

Good to Have an Ambitious Ranking Policy, but How about the Realities? Analysing the Ranking Goals for an Emerging Higher Education Hub

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Abstract

Within the global higher education structure, many nations have followed various strategies to become one of popular destinations for international students. Similarly, employing national strategy focusing on internationalisation, Turkey achieved to become an emerging regional hub as the tenth most popular destination for international students. Then, as its new national goal, Turkey recently announced ranking targets at the end of 2019 to have universities in the global top 100 until 2023. Therefore, Turkey's national targets present a suitable case to determine the areas of priority that are need for development and improvement in selected universities by comparing the input-output status of Turkish universities with its international competitors. Benefitting from their ranking scores and website reports, financial and human resources and scientific performance of designated universities were compared to be able to evaluate the attainability of these challenging ranking goals. The results revealed that although financial power is critical for examined universities, without talented research-workforce no chance to seriously improve ranking performance for any university. Considering its mid-profile to attract well-known international researchers, it seems Turkey as well as other emerging economies have to raise their own stars. Possible recommendations were then discussed to expedite universities' ranking performance.

Keywords: International university rankings, National ranking policies, Turkey ranking targets, university development inputs, university ranking outputs.

DOI: 10.29329/epasr.2021.383.10

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Introduction

Since the beginning of the 21st century, the increasing number of global funders and the circulation of a large international student body have led the field of higher education (HE) to become a global sector. Despite much technical and theoretical criticism (see details in Uslu, 2020), many universities highlight their position in the international rankings to convey the message that "we are better than others" in the global competition to attract funding and students (Hazelkorn, 2015; Heffernan & Heffernan, 2018). As a result, many countries such as Germany (DFG, n.d.), Australia (ERA, n.d.), China (PREC Edu Services, n.d.), Russia (5top100, n.d.) and Turkey (Presidency of Turkish Republic, 2019) have implemented national policies to support and further the international ranking of their universities. Naturally, the attainability of strategic goals related to rankings is always a challenging, open question for all countries.

Universities are institutions in the smokeless industry sector that host humanity's scientific quests and research (Ergüder, 2015). Through scientific, technological, or social achievements, universities make their name known and become brand institutions in their own countries and even all over the world (Angervall & Beach, 2020). Some countries are proud to have such brand universities and seek to continue this success with further innovations. For example, Germany had two of its universities and Australia had a total of five universities in the ARWU 2003, which is the oldest international university ranking system (ARWU, 2003). These two countries continue to implement similar policies to increase the success of their universities in international rankings. With the performance-based Excellence Initiative (DFG, n.d.) carried out since 2005, Germany achieved a similar accomplishment as in ARWU2003, being able to position seven German universities in the top 150 of ARWU 2020 (ARWU, 2020). Likewise, Australia managed to increase the number of universities in the top 100 to seven thanks to its Excellence in Research for Australia (ERA, n.d.) policy, which also includes performance-based budgeting. As the more-than-satisfactory yield of the adopted budgeting system based on performance criteria such as publications, citations and patents, the Australian government states that the majority of country-addressed publications (according to the number of citations they receive) are above the world average in terms of impact (ARC, 2018). For Germany, on the other hand, although performance-based budgeting contributes to an increase in the number of publications, its influence on citations is following a downward trend (Matthews, 2020).

Another country is China, which was perhaps the very first to develop and implement a national policy to improve its universities' position in international rankings. China's "World-Class University (WCU)" policy started in the mid-1990s (PREC Edu Services, n.d.). Through this WCU 1.0 policy, the Chinese government identified successful universities based on criteria such as publications, citations and patents and supported these universities with generously high budgets (Wang et al., 2011). With this policy, the first Chinese university was ranked in the top 100 (58th place) in 2016 (ARWU, 2016). As a result of the WCU 1.0 policy in China, some researchers (Wang

et al., 2011; Yang & Welch, 2012) point out the remarkable progress made by universities that are considered exemplary in China. However, others warn that the top-down operation of this policy implemented by the Chinese government creates unfair competition among Chinese universities due to extra support given to some universities, conflicts between different stakeholders of the benchmark-based staff regime adopted, and quality concerns brought on by the rapid increase in international student acceptance (Huang, 2015; Song, 2018).

Yet the Chinese government increased the number of universities selected through the policy of “Double World Class University (WCU 2.0)” in 2017 and continued to provide extra support for these universities (PREC Edu Services, n.d.). The result was that China succeeded in having 6 ranked universities in 2020. (ARWU, 2020). However, Xu Zhihong, a former President of Peking University, outlined three critical features of world-class universities, as follows: i. hosting famous professors with an international research profile, ii. achieving a profound impact on socio-economic development both in the country and globally, and iii. graduating students who can contribute to human civilisation (see Yang & Welch, 2012, p. 646). Considering these features, Song (2018) argued that “finding a way of coordinating the features of ‘World-Class’ and ‘Chinese Characteristics’ is not easily achieved” (p. 729).

Similarly, Russia, which preferred to financially support universities determined according to science-technology productivity and impact criteria, initiated its policy aiming to have 5 universities in the top 100 in 2013. (5top100, n.d.). Despite this country-wide policy, no Russian university appeared in the top 100 in the 2020 ranking except for one in the 2004 rankings (ARWU, 2004; 2020). Top universities competitively selected with Russia’s Excellence Program since 2013 have received substantial financial support (Matveeva et al., 2019). Although this extra support contributed to the improvement of the publication performance of selected Russian universities (Poldin et al., 2017), so far it has been insufficient to place a second university from Russia in the top 100 rankings. Considering that countries such as Germany and Australia, which already had universities in the top rankings, continue to implement strategies for further development and it took 20 years with the WCU policy for China to gain a place with just one university in the top-100, it is not surprising that Russia's 5top100 policy has not achieved the expected success in about 7 years.

Although performance-based university selection and budgeting strategies produce slow results in terms of ranking success, they appear to be the most preferred policy around the world. Indeed, achieving previous national strategy focusing on internationalisation in higher education (Çetinsaya, 2014), as being the tenth most popular destination for international students (YÖK, n.d.a), Turkey has become one of emerging regional hubs of global higher education (Kondakci, Bedenlier, & Zawacki-Richter, 2018). Then, in July 2019, the Turkish government announced the new national goal of achieving success in rankings by 2023 (the 100th Anniversary of the Republic of Turkey), attaining places at least for two universities in the top 100 and for five in the top 500 (Presidency of

Turkish Republic, 2019). This appears to be a challenging target considering that the Turkish HE system, which consists of 207 universities, around 180,000 academic staff and 8 million students, has yet to claim a top-100 university. Nevertheless, with this ranking policy, the Turkish government has recently identified 10 research and 5 candidate research universities based on ‘publications, citations, patents, and income generation’ criteria (Gülbak, 2020). To increase the research capacity in these designated universities, similar to the four countries presented above, the Turkish government has started to provide additional support in the form of both financial and human resources (Uslu et al., in press). As such, Turkey’s new ranking policy offers an up-to-date and appropriate case for “determining priority requirements for targeted success”. Therefore, a case study on Turkey can help both Turkey and other countries who plan to determine or have already determined national goals in generating strategies on what kind of investment areas should be prioritized.

Considering the ambitions of the four countries mentioned above, it is possible to witness how evaluation of the policy outcomes often occurs after the investments have already been made. However, it is critically important to follow a policy for the success of HE institutions and to determine what is necessary beforehand, in terms of guiding the investment plans to be made. To identify priority investments needed to achieve the ranking target set by Turkey, it would be appropriate to compare the existing success of Turkey’s universities with the success of their overseas rivals. Therefore, considering Turkey’s ranking target to place two universities in the top100 and a total of five in the top 500, this study aims to compare the inputs and outputs of Turkish universities with its competitors and to determine the areas of priority that are open for development and improvement. For this purpose, the research questions are as follows:

- (1) What is the input-output status of Turkey’s current five highest ranking universities?
- (2) Compared to the ranking targets determined by Turkey, what is the input-output status of five international universities occupying the related ranking positions?
- (3) Compared with the related five international universities, what are the priority areas for development and investment in Turkey’s five highest ranking universities?

Theoretical Approach

“World Class University (WCU)” is a longstanding phenomenon in the field of HE research as a reflection of internationalisation and global competition (Collins & Park, 2016). There are many well-known studies outlining the structure of WCUs (e.g., Alden & Lin, 2004; Hazelkorn, 2015; Liu et al., 2019; Salmi, 2009; Shin & Kehm, 2013). Not surprisingly, all these studies underlined the strong connection between WCU examples and their ranking achievements. Taking this fact into consideration and also benefiting from these studies, Uslu (2020) developed one of the most recent theoretical frameworks to discuss the characteristics of high-ranked universities. This framework

provides well-evinced components to evaluate the inputs and outputs/outcomes for a high-ranked university's structure (see Table 1).

Table 1. Composition of high-ranked universities*

General Characteristics of High-Ranked Universities	
<i>Input</i>	<i>Output/Outcome</i>
National higher education policies (related to university rankings)	<u>Reputation</u>
	*reputation for its research
	*reputation for its teaching
	*recognition outside the world of HE
	*a number of world-class departments (that is, not necessarily all)
	*a distinctive reputation (focusing its research strengths) in its 'lead' subject areas
	*a long history of superior achievement
Favourable governance	<u>Publication</u>
	*produces (basic and applied) research in abundance
	*produces ground-breaking research output recognized by peers
Supportive environment (both for students and staff)	<u>Citation</u>
	*produces ground-breaking research output recognized by peers
Abundant resources	<u>Prize</u>
	*produces research output recognized by prizes (e.g., Nobel Prize winners)
Concentration of talent	<u>Internationalisation</u>
	*can recruit staff from an international market
	*attracts a high proportion of students from overseas
External image management (referring ranking position(s))	<u>Ratios/Degrees</u>
	*attract and retain the best staff
	*attracts the most able students
	<u>Income</u>
	*diversified sources of income (e.g., government, private sector, research income, overseas student fees, etc.)
	*receives large endowment capital and income

* derived from Uslu's (2020) conceptual framework (p. 952)

When looking at Table 1, national policies related to university rankings is one of the potential inputs having an influence, at least considering the selected university in terms of funding support. Yet it is not an easy task to directly explore the impact of national policies on universities' ranking performance (Salmi, 2009). Here, it is obvious that funding received from the government can increase the investment capacity of a university (Altbach & Salmi, 2011; Shin & Kehm, 2013). Therefore, it seems possible to identify the dimensions of financial resources and institutional facilities by means of the budget of a university. Against this connection between the budget and institutional facilities, it is not really possible to claim that these resources create a positive and supportive atmosphere in a university without evaluating the components of its organisation culture (Hazelkorn, 2015; Uslu, 2017). Further, having overwhelming financial power does not guarantee establishing favourable management practices in the university (Alden & Lin, 2004). In this respect, there is no direct indicator to assess and compare the positiveness of managerial approaches in universities, especially when considering international ranking tables.

External communication is an important administrative task for university management to brighten the public face of their universities, and they naturally highlight ranking outcomes on this issue (Uslu, 2017). However, it is not obvious how the announcement of ranking achievements influences the popularity of a university among potential staff and students (Heffernan & Heffernan, 2018; Shin & Kehm, 2013). At least some researchers (Altbach & Salmi, 2011; Delgado-Marquez et al., 2013; Tapper & Filippakou, 2009) have argued that a university's ranking position (particularly in subject-based rankings) is an impressive tool to attract not only domestic but also talented international researchers and postgraduate students.

Considering the potential outputs/outcomes of university rankings, one of the major indicators is the reputation of a university. However, many researchers (Collins & Park, 2016; Shin et al., 2011; Spence, 2019) identified reputation is a controversial issue, and Shin and Toutkoushian (2011) claimed that "reputation measures have [validity, sampling, and reliability] limitations in reflecting the quality of teaching and research" (p. 5). In terms of statistically measurable outputs, the number of publications produced by researchers in a university and the number of citations they receive can be re-checked through international databases such as Web of Science or SCOPUS (the same data source for international rankings) (Uslu, 2020). According to Table 1, awards (e.g., the Nobel Prize or Field Medals (ARWU, 2020)) is another output category for the international ranking scores of universities. The main issue here is that the limited number of awards potentially makes an unfair ranking contribution by winners against their competitors considering all the high-quality candidate research being published (Blackmore, 2016).

As an output in university rankings, income is also taken into consideration. However, Uslu (2020) explained that collecting income data from universities themselves is not a highly reliable strategy to fairly compare universities' grant/income acquisition from external providers or partners.

Further, it is open to discussion whether the student/staff ratio is an input or output for universities' ranking achievements while the postgraduate student cohort is one of their potential advantages in terms of research productivity (Horta & Santos, 2016). It also appears that international collaboration is another important strategy for universities to increase their research impact at global level (Abramo et al., 2011).

Given the above, it is hard to define how favourable governance practices including external image management constitute a supportive environment both for students and staff. However, national HE policies mostly involve providing extra financial support to universities to enhance their ranking performance. This sort of monetary support would be an important advantage to create abundant resources and attract talented researchers. Therefore, universities' annual budget and their staff capacity can be accounted as inputs for their scientific performance. Considering potential outputs/outcomes for universities' ranking achievement, reputation and income indicators are highly questionable in terms of their data sources and also preferred measurement techniques. Although prizes and awards can be accepted as directly countable output, it does not provide enough room for every academic to join this competitive process, even if they have proven research achievements. Other numerical outputs of scientific performance are publication and citation rates, both for academics and universities. Similar to these two outputs, internationally collaborative projects can also be observable output based on reliable sources used by ranking systems, such as the Web of Science or SCOPUS databases. In this respect, it would be meaningful to follow these observable and re-accessible inputs (annual budget, staff, international staff, international students, PhD student cohorts) and outputs (publications, citations, international collaborations) to compare various universities' ranking performance.

Methodology

This research was designed as a survey model which allows researchers to observe opinions and attitudes towards selected variables (Cohen et al., 2007). Surveying the existing indicators can provide a good basis to compare universities' ranking performance in terms of the dimensions of both input and output. Aiming to compare the recent positions of the most successful Turkish universities and their competitors according to Turkish national ranking goals, the researcher analysed secondarily the data of selected international rankings and the related universities' reports.

Rationales for Selected Data Sources

Looking at the potential resources, there are many different international university rankings. To be able to define a proper ranking system, the researcher checked various ranking systems and eliminated most of them for different reasons. For example, Quacquarelli Symonds (QS) and Times Higher Education (THE) rankings, two well-known global ranking systems, were eliminated because of the large reputation component in their system (e.g., 50% in QS and 33% in THE). Another

international ranking, CTWS Leiden Rankings, only provides data related to publications in top journals; hence, no other data is included in this ranking system. Similarly, CWUR Ranking System publishes only the list of universities without any extra data. When evaluating the US News Best Global Universities Rankings, this system only gives universities' ranking positions despite having more details about staff and student numbers. While the ARWU Ranking System focuses largely on the academic performance of universities in terms of publications and citations in the top quarter, ARWU includes one highly controversial indicator (prizes, with 30% significance). However, the system of URAP World University Rankings provides a full score on each indicator by their weight, including normalised calculation in 23 scientific fields (see <https://www.urapcenter.org/Methodology>). URAP Rankings also covers Articles (with Article Impact Total), Citations (Citation Impact Total), Total Documents, and International Collaboration indicators; all of which criteria meet our selected outputs (publications, citations, internationally collaborated publications). Therefore, the researcher decided to take URAP ranking data into consideration to be able to analyse the output (according to the 2019 ranking goals of Turkey).

For the input dimension of university ranking performance, two main variables were considered: budget and human talent. To obtain data on the universities' budget, the researcher benefitted from the related universities' annual reports or their websites (see Table 2). Focusing on human resources, the number of academic staff, doctoral students, and the international portion of this population (in terms of number of international staff and students) were included in the dataset, using the numbers given in the QS ranking system (see Findings section).

Data Analysis

Looking at the URAP Rankings (2019-2020), the top five Turkish universities and the universities occupying positions targeted in the Turkish ranking goals are listed in Table 2. The budgets of the related universities were converted to US dollars (taking the yearly average currency for 2019 into consideration), then these budgets were compared by simple calculation. In a similar vein, the researcher compared the number of academic staff (including international personnel) in these universities through the given numbers in the QS ranking system. Benefitting from the same data source, the portion of international students and also the postgraduate student cohort were compared, and their relative ratios were calculated. Focusing on the output dimension, the researcher listed articles (multiplied by article impact scores), citations (multiplied by citation impact scores), and international collaboration scores from the URAP rankings and then calculated the ratios dividing the scores for international competitors with the relevant scores of Turkish universities. All descriptive and comparative values and calculation examples are presented in the next section.

Table 2. Situation in the URAP World University Rankings 2019-20*

Turkish Universities	Position	Position	International Universities
Hacettepe U.	#534	# 99	Erasmus U., Rotterdam (Netherlands)
Istanbul U.	#582	#100	Uppsala U. (Sweden)
Istanbul Technical U.	#698	#498	Universidade Federal de Santa Catarina (UFSC) (Brazil)
Middle East Technical U.	#706	#499	Martin Luther U., Halle Wittenberg (Germany)
Ankara U.	#787	#500	University of Hawaii, Manoa (USA)

* retrieved from https://www.urapcenter.org/Rankings/2019-2020/World_Ranking_2019-2020

Budget sources for the above universities

All Turkish universities: <https://www.sbb.gov.tr/wp-content/uploads/2019/02/3-b-2018-2020-D%C3%B6nemi-Gelir-ve-Net-Finansman-Tablolar%C4%B1.pdf>

Erasmus University, Rotterdam: <https://www.eur.nl/en/about-eur/facts-and-figures/annual-reports>

Uppsala University: <https://www.uu.se/en/about-uu/quick-facts/>

Universidade Federal de Santa Catarina: <https://structure.paginas.ufsc.br/files/2020/09/UFSC-in-numbers-2019.pdf>

Martin Luther University, Halle Wittenberg: <https://www.pr.uni-halle.de/publikationen/jahresmagazin/>

University of Hawaii, Manoa:

http://www.hawaii.edu/budget/sites/www.hawaii.edu.budget/files/FY20_OpBudgetNarrative.pdf

Findings

Parallel to the research questions, the input dimension was first evaluated through two indicators, budget and human resources. As an initial indicator, the annual budget of the selected Turkish universities and their international competitors were cross-checked, and the comparative findings are presented in Table 3. Then, focusing on human resource indicators, Table 4 includes a comparison of the number of academic staff, also considering international staff in the same universities.

Table 3. Comparisons of financial input for Turkish vs Competitor universities

Turkish Universities	Budget (US\$)	Comparison	Budget (US\$)	International Competitors
Hacettepe U.	180,078,482	(x) 4.13 (=)	743,420,316	Erasmus U., Rotterdam
Istanbul U.	244,975,540	(x) 3.16 (=)	773,882,854	Uppsala U.
<i>for "2-top100" goal</i>	425,054,022	(x) 3.57 (=)	1,517,303,170	<i>Last two of top100</i>
Istanbul Technical U.	95,230,696	(x) 4.28 (=)	407,133,390	UFSC
Middle East Technical U.	94,088,653	(x) 2.57 (=)	241,908,388	Martin Luther U.
Ankara U.	180,458,401	(x) 5.94 (=)	1,071,682,750	U. of Hawaii, Manoa
<i>for "3top101-500" goal</i>	369,777,750	(x) 4.65 (=)	1,720,724,528	<i>Last three of top500</i>
<i>for "2top100" + "3top101-500" goals</i>	794,831,772	(x) 4.07 (=)	3,238,027,698	<i>"last2top100" + "last3top101-500"</i>

As can be seen in Table 3, the highest budget belongs to the University of Hawaii, Manoa, against the biggest of Istanbul University, Turkey (as 4.37 times smaller than the University of Hawaii, Manoa). Considering the top two Turkish universities' total budget compared to their competitors in the last two positions of the top 100, the ratio shows that these Turkish universities spent nearly 28% of their competitors' budget. When looking at the total budget of the five Turkish universities and their designated competitors, Turkish universities only had a quarter of their competitors' total budget.

Table 4. Comparison of human inputs

Human Resources	Turkish Universities	Total Number	Comparison	Total Number	International Competitors	Human Resources
Academic Staff	Hacettepe U.	2,474	(x) 1.00 (=)	2,471	Erasmus U., Rotterdam	Academic Staff
	Istanbul U.	1,916	(x) 1.39 (=)	2,659	Uppsala U.	
	Istanbul Technical U.	1,795	(x) 1.34 (=)	2,404	UFSC	
	Middle East Technical U.	1,270	(x) 2.32 (=)	2,942	Martin Luther U.	
	Ankara U.	4,209	(x) 0.39 (=)	1,640	U. of Hawaii, Manoa	
<i>for "2top100" + "3top101-500" goals</i>		11,664	(x) 1.04 (=)	12,116	<i>"last2top100" + "last3top101-500"</i>	
International Staff	Hacettepe U.	53	(x) 14.92 (=)	791	Erasmus U., Rotterdam	International Staff
	Istanbul U.	193	(x) 3.42 (=)	661	Uppsala U.	
	Istanbul Technical U.	54	(x) 0 (=)	0	UFSC	
	Middle East Technical U.	52	(x) 0 (=)	0	Martin Luther U.	
	Ankara U.	70	(x) 5.11 (=)	358	U. of Hawaii, Manoa	
<i>for "2top100" + "3top101-500" goals</i>		422	(x) 4.29 (=)	1,810	<i>"last2top100" + "last3top101-500"</i>	
Human Resources	Turkish Universities	Percentage	Comparison	Percentage	International Competitors	Human Resources
International Students	Hacettepe U.	2.83	(x) 7.69 (=)	21.77	Erasmus U., Rotterdam	International Students
	Istanbul U.	7.32	(x) 2.18 (=)	16.01	Uppsala U.	
	Istanbul Technical U.	4.78	(x) 0.62 (=)	3.00	UFSC	
	Middle East Technical U.	6.70	(x) 1.27 (=)	8.57	Martin Luther U.	
	Ankara U.	4.99	(x) 2.17 (=)	10.85	U. of Hawaii, Manoa	
<i>"2top100" + "3top101-500" goals</i>		(mean) 5.60	(x) 2.14 (=)	(mean) 12.01	<i>"last2top100" + "last3top101-500"</i>	

Postgraduate Students	Comparison				Postgraduate Students
	Turkish Universities	Score	Comparison	Score	
Hacettepe U.	23.00	(x) 1.48 (=)	34.00	Erasmus U., Rotterdam	
Istanbul U.	25.00	(x) 1.20 (=)	30.00	Uppsala U.	
Istanbul Technical U.	35.00	(x) 0.74 (=)	26.00	UFSC	
Middle East Technical U.	31.00	(x) 0.65 (=)	20.00	Martin Luther U.	
Ankara U.	27.00	(x) 0.85 (=)	23.00	U. of Hawaii, Manoa	
<i>for "2top100" + "3top101-500" goals</i>		(mean) 34.00	(x) 1.00 (=)	(mean) 34.00	<i>"last2top100" + "last3top101-500"</i>

Table 4 shows that the top five Turkish universities employed nearly the same number of academic staff in total compared to their international competitors (with a ratio of 0.96). However, the proportion of international staff in these Turkish universities (average 85) is less than one fourth of their international competitors (averaging 362). Similarly, the Turkish universities attracted less than half of the international students in their competitors in total (ratio 0.47). Comparing the postgraduate students' cohorts, on the other hand, these five Turkish universities trained on average the same ratio (34%) as the postgraduate students in their international competitors.

The output dimension includes articles (with their impact total), citations (and their impact score), and international collaboration scores. The comparison of all these indicators for the top five Turkish universities and their international competitors are presented in Table 5.

Table 5. Comparison of output dimensions

Output	Turkish Universities	Score	Comparison	Score	International Universities	Output
Publication (Article x Article Impact Total)	Hacettepe U.	58.01 43.54	x (x) 2.57 (=)	91.89 70.55	x Erasmus U., Rotterdam	Publication (Article x Article Impact Total)
	Istanbul U.	60.36 44.33	x (x) 2.55 (=)	93.02 73.32	x Uppsala U.	
	Istanbul Technical U.	55.84 42.01	x (x) 1.39 (=)	66.31 49.09	x UFSC	
	Middle East Technical U.	54.78 42.14	x (x) 1.27 (=)	58.58 50.22	x Martin Luther U.	
	Ankara U.	50.23 39.53	x (x) 1.55 (=)	62.04 49.58	x U. of Hawaii, Manoa	
<i>for "2top100" + "3top101-500" goals</i>	(total) 2,368.27	(x) 1.91 (=)	(total) 4,523.40	<i>"last2top100" "last3top101-500"</i>	+	
Citation (Citation x Citation Impact Total)	Hacettepe U.	73.77 60.09	x (x) 1.96 (=)	101.92 85.40	x Erasmus U., Rotterdam	Citation (Citation x Citation Impact Total)
	Istanbul U.	68.93 56.12	x (x) 2.21 (=)	100.69 85.01	x Uppsala U.	
	Istanbul Technical U.	64.37 53.12	x (x) 1.26 (=)	72.02 59.91	x UFSC	

	Middle East Technical U.	63.57 53.62	x	(x) 1.35 (=)	74.31 62.09	x	Martin Luther U.	
	Ankara U.	61.41 49.79	x	(x) 1.48 (=)	73.16 61.74	x	U. of Hawaii, Manoa	
	<i>for "2top100" + "3top101-500" goals</i>	(total) 3,637.35		(x) 1.69 (=)	(total) 6,141.83		<i>"last2top100" + "last3top101-500"</i>	+
International Collaboration	Hacettepe U.	50.64		(x) 1.40 (=)	71.06		Erasmus U., Rotterdam	International Collaboration
	Istanbul U.	43.40		(x) 1.59 (=)	69.20		Uppsala U.	
	Istanbul Technical U.	41.58		(x) 1.18 (=)	49.12		UFSC	
	Middle East Technical U.	41.92		(x) 1.24 (=)	52.10		Martin Luther U.	
	Ankara U.	38.74		(x) 1.34 (=)	51.74		U. of Hawaii, Manoa	
	<i>for "2top100" + "3top101-500" goals</i>	(mean) 43.26		(x) 1.36 (=)	(mean) 58.64		<i>"last2top100" + "last3top101-500"</i>	+

Table 5 above, in summary, indicates that the mean article score for the top five Turkish universities (55.84) is roughly two thirds of their international competitors (74.37) while their article impact scores are as follows: 42.31 for Turkish universities and 58.55 for the international competitors. Regarding the citation scores, these Turkish universities achieved 66.41 against 84.42 for their competitors, and the designated international competitors displayed a higher citation impact of around 30% compared to the Turkish universities. As the last output, the score for Turkish universities in terms of their internationally collaborated articles was roughly three quarters of their designated international competitors (ratio 0.74) in the 2019-2020 URAP rankings.

Conclusions

This research focuses on the evaluation of international rankings' components for Turkish universities in terms of national ranking goals. To comparatively illustrate the recent situation of Turkish universities, input-output calculations were performed for the top five Turkish universities and also their designated competitors according to Turkish national ranking goals, as follows: two universities in the top 100 and three more universities in the top101-500. When collecting input data (budget and human resources) from the websites of the relevant universities, output data (publications and citations as well as international collaboration) were retrieved from the URAP World University Rankings 2019-2020. Through the input-output dimensions of a theoretical framework for high-ranked universities (see Table 1), the comparative results obtained in the research are discussed below.

As many countries have done (e.g., China, Germany, Russia, etc.), the Turkish government also selected 10 universities (with 5 more as candidates) to give extra support to enable them to achieve a better ranking performance, parallel to the national ranking goals (YÖK, 2017). All five Turkish universities analysed in this study were already selected within the "research universities"

scheme. The result of the analysis showed that the designated international competitors had, on average, a budget four times larger than the top five Turkish universities in 2019. When assessing the official data (SBB, 2019), it was found that the public budget for Turkish universities increased by roughly 9% from 2019 to 2020 (in fact, re-calculating due to a fluctuating currency rate, the budget for Turkish universities decreased 13.6% in terms of US\$). Considering the huge financial support from the Russian government to their selected universities (33 million US\$ per institution, and 1.9 billion US\$ for 57 selected universities (Smolentseva, 2010)), it is difficult to believe that no new Russian university could manage to appear in the top 100, despite their improved scientific performance since 2013 (Guskov et al., 2016). This example clearly reveals that the Turkish government has to seriously increase their extra support for the selected “research universities”, not only in financial terms.

Looking at the theoretical frame developed by Uslu (2020), a significant financial investment helps universities to be able to ensure other input criteria. For example, having “abundant resources”, university managers can invest more in infra-/supra-structure development to institute a highly supportive environment for their students and staff. There is no direct evidence, but it is a well-known fact that having academic support mechanisms (for teaching, research, and services, e.g., well-equipped laboratories) allows more effective leadership in universities to flourish. Academics see both administrative mechanisms and favourable management approaches (e.g., rewards and recognition, well-designed career planning, etc.) as organisational components which can enhance their scientific performance (Hazelkorn, 2015; Salmi, 2009; Uslu, 2017). Yet, a higher budget, well-established institutional support mechanisms, and favourable governance strategies have little meaning without qualified human resources at work in the operating core of universities.

In terms of knowledge and technology production, it is obvious that the main part of the operating core is the academic staff in universities. The analysis in this research evinced that compared with their international competitors, the top five Turkish universities have almost the same number of academic staff in total. However, these Turkish universities have “24 students per tutor” against the lesser “10 students per tutor” for international competitors (QS, 2019); this means that academics have less research time because of their higher teaching load in Turkey (Calikoglu et al., 2020). Further, the finding of the current research showed that even these top Turkish universities employed just a quarter of their competitors in terms of international academic staff. On this point, the Turkish government can follow similar initiatives with other countries to attract internationally-known star researchers to their universities. For instance, China started their “Thousand Talents Programme” in 2008 to recruit high-level overseas scientists and experts and replaced this policy with the “High-end Foreign Experts Recruitment Plan” in 2019 (Thousand Talents Plan, n.d). Yet, to attract international researchers, no one can say that Turkey is one their primary choices, considering the less-than-lavish salaries in academia (i.e., roughly equal to GDP per capita, 10-12,000 US\$ per

year (The World Bank, 2019)) and also being in 54th position in the Human Development Index (HDI, 2020).

Accordingly, rather than attempting to transfer internationally well-known and productive researchers, Turkish universities have to raise their own star academics, benefitting from the extra employment rights for these “research universities” in Turkey. Naturally, this needs a longer period to materialise, considering the short time to achieve the national ranking goals of Turkey (by the 100th centenary of the Republic’s foundation, in 2023). To train the next generation of academics, not only Turkish universities but also all other countries’ universities need to expand their postgraduate (particularly PhD) student population as another input of human resources, whereas some ranking systems evaluate this as an output (e.g., QS and THE rankings). Looking at the numbers in this research, the top five Turkish universities display a head-to-head percentage with their designated competitors. In fact, all these well-established and older Turkish universities have already succeeded in attracting more PhD students (YÖK, 2019). These universities are also major beneficiaries of the “100/2,000 Doctoral Students Programme” and are able to employ PhD researchers in disciplines defined by YÖK (n.d.b), including most basic sciences, ICT related fields, and medical areas.

However, only 1.28% of the 8 million students (101,242 students) continue their education with PhD programmes at the 207 Turkish universities. Examining the ratio of PhD students in STEM fields, which are the front-runner disciplines in terms of high-impact publications (CWTS, 2020), less than half (48%) of the PhD students have been trained in these fields at Turkish universities (YÖK, 2019). Turkish universities may increase the ratio of PhD students by attracting internationally mobile postgraduate students from other countries. According to the theoretical frame, ironically, highlighting their ranking achievements is the main strategy for universities’ external image management (Hazelkorn, 2015; Heffernan & Heffernan, 2018; Uslu, 2017). Given all the above, the limitation of Turkey’s international profile is also a handicap to attracting better students from foreign countries. To overcome these deficiencies, the Turkish government may consider establishing various scholarship opportunities and also increase the financial limits for each international student, as many countries have already done around the world (e.g., DAAD, Humboldt, and the DFG scholarships in Germany (Study in Germany, n.d.) or the Australia Awards, Destination Australia, RPT Scholarships in Australia (Study Australia, n.d)).

Although not the main concern of this research, but similar to the case of China as previously described, the extra support (both financially and with staff appointments) for the selected “research universities” deepens the gap with other Turkish universities, especially for the 130 young universities established after 2005 (Özoğlu et al., 2016). Nevertheless, to have a chance to attain the targeted national ranking goals, obviously the Turkish government must increase tremendously their investments in the selected universities’ institutional development and also in the training of highly qualified researchers. In essence, to be able to achieve their ranking goals during the next three years

(until the end of 2023, the centenary year of the Turkish Republic) would appear to be a miracle, considering the time necessary to research, write and publish quality research publications and receive citations for these high-impact publications (Callaham et al., 2002).

Another alternative for the Turkish government is to continue their initial investment plans related to the “research universities” scheme without making any remarkable enhancement. In this scenario, at the end of their proposed target of 2023, they will possibly be able to make only a verbal explanation similar to the Russian experience, as follows: “Russia may still have no universities in the world’s top 100, but its 5-100 Project has made progress, says Philip Altbach, research professor and distinguished fellow in the Center for International Higher Education at Boston College and a member of the 5-100 International Council” (Altbach, 2021). As a more realistic option, as for other countries following similar ranking policies, the Turkish government should re-evaluate the existing conditions related to their top universities, as well as in comparison with their potential competitors, as we did in this research, and revise their ranking vision such as aiming for inclusion in the top 500 first and then in next 100 group (i.e., 300-400) a couple of years later.

All in all, this research assumed *ceteris paribus* conditions for potential competitors when comparing Turkey’s top universities’ ranking outputs. Therefore, similar research can be designed including the rates of change in terms of the input-output criteria for both Turkish and international universities, focusing on a certain time period (e.g., since 2013, the initial year of URAP rankings). Moreover, the researchers in other countries (i.e., Chile (Salmi, 2013), India (DrEducation, 2018), and South Korea (Byun et al., 2013)) which have ranking policies may carry out similar studies to assess the achievability of the national goals for their universities in the initial phase. It may also be worthwhile to inquire in depth the influence of such national ranking policies on the academics working in the related universities by employing qualitative data analysis.

Disclosure Statement

No potential conflict of interest was reported by the author.

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