Chapter 1

Comparative Analysis of Banking Sector Performance in Next-11 Countries: An Entropy-Based EDAS Approach[1]

Hakan Yıldırım[2]

Abstract

The concept of the Next-11, introduced to the literature by Goldman Sachs economist Jim O'Neil in 2005, refers to a group of emerging economies that includes Bangladesh, Egypt, Indonesia, Iran, South Korea, Mexico, Nigeria, Pakistan, the Philippines, Türkiye, and Vietnam. Characterized by their substantial growth potential, these countries are expected to play increasingly significant roles in shaping the future global economy. Given the central role of the banking sector in mobilizing savings, allocating capital efficiently, and supporting sustainable growth, examining its performance within this country group is of particular importance. Accordingly, this study evaluates the financial performance of the banking sector in the Next-11 economies over the period 2013–2020. In the first stage of the analysis, nine criteria were identified to measure the sector's financial performance. In the second stage, the relative importance of these criteria was determined using the Entropy Method. In the third stage, the Evaluation based on Distance from Average Solution (EDAS) Method was employed to assess financial performance across the sample period and to establish the performance rankings of the countries. The Entropy analysis revealed that the most influential criterion throughout the period was the ratio of non-performing loans. The EDAS results, on the other hand, indicated that the country with the strongest performance varied by year. Nevertheless, when average rankings across the entire period are considered, South Korea, the Philippines, and Mexico emerge as the three most successful countries. Türkiye consistently ranked fifth in most years, except for 2019 when it fell to sixth place. Conversely, Pakistan and Bangladesh recorded the lowest levels of banking sector performance during the study period.

1 This work originates from the paper entitled "Financial Performance of the Banking Sector in Next-11 Countries for the 2013–2020 Period: An Application Using Entropy-Based EDAS Method", which was presented as an abstract at the Sustainability and Development from Economic, Social and Managerial Perspectives conference (FSCONGRESS 2024 – Isparta).

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Introduction

In recent years, the acceleration of globalization, technological advancements, and various dynamics have significantly increased interactions among countries. Accordingly, numerous studies have been conducted—and continue to be conducted—within the finance literature, focusing on different country groups. With the dynamics of global change, emerging powers have started to attract researchers' attention and have become one of the most prominent areas of study. This is largely because many authorities recognize that these emerging countries, which possess high growth potential, are likely to shape the future of the global economy. In 2005, Goldman Sachs coined the term *"Next Eleven Economies"* for the first time, predicting that the countries within this group would play a key role in forming the future global economy. These countries are Egypt, Bangladesh, Iran, Indonesia, Pakistan, South Korea, Mexico, Nigeria, the Philippines, Vietnam, and Türkiye. Except for South Korea, the remaining countries fall into the category of developing economies. Consequently, these countries generally stand out due to their high economic growth performance and are expected to play a significant role in shaping the future economic system.

Although sustainable economic growth depends on various factors, the banking sector (BS) occupies a particularly important position among them. This sector, which facilitates the formation of the capital necessary for economic progress and sustainability, functions as the locomotive of the financial system, especially in developing countries. Beyond merely providing the capital required for investments, BS plays an active role in promoting trade, ensuring the efficient allocation of capital, and several other areas. Therefore, the successful performance of BS is indispensable for a country's macroeconomic performance. At the same time, BS performance is also considered an indicator reflecting the overall economic performance of countries.

As elaborated in detail in the literature review, due to its critical importance for national economies, BS has been the subject of numerous studies over many years and continues to be extensively examined. Among these studies, a significant number specifically investigate BS performance. However, studies that comparatively analyze country-level BS performance remain limited, and no study focusing explicitly on the Next-11 countries has been encountered. Building on this gap, the central aim of the present study is to conduct a comparative assessment of the financial performance of BS across the Next-11 economies for the 2013–2020 period, employing

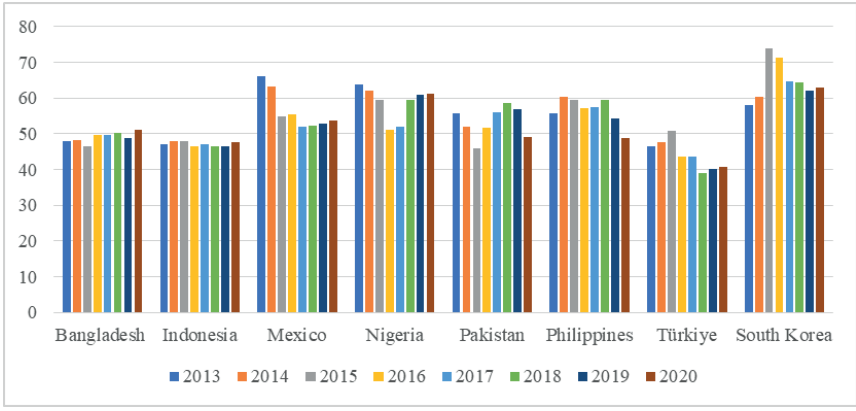
Multi-Criteria Decision-Making (MCDM) techniques, with a particular focus on ENTROPY and EDAS

To achieve this objective, the study is structured into four sections. The first section presents an overview of BS in the sampled countries during the relevant period, using trend graphs to illustrate developments. The second section reviews the literature and examines similar studies. The research methodology is outlined in the third section. Finally, the fourth section discusses the findings obtained from the analyses conducted within the study, offering a comparative evaluation.

1. Overview of the BS in the Next-11 Countries during the 2013–2020 Period

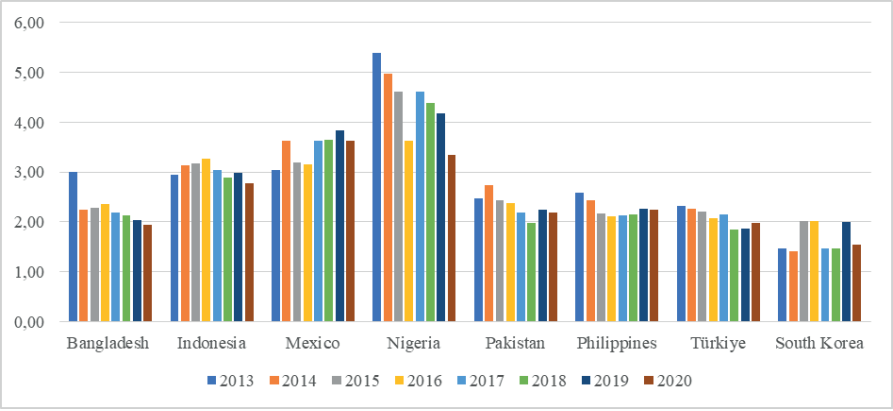
This section of the study presents the recent developments in the BS of the Next-11 countries. Based on the key indicators and factors identified as research criteria—which are detailed in the following section—the development of BS in the Next-11 countries, for which data is available, is examined.

Figure 1: Cost-to-Income Ratios of Banks in the Next-11 Countries during the 2013–2020 Period (%)



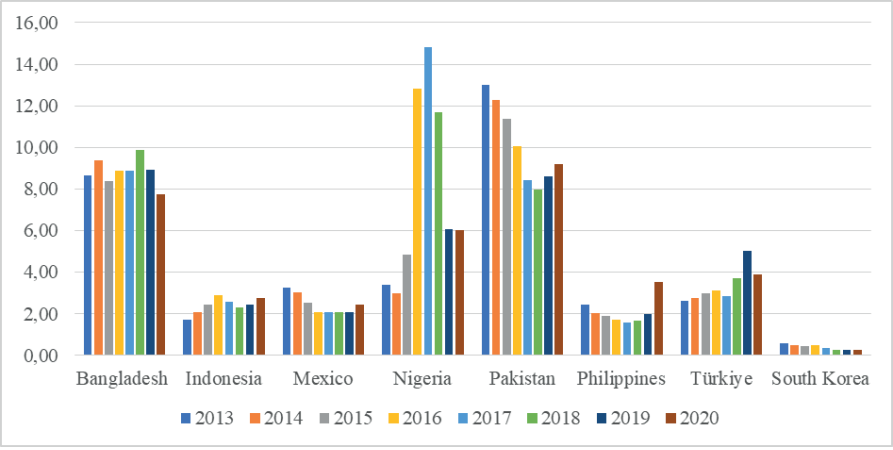
The cost-to-income ratios (CIR) is an important indicator that measures the costs incurred by banks relative to their generated income, thereby reflecting the operational efficiency of banks. According to Figure 1, during the period under review, the countries with the highest cost-to-income ratios were South Korea and Nigeria. Among these countries, Türkiye had the lowest ratio.

Figure 2: Ratio of Total Bank Operating Expenses to Total Assets in the Next-11 Countries during the 2013–2020 Period (%)



The ratio of bank overhead costs to total assets (CTA) is also an important measure for assessing the cost efficiency of banks. A lower ratio indicates that a bank is managing and controlling its operating costs more effectively relative to its assets. According to Figure 2, during the period under review, the countries where costs were most efficiently controlled on average in the BS were South Korea and Türkiye, respectively. Nigeria, on the other hand, exhibited the highest ratio of total operating expenses on average.

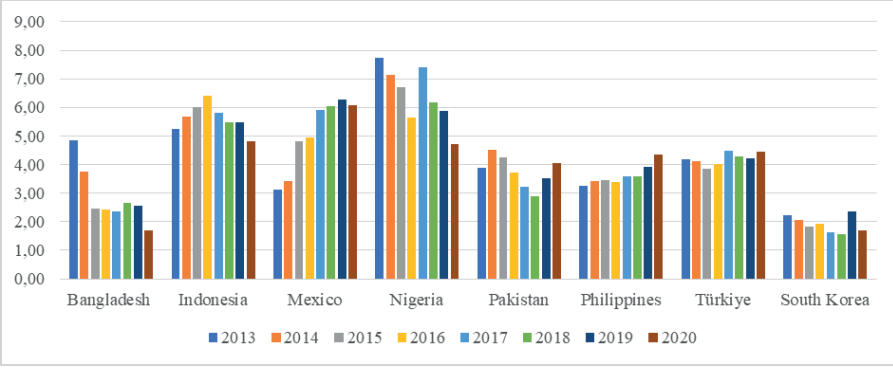
Figure 3: Ratio of Non-Performing Loans to Gross Loans in the Next-11 Countries during the 2013–2020 Period (%)



The non-performing loans (NPL) ratio is one of the most important indicators of banks' asset quality and the overall risk position of the sector. According to Figure 3, during the period under review, the ratio of non-

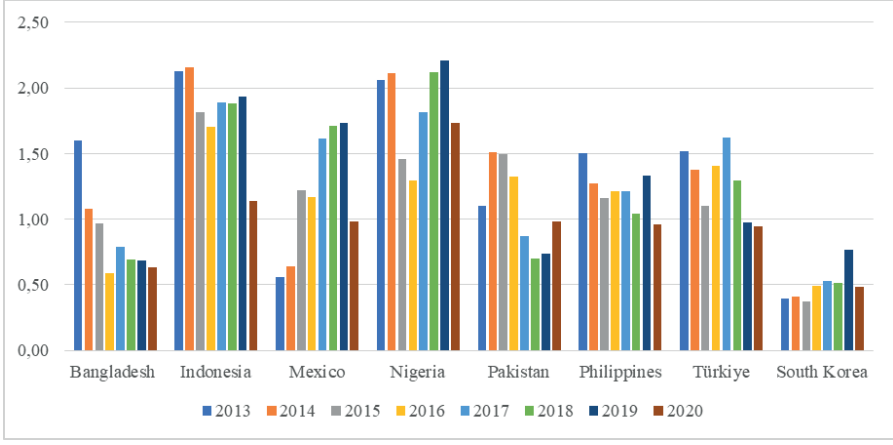
performing loans in South Korea's BS was relatively low compared to other countries. In contrast, it is noteworthy that Pakistan and Bangladesh exhibited comparatively lower credit quality in their BS.

Figure 4: Net Interest Margin of Banks in the Next-11 Countries during the 2013–2020 Period (%)



The net interest margin (NIM) constitutes an additional crucial determinant of banks' financial performance. Banks generally aim to maintain a high net interest margin. According to Figure 4, during the period under review, the countries with the highest net interest margins were Nigeria and Indonesia. In Türkiye, the BS's net interest margin remained around an average of approximately 4%.

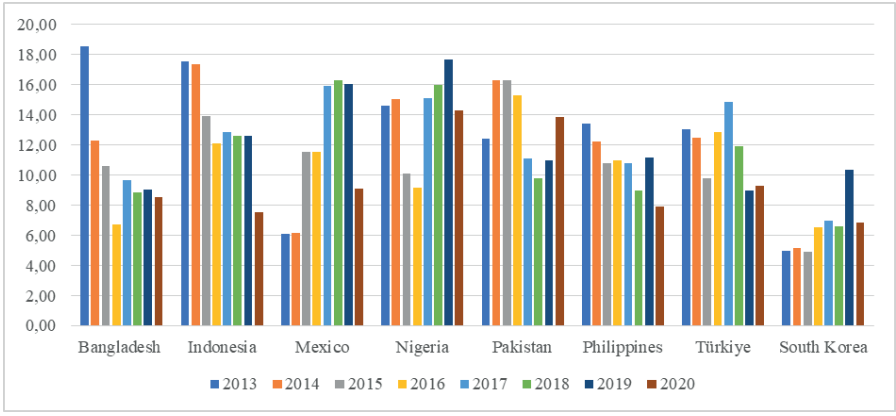
Figure 5: Return on Assets of Banks in the Next-11 Countries during the 2013–2020 Period (%)



The return on assets (ROA) is a highly important ratio that indicates the profit-generating potential of bank assets. According to Figure 5, during

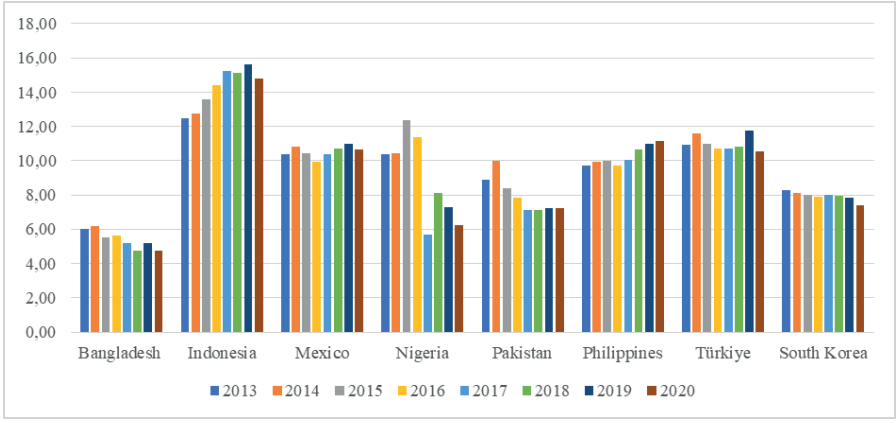
the period under review, the countries with the highest ROA in the BS were Nigeria and Indonesia. South Korea, on the other hand, exhibited the lowest ROA.

Figure 6: Return on Equity of Banks in the Next-11 Countries during the 2013–2020 Period (%)



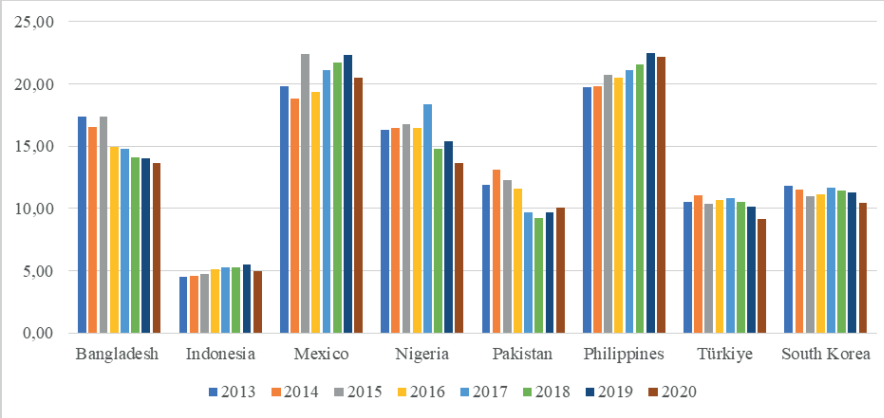
The return on equity (ROE) is another important profitability ratio that indicates the efficiency of banks in generating profit from their equity. According to Figure 6, during the period under review, the countries with the highest ROE in the BS were Nigeria and Pakistan. In Türkiye, ROE remained at an average of approximately 11% until 2018, after which it declined to around 9%.

Figure 7: Ratio of Bank Capital to Total Assets in the Next-11 Countries during the 2013–2020 Period (%)



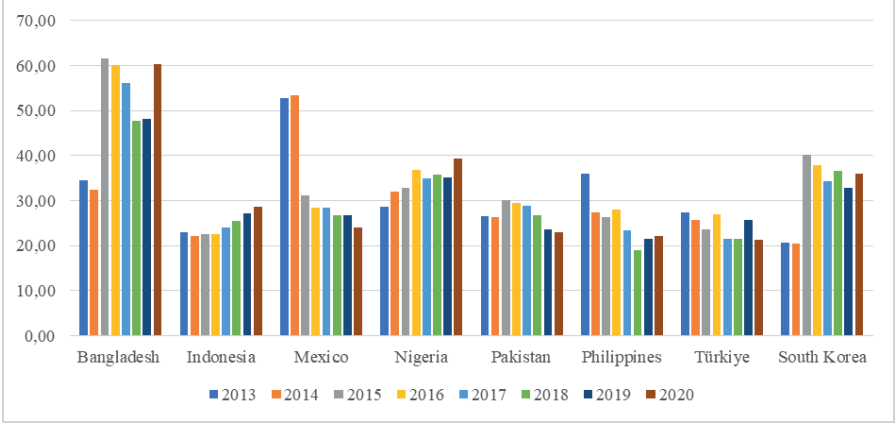
The ratio of bank capital to total assets (CR) is an important indicator reflecting banks' financial strength and risk tolerance. According to Figure 7, during the period under review, the country with the highest CR was Indonesia, while Bangladesh had the lowest. In Türkiye, the CR remained at approximately 11% on average, placing it in the middle range among the surveyed countries.

Figure 8: Z-Score of Banks in the Next-11 Countries during the 2013–2020 Period



The Z-score is an important indicator measuring the probability of failure within a country's BS. According to Figure 8, during the period under review, Indonesia had the lowest Z-score, while it is noteworthy that Bangladesh recorded the highest score. In the case of Türkiye, the Z-score in the BS declined over time, from approximately 10.56 to 9.15.

Figure 9: Ratio of Non-Interest Income to Total Income of Banks in the Next-11 Countries during the 2013–2020 Period (%)



The ratio of non-interest income to total income (NINT) is an important indicator for evaluating banks' income structure and revenue diversification. A higher ratio indicates that non-interest income constitutes a larger share of total income, reflecting a more diversified set of revenue sources for the bank. According to Figure 9, during the period under review, the countries with the highest average income diversification in the BS were Bangladesh, Mexico, and South Korea. In the case of Türkiye, as of 2020, NINT accounted for approximately 21% of total income.

2. Literature Review

The BS is a dynamic and highly important sector that is influenced by, and in turn influences, numerous internal and external factors, affecting various areas including countries' sustainable growth. Therefore, a considerable number of studies in both domestic and international literature examine BS and its financial performance. In a significant portion of these studies, MCDM methods are preferred, as they allow the identification of the most successful—or, in other words, the best-performing—alternatives based on multiple indicators across different dimensions. Some of these studies are evaluated below in terms of their objectives, methods, and findings.

Dinçer and Görener (2011) classified the Turkish BS into public, private, and foreign banks and conducted a performance analysis for the 2004–2008 period using AHP and VIKOR methods. According to their findings, the best performance was demonstrated by foreign banks in 2003 and 2008, and by public banks in 2004 and 2007.

Çalışkan and Eren (2016) analyzed the performance of the 20 largest banks by total assets for the 2010–2014 period using AHP and PROMETHEE methods. Their analysis revealed that Ziraat Bankası was the best-performing bank during this period.

Bağcı and Rençber (2014) examined the profitability performance of public and private banks operating in the Turkish BS for the 2006–2012 period using the PROMETHEE method. Their findings indicated that Halkbank achieved the highest profitability among public banks, while Denizbank was the best-performing private bank.

Demireli (2010) analyzed the financial performance of public banks in the Turkish BS for the 2001–2007 period using the TOPSIS method. The analysis revealed that the best-performing public banks varied across different years.

Liang, Zhang, Xu, and Jamaldeen (2019) evaluated the web page quality performance for internet banking of five banks operating in Ghana using the Entropy, FUZZY VIKOR, and TODIM methods. Their findings indicated that the bank labeled A demonstrated the best performance.

Akgül (2019) analyzed the financial performance of the Turkish BS for the 2010–2018 period using an Entropy-based criterion weighting method combined with SAW, MAUT, and ARAS performance ranking methods. The analysis identified the most heavily weighted criteria as liquid assets/short-term liabilities, loans/total assets, and fixed assets/total assets. According to the ranking results, the Turkish BS achieved its best performance in 2010 and its worst performance in 2018.

Özkan (2019) analyzed the financial performance of deposit banks listed on BIST for the 2013–2017 period using the TOPSIS method. The findings revealed that QNB Finansbank and Halkbank were the best-performing banks during this period.

Korzeb and Samaniego-Medina (2021) investigated the sustainability performance of 17 banks in the Polish BS for the 2015–2017 period using the TOPSIS method. The study concluded that none of the banks improved their sustainability performance during the analyzed period.

Reig-Mullor and Brotons-Martinez (2021) examined the financial, managerial, and sustainability performance of six Spanish banks for the 2015–2017 period based on the intuitionistic fuzzy numbers of AHP and TOPSIS, using multidimensional criteria. The results showed that Banco de Santander and BBVA achieved the best overall performance, whereas Banco Sabadell demonstrated the lowest performance across all areas.

Işık et al. (2025) analyzed the performance of 15 banks in Pakistan across three different dimensions using the hybrid F-LBWA, F-LMAW, and MARCOS methods, and compared the results with other MCDM methods. Their findings indicated that MCB and ABL banks were the best-performing banks.

MCDM-based studies have also been conducted to rank countries' performances. For instance, Genç and Masca (2013) analyzed the 2012 economic performance of 28 EU member states and Türkiye, as a candidate country, using TOPSIS and PROMETHEE methods. According to their findings, Estonia exhibited the best performance based on the PROMETHEE method, while Latvia was the top performer according to TOPSIS. In another study, Kaya Samut (2014) analyzed the educational performance of OECD member countries using AHP and TOPSIS,

concluding that Luxembourg achieved the best performance, followed by Canada and Switzerland.

Eyüboğlu (2016) conducted an analysis of developing countries' macroeconomic performance over the 2003–2013 period by applying AHP and TOPSIS techniques. The results indicated that Malaysia and China emerged as the top-performing nations. Similarly, Ela et al. (2018) assessed the macroeconomic performance of EU member states along with Türkiye using TOPSIS, and their findings highlighted Ireland, Cyprus, and Poland as the leading performers. In another study, Gök Kısa and Ayçin (2019) evaluated the logistics performance of OECD countries through SWARA and EDAS. Their analysis showed that logistics service quality, infrastructure, and international shipping were the most influential criteria, with Germany, the Netherlands, and Sweden ranking highest in performance.

In another study, Yıldırım (2024) analyzed the financial inclusion performance of middle-income countries in Europe and Central Asia for the 2019–2022 period using multiple MCDM methods. The results indicated that Georgia and Türkiye were the best-performing countries during this period.

Taken together, these studies demonstrate that the financial performance of the BS has been a long-standing and continuously important research topic. A significant portion of these studies utilize MCDM methods. However, when the literature is evaluated as a whole, most studies focus on bank performance within a single country. Comparative studies at the country level remain limited. Therefore, this study examines the BS performance of the Next-11 countries for the 2014–2020 period using ENTROPY and EDAS methods.

3. Data Set, Model, and Method

In line with the study's objectives, the relevant literature was reviewed, and nine evaluation criteria were determined to assess the financial performance of the BS. These criteria are presented in Table 1. Data related to the criteria were collected from the World Bank's Global Financial Development database. Countries with missing data during the relevant period—namely Iran, Vietnam, and Egypt—were excluded from the sample. Ultimately, the countries included in the study were Bangladesh, Indonesia, the Philippines, Mexico, Nigeria, Pakistan, Türkiye and South Korea. Additionally, the determination of the study's starting and ending years was influenced by the availability of data.

Table 1: Evaluation Criteria

Codes	Criteria	Direction
C1	Bank cost to income ratio (%)	Cost
C2	Bank overhead costs to total assets (%)	Cost
C3	Bank non-performing loans to gross loans (%)	Cost
C4	Bank net interest margin (%)	Benefit
C5	Bank return on assets (%, after tax)	Benefit
C6	Bank return on equity (%, after tax)	Benefit
C7	Bank capital to total assets (%)	Benefit
C8	Bank Z-score	Benefit
C9	Bank noninterest income to total income (%)	Benefit

Table 1 presents the indicators used as evaluation criteria in the analyses conducted within the scope of this study. These criteria are first weighted using the objective weighting method, ENTROPY. Once the criterion weights are determined, the BS performance of the Next-11 countries for the 2013–2020 period is comparatively analyzed using the EDAS method. Table 2 provides information on the steps of the methods applied in the analyses.

Table 2: Steps of the Analysis Methods

ENTROPY METHOD	EDAS METHOD
Step 1: begins with the formation of an initial decision matrix (X), which includes m alternatives and n criteria (Eq. 1). $X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}$ i=1,2,...m; j=1,2,..n **(1)** The criteria are normalized according to their benefit-cost characteristics by following Eq. 2 and Eq 3. $r_{ij} = x_{ij}/mak_{ij}$ (i=1,…,m;j=1,…,n) **(2)** $r_{ij} = \min_{ij}/x_{ij}$ $\min_{ij} \neq 0$ (i=1,…,m;j=1,.,n) **(3)**	**Step 1:** begins with the formation of an initial decision matrix (X), which includes m alternatives and n criteria (Eq.8). $X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}$ i=1,2,...m; j=1,2,...n **(8)**

Step 2: normalization is performed to eliminate differences among the criteria, and the P_{ij} value is calculated by following Eq. 4.

$$P_{ij}\frac{a_{ij}}{\sum_{i=1}^{m} r_{ij}};\ \forall_j \qquad (i=1,\ldots,m;j=1,\ldots,n) \qquad \textbf{(4)}$$

Step 3: Entropy values (E_j) are calculated by following Eq. 5.

$$E_{ij} = -k\ \sum_{i=1}^{m}[P_{ij} lnP_{ij}];\forall\ k = \frac{1}{\ln(m)}$$

(i=1,…,m;j=1,…,n) **(5)**

Step 4: The uncertainty D_j is calculated by following Eq. 6.

$$D_j = 1 - E_j;\ \forall_j \qquad (j=1,\ldots,n) \qquad \textbf{(6)}$$

Step 2: the average solution matrix (*AV*) is derived by computing the mean of all values for each criterion using Eq.9. The *AVj* values in Eq.9 denote the average for criterion j and are determined according to the formula presented in Eq.10.

$$AV = \left[Av_j\right]_{1xm} \qquad \textbf{(9)}$$

$$AV_j = \frac{\sum_{i=1}^{n} X_{ij}}{n} \qquad \textbf{(10)}$$

Step 3: for each criterion, the positive distance from the average (*PDA*) matrix is created using Eq. 11, and the negative distance from the average (*NDA*) matrix is generated using Eq. 12

$$PDA = \left[PDA_{ij}\right]_{nxm} \qquad \textbf{(11)}$$

$$NDA = \left[NDA_{ij}\right]_{nxm} \qquad \textbf{(12)}$$

If the criteria are benefit-oriented, the PDA and NDA matrices are calculated using Eq. 13 and Eq. 14, as shown below.

$$PDA_{ij} = \frac{\max(0,(X_{ij} - AV_j))}{AV_j} \qquad \textbf{(13)}$$

$$NDA_{ij} = \frac{\max(0,(AV_j - X_{ij}))}{AV_j} \qquad \textbf{(14)}$$

If the criteria are cost-oriented, the PDA and NDA matrices are calculated using Eq. 15 and Eq. 16, as shown below.

$$PDA_{ij} = \frac{\max(0,(AV_j - X_{ij}))}{AV_j} \qquad \textbf{(15)}$$

$$NDA_{ij} = \frac{\max(0,(X_{ij} - AV_j))}{AV_j} \qquad \textbf{(16)}$$

Step 4: the weighted overall PDA and NDA values for each decision alternative are computed using Eq.17 and 18, where the w values denote the importance weights assigned to the criteria.

$$SP_i = \sum_{j=1}^{m} W_j * PDA_{ij} \qquad \textbf{(17)}$$

$$SN_i = \sum_{j=1}^{m} W_j * NDA_{ij} \qquad \textbf{(18)}$$

Step 5: The weights assigned to the criteria (wj) are determined by following Equation 7. $W_j = \frac{D_j}{\sum_{j=1}^{n} D_j}; \forall_j \sum_{j=1}^{n} W_j = 1;$ (j=1,..,n) (7)	**Step 5:** the SP_i and SN_i values calculated in the previous step are normalized through the use of Eq. 19 and Eq. 20. $NSP_i = \frac{SP_i}{\max(SP_i)}$ **(19)** $NSN_i = 1 - \frac{SN_i}{\max(SN_i)}$ **(20)** **Step 6:** the assessment scores (AS_i) for each decision alternative are obtained using Eq. 21. $AS_i = \frac{1}{2}(NSP_i + NSN_i)$ **(21)**

Source: Perçin & Sönmez, 2018; Gök Kısa & Aycin, 2019; Yıldırım & Yaman, 2023.

At the outset of the analysis, the importance weights of the criteria for 2013 are calculated by following the ENTROPY method steps presented in Table 2. The calculations are as follows:

Table 3: Calculation of Criterion Weights for 2013

1-Decision Matrix									
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
A1	47,8942	2,9999	8,6419	4,8365	1,5995	18,5751	6,0389	17,3960	34,5794
A2	47,0916	2,9401	1,6868	5,2317	2,1280	17,5810	12,4665	4,5111	22,9645
A3	66,1984	3,0419	3,2432	3,1296	0,5547	6,1068	10,3587	19,8127	52,7813
A4	63,7693	5,3880	3,3934	7,7245	2,0617	14,5923	10,3923	16,2859	28,7530
A5	55,8182	2,4810	12,9869	3,8740	1,1044	12,4333	8,9079	11,9109	26,4771
A6	55,7225	2,5843	2,4409	3,2383	1,5000	13,4444	9,7042	19,7629	35,9275
A7	46,4690	2,3181	2,6363	4,1746	1,5177	13,0450	10,9456	10,5566	27,4731
A8	58,1739	1,4719	0,5707	2,2331	0,3954	4,9769	8,2725	11,8061	20,7395
2-Normalized Decision Matrix									
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
A1	0,1086	0,1292	0,2427	0,1404	0,1473	0,1844	0,0783	0,1553	0,1385
A2	0,1068	0,1266	0,0474	0,1519	0,1959	0,1745	0,1617	0,0403	0,0920
A3	0,1501	0,1310	0,0911	0,0909	0,0511	0,0606	0,1344	0,1768	0,2114
A4	0,1446	0,2320	0,0953	0,2243	0,1898	0,1448	0,1348	0,1454	0,1152
A5	0,1265	0,1068	0,3648	0,1125	0,1017	0,1234	0,1156	0,1063	0,1060
A6	0,1263	0,1113	0,0686	0,0940	0,1381	0,1334	0,1259	0,1764	0,1439
A7	0,1053	0,0998	0,0741	0,1212	0,1397	0,1295	0,1420	0,0942	0,1100
A8	0,1319	0,0634	0,0160	0,0648	0,0364	0,0494	0,1073	0,1054	0,0831
3-Entropy Values of the Criteria (E_j)									
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
A1	-0,241064	-0,26436	-0,34367	-0,27567	-0,28209	-0,31173	-0,19951	-0,2892	-0,27379

A2	-0,238829	-0,26164	-0,14449	-0,28626	-0,31936	-0,30464	-0,29464	-0,12934	-0,21947
A3	-0,284625	-0,26624	-0,21826	-0,21793	-0,1519	-0,16991	-0,26971	-0,30637	-0,32851
A4	-0,279585	-0,33895	-0,22405	-0,33526	-0,31542	-0,27984	-0,27015	-0,28033	-0,2489
A5	-0,261575	-0,23892	-0,36787	-0,24577	-0,23244	-0,25819	-0,24937	-0,23828	-0,23794
A6	-0,261343	-0,24433	-0,18375	-0,22229	-0,27341	-0,26876	-0,26088	-0,30605	-0,27896
A7	-0,237073	-0,23001	-0,19276	-0,25578	-0,27499	-0,26468	-0,27716	-0,22256	-0,24283
A8	-0,267163	-0,17483	-0,06626	-0,17739	-0,12062	-0,14858	-0,23953	-0,23711	-0,20667
K=1/ln(m)= 0,480898347									
e_j	0,9961	0,9711	0,8373	0,9696	0,9475	0,9648	0,9911	0,9662	0,9796
d_j	0,0039	0,0289	0,1627	0,0304	0,0525	0,0352	0,0089	0,0338	0,0204
w_j	0,0104	0,0768	0,4320	0,0806	0,1394	0,0934	0,0236	0,0896	0,0541

The same procedures followed for 2013 were applied for the 2014–2020 period, and the importance weights of the criteria for this period were calculated. The criterion weights for the relevant period are presented in Table 4.

Table 4: Criterion Weights According to the ENTROPY Method for the 2013–2020 Period

	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
2013	0,0104	0,0768	0,4320	0,0806	0,1394	0,0934	0,0236	0,0896	0,0541
2014	0,0088	0,0784	0,4498	0,0735	0,1370	0,0849	0,0251	0,0825	0,0599
2015	0,0177	0,0576	0,4284	0,1037	0,0933	0,0615	0,0442	0,1150	0,0787
2016	0,0154	0,0356	0,4963	0,0949	0,0914	0,0538	0,0484	0,0952	0,0690
2017	0,0080	0,0721	0,4642	0,1138	0,0896	0,0353	0,0666	0,0922	0,0582
2018	0,0132	0,0776	0,4207	0,0986	0,1304	0,0500	0,0596	0,0988	0,0511
2019	0,0135	0,0693	0,3954	0,0812	0,1402	0,0438	0,0799	0,1275	0,0493
2020	0,0134	0,0583	0,3373	0,1153	0,0934	0,0550	0,0869	0,1348	0,1055
Average	0,0126	0,0657	0,4280	0,0952	0,1143	0,0597	0,0543	0,1045	0,0657

An examination of the data presented in Table 4 shows that, according to the ENTROPY method findings, the criterion with the highest importance weight for the BS in the Next-11 countries during the period under review is C3 (NPL). This result clearly indicates that NPLs played a decisive role in the BS performance of the sampled countries during this period. C3 is followed by C5 (ROA) and C8 (Bank Z-Score).

Once the criterion weights are calculated, the performance ranking stage is initiated. The performance analysis for 2013 is conducted by sequentially following the EDAS method steps presented in Table 2, and the findings are presented in Table 5.

Table 5: EDAS Method Results for 2013

1- Decision Matrix									
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
W	0,010	0,077	0,432	0,081	0,139	0,093	0,024	0,090	0,054
A1	47,894	3,000	8,642	4,837	1,600	18,575	6,039	17,396	34,579
A2	47,092	2,940	1,687	5,232	2,128	17,581	12,467	4,511	22,964
A3	66,198	3,042	3,243	3,130	0,555	6,107	10,359	19,813	52,781
A4	63,769	5,388	3,393	7,724	2,062	14,592	10,392	16,286	28,753
A5	55,818	2,481	12,987	3,874	1,104	12,433	8,908	11,911	26,477
A6	55,722	2,584	2,441	3,238	1,500	13,444	9,704	19,763	35,928
A7	46,469	2,318	2,636	4,175	1,518	13,045	10,946	10,557	27,473
A8	58,174	1,472	0,571	2,233	0,395	4,977	8,273	11,806	20,740
2- Avarage Solution Values									
AV	55,142	2,903	4,450	4,305	1,358	12,594	9,636	14,005	31,212

3- Positive Distance from the Average Values(PDA)										
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**SP**
A1	0,131	0,000	0,000	0,123	0,178	0,475	0,000	0,242	0,108	0,108
A2	0,146	0,000	0,621	0,215	0,567	0,396	0,294	0,000	0,000	0,410
A3	0,000	0,000	0,271	0,000	0,000	0,000	0,075	0,415	0,691	0,193
A4	0,000	0,000	0,237	0,794	0,519	0,159	0,079	0,163	0,000	0,270
A5	0,000	0,145	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,011
A6	0,000	0,110	0,451	0,000	0,105	0,067	0,007	0,411	0,151	0,270
A7	0,157	0,202	0,408	0,000	0,118	0,036	0,136	0,000	0,000	0,216
A8	0,000	0,493	0,872	0,000	0,000	0,000	0,000	0,000	0,000	0,414
4- Negative Distance from the Average Values(NDA)										
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**SN**
A1	0,000	0,033	0,942	0,000	0,000	0,000	0,373	0,000	0,000	0,418
A2	0,000	0,013	0,000	0,000	0,000	0,000	0,000	0,678	0,264	0,076
A3	0,201	0,048	0,000	0,273	0,591	0,515	0,000	0,000	0,000	0,158
A4	0,156	0,856	0,000	0,000	0,000	0,000	0,000	0,000	0,079	0,072
A5	0,012	0,000	1,918	0,100	0,187	0,013	0,076	0,150	0,152	0,888
A6	0,011	0,000	0,000	0,248	0,000	0,000	0,000	0,000	0,000	0,020
A7	0,000	0,000	0,000	0,030	0,000	0,000	0,000	0,246	0,120	0,031
A8	0,055	0,000	0,000	0,481	0,709	0,605	0,141	0,157	0,336	0,230
5- Weighted PDA Matrix and Normalization										
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	
	Min.	**Min.**	**Min.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**SN**
A1	0,001	0,000	0,000	0,010	0,025	0,044	0,000	0,022	0,006	0,001
A2	0,002	0,000	0,268	0,017	0,079	0,037	0,007	0,000	0,000	0,002
A3	0,000	0,000	0,117	0,000	0,000	0,000	0,002	0,037	0,037	0,000
A4	0,000	0,000	0,103	0,064	0,072	0,015	0,002	0,015	0,000	0,000
A5	0,000	0,011	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
A6	0,000	0,008	0,195	0,000	0,015	0,006	0,000	0,037	0,008	0,000
A7	0,002	0,015	0,176	0,000	0,016	0,003	0,003	0,000	0,000	0,002
A8	0,000	0,038	0,377	0,000	0,000	0,000	0,000	0,000	0,000	0,000

6- Weighted NDA Matrix and Normalization

	C1	C2	C3	C4	C5	C6	C7	C8	C9	
	Min.	Min.	Min.	Max.	Max.	Max.	Max.	Max.	Max.	SN
A1	0,000	0,003	0,407	0,000	0,000	0,000	0,009	0,000	0,000	0,000
A2	0,000	0,001	0,000	0,000	0,000	0,000	0,000	0,061	0,014	0,000
A3	0,002	0,004	0,000	0,022	0,082	0,048	0,000	0,000	0,000	0,002
A4	0,002	0,066	0,000	0,000	0,000	0,000	0,000	0,000	0,004	0,002
A5	0,000	0,000	0,829	0,008	0,026	0,001	0,002	0,013	0,008	0,000
A6	0,000	0,000	0,000	0,020	0,000	0,000	0,000	0,000	0,000	0,000
A7	0,000	0,000	0,000	0,002	0,000	0,000	0,000	0,022	0,006	0,000
A8	0,001	0,000	0,000	0,039	0,099	0,056	0,003	0,014	0,018	0,001

	NSP	*NSN*	*ASI*	Rank
A1	0,1352	0,5164	0,3258	6
A2	0,7761	0,9131	0,8446	4
A3	0,8701	0,9670	0,9185	1

Table 5 presents the performance ranking data for 2013 based on the EDAS method, using the criteria weighted by the ENTROPY method. The same protocol was applied for all subsequent years, and the cumulative performance rankings of the Next-11 countries' BS for the 2013–2020 period are presented in Figure 10.

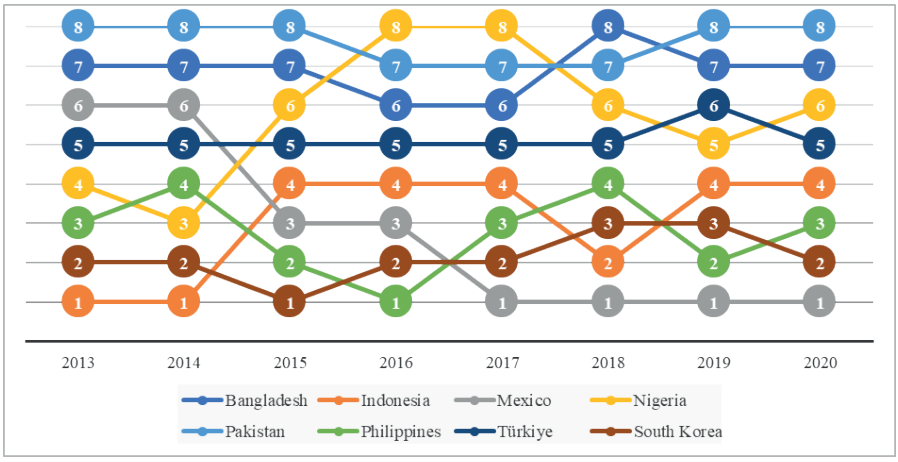


Figure 10: Financial Performance Rankings of BS in Selected Countries

As shown in Figure 10, the BS performance of the countries exhibits variability over the years. In recent years, Mexico's BS has consistently ranked first, whereas Bangladesh's BS has occupied the last position over the past three years.

4. Conclusion

As previously stated, the BS performance of countries is a critical factor for the sustainable growth of national economies. Therefore, within the scope of this study, the BS performance for the 2013–2020 period was analyzed using MCDM methods, yielding valuable insights. When the countries are evaluated individually based on the research criteria and analysis results:

In Bangladesh, the CIR has been steadily increasing. The NPL ratio remains considerably higher compared to other countries, while NIM has shown a narrowing trend over the years. Additionally, profitability ratios have been declining. According to the EDAS method results, Bangladesh generally ranks at the lower end of the group in terms of financial performance, most often in seventh place.

In Indonesia, the CIR has remained stable at around 47%. The NPL ratio has shown a continuous upward trend in recent years. Both NIM and profitability levels are above the group average. Although Indonesia ranks as the strongest country in terms of CR, its Z-Score is relatively low; this may be attributed to factors such as asset quality issues, high credit volume, and political instability. Based on EDAS results, the BS in Indonesia ranked first in 2013 and 2014 but declined to fourth place in subsequent years.

In Mexico, the CIR has been steadily decreasing. The NPL ratio has declined, while NIM has experienced an upward trend. Profitability ratios have shown a notable increase compared to 2013. Mexico holds the highest Z-Score among the countries. According to EDAS results, Mexico, which ranked sixth in 2013 and 2014, improved its financial performance in later years and moved up the rankings.

In Nigeria, although profitability and NIM are relatively high compared to other group countries, increases have been observed in CIR and CTA. The NPL ratio has risen significantly, which has correspondingly reduced CR and the Z-Score. According to EDAS results, Nigeria ranked fourth in 2013 but fell to eighth place in 2016 and 2017.

In Pakistan, the CIR remains at high levels, and the NPL ratio is the highest among the group countries. Additionally, the Z-Score is relatively low compared to other countries. According to EDAS results, Pakistan ranked seventh in 2016 and 2017, and eighth (last) in all other years.

In the Philippines, CIR and CTA have decreased. The NPL ratio has generally remained low but reached its peak in 2020. During the period, NIM, Z-Score, and CR increased, whereas profitability indicators declined.

According to EDAS results, the Philippines ranked third in 2013, rose to first place in 2016, and returned to third place in 2020.

In Türkiye CIR and CTA showed a partial decline. The NPL ratio generally increased, peaking in 2019. Profitability levels significantly decreased over the years. CR remained stable at approximately 11%, while the Z-Score was relatively low compared to other countries. According to EDAS results, the Turkish BS ranked sixth in 2019 and fifth in all other years.

In South Korea, CIR is high compared to other countries, while CTA remains low. The NPL ratio is very low and has been steadily decreasing. However, NIM and profitability levels are among the lowest in the group. A rising trend in NINT has been observed. According to EDAS results, the South Korean BS rose to first place in 2015, ranked third in 2018 and 2019, and was second in all other years.

When all analyses are evaluated together, the countries with the highest and lowest BS financial performance vary across years. Therefore, when the BS performance of the countries is assessed based on the average performance over the period, the top-performing countries are South Korea, the Philippines, and Mexico, while the lowest-performing countries are Pakistan and Bangladesh. Türkiye ranked sixth only in 2019 and fifth in all other years.

Based on these results, in line with the expectations that led to the Next-11 concept, it is recommended that countries with lower performance take measures to enhance the performance of their BS in order to fully leverage their growth potential. Future studies could investigate the BS financial performance of the Next-11 countries in a comparative analysis with a different group of countries.

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