

## **EVALUATING THE ECONOMIC RESILIENCE OF SAARC COUNTRIES BY USING AHP-TOPSIS APPROACH**

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### **Abstract:**

*Economic resilience is new discussion which was disclosed by the economists after the conspicuous global financial crises of 2007-8. Throughout the years, numerous determinants have been used by different economists to calculate the resistance of any economy against these shocks. However, among them, the determinants used by Briguglio are broadly appreciated. Similarly, in this research paper mostly the similar determinants have been used to determine the economic resilience of the SAARC countries and its observer members, Iran nevertheless, Afghanistan has been excluded due to unenviable data. For the construction of resilience index and evaluating the ranking of countries the AHP (Analytical Hierarchy Approach) and TOPSIS approaches have been used. While Expert Choice software gave us suitable weightage for the selected determinants. The findings of the study reveal that, India is ranked as the top, followed by Iran and Bangladesh as third among the SAARC countries. Bhutan and Pakistan are ranked as low due to low progress in macroeconomic indicators and the selected determinants of the economic resilience. This study, would like to divert the attention of policy makers and government authorities, they should decrease the broaden gap of external debt and fiscal deficits of the economies. They have to invest more in social development and decline their reliance on the imports. Additionally, they should more focus on the concentration of exports in a few limited group of products which are highly vulnerable to the adverse shocks.*

**Key Words:** Economic resilience, AHP-TOPSIS approach, SAARC Countries, Exogenous shocks.

**Introduction:**

*The most recent, countries are subjected to a wide variety of economic shocks, including, financial crises, foreign debt crises, commodity price fluctuations and natural disasters. They may increase the risk and uncertainty of the households. Investors, customers and governments. In the case of such vulnerabilities economy should be resilient to adverse shocks, because they could derail the sustainable growth and developments of the country. That's why these shocks are the main concern of the policy makers to identify the crucial factors of the country's resilience to adverse shocks. They may be defined the capacity and potential of the country to cope with such shocks and probability to reduce these vulnerabilities (Rohn, 2015). The notion of resilience has been used for a long time in the physical sciences, engineering, ecological sciences and psychology, but in the last few decades, it attracted the attention of regional economists and geographers (Martin 2011). Most of the dictionaries define the resilience term as the ability to recover quickly from shock, but in economic literature this has been used in three senses, i.e. shock counteraction (ability to recover quickly), shock absorption (the ability of an economy to withstand against shock) and the third is termed as the ability of an economy to avoid shocks (Briguglio, 2008). After the global financial crises of 2007-2008 many of the economists diverted to this angle that how could risk of vulnerabilities be minimized against the undesired disturbances? The smaller states of the world are considered highly vulnerable to having a high GDP per capita due to highly dependent on openness of international trade, strategic imports and concentration on exports to lack of their domestic market efficiency (Briguglio, 2009). Briguglio (2004), divided the countries in four major scenarios termed as "best case", "self-made" 'prodigal son" and*

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worst case. The countries nominated as self-made are those which refer to the highest degree and inherent economic vulnerability, but due to adoption of suitable policies resist the shocks. The countries have self-made ability to build the economic resilience to exogenous shocks. The prodigal son countries those have a low degree of inherent vulnerability like a son who is born in the rich family. The worst countries scenarios lead to a high degree of inherent economic vulnerability, but adoption of economic resilience enable them to minimize the effects of shocks. Bruglio (2008), for the construction of resilience index has defined the four major areas, which were further divided into sub-indicators. Macroeconomic stability, microeconomic market efficiency, good governance and social development are essential components of the economic resilience. These components have ability to absorb the effects of adverse shocks. Microeconomics market efficiency depends on the economic freedom and choices of the consumer for construction index, he used the economic freedom world index, which has published by the Fraser institute yearly to define the ranking of countries for economic freedom, it also has been constructed by its sub-indicators like the size of government, sound money, system of property rights and freedom of international trade.

The FM global resilience index, defines the resilience as the combination of the vulnerability of a country to supply chain disturbance and the efficiency of the country to recover from such hurdles. The index explains twelve key components of resilience, including political risk, natural hazard risk quality, productivity, control of corruption, oil intensity, quality of infrastructure, urbanization rate and planning to risk management. These components are marginalized into three broad factors like, economic, risk quality and supply chain. In this method index is

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*constructed and combined for 130 countries and territories. In 2016 Switzerland ranked first<sup>1</sup> among the countries due to its efficient infrastructure, prime location, and quality for suppliers, economic productivity and resilience to oil shocks. The world economic forum global risk report<sup>2</sup> explored the qualitative and quantitative indicators to assess the resilience of the national economy to adverse global shocks. It had been observed by main systems (economic, environmental, governance, infrastructure and society) of the economy by the five crucial component robustness, redundancy, resourcefulness, response and recovery.*

### **Resistance Economy and Economic Resilience**

*Resistive Economy is a resilient economic situation of the economy which has the capacity to stand against unforeseen shocks. In economic literature, this term is mainly used to overcome the conditions of the blockade and economic sanctions. The term "resistance economy" first appeared in economic literature in 2005, when Gaza was blockaded by Israel. In September 2007, Israel surrounded Gaza and imposed a complete blockade on the Gazans which resulted in their having limited access to imports and exports of agricultural amenities. In the article: "What is Resistance Economy and Can It Made an Alternative?" – Tariq (2014, p. 6), he introduced the dimensions of a resilient economy in Palestine and considered this to be the only kind of 'resistance economy' which could improve the Palestinian situation. He stressed the importance of resistance economy which relies only on agriculture and which*

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*can divert the economy towards development. Another researcher in the agricultural sector suggested that a resilient economy could be a viable policy that would ensure the survival of Gaza under the siege. Because the people of Gaza rely on the cultivation of agricultural products to meet the demands of everyday life, the Palestinian government should therefore back the agricultural sector with resilient economic policies.*

*The Supreme Leader (of Iran) also referred to Resistance Economy in September 2010 and stressed upon the importance and promotion of self-reliance and confrontation of the economic sanctions of the United Nations, the United States, and the European Union. The great leader explained the 'resistance economy' in these words "Resistance economy means that we should have an economy that maintains the economic growth process in the country, along with a decrease in the vulnerability of the economy. In this situation, the economic system of the country should be such that, it would be less damaged and less disturbed by the tricks of the enemies who are always seeking for opportunities by which they could inflict harm upon us. This result could be achieved by utilizing all governmental and public capabilities, and also by the utilization of intellectual ideas of experts and investing more capital in the country."<sup>3</sup> He emphasized the importance of resistance economy and stressed that it is the only strategy by which*

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*we could neutralize the economic sanctions of the United States and the European Countries.*

*After a few years, he presented a complete plan of resistance economy with its dimensions and polices which is now implemented in the country. He urged all government officials and the general public to advance towards resistance economy as the only way by which they could resist severe economic sanctions. By deploying resistance economic strategies, we could move towards sustainable development. He added that the resistance economy would guide them towards an economy that is independent of oil because, oil-dependent economies are highly vulnerable to external shocks, which are mostly economic sanctions. In situations of economic sanctions, they face budget deficits. Resistance economy is a strategy that is highly dependent on the domestic resources of a country. In the broad definition of resistance economy, the leader explained that by maximal utilization of natural and domestic resources we could make our economy more resilient to external shocks. He said: “We should be aware of the tasks that they can carry out. They impose sanctions! We should develop our economy from the inside. We should turn it into the economy of resistance so that sanctions will not work. The honourable officials should take the economy of resistance seriously. They should not support it just in words. The economy of resistance does not agree with*

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*uncontrolled importation. It does not agree with the weakness in production. They should strengthen domestic production. Government and executive offices should prefer domestic products to their foreign counterparts. One important buyer in the market is executive organizations that buy everything and which need everything. They should prefer what is produced inside the country. The people too should turn to domestic products. All these things will break the spell of the sanctions that the enemy has cast”<sup>4</sup>.*

*The leader described all the dimensions of resistance economy which, when applied to an economy will make it resilient, such as a Knowledge-based economy, an increase in exports, a decreased in imports, export diversification; oil-freed economy and less vulnerable banking systems are crucial dimensions of a resistance economy. Resilient economies are those that can counter the effect of external shocks, along with the absorption of its strong fiscal and monetary policies, because external shocks could derail the sustainable development of the country. However, economic resilience is the situation where the economy could bounce back to its origin. It means that the resistance economy can be defined in a broad sense along with having a resilient feature. So, resistance economy should be resilient to external shocks depending on the domestic resources but, economic resistance may be a feature of resistance economy against unforeseen shocks. Some researchers*

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*are considered both as the same in practical terms, but these are a bit different from each other strategically and in their implementation. Resistance economy, could resist economic sanctions and counter their impact on an economy in order to maintain sustainable development this situation refers to resiliency. However, economic resilience responds after economic shocks in such a way that the economy is able to quell the impacts of shock. The efficient utilization of domestic resources may help make the economy more resilient to exogenous shocks. (Jalili, 2017).*

### **Literature Review**

*The concept of regional economic resilience is also new discussion among the economists from last decades, which explained the ability of region to recover quickly from exogenous shocks. These shocks diverted the growth path of the regional economy (Edward w. (Nell) 2008). Numerous studies shed light on the importance of economic resilience, some of them are described here.*

*Samani (2018), investigated his research project on "the impact of political stability on economic resilience" by vaulting that terrorism is the main factor that affects the political stability of the country from very recent years. His well-thought-out political stability is a more crucial factor of economic resilience that directly affects economic resilience. Hence, he divided the countries into developing and developed country group with data panel data spanning from*

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1996-2014 by using a simple regression model for panel data. He has also compared the important two factors, political stability and economic resilience in the capitalistic system and the Islamic economic system. The findings of the research conclude that political stability, control of corruption, political openness, rent to natural resources and economic openness has a positive, substantial association to the economic resilience of selected countries within a selected time period, while social openness has not significant affiliation with economic resilience. Granger causality test also confirmed that political stability, control of corruption, economic openness, and social openness are important factors of economic resilience, however, political openness has not eloquent causality to economic resilience which suggested by the result of this study.

Nik (2017), documented the impact of economic vulnerability and resilience on GDP per capita volatilities. He used panel data of 106 countries for GDP per capita ranging the time period from 2000-2014. For the construction of vulnerability and resilience indices, he used Briguglio's vulnerability and resilience methods. He estimated GDP per capita volatilities by using a Hodrick-Prescott filter method. The study recommends that economic vulnerability has a significant negative impact on GDP per capita, whereas economic resilience has an expressive positive effect on GDP per capita volatilities. The research also suggests that Iran has low economic resilience and

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*high economic vulnerability due to high export concentration and weak good governance.*

*Feli (2018), analyzed the risks to the stability of the Iranian insurance sector and specify its resilience to shocks such as sanctions. He took a deposit interest rate, market concentration, price index, gross domestic product, the total number of cars in use and dollar exchange rate as explanatory variables in his empirical model. The period of time from 2011-2014 deliberated as a dummy variable in the model because that was a peak period of economic sanctions on Iran's economy. The data of 17 insurance companies in Iran covered the period of time spanning from 2006-2016. He applied a least-squares, random effect and fixed effect method for estimation. The results established that economic sanctions did affect Iranian insurance sector stability. Dollar exchange rate, the total number of vehicles in use gross domestic product affects the stability and solvency of the Iranian insurance sector, but product concentration, price index, market concentration, blood money, and deposit interest rate did not distress the insurance sector stability. Hence, the one year lagged of the dependent variable was highly significant in the model which indicates that remaining solvent and resilient are greatly sub-ordinated to the insurance companies themselves*

*Bishop etl. (2016), studied the impact of crises on Great Britain's local Authority Districts by using economic resilience approach. He*

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*focused on the employment and purposed new methods for the assessment of recession impact. He determined that initial economic conditions, human capital, age structure and urbanization are effective factors which influenced the employment of the districts at the time of crises.*

*Jahan (2016), she observed the regional economic resilience of resource based community (RBC) of the town of Devon in the province of Alberta Canadian content. She summarized the findings of her research project with three crucial points, firstly resilience of RBC are achievable, secondly Devon town attributed to typical, social, economic and environmental characteristics of RBC but it has experienced the changes towards resilience in social and environmental domains which laid that municipality initiatives and policies were focusing to facilitate development and environmental resilience. Thirdly, she investigated that, the town seized the advantage of its geographical location which increases the economic diversifications and long term resilience.*

*Dorbniak et.al (2012) they investigated the urban economic resilience of the two post-industrial cities Katowice and Bytom. Katowice is the most developed city among the cities and towns due to its economic structures which is growing up with transformations in the terms of the service sector developments and attracted the foreign direct investment. Besides that conceded as the more vulnerable to shocks*

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*compared to other cities. It defined to less resilient due to population outflow and work place reduction. Bytom, was also assigned to less urban economic resilience, although municipality took the numerous steps for the development of this city.*

*Wink (2012), discussed the specific challenges of regional economic resilience for Central European postindustrial regions. The concept of regional resilience required to an evolutionary perspective which focused the vulnerabilities and alteration capabilities. The two cases of Leipzig and Halle, illustrated the difficulties and increase that capability. Leipzig seemed to very successful within transition process, which was affected by the foreign direct investment, however the Halle modifications influenced by the constant loss of population. That deliberated the big challenge who could help to sustain the level of employment and population.*

*Simmie et.al (2009), studied the different definitions of resilience and their effective application for the long-term development of urban and regional economies. They rejected the equilibrist versions of resilience instead of recommending the evolutionary perspective. After discussing the different perspectives, they suggested adaptive cycle model for urban and regional resilience. Two case studies for city-regional economies were tested for that model and recommended adaptive evolutionary cycle model is a framework for the economic resilience.*

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*Jalili and Ronshak (2018), investigated the Iran's economic resilience of selected years from (1384-1394). Unemployment rate, inflation rate, Gini coefficient, total imports and exports ratio to GDP and exchange rate are considered as the determinants of the economic resilience. They concluded that, the economic resilience index of Iran was highest in 1393 SH but it assigned the lowest score in 1383 SH. The findings recommended the positive relation between economic resilience and GDP per capita of Iran.*

### **Data Collection and Methodology**

*This study, attempt to ovulate the economic resilience index among SAARC countries. Numerous studies has been done regarding other countries, but none of them do about these countries. The main aim of the study, is exploring the economic resilience index and then ranking of the selected countries. By using AHP-TOPSIS approach, we would be ranked the countries on the basis of the determinants of the economic resilience.*

*SAARC is one of the main rapidly growing region due to emerging market structure. SAARC is the habitat of 2% of the world population that covers the 3% of the global area and shares 3.8% of the global economy. Most of the SAARC countries have four thousand dollars per capita GDP and positive growth rates. Hence, all countries of SAARC are trade deficits because they heavily dependent on the imports rather than their exports. They are still*

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*importing capital machinery, chemicals and raw materials for their domestic production. Due to large population dynamic and emerging market structure they, have attracted more foreign investment inflow. India got 87.8% of the total inflow of FDI followed by Pakistan with 5.3% and Bangladesh's position 3rd with 3.6 %. (UNCTAD database).*

*In this study, for the emulation of economic resilience index of SAARC countries, different determinants have been accessed. Macroeconomic stability, macroeconomic market efficiency, social development, good governance export independence is main determinants of the study, which have calculated by further proxy variables. For the assessment of macroeconomic stability of the country's fiscal deficit ratio to GDP, misery index, external debt ratio to GDP, government size and government expenditures have used. Regulations derived from Fraser Institute has used as a proxy for macroeconomic market efficiency, HDI for social development and exports ratio to GDP, export concentration index and exports diversification index has considered for the exports independence. More importantly, the determinants for the good governance that are usually formulated by WGI have been used for the assessment of good governance. Voice and accountability, rule of law, government effectiveness, regulatory, control of corruption and legal system and property rights are the proxy variables of the good*

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*governance. For the index of good governance simple average has been accumulated.*

*The data of selected determinants have collected from World Bank indicators of year 2017. FM global index and world economic freedom report, which is normally derived from Fraser Institute yearly. Data about the variables of good governance and export independence has been extracted from WGI and UNCTAD databases respectively. The SAARC countries and Iran have been selected for this research. In this research, based on selected determinants the researcher tried to find the economic resilience of these countries. However, Afghanistan has been excluded from this research due to the lack of data availability, while Iran is the observer of SAARC countries and is included in this identification. Twelve determinants have nominated for the economic resilience. AHP-TOPSIS has been used to ovulate the resilience index of SAARC countries. The both techniques are discussed below.*

### **Analytic Hierarchy Approach: (AHP)**

*Different steps are involved in this process as explained below.*

**Step 1:** *In this first step, the qualitative and quantitative criteria and sub-criteria are defined; developed a hierarchical structure with a goal at the top level, criteria at the second level whereas alternatives at the third.*

**Step 2:** Relative importance of different attributes/criteria were assigned by the distinguished economists with respect to the goal through a questionnaire. The Saaty's<sup>5</sup> comparison scale was used, as shown in Table 1. Equations from 1 to 9 are derived from Saaty's AHP calculation<sup>6</sup>.

$$C_{ij} = \begin{bmatrix} C_{11} & C_{12} & \dots & \dots & \dots & C_{1n} \\ C_{21} & C_{22} & \dots & \dots & \dots & C_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ C_{n1} & C_{n2} & \dots & \dots & \dots & C_{nn} \end{bmatrix}$$

Where  $n$  is the criteria count, and  $C_{ji} = 1/C_{ij}$ , where  $i$  and  $j$  is 1 to  $n$ .

**Table 1: Comparison, Value Scale**

Scale	Degree of Preference
1	Equal Importance
3	Moderate Importance
5	Strong Importance
7	Very, very Strong Importance
9	Extreme Importance
2,4,6,8 1/3,1/7,1/9	Intermediate Importance Values of Inverse Comparison

**Step 3:** Third step is to generate the normalized pairwise matrix 'X' by dividing each element in the matrix by its column total:

$$X_{ij} = \frac{C_{ij}}{\sum_{j=1}^n C_{ij}}$$

Where,  $i$  and  $j$  is 1 to  $n$ .



$$X_{ij} = \begin{bmatrix} X_{11} & X_{11} & \dots & \dots & \dots & X_{1n} \\ X_{21} & X_{22} & \dots & \dots & \dots & X_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ X_{n1} & X_{n2} & \dots & \dots & \dots & X_{nn} \end{bmatrix}$$

Now, using the above X matrix to get the vector weights matrix W. It can be calculated as:

$$W_i = \frac{\sum_{j=1}^n X_{ij}}{n}, \text{ we get vector weight matrix } W = \begin{bmatrix} W_1 \\ W_1 \\ \vdots \\ \vdots \\ W_n \end{bmatrix}$$

Where, *i* and *j* is 1 to *n*.

**Step 4:** Multiply each column pairwise comparison matrix by the corresponding weight, will give us another matrix:

$$D_{ij} = \begin{bmatrix} C_{11} & C_{11} & \dots & \dots & \dots & C_{1n} \\ C_{21} & C_{22} & \dots & \dots & \dots & C_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ C_{n1} & C_{n2} & \dots & \dots & \dots & C_{nn} \end{bmatrix} \times \begin{bmatrix} W_1 \\ W_2 \\ \vdots \\ \vdots \\ W_n \end{bmatrix} = \begin{bmatrix} D_1 \\ D_2 \\ \vdots \\ \vdots \\ D_n \end{bmatrix}$$

Where, *i* and *j* is 1 to *n*.

**Step 5:** Then divide the sum of row entries of the corresponding weight;

$$E_i = \frac{D_i}{w_i}$$

Where, *i* is 1 to *n*. Now, we can get the λ value by

$$\lambda_{max} = \frac{\sum_{j=1}^n E_i}{n}$$

Where *i* is 1 to *n*.

**Step 6:** The consistency index is calculated by the following formula

$$\text{Consistency Index} = \frac{\lambda_{max} - n}{n - 1}$$

**Step 7:** The final step in the AHP approach is to calculate a Consistency Ratio (CR). In this stage we find-out how consistent the judgments have been relative to large samples of purely random judgments. If CR is lower than 0.1 or equal to 0.1, the calculations of the criteria are consistent otherwise the judgments are untrustworthy. The consistency ratio calculated as  $CR = CI/RI$ , where RI is a random index given in table II.

Table II: Random Index Value Scale

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.46	1.49

In our case, the inconsistency ratio is automatically generated by using the expert choice is 0.06 which is less than 0.1. Thus, the weights given in Table III, can be used for TOPSIS calculations.

**Step 8:**

$$A_{ij} = \begin{bmatrix} A_{11} & A_{11} & \dots & \dots & \dots & A_{1n} \\ A_{21} & A_{22} & \dots & \dots & \dots & A_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ A_{m1} & A_{m2} & \dots & \dots & \dots & A_{mn} \end{bmatrix}$$

Where m represents the number of the selected countries which is 8 in our case, and n is the criteria counts which is 11 in our specified model.

### TOPSIS Approach

*This technique is one of the useful technique which is very simple and easy to implement, that's why it is familiar as weighting technique. This technique was developed by Hwang and Yoon (Saaty, Vargas, 1987). On the basis of this technique the best alternative would be one which is nearest to the positive ideal solution, and far from the negative ideal solution. (Benitez et al, 2007). In this study, Topsis method is used for determining the final ranking of SAARC countries on the basis of selected economic resilience determinants. These following steps are involved in the obtaining of best rank country among the others*

**Step 9:** *To perform TOPSIS calculations, first we normalize the matrix  $A_{ij}$  To get a new matrix by the formula given as*

$$N_{ij} = \frac{A_{ij}}{\sqrt{\sum_{j=1}^m A_{ij}}}$$

*Where  $m$  represents number of countries. The normalized matrix is shown in appendix table III.*

**Step 10:** *In this step, multiplying each entry with corresponding weight in order to get new matrix which is a weighted normalized matrix  $K_{ij}$ , as shown in table IV*

$$K_{ij} = \begin{bmatrix} N_{11} & N_{11} & \dots & \dots & \dots & N_{1n} \\ N_{21} & N_{22} & \dots & \dots & \dots & N_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ N_{m1} & N_{m2} & \dots & \dots & \dots & N_{mn} \end{bmatrix} \times \begin{bmatrix} W_1 \\ W_2 \\ \vdots \\ \vdots \\ W_n \end{bmatrix}$$

Where  $m$  is the number of countries and  $n$  is the criteria count. Also,  $i$  and  $j$  is 1 to  $n$ .

**Step 11:** here, the positive ideal solution can be found at:

$$A_j^+ = \text{Max}(K_{ij})$$

While, negative ideal solution found at:

$$A_j^- = \text{Min}(K_{ij})$$

Where  $i$  1 to  $m$  that is number selected countries and  $j$  1 to  $n$  that is criteria count. In this step, we find ideal best and ideal worst solution. It is pertinent to note here, the minimum value of misery index, external debt to GDP and tax burden represents the best ideal solution because, normally, lower value of external debt and misery index favor country's macroeconomic stability. Same is the case in tax burden. The ideal best and worst value is shown in table V.

**Step 12:** Calculate the Euclidean distance from the ideal best and the ideal worst value. It can be calculated as:

$$S_i^+ = \sqrt{\sum_{j=1}^n (K_{ij} - A_j^+)^2}$$

$$S_i^- = \sqrt{\sum_{j=1}^n (K_{ij} - A_j^-)^2}$$

Where  $i$  is 1 to  $m$  that is the number of selected countries while  $j$  is 1 to  $n$  which is criteria count as shown in table VI.

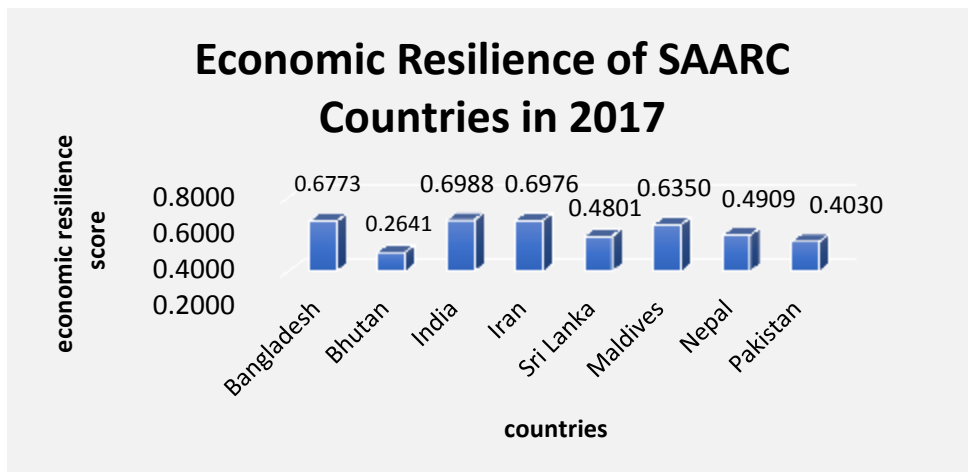
**Step 13:** The final step would ultimately give us the performance score. It can be found at:

$$P_i = \frac{S_i^-}{S_i^- + S_i^+}$$

Where  $i$  1 to  $m$  which is the number of selected countries. In addition, countries with higher performance score would be ranked

higher. In our model, India ranked first with a higher performance score followed by Iran and Bangladesh as shown in figure 1.

**Figure-1**



**Source: Arthur's Calculations**

### **Concluding Remarks**

*In this study, India topped with 0.699 score followed by Iran with 0.698 and third by Bangladesh 0.677. However, Bhutan recognized the lowest rank with a score of 0.264 and followed by Pakistan with 0.403. The findings of the study, confirmed the situation of that year. As per our ranking that topped the Indian economy, which performed well in 2017. In terms of trade, the economy made better improvements and contributed 13% to current account and fiscal positions.*

*A sharp decline in inflation has estimated in inflation and the rupee was in good appreciations. In this study, misery index that has calculated by summing of inflation and unemployment and external debt ratio to GDP got highest weighted due to the heavily importance in context of economic resilience. In the same year, due to low global commodity prices a range of supply side measures and tight stance monetary policy that resulted in a sharp decline in CPI from an average 9% in 2011-13 to around 4% during 2017-18. The current account deficit was narrowed from a high 4.8% of GDP in*

2012-13 with an average around 1.3% of GDP during 2013-14 and 2016-17. Iranian economy, although having a severe sanctions imposed by USA showed the good situation in that year upon the considerations of the selected determinants. Mainly fiscal deficit has reduced to around 1.3 percent in that year. The country has in better position among the SAARC countries due to good social development, less poverty indexes, large size of exports and low external debt ratio to GDP comparisons. Whereas the economy of Bangladesh performed well in 2017. His real GDP growth was estimated 7% following an increase in food prices, inflation appears to be stabilized around 6% in line with targets set out by the government. Foreign reserves and public debt rate that, plays an important role for the imports and exports also recorded at stabilizes positioning.

Pakistan got the lowest rank in this study because his economy was facing macroeconomic challenges. The burden of high population, low social development and higher index of poverty are important challenges of the country. External and fiscal vulnerabilities have been increasing. The current account deficit widened rapidly during FY2016/17 to 4 percent of GDP, reflecting strong import growth and flat remittances. Foreign exchange intervention has reduced gross international reserves to below three months of import cover. Despite higher growth and owing to significant overspending by provinces and some revenue underperformance, the overall fiscal deficit (excluding grants) widened to 5.8 percent of GDP in FY2016/17. (IMF, 2018 outlook).

Bhutan is one of the smallest, but fastest-growing economies in the world. Its annual economic growth of 7.5 percent on average between 2006 and 2015, placed the country 13th of 118 countries. This growth has been shared by a majority of Bhutanese, with extreme poverty dropping from 25 percent in 2003 to 2 percent in 2012, based on the international poverty line of \$1.90 a day (at purchasing power parity). This is among the rate in South Asia and compares favorably to the regional poverty rate of 19 percent.

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*Equally impressive improvements were made in access to basic services such as health, education and asset ownership<sup>7</sup>. This high growth and improvements unfortunately, stopped and macroeconomic indicators of the economy showed poor performance. CPI was recorded 4.96% in 2017 which was an increase of 1.74% points from 3.225 in 2016. Most important indicator of the economy like GDP indicated lowest performance as compared to the previous years around 4.63% to 8.02% in 2017 and 2016. In this study, imports concentration index has been considered a key determinant for the economic resilience of the country. Hence, in the case of Bhutan economy it shows that, imports of goods and services increased in 2017 and this increment is very high and observed that 19.38% . (NAS, 2017).*

## **Conclusion**

*Economic resilience is a new buzz word in the economic literature that is attracting the economists. Because the world is objectively being observed to suffer adverse shocks, uncertainties and vulnerabilities. In this line, Briguglio worked about vulnerabilities of the economies which are mainly more vulnerable to adverse shocks. He developed the new framework and suggested that, how could we mitigate exogenous shocks. That study and his work is broadly appreciated by the world leaders. In this study we have used the key determinants of economic resilience in the context of SAARC countries. For the assessment of the economic resilience and ranking AHP-TOPSIS has been deployed. The results of the study reveal that, India has ranked top, followed by Iran and Bangladesh. These countries performed well in 2017 which was used for the evolution of ranking. Bhutan and Pakistan ranked as lowest due to lowest performance in macroeconomic indicators, more specifically, in external debt and high deficits. This study, would make to divert the attention of policy makers and government authorities to pay more focus on reduction of external debt and imports. Additionally,*

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*they should more invest in social sectors of the countries and specially, diversified their concentrated exports that are always more vulnerable to the adverse shocks.*

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**Table III: Normalized Matrix**

Countries	Fiscal Deficit%GDP	IMsery Index	External Debt&%GDP	Regulation	Govt Size	Govt Expenditure	Good Governance	HDI	Export %GDP	Export Concentration	Export Diversification
Pakistan	0.027815318	0.913027224	1.549934466	0.87243385	0.994158853	1.238236907	0.308668319	0.244383501	0.590528646	0.318921498	0.124081854
Nepal	3.136220281	0.576867744	1.543561428	0.977847161	1.004303331	1.247787396	0.421966363	0.24979483	0.652295072	0.277090018	0.085918624
Maldives	0.518297849	0.966399071	1.537714605	0.72124897	0.958665318	0.524313054	0.450852725	0.311946248	4.848722741	0.366815063	0.393792355
Sri Lanka	0.086382975	0.734605923	3.437055248	0.954267868	1.047417363	0.926625909	0.550839724	0.335072888	1.554920633	0.298794805	0.113260487
Iran	0.725616988	2.626988935	0.118632051	0.786438781	0.872425116	1.476794591	0.375825918	0.347277688	1.788497946	0.224747615	0.445932338
India	0.431742108	0.874513894	1.169364718	0.901561213	0.978942136	1.212963041	0.558899323	0.278425725	1.346678225	0.188051265	0.072045852
Bhutan	0.464740404	0.570576792	6.665378894	1.068003283	0.945972582	1.807532404	0.789160634	0.266495852	2.0860606	0.341822049	0.221065746
Bangladesh	0.397361684	1.149693987	1.081662364	0.92791454	1.084191096	0.659347103	0.332446985	0.264641325	1.078175645	0.372508893	0.239137622

The weights of all criteria, defined by the AHP criteria

**Table IV: Weighted Matrix**

Fiscal Deficit%GDP	Misery Index	External Debt%GDP	Regulation	Govt Size	Govt Expenditure	Good Governance	HDI	Export %GDP	Export Concentration	Export Deversfiction
0.066	0	0	0	0	0	0	0	0	0	0
0	0.14	0	0	0	0	0	0	0	0	0
0	0	0.13	0	0	0	0	0	0	0	0
0	0	0	0.07	0	0	0	0	0	0	0
0	0	0	0	0.08	0	0	0	0	0	0
0	0	0	0	0	0.05	0	0	0	0	0
0	0	0	0	0	0	0.07	0	0	0	0
0	0	0	0	0	0	0	0.12	0	0	0
0	0	0	0	0	0	0	0	0.07	0	0
0	0	0	0	0	0	0	0	0	0.09	0
0	0	0	0	0	0	0	0	0	0	0.11

**Table IV: Normalized Weighted Matrix**

Countries	Fiscal Deficit%GDP	IMsery Index	External Debt&%GDP	Regulation	Govt Size	Govt Expenditure	Good Governance	HDI	Export %GDP	Export Concentration	Export Deversfiction
Bangladesh	0.026	0.161	0.141	0.065	0.087	0.033	0.023	0.032	0.075	0.034	0.026
Bhutan	0.031	0.080	0.866	0.075	0.076	0.090	0.055	0.032	0.146	0.031	0.024
India	0.028	0.122	0.152	0.063	0.078	0.061	0.039	0.033	0.094	0.017	0.008
Iran	0.048	0.368	0.015	0.055	0.070	0.074	0.026	0.042	0.125	0.020	0.049
Sri Lanka	0.006	0.103	0.447	0.067	0.084	0.046	0.039	0.040	0.109	0.027	0.012
Maldives	0.034	0.135	0.200	0.050	0.077	0.026	0.032	0.037	0.339	0.033	0.043

Nepal	0.207	0.081	0.201	0.068	0.080	0.062	0.030	0.030	0.046	0.025	0.009
Pakistan	0.002	0.128	0.201	0.061	0.080	0.062	0.022	0.029	0.041	0.029	0.014

V+	0.207	0.080	0.015	0.075	0.087	0.090	0.055	0.042	0.339	0.017	0.049
V-	0.002	0.368	0.866	0.050	0.070	0.026	0.022	0.029	0.041	0.034	0.008

**Table VI: Euclidean Distance, Performance Score**

Countries	Si+	Si-	Pi	Ranking
Bangladesh	0.360	0.757	0.677	3
Bhutan	0.885	0.318	0.264	8
India	0.327	0.759	0.699	1
Iran	0.372	0.859	0.698	2
Sri Lanka	0.530	0.490	0.480	6
Maldives	0.250	0.435	0.635	4
Nepal	0.343	0.331	0.491	5
Pakistan	0.405	0.274	0.403	7

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