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Original Research Article

Evaluation of University Ranking System to Propose a Model for Bangladeshi Universities

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Abstract: This study investigates and compares various university ranking systems, particularly considering the unique situation of Bangladesh. With the rise of globalization and emphasis on research in the knowledge-based economy, university rankings have gained significant attention. However, different organizations use diverse criteria and methodologies, leading to discrepancies in ranking positions. This research employed a two-phase approach. The first phase involved a systematic literature review focusing on globally used indicators and methodologies for university rankings. This phase revealed that research-related indicators hold the highest weightage (67.93%) in most ranking systems. Subsequently, the second phase utilized active ranking algorithms to explore the findings from the first phase. The study concludes that research output significantly influences a university's ranking and competitiveness globally. Considering Bangladesh's lower publication volume compared to other nations, adopting a ranking system like QS or THEWUR could be beneficial. This system aligns with the global focus on research output and could incentivize research efforts within Bangladeshi universities.

Keywords: University ranking system, Indicators, Criteria, Research, Method, Bangladesh.

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INTRODUCTION

Ranking systems for colleges have become more important due to the rise of the information economy and greater global competition. Institutions should assess their performance through rankings to enhance the quality of instruction and research output, as well as to conduct comparative evaluations with other institutions by anticipating potential issues. The study aims to establish a rating system for institutions in Bangladesh based on several subjects. The proposed strategy aims to provide transparency and visibility to decision-makers in higher education institutions, based on the necessity of a grading system in Bangladesh.

Universities and other institutions of higher learning are increasingly engaging in a globalized competition for top rankings, vying for recognition not just within their nations, but also regionally and internationally. These institutions often share similar objectives and outputs, such as research projects and publications generated by students and faculty. Their work contributes to the dissemination of knowledge across academic disciplines, proposing solutions to pressing social, economic, and political challenges, and often engaging with society to implement these solutions (Lepori, B. 2007). The growing importance of educational evaluation is evident in the rise of rankings for universities, colleges, and national, regional, and international educational systems. The prevalence of academic conferences, seminars, and annual rankings further underscores this trend. These ranking methodologies serve as growth catalysts for higher education institutions, allowing them to benchmark their performance and demonstrate excellence in research and education (Aguillo *et al.,* 2010). Ranking systems employ diverse indicators and methodologies, leading to variations in the assessed aspects. Key indicators typically encompass research impact, faculty and student numbers, Nobel laureates and distinguished scholars, and publications in high-impact journals like Nature and Science.

Universities compete in a globalized environment, striving for top rankings in various regional and international systems like QS, SCImago, THE

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(Times Higher Education), and others. However, only a few nations have established their national ranking systems, raising concerns about potential bias (Lepori, B. 2007).

Some argue that national ranking systems may be susceptible to unconscious bias, favoring domestic institutions. This concern stems from the natural tendency of scholarly societies to promote their institutions (Lepori, B. 2007). For example, a Russian non-profit organization's ranking placed Moscow State University exceptionally high, raising doubts about potential bias (Aguillo *et al.,* 2010)

The Shanghai Ranking (ARWU) has faced significant criticism. Researchers have questioned its methodology, and some argue that despite its popularity, it is neither an accurate nor an appropriate tool for evaluating university excellence (Oswald, A., 2010, Baty, Phil. 2010). Others defend the system's reliability at a macro level, highlighting the consistency of its indicators across institutions (Dill, D, *et al.*, 2005). Critics also point out potential flaws in various ranking systems, including inconsistencies due to university name changes, website variations, and domain usage (Zitt, M. *et al.,* 2006). Overall, concerns exist regarding the construction, focus areas, and validity of performance assessments used in ranking systems (Van Raan. *et al*., 2006)

To address these concerns, several initiatives have emerged. The International Ranking Expert Group (IREG), for instance, utilizes the Berlin Principles, a set of 16 criteria, to evaluate and certify ranking systems based on their transparency, objectivity, and other important features (Buela-Casal, *et al*., 2007).

METHODOLOGY AND MODEL DESIGN

The approach of literature analysis was utilized to complete the first step of theoretical inquiry. The dimensions used in the selected method of bibliographic analysis to examine the university ranking system globally include the number of papers published each year, the frequency of degree-granting units, the frequency of tutor guidance, the frequency of literature citations, the frequency of disciplines and majors, and the frequency of keywords. The systematic literature review and meta-analysis (PRISMA) method was used to identify the university's systems of world rankings in related literature. In the second stage of the research, which was identified in the previous stage, active ranking systems were empirically examined.

1.1 A Bibliographic Review of the Literature

Bibliographic analysis is a cross-disciplinary research method that quantifies all knowledge carriers using mathematical and statistical methods. Not only may bibliometric analysis be used to examine the outward qualities of literature, but it may also be used to analyze the intrinsic qualities of literature and help researchers understand the research's hotspots and directions in a specific topic in a precise and scientific way, as well as overcoming subjective bias examination (Wu, R. M. *et al*., 2010)

Annual Publications and Growth Projections

69,800 articles in total met the retrieval criteria. According to Figure 1, there are an average of 64,800 articles produced per year, up from 116,000 in 2015 (the year the graph was created). There were 99,715 articles published annually on average, and the total number of publications remained constant. There were 64,800 articles published in 2021 as of December 26**.** Figure 1 shows a declining trend from 2015-2021

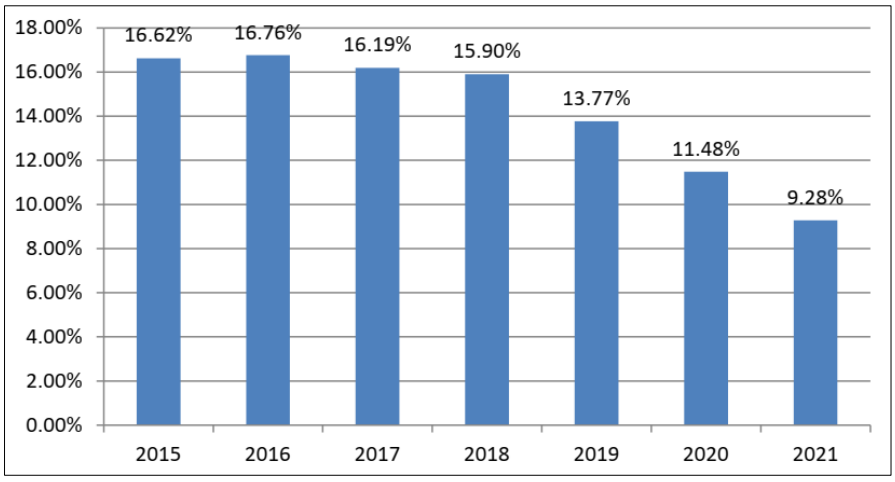

Figure 1: Growth factor of the publications

Number of Hit Search Criteria

In the WoSC database, 3,372 articles met our search criteria; in SCOPUS, the number has dropped by 288.

Table 1: Number of hit search criteria

Keywords	WoSC	SCOPUS
University Ranking System	1621	142
Indicator	1369	117
Criteria	382	29

Profiling of Institution

University rankings for the last year included 17,638 institutions. SIR has the most universities (3164), followed by URAP (3003) and WR (2000). Figure 2 shows the details.

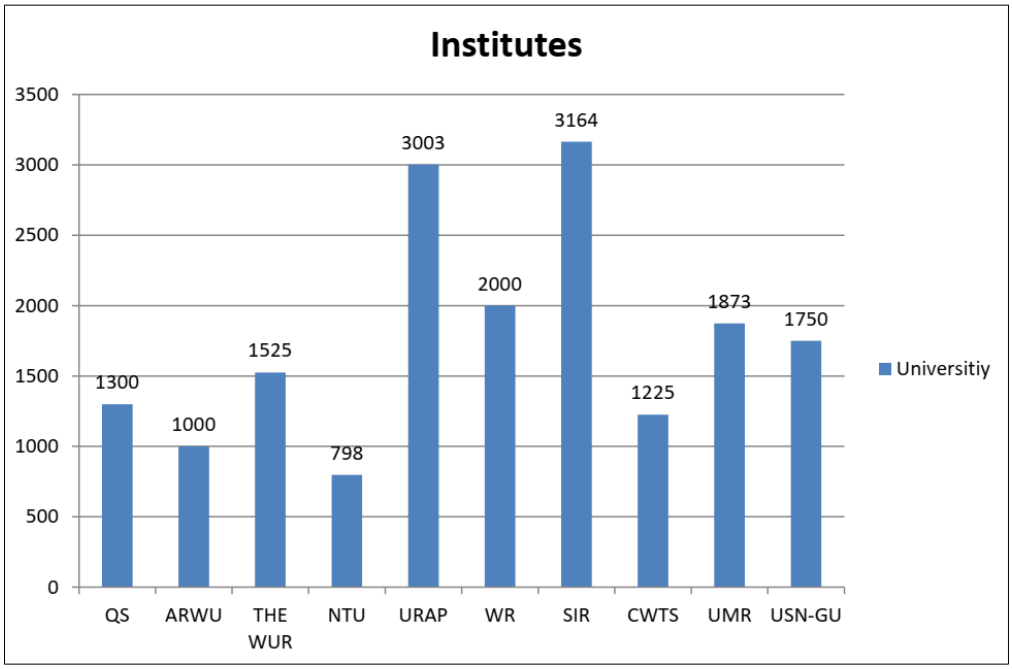

Figure 2: Institutions ranked by global ranking system last year.

Profiling of Countries

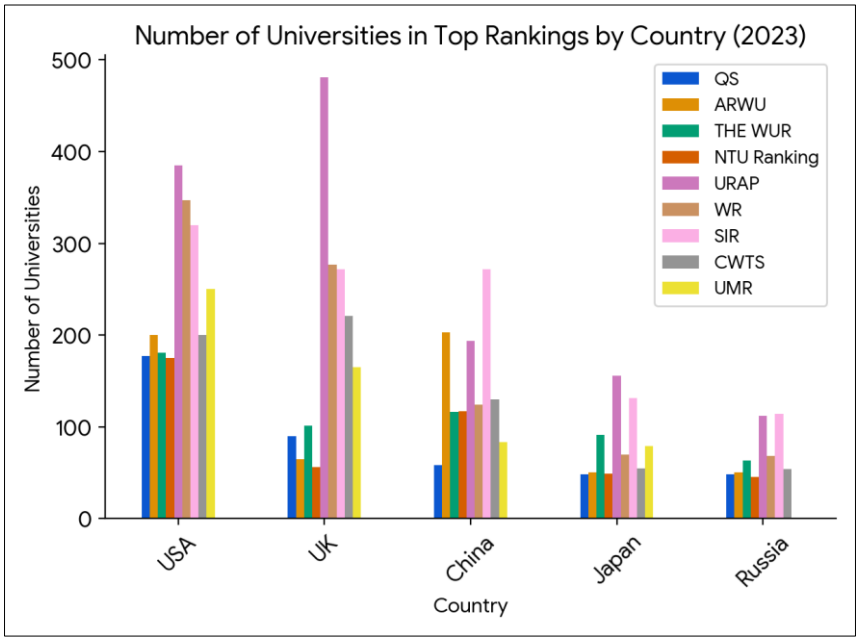

Figure 3: Five top countries ranked universities

Table 2: Basic details on specific global university ranking systems

System Of Ranking	Country	Number of Indicators	System Version	List Size	UR	RBF	FoP	CU
ARWU	China	6	2017	1000	Yes	Yes	Annually	No
THE WUR	UK	13	2018	1525	Yes	Yes	Annually	No
QS	UK	6	2018	1300	Yes	Yes	Annually	Yes
NTU	Taiwan	8	2017	798	Yes	Yes	Annually	No
URAP	Turkey	6	2017	3003	Yes	Yes	Annually	No
WR	Spain	4	2018	2000	Yes	Yes	Semi Annually	No
USN-GU	USA	13	2018	1250	Yes	Yes	Annually	No
SIR	Spain	12	2018	3164	Yes	Yes	Annually	Yes
UMR	Belgium	35	2018	1873	Yes	Yes	Annually	Yes
CWTS	Saudi Arabia	11	2018	1225	Yes	Yes	Annually	No

1.2 Comprehensive Analysis of the Literature

A systematic literature review was conducted to identify global university ranking systems that have been compared in research studies. This review followed established methods and criteria, including defining search objectives, identifying relevant keywords, and selecting appropriate databases. The search process focused on identifying scientific articles published in the past five years (2019-2024) using keywords like "higher education," "university rankings," "systems," "indicators," and "criteria." Major academic databases like SCOPUS, Web of Science, and Google Scholar were utilized for the search. The search strategy considered the type of study, research domain, language of publications, and source credibility. This approach ensured a comprehensive and up-to-date understanding of the existing literature on comparative studies of university ranking systems.

Inclusion Criteria

The search focused on articles published in the past five years (2019-2024) within the domain of higher education and specifically related to university rankings. Articles were included if they were written in English and published in reputable academic databases.

Exclusion Criteria

Articles that are solely based on the author's point of view. In addition, in the event of publications containing keywords connected to university ranking systems, all articles that use them in a comparison or classification that isn't appropriate for them must be excluded.

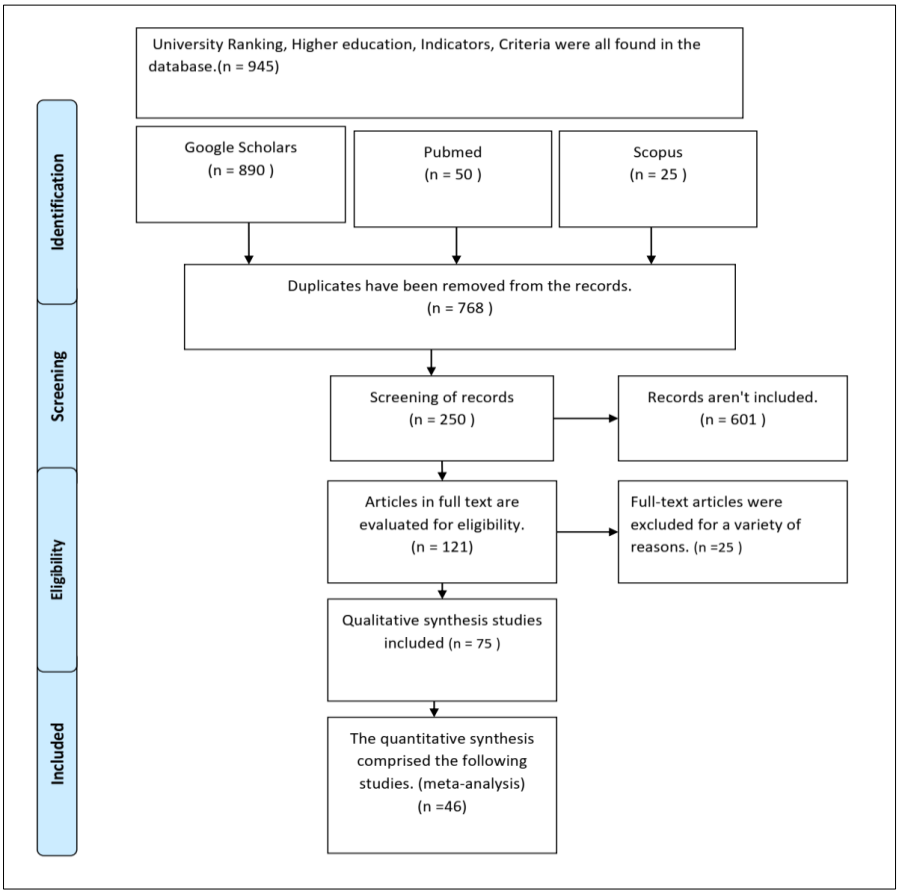

Figure 4: Prisma Model

The literature search yielded over 120 scientific publications and sections related to international university ranking systems. This included both the initial search results (over 110) and additional publications identified through secondary sources. Duplicate entries (around 20%) were removed after applying pre-defined inclusion and exclusion criteria, ensuring a focused analysis of relevant and unique research.

1.3 Active Ranking System Empirical Analysis

The second phase involved an empirical analysis of the identified university ranking systems. This analysis examined the systems in detail, based on the information gathered in the first phase. Three ranking systems were excluded from further analysis due to inconsistencies with established criteria. These excluded systems were not widely referenced in the reviewed literature and provided limited information on their ranking methodologies.

Table 3: Criteria for global ranking systems to be included and excluded from empirical analysis

Inclusion Criteria	Exclusion Criteria
• The comprehensive review of the literature reveals a global ranking system. • The ranking system is compared to other systems. • The chosen literature provides a foundational explanation of the ranking system. • The ranking scheme has been in place for the past two years. • On the worldwide Internet, you can find information on ranking results	• The rating system solely considers how one study program compares to the others. • Regional and national rankings • The ranking system does not include universities; it only measures the standing of a certain type of institution.

RESULT

Most ranking systems use a single score to determine university rankings and release their lists annually. However, some systems, like the WR system, may publish rankings more frequently (e.g., twice a year) and cover a wider range of institutions (e.g., WR covers over 110,000). The number of indicators used varies across systems, with some incorporating over 90 (e.g., UMR) and others using a more streamlined approach. Recent updates may have affected the specific number of indicators and how they are grouped within different ranking systems.

To analyze the indicators effectively, information regarding their purpose, data source, measurement period, and relative importance within each system is crucial. This analysis allows for identifying redundancies and ultimately reducing the number of indicators to a more manageable set for further evaluation. Current ranking systems can be broadly categorized into two groups based on their focus:

Research-Focused: These systems (e.g., NTU, URAP, CWTS) primarily evaluate a university's research performance.

Holistic: These systems (e.g., QS, THEWUR, UMR, UNS-GU) assess various aspects like research output, reputation, international orientation, and online presence.

Table 4: The weighted average of the measurement system's indicators

			Share of weighted coefficients of global ranking systems											
Dimension	**Category**	**Subcategory**	(%) **ARWU**	CWTS	(%) **NTU**	(%) **QS**	(%) **SIR**	(%) **THEWUR**	**UMR**	(%) **URAP**	(%) **UNS-GU**	(%) **WUR**	∑(%) **Ka**	∑(%) Dm
Input	Initial Characteristics of the University	Group size	-		-	**2.5**	-	**0.6**		-	-	-		7.0
		Study program and the number of positions	-		-	**0.6**	-	-	*	-	-	-	**3.69**	
	Staff	Structure of staff	-		-	**0.6**	-	**1.1**	*	-	-	-	**1.69**	
	Students	Structure of students	-		-	-	-	**0.6**	*	-	-	-	**0.60**	
	Financial resources	Revenues (total, ratio, development, research)	-		-	-	-	**1.0**	*	-	-	-	**1.04**	

Output	Graduated	Graduating on time	-		-	-	-	-	*	-	-	-	**0**	
		Degrees awarded	-		-	-	-	-	*	-	-	-		
	Quality of education	Awards	1		-	-	-	-		-	-	-	1.25	
		Employment	-		-	-	-	-	*	-	-	-		
	Research	Publishing (international collaborative publishing, collaborative publications, articles, conferences)	2.5	*	3.1	-	1.5	1.1	*	3.1	3.1	-	67.93	
		Citations	-	*	4.4	2.5	1.6	3.7	*	4.5	2.2	1.2		
		Research excellence	8.7	*	5.0	-	6.2	-	*	4.9	4.1	4.4		
	Innovation, technology transfer and technology impact	Intellectual property rights	-		-	-	-	-	*	-	-	-	0.94	
		Technology transfer	-		-	-	-	0.3	*	-	-	-		
		Technology impact	-		-	-	0.6	-	*	-	-	-		
	Reputation	Academic reputation (research, teaching)	-		-	5.0	-	4.1		-	3.1	-	13.50	
		Employer reputation	-		-	1.2	-	-		-	-	-		
	International collaboration	Mobility	-		-	-	-	-	*	-	-	-	0	
	Web performance	Web performance	-		-	-	2.5	-		-	-	6.9	9.37	
		∑(%)	12.5	-	12.5	12.5	12.5	12.5	-	12.5	12.5	12.5		100

DISCUSSION

The analysis reveals that several ranking systems focus solely on research, using bibliometric data like citations and publications (e.g., URAP, CWTS, NTU). Other prominent systems like ARWU, SIR, and USNGU emphasize research heavily, with ARWU dedicating almost 90% of its weight to research assessment. Interestingly, SIR and USNGU dedicate a significant portion (around 75%) to research evaluation despite having a lower overall research emphasis.

Furthermore, only a few systems (QS, THEWUR, USN-GU) consider both academic and research reputations. QS allocates 50% of its weight to assessing these reputations, with the remaining weights distributed between citations (research) and other metrics for academic excellence. Other systems like ARWU and THEWUR also acknowledge academic excellence through awards or assessments of student quality, staff composition, and learning environments. Regarding specific research performance indicators, citations remain prominent, with ARWU, NTU, and URAP heavily relying on them (70%, 40%, and 39% respectively).

Additionally, awards like Nobel Prizes are used in some systems like ARWU (10% weight). Scientific productivity is also measured in several systems, with NTU placing the highest emphasis (25% weight). Collaboration is another crucial aspect, with URAP (15% weight) and USN-GU (10% weight) placing significant emphasis on it. Innovation and technology transfer are measured by the UMR system, which considers patents, spin-off businesses, and technological impact. SIR, WUR, and USNGU also incorporate technology transfer indicators, although to a lesser extent. Global perspectives are assessed by UMR (student mobility) and SIR/WR (online presence). WR places a significant emphasis on web visibility (55% weight).

CONCLUSION AND RECOMMENDATION

Several ranking systems, including NTU, URAP, and CWTS, rely on similar data sources (e.g., WoS) for indicator calculations. This study evaluated research quality through various lenses, including academic productivity, scientific excellence, and citations (e.g., ARWU). Additionally, aspects like technical impact, technology transfer, and reputation (e.g., QS, THEWUR, UNS-GU) were also considered. Furthermore, some systems assessed teaching and learning environments (e.g., QS, THEWUR, UNS-GU)

and institutional characteristics like student-to-staff ratio (e.g., QS, THEWUR). University internationalization was measured through website analysis (e.g., SIR, WR) and staff/student mobility (e.g., UMR).

Given the limited research output (28 institutions) in Bangladesh compared to other countries, systems like QS or THEWUR, which weigh research heavily, may not be the best fit for the nation. It's crucial to consider the specific context and priorities of Bangladesh when choosing a ranking system for its universities.

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