

# A turning point for Saudi Arabian affiliations in the 2023 Highly Cited Researchers™ list from Clarivate

November 24th, 2023

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# Executive Summary

This study builds upon our more [in-depth report of May 2023](#), which analysed affiliation (switch) patterns of Highly Cited Researchers (HCRs) who indicated primary affiliations to Saudi Arabian institutions between 2014-2022, and at the same time a foreign secondary affiliations. Many of these secondary affiliations actually turned out to be their true primary employers. **Investigations of EL PAÍS**, revealed that some of the HCRs obtained **financial incentives** to switch their affiliation to a Saudi Arabian institution, without having to switch employer<sup>1</sup>.

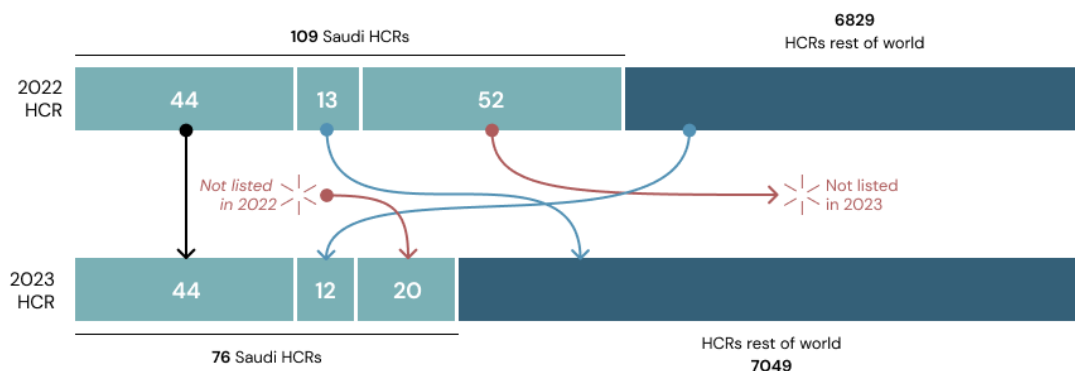
This study analyses the evolution of such cases in the newly released Highly Cited Researchers list of 2023, released on November 15<sup>th</sup>, 2023.

## Our results revealed the following:

- **76 researchers were primarily affiliated to a Saudi Arabian institution in the 2023 Highly Cited Researchers list, down from 109 HCRs in 2022.** This is the biggest drop in the past 10 years and the first drop after a continuous increase of primarily affiliated Highly Cited Researchers in the past 6 years.
- **Percentage of Saudi HCRs who have a foreign secondary affiliation, is 51%** (down from 75% in 2022), which is over **5 times higher the average** share of foreign secondary affiliations in the other benchmark countries.
- **44 of the 2022 Saudi Arabian HCRs remained with the same primary affiliation in 2023.** 60% of them had secondary affiliation from another country.
- **66 were not listed anymore amongst the Saudi Arabian HCRs in 2023:** 13 switched their primary affiliation to an affiliation of another country. 52, disappeared from the HCR list in 2023. Over 80% of those cases had a secondary affiliation country in 2022.
- For those 52 HCRs which aren't listed anymore in 2023, is not clear if a.) they were excluded by Clarivate through their more strict exclusion criteria, b.) they aren't anymore amongst top1% most cited scientists or c.) the HCR decided to not be listed anymore, e.g for the reason of the negative impact the mediatisation of their cases had on their researchers careers.
- **There were 32 newly listed Saudi Arabian HCRs in 2023: 12 HCRs** who were listed **in 2022 under a non-Saudi Arabian primary affiliation**, switched their primary affiliation to a Saudi Arabian institution in 2023. **20 of the new Saudi HCRs in 2023 have not been listed in the Highly Cited Researchers list in 2022.** 50% of them have a secondary affiliation to another country.

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<sup>1</sup> M.Ansede (18/04/2023), Saudi Arabia pays Spanish scientists to pump up global university rankings. *EL PAÍS*. <https://english.elpais.com/science-tech/2023-04-18/saudi-arabia-pays-spanish-scientists-to-pump-up-global-university-rankings.html>



### Focus per Saudi Arabian institution

- **King Saud University (KSU)** still tops the list with most affiliated HCRs, namely 32 HCRs. While in the past year, it was followed by **King Abdulaziz University (KAU)**, this university has dropped to a third its number of HCRs, namely from 31 HCRs in 2022 to 12 HCRs in 2023. The **share of HCRs with a second foreign affiliation dropped from to 87% to 68% for KSU** and from **87% to 42% for KAU** between 2022 and 2023.
- **King Abdullah University of Science & Technology (KAUST)** grew from 15 to 18 HCRs in 2023, positioning itself as the second Saudi Arabian university in terms of numbers of affiliated HCRs. **The share of HCRs, which have a foreign secondary affiliation was halved from 22% in 2022 to 11% in 2023.**
- King Abdulaziz University, according to those first estimations, would lose more than 50 positions and **fall out of the Top 200** in ShanghaiRanking's ARWU 2024.. This will probably reduce the number of Saudi institutions within the Top 200 of the ShanghaiRanking to 1 university, getting further away from the Kingdom's objective of its Vision 2030 to reach 5 universities in the Top 200 of international rankings by 2030.

### Focus per Secondary Affiliation Country

- China tops the list with 7 Saudi Arabian HCRs who indicated a Chinese secondary affiliation. It's the only country with more than 3 HCRs, in contrast to 6 countries in 2022. It's followed by Italy, India and the UK, who all have 3 HCRs who indicate a primary Saudi affiliation.
- The **biggest changes, compared to 2022, can be seen for Germany and Spain.** While **Spain** was the second country in this list, with 11 Saudi HCRs indicating a secondary Spanish affiliation in 2022, in 2023 none such case was observed anymore.
- **Germany** has also seen a significant drop, from 5 Saudi Arabian HCRs, indicating a German secondary affiliation in 2022 to just 1 case in 2023.

## Conclusion

The results of our study shows that **Saudi Arabia experienced the largest drop of Highly Cited Researchers primarily affiliated to them in the past decade** and that this will probably **reduce the number of Saudi institutions within the Top 200** of the Shanghai Ranking to 1 university.

In the short term, this will move Saudi Arabia further away from its Vision 2030 objective of ensuring that 5 universities are ranked in the Top 200 of international rankings by 2030. This said, we believe that, in the long-term, it will have a positive impact on higher education and research policy not only in the countries and universities that were negatively impacted by the previous gaming of affiliations in Clarivate's database of Highly Cited Researchers but also on the Saudi Arabian system of higher education and research itself.

The loss of a few places in the Shanghai Rankings will not make **Saudi Arabia a less attractive place for top researchers** and there have not been big waves of resignations from Saudi Arabian top researchers; **the impact is simply virtual on a virtual list**. The legitimate ambition of becoming a leading nation in research and higher education should be based on sustainable assets and focused on developing local talent. Targeted talent attraction measures make sense only if they are embedded in a wider long-term strategy.

# Introduction

## Context and results of the previous reports

At the end of March 2023, EL PAÍS published [an article](#), placing a major focus on the case of the Highly Cited Research (HCR) Rafael Luque, a full-time civil servant of the University of Córdoba in Spain, who had been suspended from employment and salary for the next 13 years, for the **incorrect scientific affiliation of his research production**. Concretely he **indicated King Saud University as his primary affiliation in the 2022 Highly Cited Researchers™ (HCR) list from Clarivate and only as secondary affiliation his true employer, the University of Córdoba**.

For universities, employing a HCR is considered a mark of quality of the research ecosystem and increases attractiveness. **It also impacts the university's ranking within the ShanghaiRanking's Academic Ranking of World Universities (ARWU)**, since the number of primarily affiliated (and not secondarily affiliated) HCRs is one of its indicators. In practice, adding a single **Highly Cited Researcher HCR might result in a university gaining more than 100 places<sup>2</sup>**.

This news of the case in Córdoba triggered the launch of a series of reports by us, [SIRIS Academic](#), and parallel investigations by journalists, especially from **EL PAÍS** and consequently by scientific institutions and governmental agencies.

Concretely, **our first report “[The affiliation game between Spanish and Saudi Arabian higher education & research institutions](#)”** in April 2023 aimed at **contextualising the case better** and showed that a similar pattern of such affiliation practices to Saudi Arabian institutions can be found within the **Highly Cited Researchers™ list produced by Clarivate<sup>3</sup>**, with 109 cases identified around the world. The particular focus, case by case, was laid on the Spanish HCRs with a primary affiliation to a Saudi Arabian institution in 2022.

The attention drawn by the press around the topic led to **further cases being questioned**, notably in the Spanish context, where, through **investigations of EL PAÍS**, it was revealed that many of the HCRs obtained **financial incentives** to switch their affiliation to a Saudi Arabian institution, without having to switch employer<sup>4</sup>. A case of an **intermediary agency, which received commissions** for convincing HCRs to switch their affiliation, was also revealed<sup>5</sup>.

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<sup>2</sup> ShanghaiRanking's ARWU includes [five other indicators](#) but are far harder for a university to influence: whereas you can hire a Highly Cited Scholar to increase your score in the HiCi indicator, a Nobel Prize must be working in your university when they are awarded the prize for this to count.

<sup>3</sup> a list of around 7000 researchers who stand out by having published, over the last decade, multiple papers which are amongst the top 1% more cited - so called “highly cited papers”.

<sup>4</sup> M.Ansele (18/04/2023), Saudi Arabia pays Spanish scientists to pump up global university rankings. *EL PAÍS*. <https://english.elpais.com/science-tech/2023-04-18/saudi-arabia-pays-spanish-scientists-to-pump-up-global-university-rankings.html>

<sup>5</sup> M.Ansele (20/04/2023), Un catedrático capta con su empresa tapadera a científicos



The news drew global attention, and asked for even better contextualisation of the cases. We therefore published in May 2023 the international in-depth version of our report titled “[\*Full International Edition \(2014-22\): The affiliation game of Saudi Arabian higher education & research institutions\*](#)”. This report considered the **entire timespan between 2014-2022**, understanding the evolution of affiliation practices of **Saudi Arabian institutions**, and investigated more in depth the **cases of the 8 countries, which appeared most often in secondary affiliations of Saudi Arabian HCRs** between 2014-22 and finally identified recurring patterns of affiliation switches.

The main results were:

- **Saudi Arabia**, with 109 Highly Cited Researchers in 2022 has a 5 to **10 times higher share of HCRs amongst its researchers (0.44 %)** compared to countries such as **Spain, Germany or France**, and twice as high than Switzerland and the Netherlands, which have some of the highest share of HCRs amongst its researchers.
- The **number of HCRs primarily affiliated** to a Saudi Arabian institution has been **growing** from 27 in 2014 to 109 in 2022, while the secondary affiliations have fallen from 129 in 2014 to 10 in 2020. As a reminder, since 2014 ARWU no longer takes into account secondary affiliations for its ranking.
- **75 % of Saudi Arabian HCRs in 2022 have a second foreign affiliation**; far higher than for the other countries we looked at, where foreign secondary affiliations accounted for 0-13%. The share of foreign second affiliations depends on the institution: it is especially high for King Abdulaziz University (81%) and King Saud University (82%), while it is only half as high for the King Abdullah University of Science & Technology (41%). Most Saudi Arabian universities are not concerned by this phenomenon. From the **274 HCRs affiliated to Saudi Arabian institutions between 2014-22**, there were **only 64 HCRs** which indicated **solely Saudi Arabian institutions in their affiliations**.
- The **8 countries, which appeared most often in secondary affiliations of Saudi Arabian HCRs between 2014-2022** were: **China** (44 HCRs), **Spain** (19 HCRs), **USA** (16 HCRs), **Turkey** (14 HCRs), **India** and **UK** (both 13 HCRs), **Italy** and **Germany** (both 12 HCRs). Those represent 139 HCRs out of the of the **total 210 different HCRs, stemming from 41 countries, who have indicated Saudi Arabia as their primary affiliation and a foreign institution as a secondary affiliation, between 2014-2022**.
- The **affiliation history in the Highly Cited Researchers™ list from Clarivate of the 139 HCRs from the 8 countries have been analysed in depth**.
- **3 main models of affiliation switches were identified**:
  - **Model 1 (When primary becomes secondary model)**, for cases where after several years of primary affiliation with one institution, the HCR switches

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españoles para que mientan y digan que trabajan en una universidad saudí. EL PAÍS. <https://elpais.com/ciencia/2023-04-20/un-catedratico-capta-con-su-empresa-tapadera-a-cientificos-espanoles-para-que-mientan-y-digan-que-trabajan-en-una-universidad-saudi.html>

- their primary affiliation to secondary affiliation, leaving the place to the Saudi university. This happened for **49% of the analysed cases**.
- **Model 2 (The rollercoaster careers model)** represents affiliation practices with strong fluctuations by e.g. switching each year affiliation order or having affiliations to various Saudi Arabian universities. This happened for **9% of the analysed cases**.
  - **Model 3 (The True Saudi? model)** stands for cases where HCRs enter the HCR list from the beginning with a Saudi university as primary affiliation and a foreign institution as secondary affiliation; they never make any switches. The emphasis in this model is on the question mark in the model name, as from the data alone it is not clear if it's either a fully legitimate case where the main employer is the Saudi Arabian university or a case where the switch was made before the publication of the final HCR list. This happened for **42% of the analysed cases**.
  - Some cases of **universities, whose position in the ShanghaiRanking's ARWU has been affected by potential gaming practices of Saudi Arabian universities were highlighted**. We show how lower ranked universities with few HCRs can be deeply affected with **changes of ranks of over 100 places**.

Most importantly, the **previous report also introduces the problem of institutional affiliations, related to this the important role of research integrity** and moreover explains in more depth the methodology of the selection process of Highly Cited Researchers by Clarivate and explains its relevance in the context of the ShanghaiRanking's ARWU university ranking. We will omit those sections in this report and **refer to our previous report** for this contextualization.

## Impact of and reaction on the previous reports

The revelations of the facts [in our report](#), together with the investigations by EL PAIS, led to broad reaction from the scientific community. This list is a excerpt of the impact it had:

- **Institutional ethical committees** set in place, amongst others by the:
  - **CSIC:** In April 2023 CSIC announced it will investigate the cases of the researchers affiliated to its organisation<sup>6</sup> and in November 2023 it initiated disciplinary proceedings against five academics allegedly involved in the ruse.<sup>7</sup>
  - **Catalan Government :** In April the Catalan Government it will investigate the

<sup>6</sup> JULIO CARABAÑA (18/04/2023). El CSIC investiga el «fichaje» de investigadores españoles. LA RAZON. <https://www.larazon.es/sociedad/csic-investiga-fichaje-investigadores-espanoles-20230418643edaf91036390001d528c5.html>

<sup>7</sup> Manuel Ansele (08/11/2023). Spanish national research council investigates five scientists for manipulating university rankings. EL PAIS. <https://english.elpais.com/science-tech/2023-11-08/spanish-national-research-council-investigates-five-scientists-for-manipulating-university-rankings.html>



Catalan cases<sup>8</sup> and in May 2023 the Committee for the Integrity of Research in Catalonia set up by the government for those cases published recommendations on multiple affiliation in journals<sup>9</sup>

- **Statements by Dutch<sup>10</sup> and Spanish ministers<sup>11</sup>** denouncing the cases of researchers indicating false affiliations.
- **Clarivate statement** on Highly Cited Researcher affiliations on 25 April 2023, to position their role in the context of those revelations<sup>12</sup>
- Involved Highly Cited Researcher of Sant Joan de Déu Research Institute **forced to renounce her contract with Saudi Universities** and later **resigned from her ICREA position** and left Spain<sup>13</sup>
- Scientists from the The Catalan Institute for Water Research **asked that their director, who had a primary Saudi Arabian affiliation, leave his position as director<sup>14</sup>**
- **Wageningen University & Research** started investigation into foreign affiliations: Involved HCR ***may not lead his research and teaching group for two years. He will stay on as a regular professor, but will be fired if he goes wrong again.***<sup>15</sup>
- The newly formed **Spanish Research Ethics Committee** published its first **report on authorship and affiliations of scientific and technical papers in November 2023.**<sup>16</sup>

<sup>8</sup> EFE (19/04/2023), Universidades investigará malas praxis de científicos con centros saudíes, LA VANGUARDIA. <https://www.lavanguardia.com/vida/20230419/8908008/universidades-investigara-malas-praxis-investigadores-centros-saudies.html>

<sup>9</sup> Comit  para la Integritat de la Investigaci  en Catalunya (16/05/2023) Recomendaci n 1/2023, de 16 de mayo, sobre m ltiples afiliacions en revistes cient fiques [https://recercaiuniversitats.gencat.cat/es/01\\_departament\\_recerca\\_i\\_universitats/el\\_departament/organismes/comite-per-a-la-integritat-de-la-recerca-a-catalunya-circat/Dictamen-1-2023-sobre-afiliacions-multiples-en-revistes-cientifiques](https://recercaiuniversitats.gencat.cat/es/01_departament_recerca_i_universitats/el_departament/organismes/comite-per-a-la-integritat-de-la-recerca-a-catalunya-circat/Dictamen-1-2023-sobre-afiliacions-multiples-en-revistes-cientifiques)

<sup>10</sup> [https://www.linkedin.com/posts/robbertdijkgraaf\\_saoedische-universiteit-betaalt-wetenschappers-activity-7061247501877555200-SVxB?utm\\_source=share&utm\\_medium=member\\_ios](https://www.linkedin.com/posts/robbertdijkgraaf_saoedische-universiteit-betaalt-wetenschappers-activity-7061247501877555200-SVxB?utm_source=share&utm_medium=member_ios)

<sup>11</sup> <https://www.lavanguardia.com/local/valencia/20230419/8907227/subirats-aboga-indicadores-distintos-numericos-valorar-universidades-evitar-efectos-perversos.html>

<sup>12</sup> <https://clarivate.com/news/clarivate-statement-on-highly-cited-researcher-affiliations/>

<sup>13</sup> M. Ansede (20/04/2023), One of the most internationally cited scientists, Ai Koyanagi, forced to renounce her controversial contract with a Saudi university. EL PA S. <https://english.elpais.com/science-tech/2023-04-20/one-of-the-most-internationally-cited-scientists-ai-koyanagi-forced-to-renounce-her-controversial-contract-with-a-saudi-university.html> and resignation source: <https://www.icrea.cat/Web/ScientificStaff/ai-koyanagi-296718>

<sup>14</sup> M. Ansede (27/04/2023), Los cient ficos de la instituci n del qu mico Dami  Barcel  piden su suspensi n cautelar tras su implicaci n en el esc ndalo de la trama saud . EL PA S. <https://elpais.com/ciencia/2023-04-27/los-cientificos-de-la-institucion-del-quimico-damia-barcelo-piden-su-suspension-cautelar-tras-su-implicacion-en-el-escandalo-de-la-trama-saudi.html>

<sup>15</sup> <https://www.miragenews.com/wur-start-investigation-into-foreign-1000896/> and <https://www.volkskrant.nl/nieuws-achtergrond/zwarte-straf-voor-hoogleraar-die-saoedische-universiteit-hielp-ranglijst-te-manipuleren~bb8219e4/>

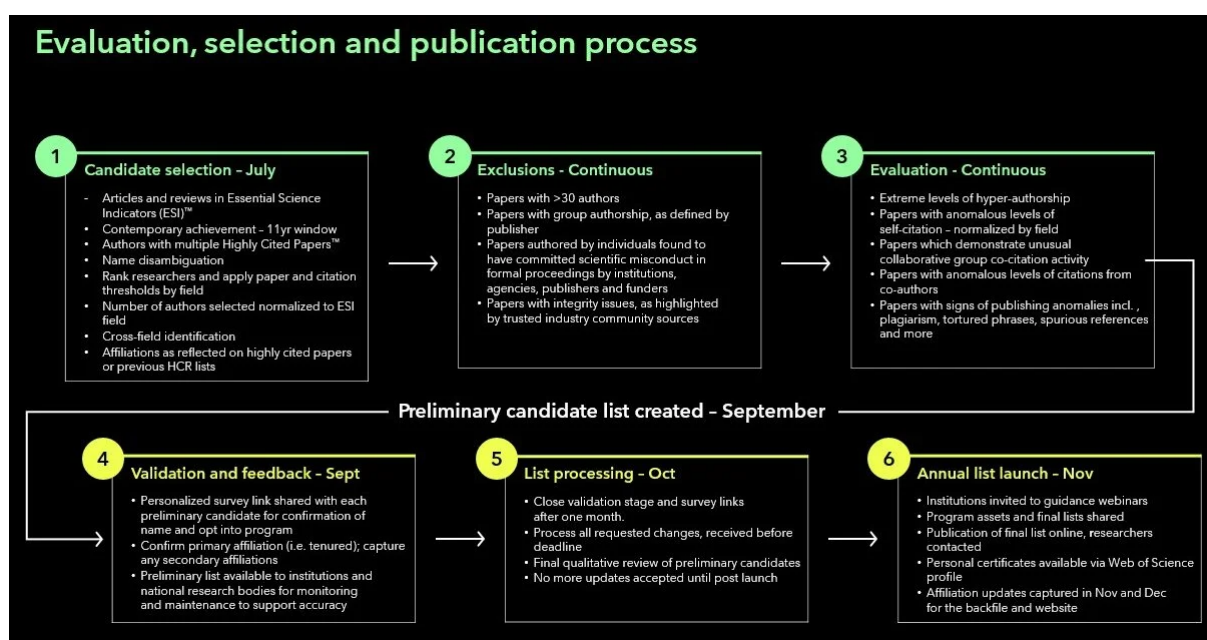
<sup>16</sup> <https://www.ciencia.gob.es/Noticias/2023/noviembre/El-Comit--Espa ol-de--tica-en-la-Investigaci n-aprueba-su-primer-informe-sobre-la-autor-a-y-las-afiliaciones-de-los-trabajos-cient ficos-y-t cnicos.html>

## Highly Cited Researchers in 2023 list: what's new?

The aim of this study is to analyse the evolution of above-mentioned Saudi double affiliation cases in the newly released Highly Cited Researchers list of 2023, released on November 15<sup>th</sup>, 2023<sup>17</sup>.

In a blog post announcing the launch of the list, the Head of Research Analysis at the Institute for Scientific Information of Clarivate<sup>18</sup>, explained that **Clarivate has evolved their evaluation and selection policies** for their annual Highly Cited Researchers program *to address the challenges of an increasingly complex and polluted scholarly record*.

We deem it important to copy their explanations from the blog post on how they evaluate and exclude researchers from a preliminary list, which is constructed on citation data from the papers published from the previous 11-year rolling window. The summary can be found in Fig. 1.



**Fig. 1** Evaluation, selection and publication process by Clarivate in the context of the Highly Cited Researchers list. Source: Clarivate<sup>19</sup>

"After the citation triage stage, we look at a growing number of factors when evaluating papers including, but not but limited to:

- *Hyper-authorship of papers – Our expectation is that an author has provided a meaningful contribution to any paper which bears their name and the publication of multiple papers per week over long periods strains our*

<sup>17</sup> <https://clarivate.com/highly-cited-researchers/>

<sup>18</sup> <https://clarivate.com/blog/highly-cited-researchers-2023-the-evolution-of-our-evaluation-and-selection-policy-to-support-a-robust-scholarly-landscape/>

<sup>19</sup> <https://clarivate.com/highly-cited-researchers/evaluation-and-selection>

*understanding of normative authorship and credit.*

- *We exclude papers which reveal an excessive level of self-citation for the field of research – our paper outlines how we determine [How much is too much?](#)*
- *We look for evidence of extraordinary, very recent publications that represent research of incremental value, accompanied by high levels of author self-citation.*
- *Unusual patterns of collaborative group citation activity and anomalous levels of citations from co-authors. The identification of networks of co-authors raises the possibility that an individual's high citation counts may be highly reliant on citations from this network; if more than half of a researcher's citations derive from co-authors, we consider this to be narrow influence, rather than the broad community influence we seek to reflect.*

*With the continuing assistance of [Retraction Watch](#) and its unparalleled database of retractions we enhanced our qualitative analysis in 2022; this exercise has continued. This year we also took account of expressions of concern from identified representatives at research institutes, national research managers and our institutional customers, along with information shared with us by other collective community groups, e.g. [For Better Science](#), [Pub Peer](#). Some of these resources include anonymous or whistleblower sources. We also consider such evidence from trusted sources – where we can verify claims through direct observation.”<sup>20</sup>*

On the basis of latter Clarivate explained in their updated Evaluation and Selection section<sup>21</sup> that **researchers found to have committed scientific misconduct** in formal proceedings conducted by a researcher's institution, a government agency, a funding agency, or a publisher **cannot be selected as a Highly Cited Researcher**.

The impact of their new approach for selecting and excluding HCRs, led to the number of potential preliminary **candidates excluded from the Highly Cited Researchers list increased from 500 in 2022 to more than 1,000 in 2023**.

Those changes in Clariavate's selection criteria are a **clear impact of increased call from the community to uphold research integrity**, but have also presumably been impacted by the mediatisation and institutional investigations of the cases of falsely affiliated Saudi Arabian HCRs. As this report will show, those changes have strongly impacted the listing of Highly Cited Researchers affiliated with a Saudi Arabian institution in 2023.

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<sup>20</sup> <https://clarivate.com/blog/highly-cited-researchers-2023-the-evolution-of-our-evaluation-and-selection-policy-to-support-a-robust-scholarly-landscape/>

<sup>21</sup> <https://clarivate.com/highly-cited-researchers/evaluation-and-selection/>

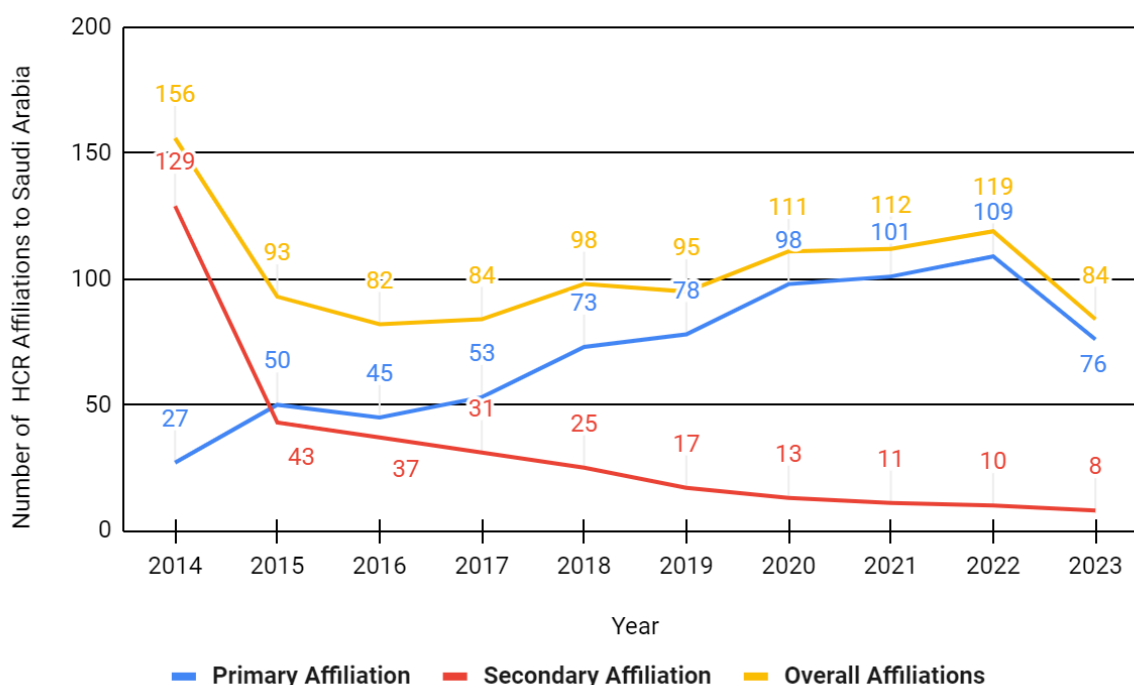
## Overview

As an opening disclaimer, our study is merely about identifying institutional practices. We therefore chose to remove individual names, which, for those interested, are openly available through the Clarivate webpage.

We want to emphasise that we have no way of knowing whether an individual's affiliation practice is legitimate or not - that might depend on highly contextual circumstances - and we do not have the legitimacy to raise that question, which should be tackled by institutions themselves.

## Primary affiliated Saudi Arabian Highly Cited Researchers: What's new in 2023?

**76 researchers were primarily affiliated to a Saudi Arabian institution in the 2023 Highly Cited Researchers list, down from 109 in 2022.** This is the biggest drop in the past 10 years and the first drop after a continuous increase of primarily affiliated Highly Cited Researchers in the past 6 years. Also the number of HCRs with secondary affiliation to a Saudi Arabian institution has continued to drop, from 10 in 2022 to 8 in 2023.



**Fig. 2 .** Number of Highly Cited Researchers affiliated to Saudi Arabia between 2014-2023. Overall affiliations (yellow), primary (blue) and secondary affiliations (red) are distinguished.

It is important to note that this number is still extremely high compared to the overall number of researchers in Saudi Arabia. Table 1. shows that the **share of Saudi Arabian HCRs amongst all researchers, 0.31%, is close to 2 times higher than in the US or the UK** (0.17% and 0.18 %) and around 4 times higher than countries like China, Germany, Italy and Spain who have a share of 0.05-0.07% of HCRs. More remarkably is the **percentage of those HCRs who have a foreign secondary affiliation, namely 51%** (down from 75% in 2022), which is over **5 times higher the average** share of foreign secondary affiliations in the other benchmark countries.

	Number of researchers in FTE (2021 <sup>22</sup> )	Number of HCRs (2023)	Share of HCRs amongst all researchers	HCRs with foreign 2nd affiliation country (2023)	% of HCRs with foreign 2nd affiliation country (2023)
<b>USA</b>	1,493,074 <sup>23</sup>	2544	0.17%	64	3%
<b>China</b>	2,405,510	1,194	0.05%	69	6%
<b>UK</b>	309,074 <sup>24</sup>	560	0.18%	40	7%
<b>Germany</b>	461,643	330	0.07%	25	8%
<b>Saudi Arabia</b>	24,749	76	0.31%	39	51%
<b>Italy</b>	158,959	114	0.07%	9	8%
<b>Spain</b>	154,126	97	0.06%	10	10%
<b>India</b>	361,924 <sup>25</sup>	20	0.01%	4	20%
<b>Turkey</b>	168,879	7	0.00%	1	14%

**Table 1.** Per country; total number of researchers, number of Highly Cited Researchers primarily affiliated to each country in 2023 and share amongst those who have a second foreign affiliation.

The coming chapters will go in depth into the cause of this drop and identify if some institutions or secondary affiliated countries have been impacted more than others.

<sup>22</sup> Calculated from the UNESCO Institute for Statistics (UIS) indicators “Researchers per million inhabitants (FTE)” and “Total population (thousands)”

<sup>23</sup> UIS data from 2020

<sup>24</sup> UIS data from 2018

<sup>25</sup> UIS data from 2020

## Researchers affiliation pathways: What happened with the Saudi HCRs of 2022 and who are the new Saudi HCRs of 2023?

As commented in the previous chapter, there were in the 2022 Highly Cited Researchers list 109 researchers with a primary Saudi Arabian affiliation. This number was reduced by 33 HCRs in 2023 to 76 Saudi Arabian Highly Cited Researchers.

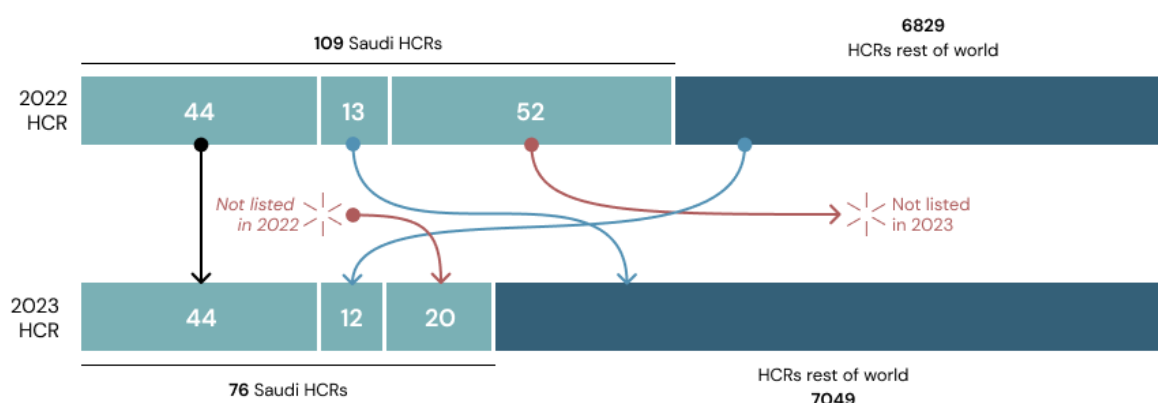
Figure 3 takes a closer look at the researchers' affiliation pathways:

**44 of the 2022 Saudi Arabian HCRs remained with the same primary affiliation in 2023.**

**65 researchers were not listed anymore as Saudi Arabian HCRs in 2023: 13 HCRs switched their primary affiliation to an affiliation of another country and nearly half of them, 52 researchers, disappeared from the HCR list in 2023.**

For those **52 HCRs who aren't listed anymore in 2023**, it is not **not clear** if a.) they **were excluded by Clarivate** through their more strict exclusion criteria, b.) they **aren't anymore amongst the top1% most cited scientists** or c.) the **HCR decided to not be listed anymore**, e.g for the reason of the negative impact the mediatisation of their cases had on their researchers careers.

In addition, **32 researchers were listed newly as Saudi Arabian HCR: 12 HCRs who were listed in 2022 under a non-Saudi Arabian primary affiliation, switched their primary affiliation to a Saudi Arabian institution in 2023.** Finally, **20 of the new Saudi HCRs in 2023 were not listed in the Highly Cited Researchers list in 2022.**



**Fig. 3 .** Pathways of HCRs in between the 2022 and 2023 list with a focus on primary affiliation to Saudi Arabia. Black arrow indicates HCRs, which remained primarily affiliated to HCRs. Blue arrows indicate HCRs, which switched affiliations between 2022 and 2023. Red arrows indicate HCRs which were listed only in one of both HCR List editions.



This more detailed analysis of the switches shows, that the **main reason for the decrease in the number of HCRs for Saudi Arabia in 2023 is the far larger number of HCR who aren't listed anymore in the 2023 HCR list, compared to Saudi HCRs from 2023 who weren't listed in 2022.** The remaining flux of HCRs remains more or less equal, i.e. the number of HCRs, which changed their affiliation to a Saudi Arabian institution in 2023 (12 HCRs) is comparable to the number of those which switched their 2022 Saudi affiliation to another one (13 HCRs).

# Focus per Saudi Arabian institution

## Primary affiliated Saudi Arabian Highly Cited Researchers: What's new in 2023?

Looking at the evolution for each of the listed Saudi Arabian institutions, we can see that **King Saud University (KSU)** still tops the list with most affiliated HCRs, namely 32 HCRs. While in the past year, it was followed by **King Abdulaziz University (KAU)**, this university has dropped to a third its number of HCRs, namely from 31 HCRs in 2022 to 12 HCRs in 2023.

Primary Affiliations	2022 HCR list			2023 HCR list		
	Overall	Foreign 2nd affil.	% Foreign 2nd affil.	Overall	Foreign 2nd affil.	% Foreign 2nd affil.
<b>King Saud University</b>	39	34	87%	32	22	69%
<b>King Abdullah University of Science &amp; Technology</b>	15	4	27%	18	2	11%
<b>King Abdulaziz University</b>	31	27	87%	12	5	42%
<b>Taif University</b>	10	9	90%	6	3	50%
<b>Princess Nourah bint Abdulrahman University</b>	7	5	71%	5	5	100%
<b>Ministry of Health - Saudi Arabia</b>	1	1	100%	1	0	0%
<b>Johns Hopkins Aramco Healthcare, Saudi Arabia</b>				1	1	100%
<b>Qassim University, Saudi Arabia</b>				1	1	100%
<b>King Fahd University of Petroleum &amp; Minerals</b>	5	2	40%			
<b>King Abdullah International Medical Research Center (KAIMRC)</b>	1	0	0%			

**Table 2.** Number of primary affiliated HCRs per Saudi Arabian institution in 2022 and 2023 and share HCRs with a foreign secondary affiliation.

The only major institution, which did not lose HCRs between 2022 and 2023, is the **King Abdullah University of Science & Technology (KAUST)**, which increased from 15 to 18 HCRs in 2023, positioning itself as the second Saudi Arabian university in terms of numbers of affiliated HCRs. The latter two institutions have also halved between

2022 and 2023 their share of HCRs, which have a foreign secondary affiliation (KAUST from 22% to 11% and KAU from 87% to 42%). **KAUST** has a very low share of foreign secondary affiliation, and its percentage resembles figures found in other benchmark countries (see Table 2. above). The share of KSU still remains very high, at 69%, while for **Princess Nourah bint Abdulrahman University** 100% of its 5 HCRs have a foreign secondary affiliation. **Taif University**, the 4<sup>th</sup> institution in number of HCRs (6 HCRs) has nearly halved its number of HCRs, but also the share of foreign secondary affiliation (90 to 50%) in 2023.

Finally, interestingly, **King Fahd University of Petroleum & Minerals** lost all of its 5, in 2022, listed HCRs. The next chapter will analyse in more depth what happened with those researchers.

This change in the number of HCRs for Saudi Arabian universities will also impact their position in the ShanghaiRanking's Academic World ranking of Universities (ARWU) of 2024, which takes the number of HCRs in the 2023 list into account. Given that ShanghaiRanking's ARWU 2024 relies on publication data from 2023, no predictions of the rankings of 2024 can be made at this stage, as not all indicators can be calculated yet. Instead, an estimation of its position could be made, with the assumptions that all remaining scores of remaining institutions remain equal, while updating the scores of the Highly Cited Researchers indicator for the Saudi Arabian universities. Table 3. shows the results<sup>26</sup>.

	Number of HCRs 2022	Number of HCRs 2023	ARWU 2023	Simulated position in ARWU 2024 (all things being equal)
<b>King Saud University</b>	39	32	115	128
<b>King Abdulaziz University</b>	31	12	166	221
<b>King Abdullah University of Science and Technology</b>	15	18	256	236
<b>Taif University</b>	10	6	293	317
<b>Princess Nourah Bint Abdulrahman University</b>	7	5	385	440

**Table 3.** Impact of the 2023 HCRs numbers on positions of Saudi Arabian universities in ShanghaiRanking's ARWU 2024, assuming all other indicator scores remain equal.<sup>27</sup>

<sup>26</sup> Simulations were carried out in collaboration with [Domingo Docampo](#).

<sup>27</sup> While in our report we count HCRs appearing in two different categories as one HCR, ARWU counts this HCR double.

The biggest impact of the changes in the HCR list 2023, will be felt by King Abdulaziz University: **according to those first estimations it would lose more than 50 positions and fall out of the Top 200 in ShanghaiRanking's ARWU 2024, concretely 221<sup>st</sup>.**

Besides being a big drop, this also **reduces the number of Saudi Arabian universities that will be ranked in the Top 200 of Shanghai Ranking's ARWU to one**, namely King Saud University, which would lose a dozen of places from 115 in 2023 to somewhere around rank 128 in 2024, thus still in the 101-150 range. This is relevant, as one of the **main objectives, in terms of higher education in the Saudi Vision 2030 program<sup>28</sup>, is to have at least five Saudi universities among the top 200** universities in international rankings. Looking at the other main international rankings, THE and QS, the situation doesn't look better: In THE World University Ranking 2024<sup>29</sup>, which changed in 2023 its methodology<sup>30</sup>, no Saudi Arabian university is ranked in the Top 200. King Abdulaziz University was ranked 101st last year, but suffered in the 2024 ranking (published in 2023) a loss in 150 positions, amongst others probably due to the change in methodology. In the QS World University Ranking 2024<sup>31</sup>, 2 Saudi Arabian universities are ranked in the Top 200, namely King Abdulaziz University and King Fahd University of Petroleum & Minerals. QS also changed their methodology in 2023<sup>32</sup>.

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#### AN EDUCATION THAT CONTRIBUTES TO ECONOMIC GROWTH

We will close the gap between the outputs of higher education and the requirements of the job market. We will also help our students make careful career decisions, while at the same time training them and facilitating their transition between different educational pathways. In the year 2030, we aim to have at least five Saudi universities among the top 200 universities in international rankings. We shall help our students achieve results above international averages in global education indicators.

**Fig. 4.** Screenshot from the Vision 2030 Program, indicating the objective in terms of 5 Saudi Arabian Universities in the Top 200 of international rankings <sup>33</sup>

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<sup>28</sup>A government program launched in 2016 by the Kingdom of Saudi Arabia that aims to achieve the goal of increased diversification economically, socially and culturally, in line with the vision of Saudi Crown Prince and Prime Minister Mohammed bin Salman. <https://www.vision2030.gov.sa/>

<sup>29</sup> <https://www.timeshighereducation.com/world-university-rankings/2024/world-ranking>

<sup>30</sup> <https://www.timeshighereducation.com/world-university-rankings/world-university-rankings-2024-methodology>

<sup>31</sup> <https://www.topuniversities.com/world-university-rankings?countries=sa>

<sup>32</sup> <https://www.topuniversities.com/qs-world-university-rankings/methodology>









<sup>33</sup> <https://www.vision2030.gov.sa/media/cofh1nmf/vision-2030-overview.pdf>

Regarding the other Saudi Arabian universities in the estimated evolution for Shanghai Ranking's ARWU 2024, we see KAUST, which is approaching the Top 200 by moving from position 256 to 236. Taif University would fall out of the Top 300, while Princess Nourah Bint Abdulrahman University will probably fall out of the Top 400.

## **Researchers affiliation pathways: What happened with the Saudi HCRs of 2022 and who are the new Saudi HCRs of 2023?**

Looking in more depths on the affiliation pathways of the HCRs affiliated to Saudi Arabian institutions in 2022 or 2023, we can see that King Saud University lost 21 of its 39 primarily affiliated HCRs of 2022 (14 were not listed anymore in 2023 and 7 switched affiliation) and that King Abdulaziz University lost 24 of its 31 HCRs of 22 (19 were not listed anymore in 2023 and 5 switched affiliation). For both universities this is over half of HCRs, while for King Abdullah University of Science & Technology just 3 out of 15 HCR didn't appear affiliated anymore to the university in 2023 (2 were not listed anymore in 2023 and 1 switched affiliation). The impact was also big on Taif University, Princess Nourah bint Abdulrahman University and King Fahd University of Petroleum & Minerals, which all lost over 70% of their HCRs between 2022 and 2023.

Newly affiliated HCRs to the institutions can be seen especially for KSU which had 13 newly affiliated HCRs (6 switched affiliations from another institution), 6 for KAUST and 5 for KAU (1 switched affiliation from another institution in both cases)

Primary Affiliation	Primary Affiliation Saudi Arabia 2022		Primary Affiliation Saudi Arabia 2022 & 2023	Primary Affiliation Saudi Arabia 20223	
	 HCR 2022 ↓ NOT LISTED HCR 2023	 HCR 2022 ↓  HCR 2023	 HCR 2022 ↓  HCR 2023	 HCR 2022 ↓  HCR 2023	NOT LISTED HCR 2022 ↓  HCR 2023
King Saud University	14	7	18	6	7
King Abdullah University of Science & Technology	2	1	12	1	5
King Abdulaziz University	19	5	7	1	4
Taif University	7		3	2	1
Princess Nourah bint Abdulrahman University	5		2		3
Ministry of Health - Saudi Arabia			1		
John Hopkins Aramco Healthcare, Saudi Arabia				1	
Qassim University, Saudi Arabia				1	
King Fahd University of Petroleum & Minerals	4		1 <sup>34</sup>		
King Abdullah International Medical Research Center	1				
<b>TOTAL</b>	<b>52</b>	<b>13</b>	<b>44</b>	<b>12</b>	<b>20</b>

**Table 4 .** Per Saudi Arabian institution: pathways of researchers' affiliation for HCRs primarily affiliated to Saudi Arabian institutions in 2022 or 2023 in the HCR list.

<sup>34</sup> The researchers switched his affiliation in 2023 from King Fahd University of Petroleum & Minerals to King Saud University



# Focus per Secondary Affiliation Country

## Countries appearing in secondary affiliation of Saudi Arabian HCRs: What's new in 2023?

Saudi Arabia has a remarkable share of HCRs, which have a foreign secondary affiliation (75 % of cases in 2022 and 51% of cases in 2023), which, as commented in the introduction, often turns out to be their actual real primary affiliation.

While in 2022, six secondary affiliation countries had more than 4 HCRs with a primary affiliation to a Saudi Arabian institution (China with 12 HCRs, Spain with 11 HCRs, Italy and UK with 6 HCRs and India with 5 HCRs), in 2023 only **China** remains in this range, with **7 Saudi Arabian HCRs who indicated a Chinese secondary affiliation**. It's followed by **Italy, India and the UK, who all have 3 HCRs** who indicate a primary Saudi affiliation. The **biggest changes, compared to 2022, can be seen for Germany and Spain**. While **Spain** was the second country in this list, with 11 Saudi HCRs indicating a secondary Spanish affiliation in 2022, in 2023 none such case was observed anymore. This almost certainly reflects the **strong impact the wide media coverage in Spain and the consequent investigations by institutions and governments had on Spanish researchers with a Saudi Arabian affiliation**. **Germany** has also seen a significant drop, from 5 Saudi Arabian HCRs, indicating a German secondary affiliation in 2022 to just 1 case in 2023. The next section will go more in depth in the evolution of those numbers, to understand whether the difference is due to change of affiliations or because they are not listed anymore in the HCR list 2023.

**Newcomer countries** in the list are, **Hungary, Japan, Mexico, Taiwan and Tunisia**, who since 2014 had never appeared in secondary affiliations of Saudi Arabian HCRs.

Also, important to note, is that the number of Saudi Arabian HCRs, which do not have a foreign secondary affiliation, has increased from 27 to 37 HCRs<sup>35</sup> in 2023. These are presumably researchers who are indeed employed at a Saudi Arabian institution and based in the country.

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<sup>35</sup> Note that one HCR indicated as a secondary affiliation another Saudi Arabian institution.









Primary Affiliation Saudi Arabia			
Secondary Affiliation Country	Number of HCRs (2022)	Number of HCR (2023)	Evolution
China	12	7	-5
Italy	6	3	-3
United Kingdom	6	3	-3
India	5	3	-2
Pakistan	4	2	-2
Egypt	3	2	-1
Denmark	2	2	0
Estonia	2	2	0
Germany	5	1	-4
Turkey	4	1	-3
United States	3	1	-2
Brazil	2	1	-1
Greece	2	1	-1
Russia	2	1	-1
Switzerland	2	1	-1
Australia	1	1	0
Mauritius	1	1	0
Hungary	0	1	1
Japan	0	1	1
Mexico	0	1	1
Saudi Arabia	0	1	1
South Africa	0	1	1
Taiwan	0	1	1
Tunisia	0	1	1
Spain	11	0	-11
Netherlands	2	0	-2
Algeria	1	0	-1
Bangladesh	1	0	-1
Chile	1	0	-1
Malaysia	1	0	-1
Norway	1	0	-1
Slovakia	1	0	-1
Vietnam	1	0	-1

<b>Total secondary affiliation country</b>	82	39	-43
<b>No second affiliation</b>	27	37	10
<b>TOTAL</b>	<b>109</b>	<b>76</b>	<b>-33</b>

**Table 5 .** *Distribution of Highly Cited Researchers per country of secondary affiliation for researchers who have listed as primary affiliation a Saudi Arabian institution in 2022 or 2023.*

## Researchers affiliation pathways: What happened with the Saudi HCRs of 2022 and who are the new Saudi HCRs of 2023?









Out of the 109 HCRs with primary Saudi affiliation in 2022, 82 (75%) had a foreign secondary affiliation. This number was reduced to 39 HCRs (51%) with a secondary affiliation in 2023. Following table shows what happened in terms of affiliation pathway between 2022 and 2023 for the HCRs, which have a secondary affiliation.

	Primary Affiliation Saudi Arabia 2022		Primary Affiliation Saudi Arabia 2022 & 2023	Primary Affiliation Saudi Arabia 2023	
	 HCR 2022 ↓ NOT LISTED HCR 2023	 HCR 2022 ↓  HCR 2023	 HCR 2022 ↓  HCR 2023	 HCR 2022 ↓  HCR 2023	NOT LISTED HCR 2022 ↓  HCR 2023
HCRs with a secondary affiliation country	43	12	27	8	8
No secondary affiliation	9	1	17	4	12
TOTAL	52	13	44	12	20

**Table 6 .** Distribution of HCRs with a secondary affiliation country per type pathway of researchers' affiliation for HCRs primary affiliated to Saudi Arabian institutions in 2022 or 2023 in the HCR list.

The table shows that over **80% of cases of Saudi Arabian HCRs of 2022, which are not listed anymore as Saudi Arabian HCR in 2023 had a secondary affiliation country** (43 of 52 HCRs which are not listed anymore in 2023 and 12 of 13 HCRs which switched their affiliation). **60% who kept their Saudi affiliation in 2023 had a secondary affiliation from another country.** Finally, **50% of the HCRs who appear newly as Saudi Arabian HCRs in 2023, have a secondary affiliation to another country** (67 % amongst those who had a foreign affiliation in 2022, and 40% of those who were not listed in 2022).

Table 7. shows for the concrete distribution for each country of secondary affiliations.

Secondary Affiliation Country	Primary Affiliation Saudi Arabia 2022		Primary Affiliation Saudi Arabia 2022 & 2023	Primary Affiliation Saudi Arabia 20223	
	 HCR 2022 ↓ NOT LISTED HCR 2023	 HCR 2022 ↓  HCR 2023	 HCR 2022 ↓  HCR 2023	 HCR 2022 ↓  HCR 2023	NOT LISTED HCR 2022 ↓  HCR 2023
China	9		3	2	2
United Kingdom	2	1	3		
Italy	2	2	2		1
India	3		2		1
Pakistan	3		1		1
Turkey	3		1 <sup>36</sup>		1
Egypt	2		1		1
United States	2		1 <sup>37</sup>	1	
Denmark			2		
Estonia			2		
Netherlands			2 <sup>38</sup>		
Germany	3	1	1		
Brazil	1		1		
Greece	1		1		
Russia	1		1		
Switzerland	1		1		
Australia			1		
Mauritius			1		
Hungary				1	

<sup>36</sup> In 2023 no secondary affiliation

<sup>37</sup> Switched to a Saudi secondary affiliation in 2023

<sup>38</sup> In 2023 no secondary affiliation

Japan					1
Mexico				1	
South Africa				1	
Taiwan				1	
Tunisia				1	
Spain	4	7			
Algeria	1				
Bangladesh	1				
Chile	1				
Malaysia	1				
Norway		1			
Slovakia	1				
Vietnam	1				

**Table 7 . Per country of secondary affiliation: pathways of researchers' affiliation for HCRs primary affiliated to Saudi Arabian institutions in 2022 or 2023 in the HCR list.**

In summary, in the case of the 52 Saudi Arabian Highly Cited Researchers of 2022 **who aren't listed anymore in 2023** as HCR:

- 43 had a foreign secondary affiliation in 2022. 9 of them had a Chinese secondary affiliation, 4 HCRs a Spanish one, 3 HCRs a German, Indian, Pakistani or Turkish secondary affiliation.
- 9 didn't have a secondary affiliation 2022

In the case of the 13 Saudi Arabian Highly Cited Researchers of 2022 **who changed their affiliation in 2023**, following happened to the secondary affiliation:

- 9 Saudi HCRs of 2022 moved their secondary affiliation to their first affiliation in 2023. This was the case for 4 of the 7 Spanish HCRs which switched away from their Saudi Arabian affiliation, and for the 2 Italian cases and for the German, UK and Norwegian case.
- 3 Saudi HCRs of 2022 kept their secondary affiliation and added a new primary affiliation; those were all Spanish cases.
- 1 Saudi HCR of 2022 who isn't listed as Saudi in 2023, moved the Saudi primary affiliation into secondary affiliation. No other Saudi HCR of 2022 and who remained in the list, moved the Saudi affiliation to second affiliation

In the cases of the 44 Saudi Arabian Highly Cited Researchers of 2022, **which remained a Saudi HCR in 2023**, following happened to the secondary affiliation:



- 23 Saudi HCRs who had a foreign secondary affiliation in 2022, kept it in 2023. 3 of the 6 2022 Saudi-UK HCRs kept their Saudi primary affiliation. Remarkable are also Denmark and Estonia for which all of their 2 double affiliated HCRs of 2022 kept their same affiliations in 2023.
- 4 Saudi HCRs who had a foreign secondary affiliation in 2022, removed it in 2023. This was the case for both Dutch HCRs from 2022.
- All 17 Saudi HCRs who didn't have a foreign secondary affiliation in 2022 and who remained listed in 2023, still didn't have a foreign secondary affiliation.

For the 12 cases, which switched their primary affiliation between 2022 and 2023:

- 6 switched their former primary affiliation to the secondary affiliation in 2023, namely HCRs formerly primary affiliated to institution in Tunisia, Hungary, Taiwan, Mexico, United States and China
- 4 HCRs removed their primary affiliation from 2022.
- 2 HCRs kept their secondary affiliation from 2022 and replaced their primary affiliation with a Saudi Arabian one.

Of the 20 cases, which weren't listed in 2022 and are listed as Saudi HCR in 2023:

- 8 have a foreign secondary affiliation, namely from China, USA, Hungary, Mexico, South Africa, Taiwan or Tunisia
- 12 have no foreign secondary affiliation.

## HCRs marked as Research fellows

Clarivate marks in its list HCRs with asterisk, as research fellows, to indicate that *the Highly Cited Researcher is associated with this institution as part of a fellowship or associate program. This rarely occurs since most researchers follow the established tradition of using the secondary affiliation for such appointments and reserve the primary affiliation slot for their main employer.*<sup>39</sup>

In our previous report<sup>40</sup>, we made a more in depth analysis of the number of Saudi Arabian HCRs marked as research fellows. While the number of HCRs marked as research fellows rose from 9 in 2021 to 44 in the 2022 HCR list, this number dropped down again in 2023 to 16 HCRs primarily affiliated to a Saudi Arabian institution, marked as research fellows:

- 12 of the marked HCRs are primarily associated to King Saud University
- 3 of the marked HCRs are primarily associated to King Abdulaziz University
- 1 of the marked HCRs is primarily associated to Princess Nourah bint Abdulrahman University

The 5 other HCRs marked as research fellows in the 2023 HCR list (2 from Spain, 1 from China, Germany, Italy), had in 2022 their primary affiliation with a Saudi Arabian institution.

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<sup>39</sup> <https://clarivate.com/highly-cited-researchers/faqs/>

<sup>40</sup> SIRIS Academic, [\*Full International Edition \(2014-22\): The affiliation game of Saudi Arabian higher education & research institutions\*](#), (2023)

## Conclusion

The results of our study shows that **Saudi Arabia experienced the largest drop of Highly Cited Researchers primarily affiliated to them in the past decade** and that this will probably **reduce the number of Saudi institutions within the Top 200** of the Shanghai Ranking to 1 university.

In the short term, this will move Saudi Arabia further away from its Vision 2030 objective of ensuring that 5 universities are ranked in the Top 200 of international rankings by 2030. This said, we believe that, in the long-term, it will have a positive impact on higher education and research policy not only in the countries and universities that were negatively impacted by the previous gaming of affiliations in Clarivate's database of Highly Cited Researchers but also on the Saudi Arabian system of higher education and research itself.

A policy based on artificially boosting indicators in virtual lists is by definition fragile, it does nothing to improve the research system and negatively impacts researchers and institutions operating according to commonly accepted rules of good practice. The loss of a few places in the Shanghai Rankings will not make **Saudi Arabia a less attractive place for top researchers** and there have not been big waves of resignations from Saudi Arabian top researchers; **the impact is simply virtual on a virtual list**. Indeed, Saudi Arabian universities that did not engage in this type of practice such as KAUST have actually increased their number of Highly Cited Researchers and are likely to further improve their ranking. The legitimate ambition of becoming a leading nation in research and higher education should be based on sustainable assets and focused on developing local talent. Targeted talent attraction measures make sense only if they are embedded in a wider long-term strategy.

Last but not least, we fear that the cases of individual researcher malpractice uncovered by our study and by the journalists of El Pais are only the tip of the iceberg of a far wider phenomenon. In this context, the strong ethical decisions taken by universities and other institutions of higher education and research over the past year are fundamental.



## The authors of this report

**SIRIS Academic** is a **European consulting company, based in Barcelona**, active in the field of higher education, research and innovation. It is fully owned by a not-for-profit foundation. It helps design, implement and monitor complex projects - from large-scale applications and strategic plans, to data analysis, monitoring impact evaluation.

For follow-up questions or in-depth discussion on the topic, please contact:  
Yoran Beldengrün - [yoran.beldengruen@sirisacademic.com](mailto:yoran.beldengruen@sirisacademic.com)

# Annex: Institutional Affiliations of Saudi Arabian HCRs in 2022 and 2023

## 44 HCRs with Saudi Arabian primary affiliations in 2022 and 2023

	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  HCR 2022         </div> <div style="font-size: 2em;">→</div> <div style="text-align: center;">  HCR 2023         </div> </div>			
	Primary affiliation 2022	Secondary affiliation 2022	Primary affiliation 2023	Secondary affiliation 2023
HCR 1	King Abdulaziz University, Saudi Arabia	Ecole Polytechnique Fédérale de Lausanne, Switzerland	King Abdulaziz University, Saudi Arabia	Ecole Polytechnique Fédérale de Lausanne, Switzerland
HCR 2	King Abdulaziz University, Saudi Arabia	Technical University of Denmark, Denmark	King Abdulaziz University, Saudi Arabia	Technical University of Denmark, Denmark
HCR 3	King Abdulaziz University, Saudi Arabia	University of Leicester, United Kingdom	King Abdulaziz University, Saudi Arabia	University of Leicester, United Kingdom
HCR 4	King Abdulaziz University, Saudi Arabia		King Abdulaziz University, Saudi Arabia	
HCR 5	King Abdulaziz University, Saudi Arabia		King Abdulaziz University, Saudi Arabia	
HCR 6	King Abdulaziz University, Saudi Arabia		King Abdulaziz University, Saudi Arabia	
HCR 7	King Abdulaziz University, Saudi Arabia		King Abdulaziz University, Saudi Arabia	
HCR 8	King Abdullah University of Science & Technology, Saudi Arabia	Aarhus University, Denmark	King Abdullah University of Science & Technology, Saudi Arabia	Aarhus University, Denmark
HCR 9	King Abdullah University of Science & Technology, Saudi Arabia	Delft University of Technology, Netherlands	King Abdullah University of Science & Technology, Saudi Arabia	
HCR 10	King Abdullah University of Science & Technology, Saudi Arabia	Imperial College London, United Kingdom	King Abdullah University of Science & Technology, Saudi Arabia	Imperial College London, United Kingdom
HCR 11	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 12	King Abdullah University		King Abdullah University	




	of Science & Technology, Saudi Arabia		of Science & Technology, Saudi Arabia	
HCR 13	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 14	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 15	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 16	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 17	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 18	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 19	King Abdullah University of Science & Technology, Saudi Arabia		King Abdullah University of Science & Technology, Saudi Arabia	
HCR 20	King Fahd University of Petroleum & Minerals, Saudi Arabia	Abdullah Gul University, Turkey	King Saud University, Saudi Arabia	
HCR 21	King Saud University, Saudi Arabia	Chinese Academy of Sciences, China Mainland	King Saud University, Saudi Arabia	Chinese Academy of Sciences, China Mainland
HCR 22	King Saud University, Saudi Arabia	Consiglio Nazionale delle Ricerche (CNR), Italy	King Saud University, Saudi Arabia	Consiglio Nazionale delle Ricerche (CNR), Italy
HCR 23	King Saud University, Saudi Arabia	Estonian University of Life Sciences, Estonia	King Saud University, Saudi Arabia	Estonian University of Life Sciences, Estonia
HCR 24	King Saud University, Saudi Arabia	Huazhong University of Science & Technology, China Mainland	King Saud University, Saudi Arabia	Huazhong University of Science & Technology, China Mainland
HCR 25	King Saud University, Saudi Arabia	Max Planck Society, Germany	King Saud University, Saudi Arabia	Max Planck Society, Germany
HCR 26	King Saud University, Saudi Arabia	RUDN University, Russia	King Saud University, Saudi Arabia	RUDN University, Russia
HCR 27	King Saud University, Saudi Arabia	Suez Canal University, Egypt	King Saud University, Saudi Arabia	Suez Canal University, Egypt
HCR 28	King Saud University, Saudi Arabia	Universidade Federal do Rio Grande do Sul, Brazil	King Saud University, Saudi Arabia	Universidade Federal do Rio Grande do Sul, Brazil
HCR 29	King Saud University,	University of Glasgow,	King Saud University,	University of Glasgow,

	Saudi Arabia	United Kingdom	Saudi Arabia	United Kingdom
HCR 30	King Saud University, Saudi Arabia	University of Mauritius, Mauritius	King Saud University, Saudi Arabia	University of Mauritius, Mauritius
HCR 31	King Saud University, Saudi Arabia	University of Salerno, Italy	King Saud University, Saudi Arabia	University of Salerno, Italy
HCR 32	King Saud University, Saudi Arabia	University of Tartu, Estonia	King Saud University, Saudi Arabia	University of Tartu, Estonia
HCR 33	King Saud University, Saudi Arabia	University of Wollongong, Australia	King Saud University, Saudi Arabia	University of Wollongong, Australia
HCR 34	King Saud University, Saudi Arabia	Vishnugupta Vishwavidyapeetam, India	King Saud University, Saudi Arabia	Vishnugupta Vishwavidyapeetam, India
HCR 35	King Saud University, Saudi Arabia	Westerdijk Fungal Biodiversity Institute (KNAW), Netherlands	King Saud University, Saudi Arabia	
HCR 36	King Saud University, Saudi Arabia		King Saud University, Saudi Arabia	
HCR 37	King Saud University, Saudi Arabia		King Saud University, Saudi Arabia	
HCR 38	King Saud University, Saudi Arabia		King Saud University, Saudi Arabia	
HCR 39	Ministry of Health - Saudi Arabia, Saudi Arabia	Emory University, United States	Ministry of Health - Saudi Arabia, Saudi Arabia	Alfaisal University, Saudi Arabia
HCR 40	Princess Nourah bint Abdulrahman University (PNU), Saudi Arabia	Fujian Normal University, China Mainland	Princess Nourah bint Abdulrahman University, Saudi Arabia	Fujian Normal University, China Mainland; Zhejiang Normal University
HCR 41	Princess Nourah bint Abdulrahman University, Saudi Arabia	University of Agriculture Faisalabad, Pakistan	Princess Nourah bint Abdulrahman University, Saudi Arabia	University of Agriculture Faisalabad, Pakistan
HCR 42	Taif University, Saudi Arabia	Galanakis Laboratories, Greece	Taif University, Saudi Arabia	Galanakis Laboratories, Greece
HCR 43	Taif University, Saudi Arabia	Ingenium Naturae Private Limited, India	Taif University, Saudi Arabia	Ingenium Naturae Private Limited, India
HCR 44	Taif University, Saudi Arabia		Taif University, Saudi Arabia	

**Table A1 . Institutional Affiliations of HCRs with Saudi Arabian primary affiliations in 2022 and 2023**





## 13 HCRs with Saudi Arabian primary affiliations in 2022 and foreign primary affiliation in 2023

<div><div></div><div>HCR 2022HCR 2023</div></div>				
	Primary affiliation 2022	Secondary affiliation 2022	Primary affiliation 2023	Secondary affiliation 2023
HCR 45	King Abdulaziz University, Saudi Arabia	Centro de Investigacion Ecologica y Aplicaciones Forestales, Spain	Centro de Investigacion Ecologica y Aplicaciones Forestales, Spain	
HCR 46	King Abdulaziz University, Saudi Arabia	Centro Tecnológico da Carne, Spain	Centro Tecnológico da Carne, Spain	
HCR 47	King Abdulaziz University, Saudi Arabia	Universidad Europea del Atlantico, Spain	Marche Polytechnic University, Italy	Universidad Europea del Atlantico, Spain
HCR 48	King Abdulaziz University, Saudi Arabia	ICREA, Spain	Parque Sanitario San Joan de Deu, Spain	ICREA, Spain
HCR 49	King Abdulaziz University, Saudi Arabia	University of Birmingham, United Kingdom	University of Birmingham, United Kingdom	King Abdulaziz University, Saudi Arabia
HCR 50	King Abdullah University of Science & Technology, Saudi Arabia		South China University of Technology, China Mainland	King Abdullah University of Science & Technology, Saudi Arabia
HCR 51	King Saud University, Saudi Arabia	Consejo Superior de Investigaciones Cientificas (CSIC), Spain	Consejo Superior de Investigaciones Cientificas (CSIC), Spain	
HCR 52	King Saud University, Saudi Arabia	Istituto Italiano di Tecnologia - IIT, Italy	Istituto Italiano di Tecnologia - IIT, Italy	
HCR 53	King Saud University, Saudi Arabia	Norwegian University of Science & Technology (NTNU), Norway	Norwegian University of Science & Technology (NTNU), Norway	SINTEF Digital, Norway
HCR 54	King Saud University, Saudi Arabia	University of Barcelona, Spain	Parc Sanitari Sant Joan de Deu, Spain	University of Barcelona, Spain
HCR 55	King Saud University, Saudi Arabia	Research Center Julich, Germany	Research Center Julich, Germany	Macquarie University, Australia
HCR 56	King Saud University, Saudi Arabia	Universidad de Jaen, Spain	Universidad de Jaen, Spain	
HCR 57	King Saud University, Saudi Arabia	University of Catania, Italy	University of Catania, Italy	

**Table A2 . Institutional Affiliations of HCRs with Saudi Arabian primary affiliations in 2022 and foreign primary affiliation in 2023**

## 52 HCRs with Saudi Arabian primary affiliations in 2022 and not listed in the HCR list in 2023


<div style="display: flex; align-items: center; justify-content: center;">  <div style="text-align: center;">  <p style="color: orange; font-weight: bold; margin: 0;">NOT LISTED</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>HCR 2022</span> <span>HCR 2023</span> </div>				
	Primary affiliation 2022	Secondary affiliation 2022	Primary affiliation 2023	Secondary affiliation 2023
HCR 58	King Abdulaziz University, Saudi Arabia	AZTI, Spain		
HCR 59	King Abdulaziz University, Saudi Arabia	Bogazici University, Turkey		
HCR 60	King Abdulaziz University, Saudi Arabia	Cairo University, Egypt		
HCR 61	King Abdulaziz University, Saudi Arabia	Centro Tecnológico da Carne, Spain		
HCR 62	King Abdulaziz University, Saudi Arabia	China University of Mining & Technology, China Mainland		
HCR 63	King Abdulaziz University, Saudi Arabia	China West Normal University, China Mainland		
HCR 64	King Abdulaziz University, Saudi Arabia	Grambling State University, United States		
HCR 65	King Abdulaziz University, Saudi Arabia	Guangxi Normal University, China Mainland		
HCR 66	King Abdulaziz University, Saudi Arabia	Harran University, Turkey		
HCR 67	King Abdulaziz University, Saudi Arabia	Jashore University of Science and Technology, Bangladesh		
HCR 68	King Abdulaziz University, Saudi Arabia	Russian Academy of Sciences, Russia		
HCR 69	King Abdulaziz University, Saudi Arabia	Shandong University of Science & Technology, China Mainland		
HCR 70	King Abdulaziz University, Saudi Arabia	Southwestern University of Finance & Economics - China, China Mainland		
HCR 71	King Abdulaziz University, Saudi Arabia	University of Leicester, United Kingdom		
HCR 72	King Abdulaziz University, Saudi Arabia	University of South Florida, United States		

HCR 73	King Abdulaziz University, Saudi Arabia	University of Wuppertal, Germany		
HCR 74	King Abdulaziz University, Saudi Arabia	Xi'an University of Architecture & Technology, China Mainland		
HCR 75	King Abdulaziz University, Saudi Arabia	Zhejiang Normal University, China Mainland		
HCR 76	King Abdulaziz University, Saudi Arabia	Zhejiang University of Technology, China Mainland		
HCR 77	King Abdullah International Medical Research Center (KAIMRC), Saudi Arabia			
HCR 78	King Abdullah University of Science & Technology, Saudi Arabia	Ecole Polytechnique Federale de Lausanne, Switzerland		
HCR 79	King Abdullah University of Science & Technology, Saudi Arabia			
HCR 80	King Fahd University of Petroleum & Minerals, Saudi Arabia	Uludag University, Turkey		
HCR 81	King Fahd University of Petroleum & Minerals, Saudi Arabia			
HCR 82	King Fahd University of Petroleum & Minerals, Saudi Arabia			
HCR 83	King Fahd University of Petroleum & Minerals, Saudi Arabia			
HCR 84	King Saud University, Saudi Arabia	Catalan Institute for Water Research, Spain		
HCR 85	King Saud University, Saudi Arabia	COMSATS University Islamabad (CUI), Pakistan		
HCR 86	King Saud University, Saudi Arabia	Jamia Hamdard University, India		
HCR 87	King Saud University, Saudi Arabia	National Research Centre (NRC), Egypt		
HCR 88	King Saud University, Saudi Arabia	Senac Faculty of Ceara, Brazil		
HCR 89	King Saud University, Saudi Arabia	Slovak University of Technology Bratislava, Slovakia		
HCR 90	King Saud University, Saudi Arabia	Universidad de Cordoba, Spain		
HCR 91	King Saud University, Saudi Arabia	University of Catania, Italy		
HCR 92	King Saud University, Saudi Arabia	University of Florence, Italy		

	Arabia			
HCR 93	King Saud University, Saudi Arabia	University of Gottingen, Germany		
HCR 94	King Saud University, Saudi Arabia	University of Haripur, Pakistan		
HCR 95	King Saud University, Saudi Arabia	University of Munster, Germany		
HCR 96	King Saud University, Saudi Arabia			
HCR 97	King Saud University, Saudi Arabia			
HCR 98	Princess Nourah bint Abdulrahman University, Saudi Arabia	University Djillali Liabes Sidi Bel Abbes, Algeria		
HCR 99	Princess Nourah bint Abdulrahman University, Saudi Arabia	University of Patras, Greece		
HCR 100	Princess Nourah bint Abdulrahman University, Saudi Arabia	University of Swabi, Pakistan		
HCR 101	Princess Nourah bint Abdulrahman University, Saudi Arabia			
HCR 102	Princess Nourah bint Abdulrahman University, Saudi Arabia			
HCR 103	Taif University, Saudi Arabia	Birla Institute of Technology & Science Pilani (BITS Pilani), India		
HCR 104	Taif University, Saudi Arabia	Jiangsu University, China Mainland		
HCR 105	Taif University, Saudi Arabia	Scotland's Rural College, United Kingdom		
HCR 106	Taif University, Saudi Arabia	SSN College of Engineering, India		
HCR 107	Taif University, Saudi Arabia	Universidad de Tarapaca, Chile		
HCR 108	Taif University, Saudi Arabia	University of Nottingham Malaysia, Malaysia		
HCR 109	Taif University, Saudi Arabia	Van Lang University, Vietnam		

**Table A3 . Institutional Affiliations of HCRs with Saudi Arabian primary affiliations in 2022 and not listed in the HCR list in 2023**




## 20 HCRs not listed in 2022 HCR list and listed as Saudi primary affiliation in 2023

<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <p><b>NOT LISTED</b></p> <p>HCR 2022</p> </div> <div style="margin: 0 20px;">→</div> <div style="text-align: center;">  <p>HCR 2023</p> </div> </div>				
	Primary affiliation 2022	Secondary affiliation 2022	Primary affiliation 2023	Secondary affiliation 2023
HCR 110			King Abdulaziz University, Saudi Arabia	
HCR 111			King Abdulaziz University, Saudi Arabia	North University of China, China Mainland
HCR 112			King Abdulaziz University, Saudi Arabia	
HCR 113			King Abdulaziz University, Saudi Arabia	
HCR 114			King Abdullah University of Science & Technology, Saudi Arabia	
HCR 115			King Abdullah University of Science & Technology, Saudi Arabia	
HCR 116			King Abdullah University of Science & Technology, Saudi Arabia	
HCR 117			King Abdullah University of Science & Technology, Saudi Arabia	
HCR 118			King Abdullah University of Science & Technology, Saudi Arabia	
HCR 119			King Saud University, Saudi Arabia	
HCR 120			King Saud University, Saudi Arabia	University of Palermo, Italy
HCR 121			King Saud University, Saudi Arabia	
HCR 122			King Saud University, Saudi Arabia	
HCR 123			King Saud University, Saudi Arabia	Hosei University, Japan

HCR 124			King Saud University, Saudi Arabia	University of Electronic Science & Technology of China, China Mainland
HCR 125			King Saud University, Saudi Arabia	
HCR 126			Princess Nourah bint Abdulrahman University, Saudi Arabia	Minia University, Egypt
HCR 127			Princess Nourah bint Abdulrahman University, Saudi Arabia	Jagat Guru Nanak Dev Punjab State Open University, India
HCR 128			Princess Nourah bint Abdulrahman University, Saudi Arabia	University of Agriculture Faisalabad, Pakistan
HCR 129			Taif University, Saudi Arabia	Izmir Katip Celebi University, Turkey

**Table A4 .** Institutional Affiliations of HCRs not listed in 2022 HCR list and listed as Saudi primary affiliation in 2023

## 12 HCRs with foreign primary affiliation in 2022 and Saudi primary affiliation in 2023

<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <span>HCR 2022</span> <span>HCR 2023</span> </div>				
	Primary affiliation 2022	Secondary affiliation 2022	Primary affiliation 2023	Secondary affiliation 2023
HCR 130	Indiana University System, United States		John Hopkins Aramco Healthcare, Saudi Arabia	Indiana University System, United States
HCR 131	East China University of Science & Technology, China Mainland		King Abdulaziz University, Saudi Arabia*	East China University of Science & Technology, China Mainland
HCR 132	International Institute for Applied Systems Analysis (IIASA), Austria	King Abdullah University of Science & Technology, Saudi Arabia	King Abdullah University of Science & Technology, Saudi Arabia	
HCR 133	University of Mauritius, Mauritius	University of Johannesburg, South Africa	King Saud University, Saudi Arabia	University of Johannesburg, South Africa
HCR 134	South China University of Technology, China Mainland		King Saud University, Saudi Arabia	
HCR 135	Semmelweis University, Hungary	Research Center for Natural Sciences, Hungary	King Saud University, Saudi Arabia	Semmelweis University, Hungary
HCR 136	National Yunlin University Science & Technology, Taiwan	Vellore Institute of Technology, India	King Saud University, Saudi Arabia	National Yunlin University Science & Technology, Taiwan
HCR 137	Kunming Institute of Botany CAS, China Mainland	Centre for Mountain Futures, China Mainland	King Saud University, Saudi Arabia	Centre for Mountain Futures, China Mainland
HCR 138	International Maize & Wheat Improvement Center (CIMMYT), Mexico		King Saud University, Saudi Arabia	International Maize & Wheat Improvement Center (CIMMYT), Mexico
HCR 139	Universite de Carthage, Tunisia	Qassim University, Saudi Arabia	Qassim University, Saudi Arabia	Universite de Carthage, Tunisia
HCR 140	Jiangsu University, China Mainland		Taif University, Saudi Arabia	
HCR 141	Jiangsu University, China Mainland		Taif University, Saudi Arabia	

**Table A5 . Institutional Affiliations of HCRs with foreign primary affiliation in 2022 and Saudi primary affiliation in 2023**