-criteria decision analysis method which was developed by Hwang and Yoon (1981) and further improved by Yoon (1987) and Hwang, Lai and Liu (1993). TOPSIS mainly applied in management science and occasionally in economics study. Among economics studies which applied TOPSIS are Karimi et al. (2010) which using TOPSIS to determine the most suitable location for foreign direct investment among ASEAN countries; SALT (2011) applied TOPSIS to analyse economic performance among European Union members; Balcerzak and Pietrzak (2016) on comparison of sustainable development in European Union Countries; Wei et al. (2011) on evaluation of the industrial economic benefits of a province in China and Dai & Chang (2011) on analysis of regional disparity of economic development in Zhejiang province, China.

TOPSIS is based on the concept that the chosen alternative should have the shortest gap with the positive ideal solution and the longest gap with the negative ideal solution. It is a method which compares a set of alternatives with a set of criterion and rank the alternatives according to the calculated index for each alternative. The process involves seven steps. The advantage of TOPSIS is its simplicity in term of Mathematics and flexible in choosing criterion. Thus TOPSIS is a suitable method for comparative study in this paper. In this study, the following matrix decision [A] is built (step 1 of TOPSIS):

$$A = [a_{ij}]_{mxn} = A_i \begin{matrix} \\ \\ \\ \\ \\ \end{matrix} \overset{C_j}{\begin{bmatrix} x_{11} & x_{12} & x_{13} & a_{14} & x_{15} \\ x_{21} & \cdots & \cdots & \cdots & \cdots \\ x_{31} & \cdots & \cdots & \cdots & \cdots \\ x_{41} & \cdots & \cdots & \cdots & \cdots \\ x_{51} & x_{52} & \cdots & \cdots & x_{55} \end{bmatrix}}$$

Where A_i is the *i*th alternative, which is the countries involve in this study: Armenia, Bahrain, Iraq, Jordan, Kuwait, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen, Japan, Korea Republic and Singapore. C_j is the *j*th criteria, which is the variables of human capital chosen in this study: average years of primary schooling, average years of secondary schooling, average years of tertiary schooling, life expectancy, adult mortality rate (male), adult mortality rate (female), under-5 year old mortality rate and labor force participation rates. Table 4 demonstrates the details of the

variables. ^{X}ij is the performance score of *i*th alternative for *j*th criterion. The variables for human capital in this study are chosen based on The Human Capital Report 2016 by World Economic Forum and Human Development Index by United Nation Development Programme which cover three aspects of human capital: education, health and economic involvement. Data are taken from databank of World Bank.

Table 4: Variables' definition

Variable	Definition
Average years of primary schooling	Average years of primary education completed among people over age 15.
Average years of secondary schooling	Average years of secondary education completed among people over age 15.
Average years of tertiary schooling	Average years of tertiary education completed among people over age 15.
Labor force participation rate	Proportion of the population ages 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.
Life expectancy	Number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
Mortality rate, adult, female (per 1,000 female adults)	Probability of dying between the ages of 15 and 60: that is, the probability of a 15-year-old female dying before reaching age 60, if subject to age-specific mortality rates of the specified year between those ages.
Mortality rate, adult, male (per 1,000 male adults)	Probability of dying between the ages of 15 and 60: that is, the probability of a 15-year-old male dying before reaching age 60, if subject to age-specific mortality rates of the specified year between those ages.
Mortality rate, under-5 (per 1,000 live births)	Probability per 1,000 that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year.

Source: World Bank 2017.

Upon confirming the alternatives and set of criterion, the following steps of TOPSIS analysis will then be carried out using Microsoft Excel:

Step 2:

Normalize decision matric, [A] to form the matrix $R = [R_{ij}]_{mxn}$ using the following normalization method:

$$R_{ij} = \frac{x_{ij}}{(\sum_{i=1}^{m} x_{ij}^2)^{1/2}} \qquad i = 1, 2, \dots n;\ j = 1, 2, \dots n$$

Step 3:

Calculate the weighted normalised decision matrix [V]. The value of ^{V}ij is calculated using the following formula:

$$v_{ij} = w_j r_{ij} \qquad i = 1, 2, \dots m; j = 1, 2, \dots n$$

Where $\sum_{i=1}^{n} w_i = 1$

Step 4:

Identify the positive ideal solution (*A**) and negative ideal solution (*A*-):

$$A^* = \{V_1^*, V_2^*, \dots \ V_n^*\} = \{(\max v_{ij}; i \in I'), (\min v_{ij}; i \in I'')\}$$
$$A^- = \{V_1^-, V_2^-, \dots \ V_n^-\} = \{(\min v_{ij}; i \in I'), (\max v_{ij}; i \in I'')\}$$

Where I^i is associated with the criterion with positive impact and I^{ii} is associated with criterion with negative impact.

Step 5:

Calculate the distance between *i*th alternative and the ideal positive solution,

$$S^* = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^*)^2} \ , i = 1, 2, \dots m$$

And the distance between *i*th alternative and the ideal positive solution,

$$S^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2} \ , i = 1, 2, \dots m$$

Step 6: Calculate the similarity to the negative ideal solution as follow:

$$C_i^* = \frac{S^-}{S^- + S^*} , \qquad i = 1, 2, \dots . m$$

where $0 \leq C^* \leq 1$, ith alternative is close to ideal when C_i^* close to 1.

Step 7: Rank the alternatives according to C_i^*.

RESULTS AND DISCUSSION

The results of TOPSIS analysis are reported in Table 5, 6 and 7. According to the results, Armenia has been on top of the list for the year 1990, 2000 and 2010. In 1990, the top three countries are Armenia Bahrain and Kuwait. The gap between Armenia on the top with other countries are indicated in the Gap column. Bahrain and Armenia have a gap of more than 0.2 point which is considered as wide between consecutive countries in the ranking. The gap among the other countries are considered as small which are less than 0.1 point. Bottom three in the ranking are occupied by Iraq, Syrian Arab Republic and Yemen Republic, consistent with HDI ranking in year 1990. The gap between Armenia and Yemen is over 0.8 point. Compared with HDI ranking in 1990, Armenia is in the better position in this analysis.

Table 5: TOPSIS result for year 1990

Rank	Country	s+	s-	C	Gap

1	Armenia	0.02930	0.21919	0.88210	/
2	Bahrain	0.08999	0.14587	0.61846	-0.26364
3	Kuwait	0.09769	0.14134	0.59131	-0.29079
4	United Arab Emirates	0.09637	0.13412	0.58189	-0.30021
5	Qatar	0.10259	0.13856	0.57457	-0.30753
6	Jordan	0.11608	0.11954	0.50735	-0.37475
7	Saudi Arabia	0.11974	0.11401	0.48775	-0.39435
8	Turkey	0.13289	0.10613	0.44402	-0.43808
9	Iraq	0.15099	0.08156	0.35071	-0.53139
10	Syrian Arab Republic	0.16282	0.07565	0.31723	-0.56487
11	Yemen, Rep.	0.22448	0.00571	0.02479	-0.85731

Results demonstrated in Table 6 shows that the top three countries in year 2000 are Armenia, United Arab Emirates and Qatar. Compared with year 1990, United Arab Emirates and Qatar have moved up in the ranking. Besides, the gap between Armenia and the second place country have been reduced to only 0.1 point. The bottom three countries remained unchanged compared with year 1990. Yemen Republic still occupied the bottom of the ranking with gap over 0.8 point, a wide gap with the top country.

Table 6: TOPSIS result for year 2000

Rank	Country	s+	s-	c	Gap
1	Armenia	0.02741	0.17442	0.86418	/
2	United Arab Emirates	0.04643	0.14877	0.76216	-0.10202
3	Qatar	0.07331	0.12973	0.63894	-0.22524
4	Bahrain	0.06970	0.11931	0.63123	-0.23295
5	Jordan	0.07969	0.11479	0.59022	-0.27396
6	Saudi Arabia	0.08510	0.10832	0.56003	-0.30415
7	Kuwait	0.08456	0.10561	0.55535	-0.30883
8	Turkey	0.11162	0.08050	0.41901	-0.44517
9	Iraq	0.11281	0.07991	0.41464	-0.44954
10	Syrian Arab Republic	0.15062	0.05672	0.27355	-0.59063
11	Yemen, Rep.	0.17992	0.00716	0.03829	-0.82589

Table 7 demonstrates the ranking of year 2010. Armenia is still on top of the list, followed by Qatar and United Arab Emirates. The gap between Armenia and Qatar is considered big, which is more than 0.2 point. Qatar overtakes United Arab Emirates with very small gap between them, 0.01 point. The bottom three countries are Turkey, Syrian Arab Republic and Yemen Republic. Iraq has a noticeable improvement from eight place in 2000 to fifth place in 2010. The gap between Armenia and Yemen remains at over 0.8 point.

Table 7: TOPSIS result for year 2010

Rank	Country	s+	s-	c	Gap
1	Armenia	0.03466	0.19060	0.84613	/
2	Qatar	0.08521	0.13003	0.60414	-0.24199
3	United Arab Emirates	0.08606	0.12408	0.59046	-0.25567
4	Jordan	0.11818	0.10196	0.46317	-0.38296
5	Iraq	0.11531	0.09760	0.45842	-0.38771
6	Saudi Arabia	0.11440	0.09585	0.45588	-0.39025
7	Bahrain	0.12490	0.08803	0.41343	-0.43269
8	Kuwait	0.14084	0.07770	0.35554	-0.49059
9	Turkey	0.14115	0.07038	0.33273	-0.51340
10	Syrian Arab Republic	0.17289	0.05478	0.24062	-0.60551
11	Yemen, Rep.	0.19971	0.00732	0.03536	-0.81076

Table 8 summarizes the trend of the ranking for year 1990 to 2010. Armenia remained top, Qatar improved three positions and Qatar improved one position. Iraq had the largest improvement of four positions while Bahrain and Kuwait step down 5 positions. Syrian Arab Republic and Yemen Republic remained at the bottom of the ranking. This

indicates that Armenia has been the greatest country in West Asian region in terms of human capital performance. Qatar is catching up Armenia while Iraq is improving since 1990. Syrian Arab Republic and Yemen are doing worst in term of human capital development compared to other countries in the same region.

Table 8: Trend 1990 – 2010

Country	1990	2000	2010	Change in rank 1990-2010
Armenia	0.88209	0.86418	0.84612	0
Qatar	0.57457	0.63893	0.60413	3
United Arab Emirates	0.58189	0.76216	0.59045	1
Jordan	0.50734	0.59021	0.46316	2
Iraq	0.35071	0.41464	0.45841	4
Saudi Arabia	0.48775	0.56003	0.45587	1
Bahrain	0.61845	0.63122	0.41343	-5
Kuwait	0.59130	0.55534	0.35553	-5
Turkey	0.44402	0.41901	0.33272	-1
Syrian Arab Republic	0.31723	0.27355	0.24061	0
Yemen, Rep.	0.02478	0.03828	0.03536	0

TOPSIS analysis is then extended to make comparison between West Asian countries and advanced Asian countries: Japan, Korea Republic and Singapore in year 1990, 2000 and 2010. Table 9 reports the result for year 1990. In year 1990, Japan is on top of the ranking followed by Armenia and Korea Republic with a tight gap of 0.016 point and 0.038 respectively. Singapore is at tenth place ahead of Turkey, Iraq, Syrian Arab Republic and Yemen Republic.

Table 9: Comparison with advanced Asian Countries, 1990

Rank	Country	s+	s-	c	Gap
1	Japan	0.04317	0.22711	0.84029	/
2	Armenia	0.04683	0.21919	0.82396	-0.01633
3	Korea, Rep.	0.05110	0.20701	0.80201	-0.03828
4	Bahrain	0.10835	0.14587	0.57380	-0.26649
5	Kuwait	0.12352	0.14134	0.53364	-0.30665
6	Qatar	0.12155	0.13856	0.53269	-0.30760
7	United Arab Emirates	0.12015	0.13412	0.52748	-0.31281
8	Jordan	0.14146	0.11954	0.45802	-0.38227
9	Saudi Arabia	0.14138	0.11401	0.44643	-0.39386
10	Singapore	0.16468	0.11807	0.41757	-0.42272
11	Turkey	0.15185	0.10613	0.41139	-0.42890
12	Iraq	0.17395	0.08156	0.31920	-0.52109
13	Syrian Arab Republic	0.18737	0.07565	0.28762	-0.55267
14	Yemen, Rep.	0.24932	0.00571	0.02238	-0.81792

In year 2000, Korea Republic overtakes Japan at the first place with a tight gap of 0.054 point. Singapore improved from tenth place to third place. Armenia as the best among West Asian countries drops to fourth place with a gap of 0.27 point with Korea Republic. Compared to Asia Advanced countries, the human capital development among West Asian countries is less rapid than the advanced countries. Korea Republic and Singapore are doing better than Armenia.

Table 10: Comparison with advanced Asian Countries, 2000

Rank	Country	s+	s-	c	Gap
1	Korea, Rep.	0.02338	0.24066	0.91144	/
2	Japan	0.03662	0.21910	0.85681	-0.05463

3	Singapore	0.08737	0.16905	0.65927	-0.25218
4	Armenia	0.09859	0.17442	0.63889	-0.27256
5	United Arab Emirates	0.10983	0.14877	0.57530	-0.33614
6	Qatar	0.12902	0.12973	0.50138	-0.41007
7	Bahrain	0.14120	0.11931	0.45799	-0.45345
8	Jordan	0.15708	0.11479	0.42222	-0.48923
9	Saudi Arabia	0.14947	0.10832	0.42020	-0.49125
10	Kuwait	0.16440	0.10561	0.39114	-0.52031
11	Iraq	0.17694	0.07991	0.31111	-0.60033
12	Turkey	0.17889	0.08050	0.31035	-0.60109
13	Syrian Arab Republic	0.22129	0.05672	0.20401	-0.70743
14	Yemen, Rep.	0.24985	0.00716	0.02787	-0.88357

Table 11 demonstrates Korea Republic remains on top of the ranking followed by Singapore with only 0.02 point gap and Japan with 0.21 point gap. Armenia remains at fourth place with a bigger gap (0.32) with Korea Republic compared to year 2000. Besides, the gap between other West Asian countries with Korea Republic are more than 0.50 point indicating the gap are getting wider.

Table 11: Comparison with advanced Asian Countries, 2010

Rank	Country	s+	s-	c	Gap
1	Korea, Rep.	0.03257	0.30512	0.90355	/
2	Singapore	0.03767	0.28580	0.88355	-0.02000
3	Japan	0.09837	0.22223	0.69317	-0.21038
4	Armenia	0.13577	0.19060	0.58399	-0.31956
5	Qatar	0.19896	0.13003	0.39524	-0.50831
6	United Arab Emirates	0.20869	0.12408	0.37287	-0.53068
7	Iraq	0.21834	0.09760	0.30893	-0.59462
8	Jordan	0.23806	0.10196	0.29987	-0.60368
9	Saudi Arabia	0.23287	0.09585	0.29157	-0.61198
10	Bahrain	0.24412	0.08803	0.26504	-0.63851
11	Kuwait	0.26261	0.07770	0.22832	-0.67523
12	Turkey	0.25602	0.07038	0.21564	-0.68791
13	Syrian Arab Republic	0.28921	0.05478	0.15925	-0.74430
14	Yemen, Rep.	0.31171	0.00732	0.02295	-0.88060

SUMMARY AND CONCLUDING REMARKS

The objective of this paper is to study and compare the performance of human capital among West Asian countries for year 1990, 2000 and 2010. The multi-criteria decision analysis method; Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) is applied. The indicators for human capital are average years of primary, secondary and tertiary schooling, life expectancy, mortality and labor force participation rates. The analysis is then extended to make comparison between West Asian countries and advanced countries in Asia. Results indicates that the top country among West Asian countries is Armenia, followed by Qatar and United Arab Emirates. The gap between Armenia and country in the second place is considered big while the gap among the rest of the countries are considered small. Bottom two countries are consistently occupied by Syrian Arab Republic and Yemen. Comparison with advanced countries in Asia shows that the advanced countries are doing far better than West Asian countries, including Armenia since decades ago. The gap between Armenia and advanced countries shows an increasing sign. This comparative study is a reference for policymakers in West Asian countries to evaluate their performance in human capital compared to other countries in the same region and draw appropriate strategies to do better with the top country as benchmark. This is crucial for sustainable economic development especially countries currently depending on natural resources such as oil and natural gas as the sources will be exhausted in future. In addition, it is also a reference for investors worldwide on the

prospect of future economics among West Asian countries as human capital is proven to be an important determinant of economic growth in long run.

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