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An Alternative Model Proposal for Measuring the Performance of Research Universities in Türkiye

Türkiye'deki Araştırma Üniversitelerinin Performansının Ölçülmesine Yönelik Alternatif Bir Model Önerisi

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Abstract

In this study, 29 universities in Türkiye, designated as research universities and candidate research universities, were evaluated within the framework of 36 indicators defined under the dimensions of 'research capacity,' 'research quality,' and 'interaction and collaboration. The "Entropy Method" was used to determine the importance of the 36 indicators, and the "Gray Relational Analysis" technique was used to rank the universities according to their performance. In annual data calculations for 2015 to 2022, the weights of indicators as well as the scores and rankings of universities change very rapidly, which makes it difficult to accurately measure the performance of universities. In order to eliminate this problem, the indicators and university performances were analyzed not on an annual basis, but by taking averages over five-year time periods (2015 – 2019, 2016 – 2020, 2017 – 2021 and 2018 – 2022). The indicator set established in this study reflects the progress of 23 designated research universities and 6 candidate research universities in Türkiye for the period 2015–2022, providing a systematic basis for performance evaluation. It is hoped that the techniques used and the findings obtained in this study will contribute to the development of a new system for determining the performance rankings of research universities as well as the creation of new policies by higher education stakeholders. Developing such a system that allows for a more objective evaluation will make significant contributions to both policy determination and decision-making processes for research universities.

Keywords: Research University, Entropy Method, Gray Relational Analysis

Özet

Bu çalışmada Türkiye'de araştırma üniversitesi asil ve aday listelerinde yer alan 29 üniversite "araştırma kapasitesi", "araştırma kalitesi" ve "etkileşim ve işbirliği" boyutlarında belirlenen toplam 36 gösterge kapsamında değerlendirilmiştir. 36 kriterin önem düzeyinin belirlenmesinde "Entropi Yöntemi", üniversitelerin performanslarına göre sıralanmasında ise "Gri İlişkisel Analiz" tekniği kullanılmıştır. 2015 – 2022 yılları için yıllık veri hesaplamalarında göstergelerin ağırlıkları, üniversitelerin puanları ve sıralamaları çok hızlı değiştiğinden, üniversitelerin performansının doğru ölçülmesi zorlaşmaktadır. Bu sorunu ortadan kaldırmak amacıyla göstergeler ve üniversite performansları yıllık bazda değil, beş yıllık (2015 – 2019, 2016 – 2020, 2017 – 2021 ve 2018 – 2022) ortalamalar alınarak analiz edilmiştir. Çalışma kapsamında oluşturulan gösterge seti, Türkiye'deki 23 asıl ve 6 aday Araştırma Üniversitesinin 2015-2022 dönemindeki ilerlemesini göstermeye yardımcı olmakta ve üniversitelerin performanslarının değerlendirilmesine katkı sağlamaktadır. Bu çalışmada kullanılan analiz yöntemlerinin ve elde edilen bulguların, araştırma üniversitelerinin performans sıralamalarının belirlenmesine yönelik yeni bir sistemin geliştirilmesine ve yükseköğretim paydaşları tarafından yeni politikalar oluşturulmasına katkı sağlayacağı umulmaktadır. Daha objektif değerlendirmeye imkan veren böyle bir sistemin geliştirilmesi, araştırma üniversiteleri için hem politika belirleme hem de karar alma süreçlerine önemli katkılar sağlayacaktır.

Anahtar Kelimeler: Araştırma Üniversitesi, Entropi Yöntemi, Gri İlişkisel Analiz

Research universities are defined as elite institutions that represent a very small portion of the total universities in the countries in which they are located, are supported in terms of infrastructure, funds and human resources, and thus contribute to scientific and technological development by conducting pioneering research (Altbach, 2011). The history of research universities, which are at the center of the global knowledge economy and are the "flagships" of higher education, dates back to the University of Berlin reformed by Humboldt (Altbach, 2011; Fallon, 1980). The Humboldt Model focuses on basic and applied research for development and education, and training nourished by research. The USA was one of the countries that best adapted this model to its own country and conditions, and after 1950, American research universities became the dominant global model (Geiger, 2017) and the international "gold standard" (Altbach, 2011).

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The concept of the research university, which emerged in the USA, is considered important in higher education systems for many countries (Kearney & Lincoln, 2013). Countries attach importance to research universities in order to gain a superior position in global competition (Shin, 2009) and to achieve their national goals by accelerating their economic growth (Mammadov & Aypay, 2020). Countries that want to be included in the global knowledge economy consider having at least one research university (Deem et al., 2008), therefore research universities are expanding rapidly around the world, especially in developing countries (Altbach, 2007; Altbach, 2013; Liu et al., 2011; Salmi, 2009;).

Research universities are institutions that embrace social responsibility and transparency (Di Sarli, 2002), provide an environment of academic freedom with the goal of excellence in research (Altbach, 2003; Salmi, 2009), serve the public interest and produce the necessary policies (Zerquera, 2011). Having higher funds compared to other universities (Belenkuyu & Karadag, 2025), research universities produce research that can contribute to the growth of knowledge (Altbach, 2009), create and disseminate added value at the international level (Mammadov & Aypay, 2020). Another feature that distinguishes research universities from others is the high number of graduate students, international students and academics (Erdoğmuş, 2018).

The idea of research university in Türkiye emerged with the conference titled "Turkish Universities in the European Research Area" hosted by the Middle East Technical University with the support of the European Commission on 8-9 October 2015. With a declaration shared after the conference, the Turkish Research Universities Alliance (TAÜG) was established by 6 Turkish Universities participating in the conference (TAÜG, 2016). The six universities included in TAÜG are Bilkent University, Boğaziçi University, İstanbul Technical University, Koç University, Middle East Technical University and Sabancı University, which have carried out the highest number of projects in the EU framework programs. The main objectives of TAÜG are to provide suggestions for the development of the higher education, research and innovation sector in Türkiye; to develop effective collaborations with relevant organizations and raise public opinion in order to increase international success; and to ensure effective cooperation among members in the fields of education, research and innovation, to disseminate best practices by combining resources and to create opportunities for joint learning and development (TAÜG, 2016, p. 1).

In 2017, the Research and Candidate Research Universities program was launched by YÖK, and the performance of universities began to be monitored within the framework of the determined indicators. In his speech at the 2017 – 2018 Academic Year Opening Ceremony, YÖK President Yekta Saraç explained the stages of the process of determining research universities (Saraç, 2017). Accordingly, firstly, 58 state universities that declared their intent were scored according to the indicators and 25 universities with suitable qualifications were determined. Subsequently, the number was reduced to 19 by taking into account the self-evaluation reports of the 25 relevant universities. In the final stage, the jury formed with the participation of external stakeholders conducted interviews with the rectors and senior management of the relevant universities and the process was completed. At the end of the process, 10[1] designated and 5 candidate research universities selected for the YÖK Research Universities Program were announced by President Recep Tayyip Erdoğan at the 2017-2018 Academic Year Opening Ceremony (Table 1).

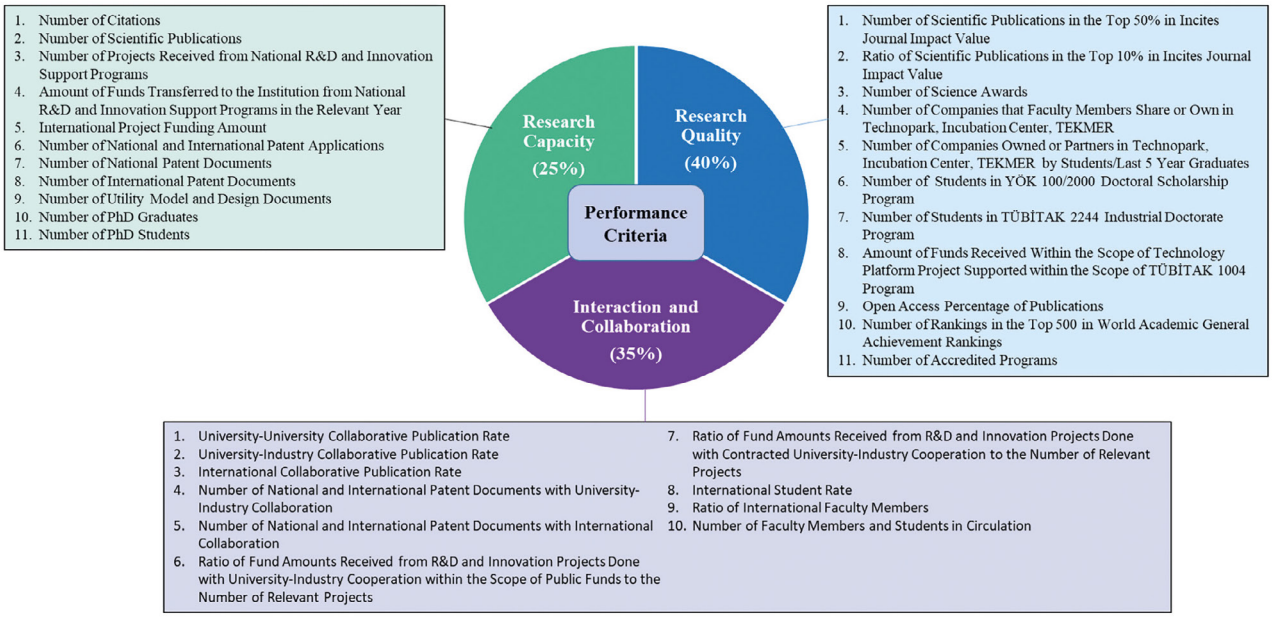
The performance monitoring process of designated research universities and candidate research universities was carried out in cooperation with TÜBİTAK in 2019, and the universities were evaluated within the scope of 32 indicators in the dimensions of "research capacity", "research quality" and "interaction and cooperation" (YÖK, 2020). The weight of each dimension and the indicators included in the dimensions are shown in Figure 1.

With the "Research Universities Meeting" held on December 13, 2021, it was announced that 20 state universities and 3 foundation universities will take part in the Research-Focused Mission Differentiation Program. The 23 universities identified are listed in Table 2. Accordingly, 5 state universities (Marmara, Dokuz Eylül, Atatürk, Fırat and Karadeniz Technical Universities) and 3 foundation universities (İhsan Doğramacı Bilkent, Koç and Sabancı Universities), which had not previously been candidate research universities, were designated as research universities.

At the meeting dated December 13, 2021, it was announced that the distinction between designated research universities and candidate research universities was abolished, research universities will be divided into three performance groups, namely "A1, A2, and A3" according to their performance, and their performances will be regularly monitored by the "Monitoring and Evaluation Commission" established within YÖK (YÖK, 2021). Performance monitoring indicators have been updated as stated in Figure 2. Accordingly, although the indicators in the research capacity dimension have changed, the total number of indicators is still 11, and the total weight of this dimension has been increased from 25% to 40%. The indicators in the Research Quality dimension were revised and the number was reduced from 11 to 10, and the weight of this dimension remained unchanged at 40%. The number of indicators in the Interaction and Collaboration dimension increased from 10 to 11, but the total weight of this dimension, which was 35%, was reduced to 20%.

1 İstanbul University-Cerrahpaşa was included among the designated research universities in 2018

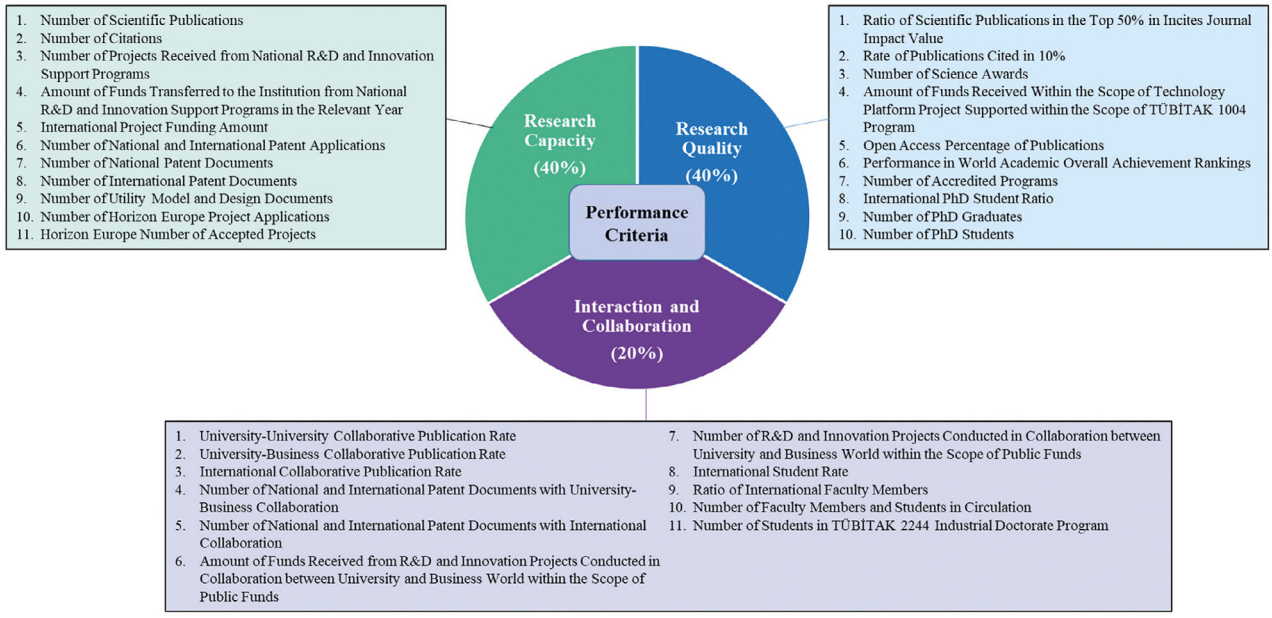
Figure 1
YÖK's Research Universities Performance Monitoring Indicators (2019)



At the meeting held on June 6, 2022, it was stated that the "Research Universities Support Program" will be implemented and additional resources will be allocated to research universities, effective from 2022, and that the resource of 100 Million TL determined for the 2022 fiscal year will vary according to the performance group of the universities (YÖK, 2022). Finally, with the written statement made by YÖK on December 14, 2023, it was stated that Akdeniz, Gaziantep, Kocaeli, Ondokuz Mayıs, Sakarya and Selçuk Universities were included in the "Research Universities Candidate Monitoring Program" (YÖK, 2023). Accordingly, while the total number of 23 remains unchanged, those universities included in the program that meet the indicators will be accepted as Research Universities.

Following the implementation of the research university initiative, academic studies discussed the success of the project. Mammadov and Aypay (2020), aiming to determine the factors affecting the productivity of research universities

Figure 2
YÖK's Research Universities Performance Monitoring Indicators (2021)



based on 2017 input and output data, found that the number of scientific research projects in the main field of study negatively affected the productivity scores of research universities, while the citation rate per publication and the ratio of doctoral graduates per doctoral program positively affected the productivity scores. Belenkuyu and Karadag (2025), aiming to determine the value of the research university project as an educational policy implementation, conducted a quasi-experimental study using six years of panel data between 2015 and 2020. The results of the study show that research universities maintain their quantitative superiority over non-research universities in all indicators of academic performance. However, Belenkuyu and Karadag (2025, p. 59) found that the "trend of supporting a few for the sake of many has produced an opposite result for the Turkish higher education system", and that the project was not successful in distinguishing research universities from non-research universities. The initiative has created a spillover effect on non-research universities, paving the way for a culture of competition for non-research universities, which has led to a decrease in the gap between research universities and non-research universities in terms of citations, patents, and projects (Belenkuyu & Karadag, 2025).

This study aims to evaluate the performance of research universities in Türkiye between 2015 and 2022 with 36 indicators in the dimensions of "research capacity", "research quality" and "interaction and collaboration". In this study, the progress of the Research University initiative was evaluated with a novel approach. It is expected that the findings of this study will contribute to a more objective evaluation of the performance of research universities. It is also hoped that this novel evaluation system will increase the quality of research universities as well as contribute to the development of decision-making and policy implementation processes.

Method

Strategy development and planning processes in any field vary depending on institutions and policies. This variability can be especially challenging for future planning processes. Multi-Indicators Decision Making Methods are used in order to overcome these difficulties and to choose the most appropriate one among the indicators or alternatives in the decision-making processes (Bogetoft & Pruzan, 1997; Fergan, 1974; Ishizaka & Nemery, 2013; Zionts, 1979). Different techniques can be used depending on the nature of the multi-indicators decision problem. While techniques such as Analytical Hierarchy Process (AHP), Analytic Network Process (AAS), Promethee, TOPSIS and VIKOR are used in selection problems that involve making the best choice among many alternatives; AHP Sort, UTADIS, Promethee, VIKOR and Gray Relational Analysis techniques are used in ranking problems where alternatives are measured and defined from best to worst (Ishizaka & Nemery, 2013). In classification problems that involve classifying alternatives according to specified indicators or preferences, AHP, AAS, TOPSIS and Gray Relational Analysis techniques are used. Subjective and objective weighting methods are used to determine indicator weights. While the decision maker is in the decisive position in subjective weighting methods, the role of the decision maker is eliminated in objective weighting methods and the importance of the indicators is determined with the help of mathematical algorithms and models (Wang et al., 2009; Zardari et al., 2015).

The "Entropy Method" was used to determine the importance of the 36 indicators determined within the scope of the study, and the "Gray Relational Analysis" technique was used to rank the universities according to their performance in the context of the indicators. The concept of entropy, defined as the measurement of uncertainty in information in terms of probability theory (Shannon & Weaver, 1947), has become a weight calculation method developed by Wang and Lee (2009). According to the entropy approach, in which indicator weights are determined by taking into account the data in the decision problem (Çakır & Perçin, 2013), the quantity and quality of information make it possible to make accurate and reliable decisions. In the entropy method, which provides measurement tools for the amount of useful information provided in the decision problem, uncertainty and entropy decrease as the amount of information increases. In the Entropy method, which is based on the contrast between the data in the decision matrix, the weights of the indicators increase depending on the intensity of the contrast of the alternatives against each indicator, otherwise they decrease (Hwang & Yoon, 2012; Konuskan & Uygun, 2014).

The entropy method consists of the following steps:

1. Creation of the decision matrix: The rows of the matrix contain alternatives, and the columns contain evaluation indicators.
2. Standardization of indicators: Since the numerical values of the indicators are different from each other, standardization is applied according to the benefit and cost elements.
3. Determination of entropy values: Entropy values of all indices are calculated.
4. Calculation of entropy weights: Using the entropy values calculated in Step 3, the entropy weights of all indexes are determined. The indicator with a higher entropy weight value, which expresses the importance of useful information, is more important in decision-making.

Gray system theory, on the other hand, is widely used in various fields of science due to its advantages in evaluating complex systems with various related indicators (Deng, 1989; Gang et al., 2011; Zeng et al., 2017). Gray Relational Analysis (GRA), developed by Deng in the 1980s based on Gray System Theory, is a ranking and decision-making method used to analyze complex and uncertain relationships between

multiple variables by quantifying them (Deng, 1982; Deng, 1989; Köse et al., 2013; Lin et al., 2004; Liu & Lin, 2006; Tang & Young, 2013). In this method, the uncertain system, which contains some known and some unknown information, is examined by mining "partial" known information and valuable information is revealed to realize accurate identification and effective monitoring of system behavior (Deng, 2002). This method is used to solve problems where the sample size is small and the full information cannot be reached, the similarities or differences between the analyzed variables represent the uncertainty of the relationship, and this situation is called "gray relationship" (Liu et al., 2011; Lin et al., 2004). With GRA method, the degree of relationship between each factor series in a "gray system" and the reference series is determined (Üstünışık, 2007).

GRA determines the degree of correlation based on the similarity between sequence curves (Deng, 1982; Deng, 1989). Accordingly, the greater the similarity between two sequences, the higher the degree of correlation. Therefore, at each index layer, an ideal or optimal index sequence is determined as a reference, and the similarity of the indexes between the evaluated alternatives and the reference sequence is taken into account. The greater the similarity between two sets of indexes, the better the overall performance of the investigated alternatives. Hence, when evaluating a system using the GRA method, an ideal alternative with optimal indices should first be introduced as a reference sequence, then the gray relational coefficients between the reference sequence and each alternative should be calculated to create the gray relational coefficient matrix.

The GRA method consists of the following steps:

1. Creation of the Decision Matrix: A decision matrix is created in which the series of alternatives and the values of the alternatives for each indicator are shown in the created data set.
2. Creating the Reference Series and comparison matrix: The reference series to be created to compare the factors in the decision problem can be determined in two ways; Using an existing reference series or using the most ideal value of the indicators. The ideal value refers to the highest value for benefit-oriented indicators and the lowest value for cost-oriented indicators. In this study, the reference series was created using the most ideal value of the indicators.
3. Creation of the normalization matrix: Data sets consisting of different scales and units are converted to the same unit, ensuring that all values fall within the [0,1] range and are comparable. In the normalization process, the highest value is taken into account for benefit-oriented indicators and the lowest value is taken into account for cost-oriented indicators.
4. Creating the Absolute Value Table: The absolute value difference between the reference value and the value of the alternatives for each indicator is calculated.
5. Calculation of the Gray Relational Coefficient: The performance value of the alternatives being equal to or close to 1 indicates the best choice.
6. Calculation of Gray Relational Degree: The measure of geometric similarity between the factor series and the reference series is determined. A high degree of gray relationship indicates that there is a strong relationship between the factor series and the reference series and that it represents the best alternative for the decision problem under consideration.

Measuring the Performance of Universities

The most visible outcome in measuring the performance of research universities is the number of scientific publications and citations that show the impact of these publications. Other important indicators can be listed as projects carried out with international collaborations or funding support, graduate student rates, number of accredited programs and the number of patents, utility models and design documents. When the data regarding these indicators are included in the indicators set as a total number, a picture emerges that favors big universities and makes it difficult to determine the real impact. In order to solve this problem objectively and to measure the impact of universities regardless of their size, the ratios of the indicators determined in this study were taken into account instead of their total number. In this study, 29 universities on the designated research university and candidate research university lists were evaluated within the scope of a total of 36 indicators determined in the dimensions of "research capacity", "research quality" and "interaction and cooperation". 13 indicators were determined in the "Research Capacity" dimension, 12 in the "Research Quality" dimension, and 11 in the "Interaction and Collaboration" dimension (Table 3).

Indicators Determined in Capacity Dimension

The 32 indicators updated by YÖK in 2021 to measure the performance of Research Universities are shown in Figure 2. The indicators determined under the research capacity dimension are in favor of big universities and are far from measuring in which field and how the capacity emerges (Adaman et al., 2021). In order to eliminate this problem, in this study, "Ratio of the Total Number of Publications (Documents) to the Number of Faculty Members" was used instead of "Number of Scientific Publications", which is among the evaluation indicators of YÖK in the capacity dimension, and "Field Weighted Citation Index" and "Field Weighted Citation Index" were used instead of "Number of Citations". "Citation Score" indicators were used. Similarly, instead of the "Number of Projects Received from National R&D and Innovation Support Programs", "Amount of Funds Transferred to the Institution from National R&D and Innovation Support Programs in the Relevant Year" and "International Project Fund Amount" indicators, which are among the evaluation indicators of YÖK, " The "Number of Externally Supported Projects Completed per Faculty Member" indicator was

used. "Number of Horizon Europe Project Applications" and "Number of Horizon Europe Projects Accepted", which were added to YÖK's evaluation indicators in 2021, were not included in the indicators set as they may have high variability on an annual basis and be misleading.

Instead of the "Number of National and International Patent Applications", "Number of National Patent Documents", "Number of International Patent Documents" and "Number of Utility Model and Design Documents" indicators, which are among the evaluation indicators of YÖK, "Number of finalized patents, utility models or designs" indicator has been added. For research universities, the positive results of the applications are more meaningful than the number of applications. Including the number of applications in the indicators set may mislead research universities into thinking that applying is sufficient, and the goal of positive results is overshadowed.

"Number of Faculty Members" and "Number of Faculty Members" indicators have been added, which will positively affect the research capacity of universities. "Number of doctoral graduates" and "number of doctoral students", which were included in the "Research Capacity" dimension in the first list of indicators created by YÖK in 2019 (Figure 1), were also removed from the indicators set because their annual variation could be high and misleading. Instead of these indicators, "Number of master's thesis students per faculty member" and "Number of doctoral students per faculty member" indicators, which show proportional values, have been added. On the other hand, "Total Number of Students", "Two-semester average of the number of weekly course hours of permanent lecturers" and "Total Number of Students / Number of Faculty Staff Ratio", which will negatively affect the research capacity of universities, have been added to the indicators set. Finally, it was evaluated that the "Number of active faculty member technology companies/total number of faculty members" indicator, which was included in the research quality dimension in the first set of indicators created by YÖK in 2019, would affect research capacity rather than research quality, and this indicator was included in the research capacity dimension.

Indicators Determined in the Quality Dimension

"Publication rate in the top 50 and top 10" in the set of indicators determined by YÖK has been revised and preserved, "Ratio of the Number of Publications Cited in the Top 10% to the Total Number of Publications" and "Ratio of the Number of Publications in the Journals in the Top 10% to the Total Number of Publications" rate" is included in the set of indicators. In addition, "Annual number of publications in SCI, SSCI and A&HCI indexed journals per faculty member" and "Q1 Publication Rate", which are considered to be decisive in measuring research quality and contain proportional data rather than numerical data, have been included in the indicators set.

The "Number of accredited programs" in the set of indicators determined by YÖK was preserved, and the "Number of undergraduate programs stated to be accredited in the YKS Higher Education Programs and Quotas Guide" indicator was included in the evaluation. Considering that what is important for this indicator is to increase the number of accredited programs rather than the rate, a proportional evaluation was not needed. The indicators "Number of peer-evaluated programs (Among Non-Accredited Programs)/Total Number of Programs" and "Number of programs self-evaluated/Total Number of Programs", which are related to this indicator, have been added. With both indicators, the ratio of accredited and self-evaluated programs within the total programs of the universities was taken into account.

"Open access percentage of publications", which is included in the set of indicators determined by YÖK, has been removed from the list because it is an indicator that does not give an idea about the quality of research and can be easily manipulated. Likewise, the indicator related to "performance in world academic general success rankings such as THE, QS, ARWU in the relevant year", which YÖK included in the indicators set, has been removed from the list. Academic achievement rankings, which are controversial in terms of method and content, include evaluations using similar sets of indicators and should not be used as input for a new performance evaluation. In addition, the "number of science awards", which is among the indicators of YÖK, takes into account individual achievements rather than measuring the general performance of universities; It was removed from the list on the grounds that the determination of a small number of award winners resulted in favor of large universities and that it could be misleading in measuring annual performance.

The "Number of international doctoral students" indicator, which is thought to be related to the interaction and collaboration dimension rather than research quality, has been revised and added to the interaction and collaboration dimension as "Number of doctoral students/Total number of students" as a ratio, not a number. Finally, "Number of Master's Programs/Total Number of Programs" and "Number of PhD Programs/Total Number of Programs", which are thought to positively affect the research quality of universities, and "Number of Associate Degree Programs/ Total Number of Programs" and "Number of Undergraduate Programs/Total Programs", which negatively affect the research quality indicators have been added to the list.

Indicators Determined in the Interaction and Cooperation Dimension

"The Ratio of the Number of Publications Made with International Collaboration to the Total Number of Publications" and "The Ratio of the Number of Publications Made with University-Industry Cooperation to the Total Number of Publications", which are outputs showing

interaction and cooperation, have been added to the set of indicators. In addition, the indicators "Number of interdisciplinary master's programs with thesis", "Number of interdisciplinary non-thesis master's programs" and "Number of interdisciplinary doctoral programs", which have the potential to increase interdisciplinary interaction, have been added.

An important feature of successful research universities in the world is the high number of international faculty members and students in these universities (Erdoğmuş, 2018). Accordingly, the number of international faculty members and students, as well as the rates of faculty members and students coming and going through exchange programs, were added to the set of indicators used in this study. The main reason for including the indicators proportionally is to be able to measure the real impact, regardless of the size of the universities. A set of indicators such as "Number of Faculty Members Coming through Faculty Exchange Programs", "Number of Faculty Members Going through Faculty Staff Exchange Programs/Total Number of Faculty Members" and "Number of Foreign Faculty Members/Total Number of Faculty Members", which are the triggers of interaction and cooperation, are included. "Number of Students Coming through Student Exchange Programs", "Number of Students Going through Student Exchange Programs/Total Number of Students" and "Number of Foreign Students/Total Number of Students", which can measure interaction and cooperation in the context of students, are also included in the set of indicators. Finally, indicators such as the number of international and national patents, the number of projects and the project fund amounts in the list of YÖK have been excluded from the interaction and cooperation dimension since they are included in the research capacity.

As a result, in this study, the indicators determined for the quality, capacity and cooperation dimensions in order to determine the performance of 23 designated research universities and 6 candidate research universities are presented in Table 3. Data for the indicators were obtained from the Higher Education Quality Board reports and the Higher Education Information Management System. The importance of the indicators in the data set created for the years 2015-2022 was determined by the entropy method, and the performance of 29 universities was ranked using the Gray Relational Analysis technique. EXCEL 2016 program was used to implement these methods.

Application of the Entropy Method

The relative importance of the 36 indicators was assessed through the application of the Entropy Method. The following steps were followed in applying the entropy method within the scope of this study (Akbulut, 2020; Akpınar & Pehlivan, 2023; Karami & Johansson, 2014; Özdağoğlu, 2018; Saraç, 2016; Saraç & Alptekin, 2017; Shuai & Wu, 2011; You et al., 2017):

- First, the decision matrix was created. The rows of the decision matrix contain alternatives (universities), and the columns contain indicators (indicators) used to evaluate the alternatives. In creating the decision matrix, the values of the alternatives (universities) are expected to be large according to 31 indicators and small according to 5 indicators. This is indicated by assigning benefits and costs to the indicators in the relevant column. The decision matrix was created as follows:

$$D = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix}_{mxn}$$

- In the second step, standardization process was applied according to the characteristics of the indicators (Benefit or Cost). To standardize by benefit element:

$$r_{ij} = \frac{x_{ij} - \min_j(x_{ij})}{\max_j(x_{ij}) - \min_j(x_{ij})}, i = 1,2,\ldots.m \quad , j = 1,2,\ldots,n$$

To standardize by cost element:

$$r_{ij} = \frac{\max_j(x_{ij}) - x_{ij}}{\max_j(x_{ij}) - \min_j(x_{ij})}, i = 1,2,\ldots.m \quad , j = 1,2,\ldots,n$$

equations were used. The two digits after the comma were taken into account in the calculations.

The standardized decision matrix can be represented as follows:

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix}_{mxn}$$

- In the third step of the Entropy method, the Entropy values of the specified indexes are calculated as follows:

$$f_{ij} = \frac{rij}{\sum_{i=1}^{m} r_{ij}}, i = 1,2,\ldots.m \qquad , j = 1,2,\ldots,n$$

$$e_j = \frac{\sum_{i=1}^{m} f_{ij}\ ln\ (f_{ij})}{ln\ (m)}, i = 1,2,\ldots m \qquad , j = 1,2,\ldots,n$$

When obtaining $\ln(f_{ij})$ values, when $f_{ij} = 0$, $\ln(0)$ has an undefined value. To eliminate this problem in the Excel table, all cells with $\ln(0)$ value are assigned the value "0".

- In the fourth step of the Entropy method, the Entropy weights of the indexes were calculated as follows:

$$wi = \frac{1 - e_j}{n - \sum_{i=1}^{m} e_j}, \quad \sum_{i=1}^{n} w_j = 1, \qquad j = 1,2,\dots,n$$

Application of Gray Relational Analysis Technique

"Gray Relational Analysis" technique was used to rank universities according to their performance within the context of 36 indicators created within the scope of the study. After calculating the weights of the indicators with the entropy method, 29 universities were ranked according to their Gray Relational Analysis values for the years 2015 – 2022 by following the steps below (Arslan Gürdal & Durmuş, 2024; Karaatlı et al., 2015; Lee & Lin, 2011; Saraç, 2016; Saraç & Alptekin, 2017; Wu, 2002; Wu & Chen, 1999):

- First, the data set was prepared and a decision matrix of size 29*x*36 with 29 alternatives and 36 indicators was created. The values of the alternatives (universities) are expected to be large for 31 indicators and small for 5 indicators. This situation is shown in the table by assigning minimum and maximum to the relevant indicators.
- In the second step, a reference series was created by using the best values of each indicator among the available alternatives (universities).
- In the third step, after the reference series was created and added to the data set, the normalization process was applied and the normalization matrix was created.

The normalization process for indicators with maximum assignment (benefit status), where large series values contribute positively to the purpose, is carried out as follows:

$$x_i^* = \frac{x_i\,(j) - \min\limits_j x_i\,(j)}{\max\limits_j x_i\,(j) - \min\limits_j x_i\,(j)}$$

The normalization process for the indicators (cost status) with minimum assignment, where the small series values contribute positively to the purpose, is carried out as follows:

$$x_i^* = \frac{\max\limits_j x_i\,(j) - x_i\,(j)}{\max\limits_j x_i\,(j) - \min\limits_j x_i\,(j)}$$

The two digits after the comma were taken into account in the calculations.

- In the fourth step of the TIA technique, the absolute differences of the normalized reference series values and the normalized alternative values were calculated as follows:

$$\Delta_{0i}(j) = |x_0^*(j) - x_1^*(j)|, \quad i = 1,2,\dots,m \text{ and } j = 1,2,\dots,n$$

- In the fifth step, using the values in the table of absolute difference values, the largest value in this table was determined as 1 (Δmax) and the smallest value as 0 (Δmin). Additionally, the discriminant coefficient was taken as ζ=0.5 as suggested in the literature (Baş, 2010).
- In the sixth step, with the help of gray relational coefficients and Entropy weights, the gray relational rank values of the universities (taking into account that the indicators have different degrees of importance (weights)) were calculated as follows, and the ranking of the universities was found by taking the calculated gray relational ranks into account.

$$\Gamma_{0_i} = \sum_{j=1}^{n} w_i\,(j)\,\gamma_{0i}\,(j) \;\;, \;\; i = 1,2,\dots,m$$

The application steps of the Entropy method and the Gray Relational Analysis Technique were followed for 36 variables and 29 research universities in the created indicator set. With data from 2015-2022, the importance levels of each variable in the indicator set created for 29 universities were calculated with the Entropy Method. As a result of the analysis, the indicator weights, averages of the indicator weights and their weight rankings for the years 2015-2022 are shown in Table 4.

The basic principle in determining policy in the academic field is to consider indicators not for a single year, but as multi-year averages (preferably 5 years) in order to reduce the variance of the measurement and detect the general trend more clearly in the long term (Adaman et al., 2021). The indicator weights listed in Table 4 vary from year to year, making it difficult to determine the importance of the indicators. In order to eliminate this problem, the indicators were analyzed not on an annual basis, but by taking averages over five-year time periods (2015-2019, 2016-2020, 2017-2021 and 2018-2022). As a result of the analysis, the indicator weights found with five-year averages for the years 2015-2022 are shown in Table 5.

From the values in Table 5, it is understood that the most effective indicators that play a role in determining the performance ranking of research universities are RQ 2, RQ 3, RC 4, IC 2, IC 7, RQ 1, IC 6, IC 9, IC 3, and IC 4, according to the 2018 – 2022 averages. When evaluated in the context of the Capacity, Quality and Interaction and Cooperation dimensions, it is seen that six of the ten indicators with the highest indicator weight are in the interaction and cooperation dimension, three are in the research quality dimension and one is in the research capacity dimension. Accordingly, in the dimension of interaction and cooperation, the number of faculty members coming and going through exchange programs, the rate of foreign faculty members and the rates of students going through student exchange programs are decisive. According

to the analysis results, it is seen that interdisciplinary programs also have an increasing effect on interaction and cooperation. The high number of accredited programs with peer evaluation and self-evaluation in the research quality dimension puts universities at the top. The weight and ranking of the "number of resulting patents, utility models or designs" indicator, which has the highest weight in the research capacity dimension, has constantly increased.

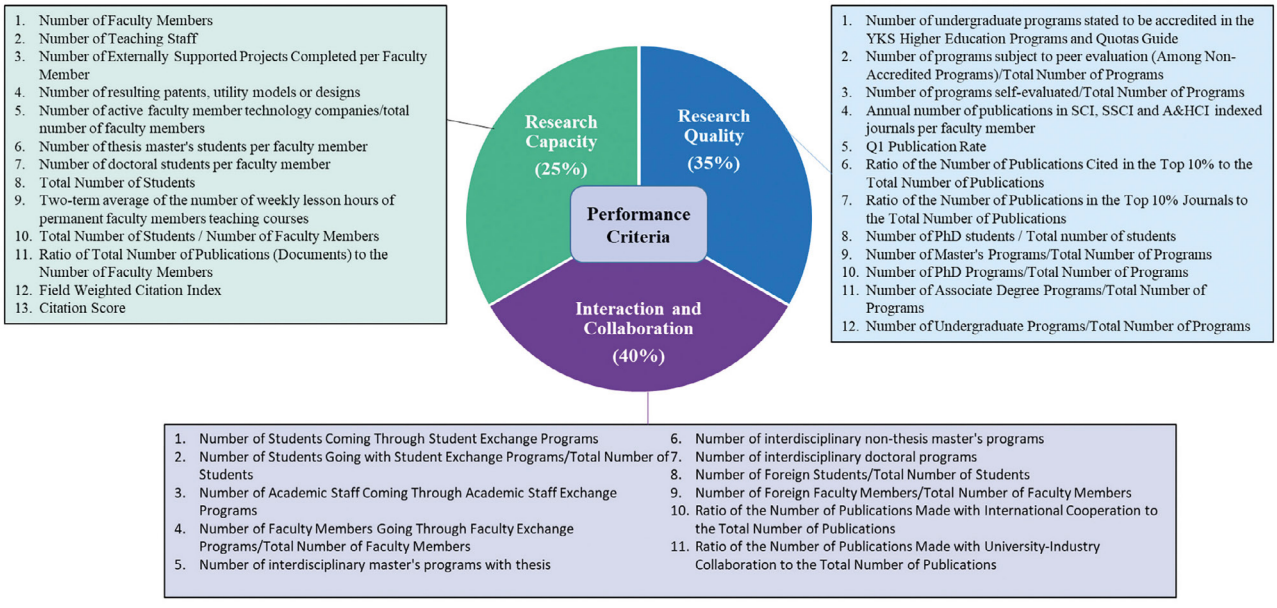
On the other hand, indicators such as RQ 11, RC 10, RQ 10, RC 2, RC 1, RC 8, RQ 12, RC 9, RQ 6 and RQ 9 were the indicators that had the least impact in determining the performance rankings of research universities according to the 2018-2022 averages. Among the ten indicators with the lowest weights, five are related to the quality and capacity dimensions, whereas none of the indicators from the interaction and cooperation dimension appear in the bottom ten. The number of associate's, bachelor's, master's and doctoral programs of universities are the indicators that least affect the quality of research. In addition, the indicator "Ratio of the Number of Publications Cited in the Top 10% of the Total Number of Publications" was not among the most important indicators, contrary to expectations. On the other hand, according to the analysis results, it can be concluded that the size of universities does not have a significant impact on research capacity. The total number of faculty members and staff of the universities, the total number of students and the student/faculty number ratio were among the indicators with the least weight. The course load of faculty members teaching at research universities does not significantly affect their research capacity. Supporting this result, while large universities decreased in the performance rankings, relatively small universities increased, which will be detailed in the following section.

There were no significant changes in the total indicator weights of the Capacity, Quality and Interaction and Collaboration dimensions. Accordingly, the Interaction and Collaboration dimension is the most important dimension with an average of 40%, the quality dimension is the second with 35%, and the capacity dimension is the last with 25% (Figure 3). The increasing weight of the Interaction and Cooperation dimension can be interpreted as this dimension should be the first priority of universities.

The weight of the indicators within each dimension can be evaluated as follows:

- The three most important indicators in the capacity dimension have not changed over the years. The indicators of "Number of Patents, Utility Models or Designs Concluded", "Number of Externally Supported Projects Completed per Faculty Member" and "Number of active faculty technology companies/ total number of faculty members" stand out as the indicators that universities should prioritize to improve their research capacity. However, the impact of the number of faculty members, instructors and students on developing research capacity is at the lowest level. In other words, research universities should focus on quality rather than quantity to improve their capacity.
- The three indicators with the highest and lowest importance in the quality dimension have not changed over the years. Accordingly, while peer evaluation, self-evaluation and the number of accredited programs are the most important indicators affecting the quality of research universities; The ratio of doctoral, undergraduate and associate degree programs within the total programs (RQ 9, RQ 10 and RQ 12) are the least important indicators. This result shows that research universities should focus on quality rather than quantitative increase.

Figure 3
Research Universities Performance Monitoring Indicators of This Study



- In the interaction and cooperation dimension, the indicator "Number of Interdisciplinary Doctoral Programs," which initially ranked first in weight, dropped to second, whereas the indicator "Number of Students Going with Student Exchange Programs/ Total Number of Students" moved to first place.. Although the indicators 'ratio of publications produced through international collaboration to total publications' and 'ratio of publications produced in university–industry collaboration to total publications' have the lowest weights, they still rank higher than 15 other indicators in the overall list. This result confirms the increasing importance of the interaction and cooperation dimension.

In the next stage, the Gray Relational Analysis method was applied with the help of the weights of the variables shown in Table 4 and the rankings of 29 universities were calculated (Table 6). Considering the annual data, it is seen that the performance of universities has changed greatly. For example, while Boğaziçi University was ranked 3rd in the general rankings with 48.52 points, according to 2016 data, it fell to 16th place with 43.55 points in 2022. Similarly, while Erciyes University ranked 3rd with 48.46 points according to 2015 data, it fell to 23rd place with 38.00 points in 2018, and ranked 15th with 44.13 points according to 2022 data. Similar rapid ups and downs occur for many universities on the list, and this situation shows that measuring the performance of universities on an annual basis is not an effective method.

In calculations made based on annual data, the scores and rankings of universities change very rapidly, which makes it difficult to accurately measure the performance of universities, understand the long-term impact and increase the performance of universities by developing effective policies. Since it is not an accurate method to measure the performance of universities in the short term (Adaman et al., 2021), five-year averages were taken into account in the calculations and university performances are shown in Tables 7-10.

Considering the indicators included in the capacity dimension, the capacity scores of all universities except İstanbul University-Cerrahpaşa increased for the years 2018-2022 compared to the 2015-2019 averages (Table 7). However, the ranking has changed significantly as the increase rate is higher for some universities. For example, Yıldız Teknik rose from 16th to 3rd place, İstanbul Technical University from 7th to 4th place, Erciyes University from 22nd to 15th place, and Ege University from 25th to 17th place. Some universities have fallen in the capacity rankings; İstanbul University-Cerrahpaşa dropped from 3rd place to 10th place, Gazi University dropped from 10th place to 16th place, and Atatürk University dropped from 15th place to 20th place. Among the candidate research universities, Ondokuz Mayıs University decreased from 19th to 22nd place, and Sakarya University decreased from 20th place to 27th place. Among the two universities with the highest scores in the capacity dimension, Sabancı University maintained its 1st place and METU maintained its 2nd place.

Only 10 universities increased their scores in the quality dimension compared to the 2015-2019 average (Table 8). The increase in the average score of these universities has also positively affected their rankings; for example, in the capacity dimension, Koç University increased from 7th to 2nd place, Gebze Technical University from 9th to 3rd place, Gazi University from 13th to 6th place. Similarly, Hacettepe University increased from 11th to 8th, Fırat University increased from 23rd to 11th, and Gaziantep University increased from 21st to 17th. Although Selçuk University's score in the quality dimension has decreased over the years, it has ranked first in all periods. Sabancı University's score decreased and it fell from 3rd to 4th place in the rankings. Akdeniz University and Ondokuz Mayıs University, which are candidate research universities, ranked in the last two places in the quality dimension in all years.

According to 2018-2022 data, the scores of 6 universities decreased in the Interaction and Cooperation dimension, and this decrease also affected the ranking of universities (Table 9). Accordingly, Kocaeli University ranked from 22nd to 29th, Erciyes University from 3rd to 25th, İzmir Institute of Technology from 17th to 23rd, Boğaziçi University from 6th to 9th, Bilkent University from 4th to 5th and Sabancı University fell from 1st to 2nd place. On the other hand, while METU rose from 2nd to 1st place, Ankara University rose from 5th to 3rd place, Hacettepe University rose from 9th to 4th place, and Ege University rose from 14th to 6th place. The universities that ranked at the bottom in the Interaction and Cooperation dimension were Atatürk University (26th place), Karadeniz Technical University (27th place), İstanbul University-Cerrahpaşa (28th place) and Kocaeli University (29th place).

According to the total performance scores and rankings of the universities in all dimensions (Table 10), among the two universities that exceeded 50 points, Sabancı University consolidated its place in the 1st place and METU in the 2nd place. Hacettepe University, which showed the biggest increase, rose from 12th to 4th place, Koç University from 8th to 5th place, İstanbul Technical University from 9th to 6th place, Ege University from 19th to 13th place, Yıldız Technical University from 18th to 14th place and Fırat University rose from 25th to 18th place.

Universities that were ranked higher in YÖK's current performance evaluation fell behind in the rankings because the rates were taken into account in this study. According to the 2018-2022 average, for example, Erciyes University experienced the biggest decrease, falling from 10th to 20th

place. İzmir Institute of Technology and İstanbul University-Cerrahpaşa also dropped 5 places each, falling to the 12th and 22nd places, respectively. Although Selçuk University, which is a candidate research university, dropped 4 places, it is in the 7th position in the overall score ranking. İhsan Doğramacı Bilkent University and Boğaziçi University dropped 3 places each, from 5th and 6th to 8th and 9th, respectively.

Karadeniz Technical University, Atatürk University, Bursa Uludağ University and Çukurova University, which currently have research university status, are outside the top 23 universities in the general ranking. Of these 4 universities, only Bursa Uludağ University was included in the list as 23rd in the 2015-2019 rankings, while the other 3 universities were not among the top 23 universities in any time period. On the other hand, among the universities that are candidate research universities, Selçuk University ranks 7th, Sakarya University ranks 17th, Gaziantep University ranks 19th, and Ondokuz Mayıs University ranks 23rd. These 4 candidate universities have always been among the top 23 universities in all time periods. The other two candidates, Akdeniz University and Kocaeli University, shared the last two places. These results call into question the transparency of the research university candidate selection process and the effectiveness of the set of indicators.

Discussion and Conclusion

Table 11 presents the performance ranking of universities based on the average scores from 2018 to 2022 . According to this ranking, universities are grouped into foru categories: those scoring 50 or above are classified as A1, those scoring between 49.99 and 45.00 as A2, those between 44.99 and 40.00 as A3, and those scoring below 40 are considered to have lost their research university status. In the A1 category, two universities -Sabancı University and Middle East Technical University- achieved scores of 50 or higher. The A2 category includes eight universities, while twelve universities fall under the A3 category. The seven universities with scores below 40 were evaluated as institutions that have lost their research university status.
These results were evaluated as follows: In YÖK's 2022 performance evaluation, the highest university score was 82 and the lowest was 27 (Table 12). The significant disparity between these scores raises concerns about the inclusion of all these universities in the same category, despite such differences. In contrast, the analysis conducted in this study shows a narrower gap between the highest and lowest scores. However, only 2 of the 29 universities managed to achieve a score of 50 or above. This finding indicates that the majority of current research universities in Türkiye are not yet competitive on a global scale.

One of the main reasons for the low performance of research universities in Türkiye is the high number of institutions granted research university status. In global practice, only 2% to 3% of a country's higher education institutions are classified as research universities (Erdoğmuş, 2018). In contrast, Türkiye has designated 23 out of 208 universities –approximately 11%- as research universities. This disproportionate ratio suggests a misalignment with international norms. Furthermore, in Türkiye, the selection of research universities has also been influenced by efforts to ensure interregional balance and to include institutions from relatively less developed regions. The findings of this study support this observation. For instance, Karadeniz Technical University, Atatürk University, Bursa Uludağ University and Çukurova University currently hold research university status but fall outside the top 23 universities in the overall rankings. Similarly, Akdeniz University and Kocaeli University, which hold candidate research university status, occupy the bottom two positions in the ranking.

This situation, which makes the selection process for research university candidates controversial and inefficient, does not contribute to enhancing the research performance of universities and hinders the effective use of existing resources. The ideal number of research universities in Türkiye should be limited to 10–12. Retaining the 10 universities that scored 45 points or more in this study as research universities will improve efficiency. In addition, YÖK's 2022 evaluation—where 10 universities received 50 points or more—should also be taken into account. Establishing a new league of research universities, composed of institutions with the competence and capacity to compete with and enrich one another, would contribute to scientific progress in a far more meaningful and sustainable way.

Most influential academic journals publish in English, and as a result, many universities encourage – or even require- academics to publish in English-language journals. Although there is ongoing debate about the implications of this emphasis on English for academic advancement, it is widely acknowledged that English is the global language of science, and it is likely to remain dominant in the foreseeable future (Altbach, 2011). The increasing selectivity of top-tier journals presents an additional challenge for scholars whose native language is not English, making publication in these venues more difficult. Nonetheless, the influence of English on education, research and science must be recognized as a defining characteristic of research universities (Altbach, 2011). This is further evidenced by the fact that the most successful research universities in Türkiye are those that excel in English-language education.

Another important factor influencing university performance is the ratio of international faculty and students. İn leading research universities worldwide, international faculty and student ratios often exceed 20%. In contrast, the relatively low presence of international academics and students in Türkiye's research universities limits opportunities for interaction and cooperation. This deficiency is especially pronounced in universities that rank

lower on the performance scale. The lack of international engagement not only restricts academic exchange but also has both direct and indirect negative effects on other dimensions of university performance. The findings of this study indicate that universities where education is primarily conducted in a foreign language tend to perform better -not by coincidence, but as a natural consequence of the increased interaction and cooperation fostered by their international orientation.

An important issue is that obtaining research university status in Türkiye does not necessitate any significant transformation in the structure, functioning, operational practices, goals, or core functions of universities (Ekinci et al., 2018). In other words, instiiutions designated as research universities can retain their status without making meaningful changes to their academic culture, governance structure, research orientation, or educational philosophy. The absence of significant improvement in the performance of these universities over time supports this observation. However, to align with and sustain research university status, institutions must be clearly informed about the structural reforms required and be guided through this process. Rather than merely setting performance benchmarks, a comprehensive roadmap outlining how to achieve these benchmarks should be provided to universities. However, YÖK does not mandate any structural reform in the universities it designates as research universities. The responsibility for initiating such changes rests solely with university leadership. As a result, it is difficult to assess the impact of research university status on institutional development beyond increased budgetary support and staffing, or to measure its influence on the cultivation of a robust research culture.

On the other hand, research universities should be structured not only to fulfill education and research functions, but also to respond to the needs and expectations of society. Accordingly, the social contribution dimension should be integrated into the performance indicators used to evaluate research universities. Currently, YÖK assesses research universities based on 32 indicators across three dimensions: research capacity, research quality, and interaction and cooperation. In contrast, the "University Monitoring and Evaluation" system, which applies to all universities, uses 64 indicators encompassing education-training, research-development, project and publication, internationalization, and community service and social responsibility. Aligning these two evaluation systems would enhance the coherence of higher education policy and improve the guidance provided to universities in developing institutional strategies. Incorporating a social contribution dimension into the performance evaluation of research universities would encourage the development of policies that address regional and local challenges, thereby increasing the socio-economic impact of academic research.

The indicator set developed within the scope of this study provides insight into the progress of the 23 principal and 6 candidate research universities in Türkiye during the 2015-2022 period and contributes meaningfully to the evaluation of their performance. However, significant differences between academic disciplines - as well as in the methods of knowledge production and dissemination- limit the ability to make fully objective and comparable assessments. Variables such as the number of faculties and departments, the presence of a faculty of medicine, and the size of the students and academic staff populations differ greatly across instiiutions, further complicating direct comparisons based on uniform indicators. Moreover, the annual revision of the research university list disrupts continuity, interrupts long-term research planning, and reduces the overall effectiveness of research universities. Transitioning to a more stable, fixed designation system would relieve pressure on universities and enable more strategic, long-term policy development. Additionally, introducing a classification system based on institutional specialization (e.g., agriculture, industry, medicine) should be considered, as it would allow for more tailored performance evaluations and better alignment with national research priorities.

In Türkiye, universities designated as research universities have largely been structured according to the market-oriented "entrepreneurial university" model, rather than the classical Humboldtian Model, which emphasizes the unity of teaching and research and the pursuit of knowledge for its own sake. The entrepreneurial university model, which gained prominence under the influence of Clark (1998), reflects the broader impact of neo-liberal policy frameworks on higher education systems globally. In practice, this model has been narrowly interpreted by higher education administrators as a focus on university–industry relations, positioning universities primarily as institutions that should promote commercially oriented knowledge production (Bok, 2009). As a result, universities are increasingly expected to "conduct research based on market cooperation" (Ekinci et al., 2018). However, this market-driven orientation tends to prioritize short-term, profit-oriented objectives over the long-term investment and support required for basic scientific research, thereby undermining the foundational mission of research universities (Adaman et al., 2021).

The lack of differentiation in the management structure of research universities in Türkiye, and the continued use of traditional administrative frameworks, create challenges in decision-making processes and result in a divergence from international standards (Balyer & Özvural, 2021). For research universities to function effectively within the Turkish higher dducation system, a transformation is needed—one that establishes a decentralized, professional bureaucratic structure grounded in legal and regulatory frameworks (Belenkuyu & Karadag, 2025; Mammadov &

Aypay, 2020). Additionally, improving efficiency requires a strategic shift: reducing the excessively high student populations in research universities, emphasizing doctoral education, and adopting process-oriented approaches rather than than focusing solely on output-based metrics. Aligning with international standards in governance and academic organization is also essential for increasing the long-term effectiveness of Türkiye's research universities (Balyer & Özvural, 2021; Erdoğmuş, 2018; Mammadov & Aypay, 2020).

The true impact of the research university initiative – an important policy intervention in Turkiye's higher education system- will only become fully apparent over time. It is hoped that the findings presented in this study will support the development of new policies by higher education stakeholders. The use of "Entropy Weight Determination Method" and "Gray Relational Analysis" in this study contributes to the establishment of a more objective and data-driven system for assessing and ranking the performance of research universities. Developing such a system will significantly enhance both policy formulation and strategic decision-making processes.

Future research could expand on this work by applying different performance indicators, weighting methods, and multi-indicators decision-making (MCDM) techniques to compare university rankings. This would allow for the analysis of relationships among various methods and provide a more comprehensive evaluation of research university performance from multiple perspectives.

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Table 1
Universities Designated as Research Universities in 2017

Designated Research Universities	Candidate Research Universities
Ankara University	Bursa Uludağ University
Boğaziçi University	Çukurova University
Erciyes University	Ege University
Gazi University	Selçuk University
Gebze Technical University	Yıldız Technical University
Hacettepe University	
İstanbul Technical University	
İstanbul University	
İzmir Institute of Technology	
Middle East Technical University	

Table 2
Universities Designated as Research Universities in 2021

Research Universities *		
Ankara University	Fırat University	İzmir Institute of Technology
Atatürk University	Gazi University	Karadeniz Technical University
Boğaziçi University	Gebze Technical University	Koç University
Bursa Uludağ University	Hacettepe University	Marmara University
Çukurova University	İhsan Doğramacı Bilkent University	Middle East Technical University Sabancı University
Dokuz Eylül University	İstanbul Technical University	Sabancı University
Ege University	İstanbul University	Yıldız Technical University
Erciyes University	İstanbul University-Cerrahpaşa	
* Universities are listed in alphabetical order		

Table 3
Indicators Determined to Measure the Performance of Universities

Dimension	Code	Indicator	Direction of Effect
RESEARCH CAPACITY	RC 1	Number of Faculty Members	Positive
	RC 2	Number of Teaching Staff	Positive
	RC 3	Number of Externally Supported Projects Completed per Faculty Member	Positive
	RC 4	Number of resulting patents, utility models or designs	Positive
	RC 5	Number of active faculty member technology companies/total number of faculty members	Positive
	RC 6	Number of thesis master's students per faculty member	Positive
	RC 7	Number of doctoral students per faculty member	Positive
	RC 8	Total Number of Students	Negative
	RC 9	Two-term average of the number of weekly lesson hours of permanent faculty members teaching courses	Negative
	RC 10	Total Number of Students / Number of Faculty Members	Negative
	RC 11	Ratio of Total Number of Publications (Documents) to the Number of Faculty Members	Positive
	RC 12	Field Weighted Citation Index	Positive
	RC 13	Citation Score	Positive
RESEARCH QUALITY	RQ 1	Number of undergraduate programs stated to be accredited in the YKS Higher Education Programs and Quotas Guide	Positive
	RQ 2	Number of programs subject to peer evaluation (Among Non-Accredited Programs)/Total Number of Programs	Positive
	RQ 3	Number of programs self-evaluated/Total Number of Programs	Positive
	RQ 4	Annual number of publications in SCI, SSCI and A&HCI indexed journals per faculty member	Positive
	RQ 5	Q1 Publication Rate	Positive
	RQ 6	Ratio of the Number of Publications Cited in the Top 10% to the Total Number of Publications	Positive
	RQ 7	Ratio of the Number of Publications in the Top 10% Journals to the Total Number of Publications	Positive
	RQ 8	Number of PhD students / Total number of students	Positive
	RQ 9	Number of Master's Programs/Total Number of Programs	Positive
	RQ 10	Number of PhD Programs/Total Number of Programs	Positive
	RQ 11	Number of Associate Degree Programs/Total Number of Programs	Negative
	RQ 12	Number of Undergraduate Programs/Total Number of Programs	Negative
INTERACTION AND COLLABORATION	IC 1	Number of Students Coming Through Student Exchange Programs	Positive
	IC 2	Number of Students Going with Student Exchange Programs/Total Number of Students	Positive
	IC 3	Number of Academic Staff Coming Through Academic Staff Exchange Programs	Positive
	IC 4	Number of Faculty Members Going Through Faculty Exchange Programs/Total Number of Faculty Members	Positive
	IC 5	Number of interdisciplinary master's programs with thesis	Positive
	IC 6	Number of interdisciplinary non-thesis master's programs	Positive
	IC 7	Number of interdisciplinary doctoral programs	Positive
	IC 8	Number of Foreign Students/Total Number of Students	Positive
	IC 9	Number of Foreign Faculty Members/Total Number of Faculty Members	Positive
	IC 10	Ratio of the Number of Publications Made with International Cooperation to the Total Number of Publications	Positive
	IC 11	Ratio of the Number of Publications Made with University-Industry Collaboration to the Total Number of Publications	Positive

Table 4
Indicator Weights for 2015-2022

Dimensions	Indicators	Direction of Effect	Indicator Weights								2015-2022 Average	Weight Ranking According To 2015-2022 Average
			2015	2016	2017	2018	2019	2020	2021	2022		
Research Capacity	RC 1	Positive	1,15	0,97	0,97	1,01	1,16	1,04	1,02	0,98	1,04	29
	RC 2	Positive	0,89	0,81	0,79	0,85	1,02	0,91	0,89	0,86	0,88	31
	RC 3	Positive	3,60	3,97	3,63	3,69	3,26	3,17	3,33	3,88	3,57	10
	RC 4	Positive	3,39	4,39	5,53	6,84	6,11	6,06	7,26	6,89	5,81	4
	RC 5	Positive	2,22	2,24	2,32	2,48	2,39	2,44	2,54	3,19	2,48	14
	RC 6	Positive	1,12	1,90	2,20	2,97	2,66	2,34	2,33	2,26	2,22	15
	RC 7	Positive	1,31	1,10	1,12	1,14	1,48	1,37	1,35	1,41	1,28	25
	RC 8	Negative	0,44	0,41	0,33	0,97	1,06	0,98	1,14	1,15	0,81	33
	RC 9	Negative	0,58	0,45	0,42	1,02	1,26	1,05	1,17	1,03	0,87	32
	RC 10	Negative	0,38	0,40	0,38	1,08	0,87	0,82	0,80	0,88	0,70	36
	RC 11	Positive	2,55	2,25	2,28	2,10	1,97	1,90	1,73	1,85	2,08	16
	RC 12	Positive	1,63	1,07	0,73	1,16	1,30	1,34	1,29	1,05	1,19	26
	RC 13	Positive	2,73	2,09	1,93	2,02	1,86	1,72	1,97	2,00	2,04	17
	TOTAL		**21,99**	**22,04**	**22,64**	**27,33**	**26,39**	**25,13**	**26,81**	**27,43**	**24,97**	
Research Quality	RQ 1	Positive	3,26	5,19	4,93	4,64	4,68	4,42	4,54	4,36	4,50	6
	RQ 2	Positive	12,79	10,87	10,73	10,32	9,89	8,86	9,37	9,39	10,28	1
	RQ 3	Positive	10,97	9,71	9,58	9,26	9,51	8,84	8,91	9,24	9,50	2
	RQ 4	Positive	2,02	1,91	1,92	1,73	1,90	1,56	1,74	1,79	1,82	20
	RQ 5	Positive	1,42	1,63	1,51	1,55	1,93	1,57	1,45	1,22	1,54	22
	RQ 6	Positive	1,31	1,23	1,27	1,08	1,18	1,04	1,22	1,03	1,17	27
	RQ 7	Positive	1,95	1,73	1,77	1,60	1,77	1,40	1,40	1,43	1,63	21
	RQ 8	Positive	2,00	1,52	1,51	1,65	1,52	1,37	1,33	1,33	1,53	23
	RQ 9	Positive	1,29	1,14	1,12	1,25	1,17	1,08	1,07	1,07	1,15	28
	RQ 10	Positive	0,43	0,38	0,37	1,00	0,94	0,87	0,86	0,86	0,71	35
	RQ 11	Negative	0,70	0,62	0,61	0,88	0,82	0,76	0,75	0,75	0,74	34
	RQ 12	Negative	0,75	0,66	0,65	1,18	1,11	1,03	1,02	1,02	0,93	30
	TOTAL		**38,89**	**36,59**	**35,97**	**36,13**	**36,43**	**32,81**	**33,66**	**33,47**	**35,49**	
Interaction And Collaboration	IC 1	Positive	1,73	2,85	3,13	2,48	2,44	2,37	3,91	3,99	2,86	13
	IC 2	Positive	3,21	6,51	6,55	7,34	5,92	5,48	5,48	5,91	5,80	5
	IC 3	Positive	3,12	2,40	2,50	3,20	3,50	6,10	3,56	3,14	3,44	11
	IC 4	Positive	1,75	2,71	1,72	2,06	3,00	5,14	5,30	3,03	3,09	12
	IC 5	Positive	6,22	5,62	5,51	3,28	3,61	3,47	3,02	2,98	4,21	8
	IC 6	Positive	3,96	3,58	3,56	3,70	4,64	4,61	4,45	4,47	4,12	9
	IC 7	Positive	9,09	7,92	7,73	4,89	4,66	5,04	4,76	4,86	6,12	3
	IC 8	Positive	1,31	1,47	1,95	2,22	2,39	2,47	2,08	2,39	2,04	18
	IC 9	Positive	5,05	5,12	4,61	4,12	3,58	3,70	3,66	5,25	4,39	7
	IC 10	Positive	1,57	1,27	1,25	1,64	1,63	1,64	1,72	1,43	1,52	24
	IC 11	Positive	2,12	1,92	2,88	1,62	1,80	2,04	1,59	1,64	1,95	19
	TOTAL		**39,12**	**41,36**	**41,39**	**36,54**	**37,18**	**42,06**	**39,53**	**39,10**	**39,54**	

Table 5
Indicator Weight Averages and Rankings

Dimensions	Indicators	Indicators Weight Averages				Weight Ranking Within Dimensions				Overall Weight Ranking			
		2015-2019	2016-2020	2017-2021	2018-2022	2015-2019	2016-2020	2017-2021	2018-2022	2015-2019	2016-2020	2017-2021	2018-2022
Research Capacity	RC 1	1,05	1,03	1,04	1,04	9	9	9	11	29	29	29	32
	RC 2	0,87	0,87	0,89	0,90	10	10	12	12	31	31	33	33
	RC 3	3,63	3,54	3,42	3,47	2	2	2	2	10	10	12	11
	RC 4	5,25	5,79	6,36	6,63	1	1	1	1	5	5	3	3
	RC 5	2,33	2,37	2,43	2,61	3	4	4	3	13	15	15	14
	RC 6	2,17	2,41	2,50	2,51	5	3	3	4	16	14	14	15
	RC 7	1,23	1,24	1,29	1,35	7	7	7	7	25	25	25	25
	RC 8	0,64	0,75	0,90	1,06	12	12	11	10	34	33	32	31
	RC 9	0,75	0,84	0,98	1,11	11	11	10	9	32	32	31	29
	RC 10	0,62	0,71	0,79	0,89	13	13	13	13	35	35	35	35
	RC 11	2,23	2,10	2,00	1,91	4	5	5	6	15	17	17	18
	RC 12	1,18	1,12	1,16	1,23	8	8	8	8	28	28	26	26
	RC 13	2,13	1,92	1,90	1,91	6	6	6	5	17	19	19	17
	TOTAL	**24,08**	**24,71**	**25,66**	**26,62**				**AVERAGE: 25,27**				
Research Quality	RQ 1	4,54	4,77	4,64	4,53	3	3	3	3	7	6	6	6
	RQ 2	10,92	10,13	9,83	9,57	1	1	1	1	1	1	1	1
	RQ 3	9,80	9,38	9,22	9,15	2	2	2	2	2	2	2	2
	RQ 4	1,89	1,80	1,77	1,74	4	4	4	4	19	20	20	19
	RQ 5	1,61	1,64	1,60	1,54	7	6	5	5	23	22	21	22
	RQ 6	1,22	1,16	1,16	1,11	8	8	8	9	26	26	27	28
	RQ 7	1,76	1,65	1,59	1,52	5	5	6	6	21	21	22	23
	RQ 8	1,64	1,51	1,48	1,44	6	7	7	7	22	23	24	24
	RQ 9	1,19	1,15	1,14	1,13	9	9	9	8	27	27	28	27
	RQ 10	0,62	0,71	0,81	0,90	12	12	11	11	36	36	34	34
	RQ 11	0,72	0,74	0,76	0,79	11	11	12	12	33	34	36	36
	RQ 12	0,87	0,93	1,00	1,07	10	10	10	10	30	30	30	30
	TOTAL	**36,80**	**35,59**	**35,00**	**34,50**				**AVERAGE: 35,47**				
Interaction and Collaboration	IC 1	2,53	2,65	2,86	3,04	7	8	8	8	12	13	13	13
	IC 2	5,91	6,36	6,15	6,03	2	1	1	1	4	3	4	4
	IC 3	2,94	3,54	3,77	3,90	6	6	6	5	11	11	10	9
	IC 4	2,25	2,93	3,44	3,71	8	7	7	6	14	12	11	10
	IC 5	4,85	4,30	3,78	3,27	3	3	5	7	6	7	9	12
	IC 6	3,89	4,02	4,19	4,37	5	5	3	3	9	9	7	7
	IC 7	6,86	6,05	5,42	4,84	1	2	2	2	3	4	5	5
	IC 8	1,87	2,10	2,22	2,31	10	9	9	9	20	16	16	16
	IC 9	4,50	4,23	3,93	4,06	4	4	4	4	8	8	8	8
	IC 10	1,47	1,49	1,58	1,61	11	11	11	11	24	24	23	21
	IC 11	2,07	2,05	1,99	1,74	9	10	10	10	18	18	18	20
	TOTAL	**39,12**	**39,71**	**39,34**	**38,88**				**AVERAGE: 39,26**				

Table 6
Performance Score and Ranking of 29 Universities by Years

	TOTAL SCORE								RANKING							
	2015	2016	2017	2018	2019	2020	2021	2022	2015	2016	2017	2018	2019	2020	2021	2022
Ankara University	42,12	47,22	48,76	51,95	55,15	46,03	46,25	45,23	9	6	4	3	2	7	7	12
Atatürk University	36,49	36,17	36,17	36,93	38,16	36,69	37,90	41,37	24	25	26	28	25	28	25	20
Boğaziçi University	46,14	48,52	44,99	45,82	47,75	45,97	44,15	43,55	5	3	7	10	7	8	14	16
Bursa Uludağ University	35,29	35,31	36,20	42,36	37,88	37,45	36,63	37,11	27	28	25	12	27	26	27	28
Çukurova University	38,02	36,21	36,23	37,79	37,59	41,37	37,36	38,31	16	24	24	24	28	19	26	26
Dokuz Eylül University	37,37	38,14	36,97	38,88	39,94	39,91	41,98	41,87	20	18	21	22	19	24	18	19
Ege University	36,87	36,88	36,49	39,98	42,36	43,22	44,38	47,79	22	21	22	17	16	12	13	7
Erciyes University	48,46	46,53	46,37	38,00	39,50	41,39	41,78	44,13	3	7	5	23	21	18	19	15
Fırat University	35,67	37,09	37,19	37,71	38,16	44,62	47,32	41,35	26	20	19	25	26	9	5	21
Gazi University	39,57	38,91	41,52	40,37	47,91	44,18	45,14	44,37	13	16	11	16	6	11	11	14
Gebze Technical University	40,85	41,52	40,21	44,80	46,45	43,06	44,52	47,17	10	11	12	11	10	13	12	8
Hacettepe University	38,71	39,72	39,25	42,08	52,74	47,20	48,65	49,87	14	12	17	13	4	4	3	3
İ. Doğramacı Bilkent University	48,01	47,77	46,11	46,39	46,19	46,99	45,47	46,76	4	4	6	7	11	5	9	9
İstanbul Technical University	40,60	45,12	42,86	45,92	48,67	49,67	45,32	46,29	11	8	9	9	5	3	10	10
İstanbul University	40,49	39,70	39,39	41,25	44,74	41,06	44,02	45,25	12	13	15	14	13	21	15	11
İstanbul University-Cerrahpaşa	0,00	0,00	0,00	39,38	39,86	41,17	40,21	39,98				20	20	20	21	23
İzmir Institute of Technology	44,25	43,96	44,01	47,13	45,81	42,63	43,90	40,08	7	9	8	6	12	15	16	22
Karadeniz Technical University	35,84	36,42	36,15	37,41	38,39	37,34	38,20	39,31	25	23	27	26	23	27	23	24
Koç University	42,88	42,37	42,78	49,15	47,21	46,84	46,79	48,02	8	10	10	5	9	6	6	5
Marmara University	38,02	39,12	39,46	46,28	43,65	42,65	41,99	42,09	17	15	14	8	14	14	17	17
Middle East Technical University	45,98	47,44	51,47	52,14	56,52	57,00	51,74	51,73	6	5	2	2	1	1	2	2
Sabancı University	55,16	56,01	57,12	56,91	54,27	51,61	53,86	54,99	1	1	1	1	3	2	1	1
Yıldız Technical University	38,35	38,52	39,32	39,98	39,44	41,53	47,75	48,48	15	17	16	18	22	17	4	4
Akdeniz University*	36,59	35,70	36,12	36,94	38,35	40,37	36,52	37,71	23	27	28	27	24	23	28	27
Gaziantep University*	37,61	37,76	37,17	39,49	40,48	40,42	40,13	47,89	18	19	20	19	18	22	22	6
Kocaeli University*	34,94	36,80	37,45	36,91	37,11	35,51	36,14	35,89	28	22	18	29	29	29	29	29
Ondokuz Mayıs University*	36,87	36,10	36,43	39,27	41,24	38,56	37,99	39,19	21	26	23	21	17	25	24	25
Sakarya University*	37,44	39,59	39,76	41,02	42,80	42,27	41,26	41,92	19	14	13	15	15	16	20	18
Selçuk University*	52,50	51,17	50,53	49,70	47,43	44,53	45,95	44,52	2	2	3	4	8	10	8	13

*candidate research university

Table 7
Performance Scores and Rankings of Universities in the Research Capacity Dimension (Five-Year Averages)

	SCORE				RANKING			
	2015-2019	2016-2020	2017-2021	2018-2022	2015-2019	2016-2020	2017-2021	2018-2022
Ankara University	10,51	11,14	11,64	12,08	14	13	13	14
Ataturk University	10,39	9,91	10,38	10,97	15	21	22	20
Boğaziçi University	11,59	12,65	12,87	13,10	8	7	9	9
Bursa Uludağ University	10,06	10,34	10,76	11,21	17	17	17	18
Çukurova University	9,39	9,88	10,34	10,80	26	24	23	23
Dokuz Eylül University	9,37	9,69	10,19	10,69	27	27	26	25
Ege University	9,56	9,96	10,59	11,46	25	20	18	17
Erciyes University	9,68	10,49	11,13	11,81	22	16	16	15
Fırat University	9,91	9,90	10,42	11,08	18	22	20	19
Gazi University	11,35	11,48	11,64	11,64	10	11	14	16
Gebze Technical University	12,25	12,76	13,16	13,50	5	6	5	8
Hacettepe University	10,97	11,04	11,49	12,17	12	14	15	12
İ. Doğramacı Bilkent University	11,20	11,76	12,23	12,85	11	10	11	11
İstanbul Technical University	12,00	13,01	13,61	14,47	7	4	4	4
İstanbul University	12,26	12,12	12,57	13,61	4	9	10	6
İstanbul University-Cerrahpaşa	12,93	12,97	12,93	12,92	3	5	7	10
İzmir Institute of Technology	12,22	13,22	13,81	13,94	6	3	3	5
Karadeniz Technical University	9,65	9,46	9,97	10,57	23	28	28	26
Koç University	11,55	12,37	12,98	13,59	9	8	6	7
Marmara University	10,94	11,29	11,73	12,14	13	12	12	13
Middle East Technical University	14,70	15,02	15,87	15,92	2	2	2	2
Sabancı University	15,23	16,32	15,98	16,23	1	1	1	1
Yıldız Technical University	10,18	11,01	12,89	14,82	16	15	8	3
Akdeniz University*	9,70	9,82	10,22	10,74	21	26	25	24
Gaziantep University*	9,62	10,08	10,41	10,92	24	18	21	21
Kocaeli University*	8,97	9,31	9,80	10,25	28	29	29	29
Ondokuz Mayıs University*	9,80	10,01	10,50	10,91	19	19	19	22
Sakarya University*	9,76	9,86	10,10	10,54	20	25	27	27
Selçuk University*	8,05	9,88	10,26	10,49	29	23	24	28
* candidate research university								

Table 8
Performance Scores and Rankings of Universities in the Research Quality Dimension (Five-Year Averages)

	SCORE				RANKING			
	2015-2019	2016-2020	2017-2021	2018-2022	2015-2019	2016-2020	2017-2021	2018-2022
Ankara University	19,63	19,42	18,21	16,69	2	2	2	5
Ataturk University	13,24	12,89	12,78	12,87	25	25	24	24
Boğaziçi University	17,02	16,42	16,00	15,63	5	7	11	12
Bursa Uludağ University	13,02	12,65	12,40	12,20	27	27	27	27
Çukurova University	13,23	12,85	12,70	12,61	26	26	25	25
Dokuz Eylül University	13,44	13,12	13,29	13,54	22	22	22	22
Ege University	13,68	13,49	13,51	13,81	19	20	19	18
Erciyes University	13,86	13,71	13,97	14,61	18	17	15	15
Fırat University	13,30	14,32	15,49	15,81	23	14	13	11
Gazi University	14,95	15,19	16,05	16,57	13	12	9	6
Gebze Technical University	16,03	15,82	16,43	17,15	9	10	6	3
Hacettepe University	15,76	15,59	15,93	16,15	11	11	12	8
İ. Doğramacı Bilkent University	15,47	15,11	14,97	14,80	12	13	14	14
İstanbul Technical University	16,79	16,88	16,54	16,41	6	4	5	7
İstanbul University	14,29	13,62	13,52	13,58	15	18	18	19
İstanbul University-Cerrahpaşa	13,56	13,43	13,38	13,34	20	21	21	23
İzmir Institute of Technology	17,36	16,66	16,03	15,37	4	6	10	13
Karadeniz Technical University	13,86	13,51	13,44	13,54	17	19	20	21
Koç University	16,79	16,77	17,26	17,54	7	5	3	2
Marmara University	14,18	13,90	13,73	13,57	16	16	17	20
Middle East Technical University	16,52	16,36	16,18	16,10	8	8	8	10
Sabancı University	18,04	17,31	17,26	17,07	3	3	4	4
Yıldız Technical University	14,30	13,93	13,84	13,90	14	15	16	16
Akdeniz University*	12,59	12,19	12,02	11,90	29	29	29	29
Gaziantep University*	13,53	13,05	12,82	13,88	21	23	23	17
Kocaeli University*	13,26	12,91	12,55	12,28	24	24	26	26
Ondokuz Mayıs University*	12,67	12,32	12,20	12,13	28	28	28	28
Sakarya University*	15,93	16,25	16,22	16,12	10	9	7	9
Selçuk University*	26,11	24,01	22,60	21,19	1	1	1	1
* candidate research university								

Table 9
Performance Scores and Rankings of Universities in the Interaction and Cooperation Dimension (Five-Year Averages)

	SCORE				RANKING			
	2015-2019	2016-2020	2017-2021	2018-2022	2015-2019	2016-2020	2017-2021	2018-2022
Ankara University	18,73	19,25	19,78	20,15	5	4	3	3
Ataturk University	13,90	14,02	14,02	14,37	28	28	28	26
Boğaziçi University	17,19	17,54	16,86	16,72	6	7	8	9
Bursa Uludağ University	14,32	14,85	14,94	14,88	25	20	21	20
Çukurova University	14,52	15,11	15,02	15,07	20	18	20	18
Dokuz Eylül University	15,56	15,96	16,05	16,29	12	13	14	12
Ege University	15,29	16,33	17,18	18,28	14	11	7	6
Erciyes University	20,12	18,16	16,30	14,54	3	5	12	25
Fırat University	14,43	14,74	15,09	14,94	23	24	19	19
Gazi University	15,37	15,91	16,14	16,18	13	15	13	14
Gebze Technical University	14,30	14,63	14,22	14,55	26	25	26	24
Hacettepe University	16,07	17,56	18,56	19,79	9	6	5	4
İ. Doğramacı Bilkent University	19,96	19,82	19,03	18,71	4	3	4	5
İstanbul Technical University	15,73	16,56	16,34	16,29	10	9	9	11
İstanbul University	15,09	15,49	16,00	16,08	16	16	15	15
İstanbul University-Cerrahpaşa	13,13	13,73	13,84	13,86	29	29	29	28
İzmir Institute of Technology	14,67	14,82	14,86	14,60	17	21	23	23
Karadeniz Technical University	13,91	14,17	14,08	14,02	27	27	27	27
Koç University	16,21	16,53	16,32	16,47	8	10	10	10
Marmara University	16,55	17,04	17,35	17,62	7	8	6	7
Middle East Technical University	20,59	21,53	21,72	21,80	2	2	1	1
Sabancı University	21,14	21,55	21,52	21,03	1	1	2	2
Yıldız Technical University	14,50	14,82	14,87	14,72	21	22	22	22
Akdeniz University*	14,55	15,48	15,43	15,33	19	17	17	16
Gaziantep University*	15,13	15,93	16,30	16,88	15	14	11	8
Kocaeli University*	14,44	14,54	14,28	13,78	22	26	25	29
Ondokuz Mayıs University*	15,67	15,99	16,00	16,21	11	12	16	13
Sakarya University*	14,56	14,98	15,11	15,20	18	19	18	17
Selçuk University*	14,33	14,79	14,76	14,76	24	23	24	21
* candidate research university								

Table 10
Total Performance Scores and Rankings of Universities in All Dimensions (Five-Year Averages)

	TOTAL SCORE				RANKING			
	2015-2019	2016-2020	2017-2021	2018-2022	2015-2019	2016-2020	2017-2021	2018-2022
Ankara University	49,04	49,82	49,63	48,92	4	3	3	3
Atatürk University	36,78	36,82	37,17	38,21	27	28	28	26
Boğaziçi University	46,64	46,61	45,74	45,45	6	6	9	9
Bursa Uludağ University	37,41	37,84	38,10	38,28	23	24	24	25
Çukurova University	37,17	37,84	38,07	38,48	24	25	25	24
Dokuz Eylül University	38,26	38,77	39,53	40,52	21	22	22	21
Ege University	38,52	39,79	41,29	43,55	19	18	18	13
Erciyes University	43,77	42,36	41,41	40,96	10	13	17	20
Fırat University	37,16	38,95	41,00	41,83	25	21	19	18
Gazi University	41,65	42,58	43,83	44,40	13	12	11	11
Gebze Technical University	42,77	43,21	43,81	45,20	11	11	12	10
Hacettepe University	42,50	44,20	45,98	48,11	12	10	8	4
İ. Doğramacı Bilkent University	46,89	46,69	46,23	46,36	5	5	7	8
İstanbul Technical University	44,64	46,45	46,49	47,17	9	7	6	6
İstanbul University	41,11	41,23	42,09	43,26	15	15	14	16
İstanbul University-Cerrahpaşa	39,62	40,14	40,15	40,12	17	17	20	22
İzmir Institute of Technology	45,03	44,71	44,70	43,91	7	9	10	12
Karadeniz Technical University	36,84	37,14	37,50	38,13	26	27	27	27
Koç University	44,88	45,67	46,56	47,60	8	8	5	5
Marmara University	41,30	42,23	42,81	43,33	14	14	13	15
Middle East Technical University	50,71	52,91	53,77	53,82	2	2	2	2
Sabancı University	55,90	55,18	54,75	54,33	1	1	1	1
Yıldız Technical University	39,12	39,76	41,60	43,44	18	19	15	14
Akdeniz University*	36,74	37,50	37,66	37,98	28	26	26	28
Gaziantep University*	38,50	39,06	39,54	41,68	20	20	21	19
Kocaeli University*	36,64	36,75	36,62	36,31	29	29	29	29
Ondokuz Mayıs University*	37,98	38,32	38,70	39,25	22	23	23	23
Sakarya University*	40,12	41,09	41,42	41,86	16	16	16	17
Selçuk University*	50,27	48,67	47,63	46,43	3	4	4	7
* candidate research university								

Table 11
Performance Ranking of Universities According to 2018-2022 Averages

		Rank	Total (100)	Research Capacity (25)	Research Quality (35)	Interaction and Collaboration (40)
A1	Sabancı University	1	54,33	16,23	17,07	21,03
	Middle East Technical University	2	53,82	15,92	16,10	21,80
A2	Ankara University	3	48,92	12,08	16,69	20,15
	Hacettepe University	4	48,11	12,17	16,15	19,79
	Koç University	5	47,60	13,59	17,54	16,47
	İstanbul Technical University	6	47,17	14,47	16,41	16,29
	Selçuk University	7	46,43	10,49	21,19	14,76
	İ. Doğramacı Bilkent University	8	46,36	12,85	14,80	18,71
	Boğaziçi University	9	45,45	13,10	15,63	16,72
	Gebze Technical University	10	45,20	13,50	17,15	14,55
A3	Gazi University	11	44,40	11,64	16,57	16,18
	İzmir Institute of Technology	12	43,91	13,94	15,37	14,60
	Ege University	13	43,55	11,46	13,81	18,28
	Yıldız Technical University	14	43,44	14,82	13,90	14,72
	Marmara University	15	43,33	12,14	13,57	17,62
	İstanbul University	16	43,26	13,61	13,58	16,08
	Sakarya University	17	41,86	10,54	16,12	15,20
	Fırat University	18	41,83	11,08	15,81	14,94
	Gaziantep University	19	41,68	10,92	13,88	16,88
	Erciyes University	20	40,96	11,81	14,61	14,54
	Dokuz Eylül University	21	40,52	10,69	13,54	16,29
	İstanbul University -Cerrahpaşa	22	40,12	12,92	13,34	13,86
Relegated	Ondokuz Mayıs University	23	39,25	10,91	12,13	16,21
	Çukurova University	24	38,48	10,80	12,61	15,07
	Bursa Uludağ University	25	38,28	11,21	12,20	14,88
	Atatürk University	26	38,21	10,97	12,87	14,37
	Karadeniz Technical University	27	38,13	10,57	13,54	14,02
	Akdeniz University	28	37,98	10,74	11,90	15,33
	Kocaeli University	29	36,31	10,25	12,28	13,78

Table 12
YÖK's Research Universities Performance Ranking (2022)

		Rank	Total (100)	Research Capacity (40)	Reaearch Quality (40)	Interaction and Collaboration (40)
	Middle East Technical University	1	82,27	33,87	30,62	17,78
	Koç University	2	75,81	26,18	32,00	17,63
A1	Sabancı University	3	74,49	22,33	34,74	17,42
	İstanbul Technical University	4	74,13	31,04	28,29	14,80
	İ. Doğramacı Bilkent University	5	67,85	24,89	28,36	14,60
	Boğaziçi University	6	61,93	20,87	28,62	12,44
	İzmir Institute of Technology	7	59,27	25,23	19,64	14,40
	Yıldız Technical University	8	56,60	25,38	19,58	11,64
	İstanbul University	9	53,79	24,42	21,51	7,86
	Hacettepe University	10	50,68	23,83	19,14	7,71
	Erciyes University	11	49,61	17,79	22,33	9,49
A2	Gebze Technical University	12	48,73	17,40	19,06	12,27
	Ankara University	13	48,28	20,10	17,31	10,87
	İstanbul University-Cerrahpaşa	14	43,81	22,32	12,24	9,25
	Ege University	15	41,83	20,96	11,92	8,95
	Gazi University	16	40,07	20,61	11,76	7,70
	Atatürk University	17	39,00	14,78	19,76	4,46
	Fırat University	18	38,53	13,66	19,32	5,55
	Marmara University	19	34,44	13,95	11,38	9,11
	Çukurova University	20	32,90	14,22	11,46	7,22
A3	Dokuz Eylül University	21	31,55	12,73	11,08	7,74
	Karadeniz Technical University	22	28,86	11,96	12,46	4,44
	Bursa Uludağ University	23	27,99	7,86	10,23	9,90