



## Ibn Zohr University: Bibliometric analysis using Scopus and VOS viewer from 1988–2024

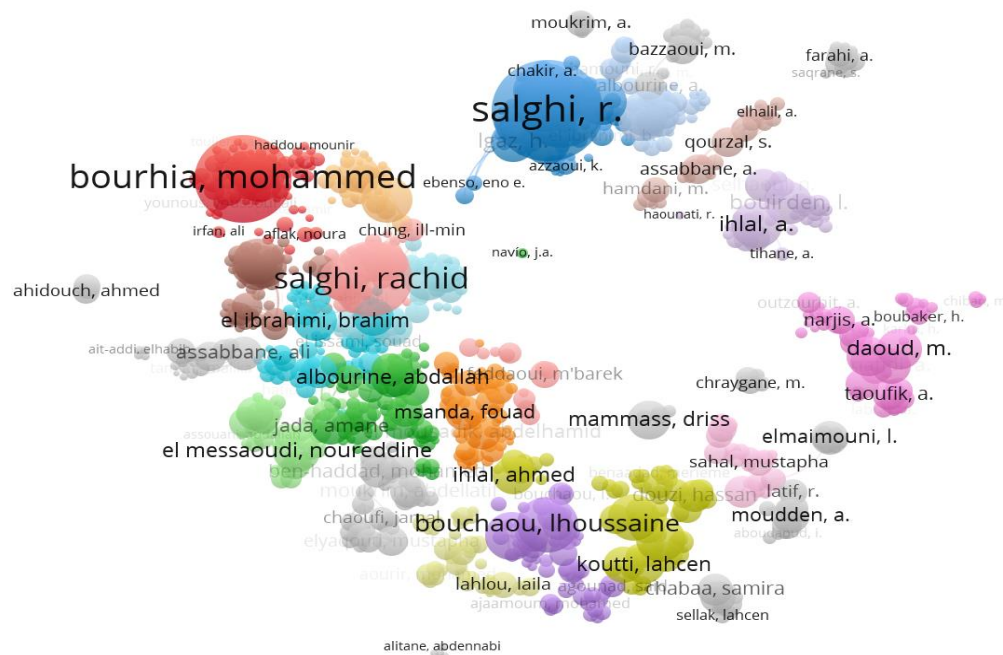
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**Abstract:** This bibliometric study applied the Scopus database to investigate the scientific output generated through Ibn Zohr University (UIZ) between 1988-2024, centering on the following general areas: publication patterns, research areas, preferred journals, top countries and regions, authors, articles, institutions, subject areas, and author keywords. The document search process involved a search of the Scopus database for terms related to Ibn Zohr University, ensuring an extensive inclusion of documents associated with the institution, for the entire documented time period. Additionally, the documents were analyzed in VOSviewer, a software tool used to create and visualize bibliometric networks, which allows for collaboration patterns and co-authorship networks to be identifiable, co-occurrence of keywords, and have a total citation analysis. This reflects their solidified place in the global scientific community. In addition, the area of Chemistry produced 782 documents total, which is 7.6% of the total UIZ scientific output, during the reported time period.

**Keywords:** Bibliometric study; VOS viewer; University; Ibn Zohr; Authors; Collaborations,

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## 1. Introduction

Ibn Zohr University, located in Agadir in the Souss-Massa region of Morocco, occupies a valued place in the national academic and research community. The university has published over 8,400 scientific manuscripts and produces lively work with greater than 2,000 author members. These facts not only highlight the wide range of disciplines represented, but also increase the evidence of the engagement of its authors through competent and internationally recognized research in a wide range of fields. As an evolving institution, Ibn Zohr University provides Morocco with an increased presence and representational structure in the international research community, increasing its importance in the global research community.

Bibliometric research uses quantitative statistical and mathematical methods (Hammouti *et al.*, 2025) to analyze scientific and technological outputs to measure and evaluate the significance and influence of research in its specific field, usually within the context of academic status and research funding options (Aichouch *et al.*, 2025; N'diyae *et al.*, 2022; Diem & Wolter, 2013). Bibliometric analysis is often the first form of action for knowledge development, diffusion, and impacting science and society in general (Yee Rock Leong *et al.* 2021; Mohiuddin *et al.*, 2023). As the production of scientific materials continues to increase rapidly, bibliometric analysis provides an overview of incoming trends, leading contributors, and collaborative structures that are a part of the research landscape (Lemghili, 2020 ; Ahmed *et al.*, 2023). By looking through parameters such as citation numbers, core author co-authorship, or keyword co-occurrence, bibliometric analyses help bring light to new research topics, dominant methods, and gaps in the field of study (Abdelwahab *et al.*, 2025; Mukherjee., 2022). The ability to map the developing intellectual structure and evolutionary trends of academia and fields of study is critical in bibliometric analyses (López-Robles *et al.*, 2019). Additionally, bibliometric tools allow for an understanding of the visualization of scientific impact, mapping collaborative clusters, and recognizing patterns of academic communication (Skute, *et al.*, 2019; Hassan., 2024). The impact of a researcher and the visibility of his or her institute are nearly always connected to the and degree of prevailing strong research collaboration (Ogondiek., 2025).

The present study will discuss global trends in the literature on leadership development at the Ibn Zohr (UIZ) University through a bibliometric analysis of 8427 documents published from UIZ's establishment in 1988 until 2024, within the Scopus database. Our goals are to review and analyze the quantitative output of global publications and to highlight the partnerships of UIZ with other universities nationally and internationally. In addition, we will discuss the most frequently cited publications and authors over the study timeframe. This expansive search strategy aims to identify relevant literature on leadership development in higher education and university contexts, providing a strong data-based foundation for further bibliometric analysis.

## 2. Methodology

### 2.1 Sourcing and preparation

VOSviewer (Visualization of Similarities) is a software tool for analyzing & visualizing structures in bibliometric data developed by the Centre for Science and Technology Studies (CWTS) at Leiden University in the Netherlands (Martins *et al.*, 2024; Bukar *et al.*, 2023). The VOS method was later implemented in the VOSviewer software, which is subsequently used very widely to construct and visualize bibliometric networks based on co-citation, bibliographic coupling, co-authorship relations

among publications, authors and journals (Liaqat *et al.*, 2023). This study used VOSviewer to examine significant trends related to leadership development at UIZ by generating co-authorship and keyword co-occurrence networks, leveraging its text-mining features. The software classifies data obtained from several bibliographic databases, such as Scopus, Web of Science, Dimensions, PubMed and RIS files (Wu, Sun *et al.*, 2025; Ahn *et al.*, 2024). VOSviewer is a Java-based application that allows users to generate, visualize, and interactively explore complex bibliometric maps (Durazzo *et al.*, 2022; Nazlidou *et al.*, 2024).

## 2. Results and Discussion

### Scopus analysis

The line chart (Figure 1) illustrates a trend in the number of documents over several years. Initially, the number of published documents was very low in the early stages of the ranking. However, it gradually increased over time, eventually reaching over 1,250 documents by the year 2024. Starting by 1988 to 2009, the number of published documents was lower than 200 and fluctuated slightly throughout this range of years. After that, the pattern of document production began to show a steady increase, which continued at an accelerated pace starting in 2012. The number of published documents peaked in 2024 at approximately 1,400. This suggests a rapid increase in document production in recent years, especially in the past decade, peaking in 2024 before possibly correcting and/or slowing down at Ibn Zohr University.

Documents by year

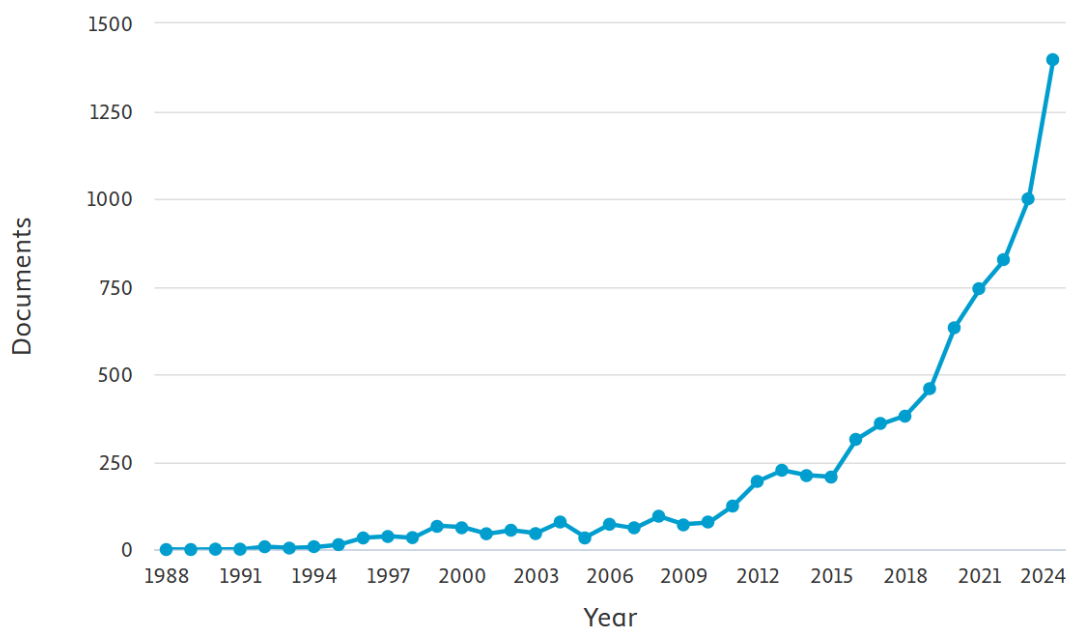
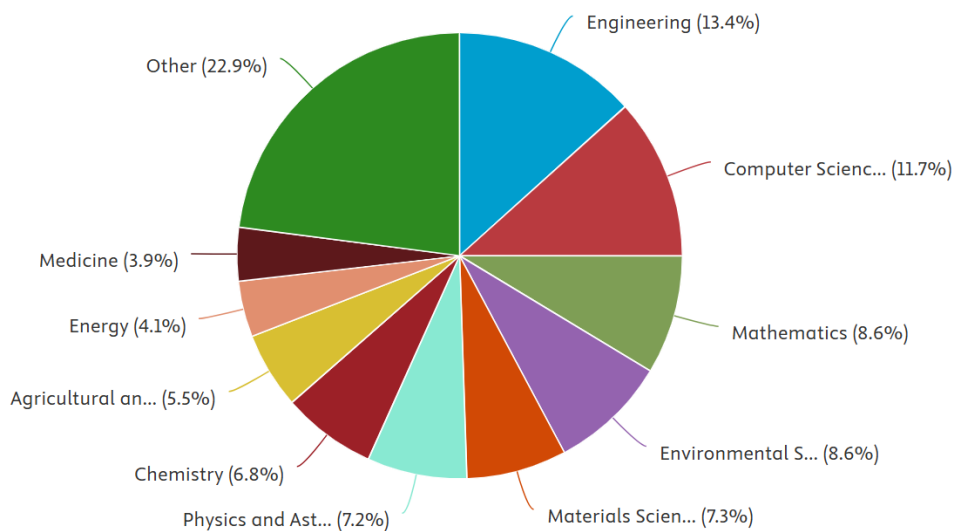


Figure 1. Evolution of the scientific production of UIZ from 1988 to 2024

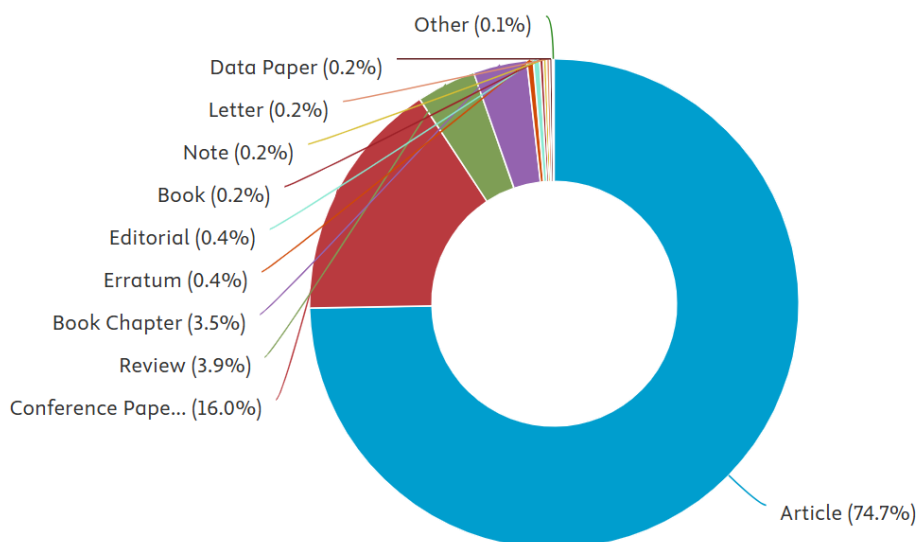
The pie chart below (Figure 2) shows the distribution of documents by field of study. The largest proportion of documents falls under the "Other" category, making up nearly a quarter of the total documents produced, with a percentage of 21.2%. The next largest categories are Engineering (12.6%) and Computer Sciences (10.0%). Mathematics (8.6%), Environmental (8.6%), and Materials Sciences (7.3%) come next. Physics and Astronomy (5.5%), Chemistry (6.8%), Agriculture and biological sciences (5.5%), Energy (4.8%), and Medicine (3.9%) are in the final stage, reflecting a lower number of documents published in these fields.



**Figure 2.** the subject area distribution of documents for UIZ

To gain more information about these documents, the following pie chart (**Figure 3**) shows the distribution of it by type. A significant majority of the documents are Articles, accounting for 74.7% of the total. The next largest category is Conference Papers, which make up 16.0% of the total documents. Reviews and Book Chapters are relatively minor, contributing 3.9% and 3.5%, respectively. Other document types such as Erratum, Editorial, Book, Note, Letter, and Data Paper each contribute 0.4% or less, indicating their minor role in the dataset. The smallest portion, other, represents only 0.1% of the total documents. Overall, this chart illustrates that Articles are by far the dominant publication type in this dataset.

#### Documents by type

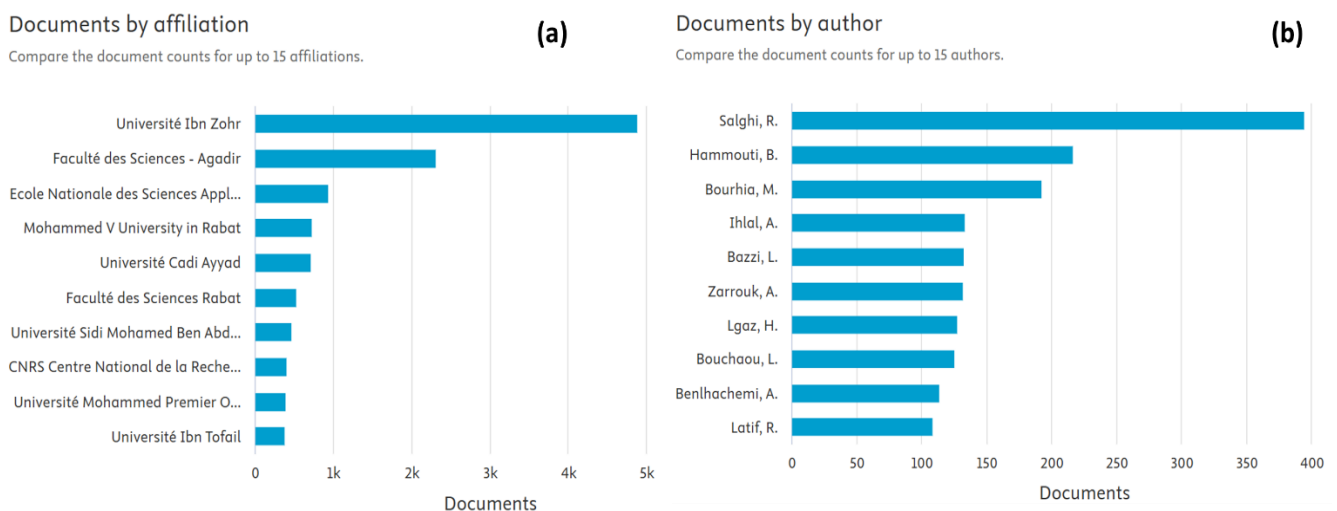


**Figure 3.** Distribution of the different types of documents for UIZ.

Each document produced is related to authors and these authors have affiliation. The bar chart below (**Figure 4.a**) illustrates the number of documents authored by various affiliations. Ibn Zohr

Univesity has the most documents produced by a large margin compared to the other affiliations. Second is the Faculty of Sciences - Agadir followed by Mohammed V University of Rabat. After that, the number of documents produced declines steadily across subsequent affiliations like the National School of Applied Sciences and University Cadi Ayyad. The two affiliations with the fewest documents produced are Sultan Moulay Slimane University and Ibn Tofail University. Overall, this chart illustrates the variance in productivity amongst the various institutions with University Ibn Zohr evidently the leader.

This quantitative analysis obtained from Scopus demonstrates the most productive authors (**Figure 4.b**) affiliated with Ibn Zohr University (UIZ). As shown in the figure, Salghi, R., ranks first with more than 390 contributions in the database. Hammouti from the Euromed University of Fes and before at the University of Mohammed the First, Oujda, is present in second place, having published with just over 200 total publications, with Bourhia, M., also in the same range. Ihlal, A., Bazzi, L., and Zarrouk, A., also represent very significant work and each has publications totals in the lower- to mid-range of just about 120 to 140 documents each. Altogether, these authors roughly represent a large portion of the scientific output from UIZ, with possibly a dozen other authors in the figure having also produced notable outputs in the past decade.



**Figure 4.** Scientific Collaboration of UIZ with other national institutions (a) UIZ’s authors list of the most published authors according to Scopus data (b).

The **Figure 5.** depicts the various forms of international collaboration and research activities of Ibn Zohr University with countries of the world. The center circle states the label "Documents by Country" with arrows showing the countries associations represented by a rectangle with the corresponding number of documents published. Morocco is listed first with a greatly inflated number of documents (7,972) which is to be expected as Ibn Zohr University is located in Morocco. Therefore, it is only natural that the vast majority of documents published originated from the country. Following Morocco is France (1,615 documents), then Saudi Arabia (647 documents), Spain (318 documents), and the United States (317 documents) are very close in number. Next, India and China show closely associated documents published (289 and 288 respectively). Lastly, the remaining countries with the least amount of documents published as represented include Turkey (228), Italy (218), and Canada (217). All in all, this diagram indicates the strong national productivity of Ibn Zohr University and a larger international presence through collaboration published.



The use of those large and progressively colored nodes is helpful for seeing where the most strongly connected authors (the clusters, in this case) are mentioned over the graph of collaboration. Clusters also allude to teams of researchers that have common interests, or at least are collaborating frequently together in established themes or research topics. The progressively lighter and warmer areas (yellow) indicate density levels that suggest populations of authors that may be larger and therefore indicate larger or more active research groups. Notably, the areas of high-density cluster around "Bourhia, Mohammed" in the lower left and "Salghi, Rachid" in the centre and to the right, indicating strong areas of collaboration. Other regions of moderate urban density also appear, indicating that the moderately warm areas represent some other groups of researchers within the university. The dark (blue) areas indicate sections with lower populations of authors, indicating that both isolated researchers in their work collaborate more often than researchers do (Figure 7).

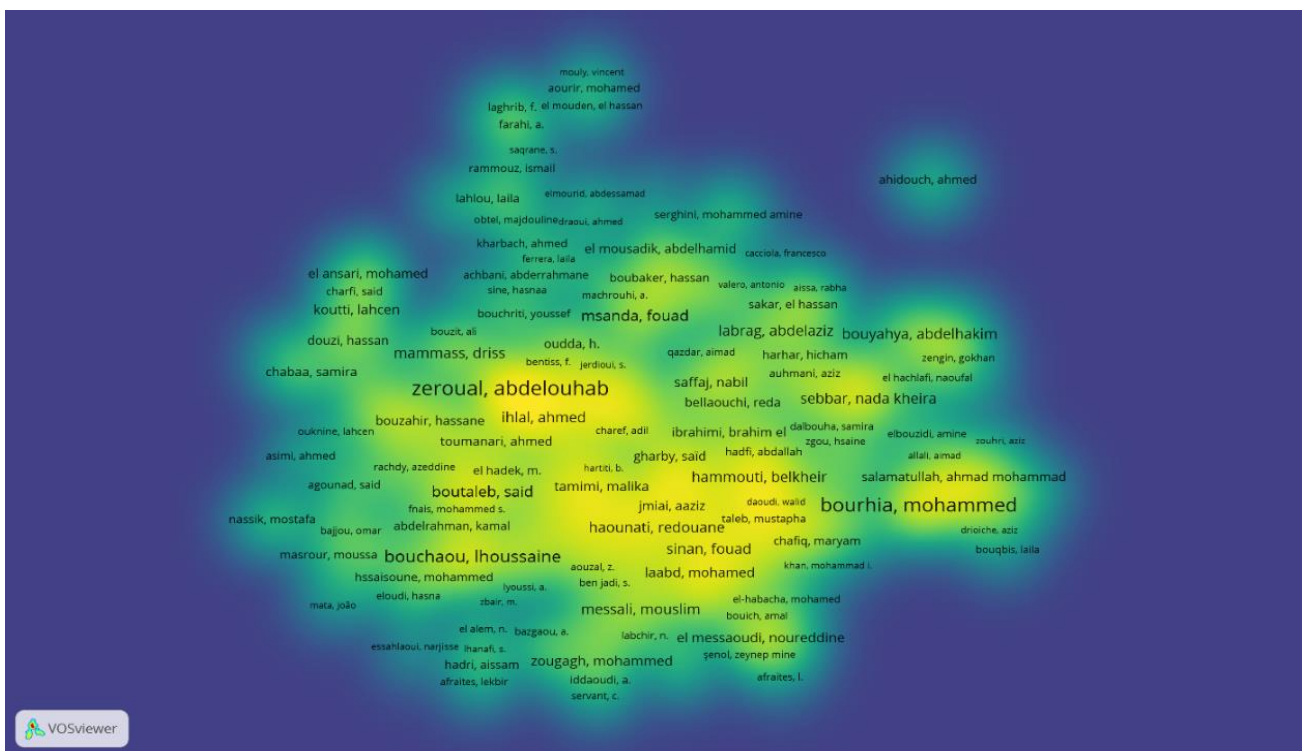
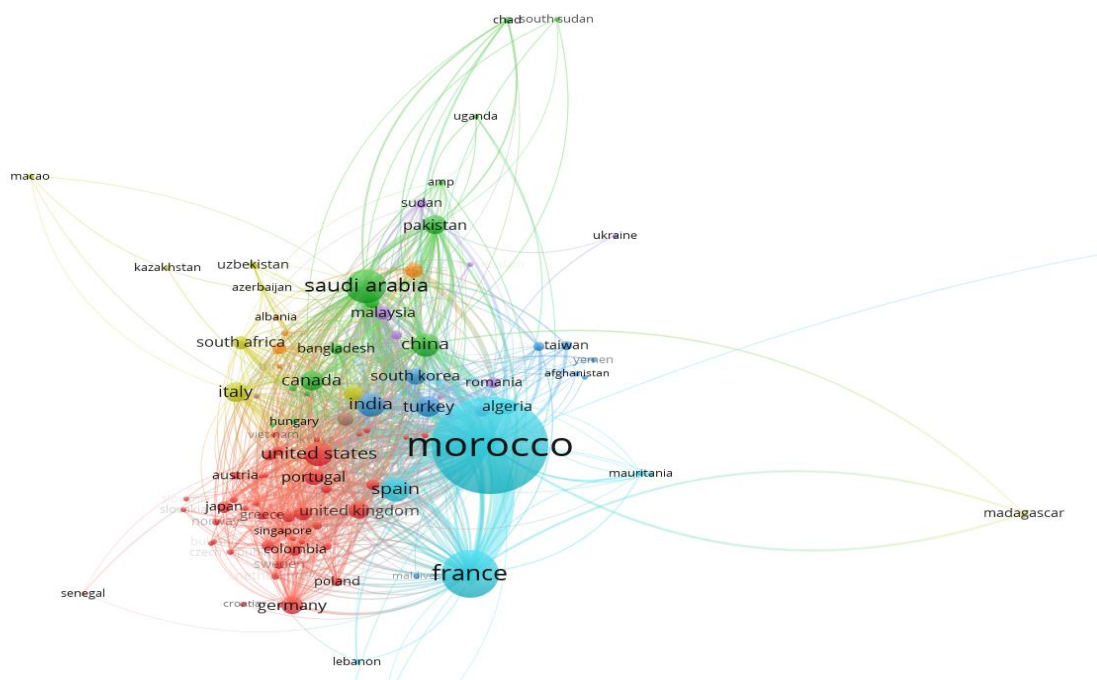


Figure 7. Network visualisation on VOS viewer of UIZ authors and collaborators

It is observed that Morocco is a central and important node (Figure 8), which is expected since it concerns the university in question. Other countries also stand out, such as France, Spain, and potentially the United States and Italy, which appear to have significant collaborations with Morocco, as indicated by the size of their nodes and the thickness of the links.

The map shows several clusters of countries, suggesting collaboration groups. For example, there is a cluster around Spain and Portugal, another around Italy and potentially other European countries, and another involving Middle Eastern countries such as Saudi Arabia. Morocco specifically Ibn Zohr University appears to be well connected to several of these clusters, indicating a diverse international collaboration network.



**Figure 8.** Network visualisation on VOS of the percentage of UIZ Collaboration



In terms of recognition of their contributions, we presented the more published authors of UIZ:



Prof. Dr. RACHID SALGHI has been working as a full professor for the National School of Applied Science, Ibn Zohr University Agadir Morocco, since 2015. He received his Ph.D (1999) degrees from First Mohamed University, Faculty of Sciences (Oujda, Morocco. His primary research interests include corrosion, density functional theory, molecular dynamics, and water irrigation, with 418 articles, h-index 68, 8 Books, and seven chapters published, 1 International Patent (PCT), 12 National Patents, and 25 PhD Students supervised. Since 2019, he has been president of the Mediterranean Group of Pesticide Research (MGPR) office (2019–2025).





Salghi has been invited. Professor at the University of Reims Champagne-Ardenne Faculty of Sciences, Group of Molecular Spectrometry and Atmospheric Chemistry, France, during the years 2007, 2010, 2013, and 2022. He was also an invited professor at the University of Castilla-La Mancha, Spain, in 2016. In 2015, he performed as a post-doctoral fellow for the Fulbright program in the Fiber and Biopolymer Research Institute (FBR) at the University of Texas Tech (TTU) (Lubbock, USA). He was selected among the Top 2% of World Scientists in the Ranking compiled by Stanford University USA in 2023 and 2024. He will be an expert evaluator with the CNRST from 2017 to 2023. He was awarded the best chemistry award in Morocco by Scopus (Elsevier) in 2022 and Web of Science in 2018. He received two Gold and one Silver Prize from Botgaram International ExpoTechnology (BIXPO) in 2017 and 2018. Prize Hassan II for the Invention and Research in the Agricultural Field since 2015. He has organized several international conferences. Post-doctoral fellowship from the German Academic Exchange Office (DAAD) at the Institute of Food Chemistry Hohenhaime, University of Stuttgart in Germany (2012). He also performed a post-doctoral at the University of Almeria in 2005. He participates in several project programs of international and national research. <https://www.scopus.com/authid/detail.uri?authorId=6602839432>



Prof. Dr. **Mohammed BOURHIA** is a distinguished Moroccan scientist and academic, currently serving as an Assistant Professor of Biochemistry at the Faculty of Medicine and Pharmacy, Ibn Zohr University in Laayoune, Morocco, since 2022. Dr. Mohammed Bourhia earned a Bachelor's degree in Biology and Health Sciences from the Multidisciplinary Faculty of Safi at Cadi Ayyad University in 2014, followed by a Master's degree in Biotechnology, Food, and Health from the Faculty of Sciences at Abdelmalek Essaadi University in Tetouan 2016.

My academic path culminated in a Ph.D. in Biology with a specialization in Biochemistry, Pharmacognosy, and Toxicology from the Faculty of Medicine and Pharmacy at Hassan II University of Casablanca 2020. Dr. Bourhia has been internationally recognized for his scientific contributions. He was named among the top 2% of the most influential scientists in the world for both 2023 and 2024, as published by Stanford University in collaboration with Elsevier. This prestigious ranking is a testament to his impactful research and sustained scholarly excellence. Renowned for his expertise in plant biotechnology, phytochemistry, and medicinal plants, Dr. Bourhia has emerged as one of Morocco's most prominent voices. His work continues to bridge traditional knowledge and modern science, advancing innovative research in natural products and their applications in health and medicine.



**Ahmed Ihlal** (   ) was born and brought up in Morocco. He studied Physics and Chemistry and holds, in 1984, his BSc degree (Licence es-Sciences Physique) in Solid State Physics from the University Mohamed V, Rabat - Morocco. He then joined Paris VII University – France, where he got, in 1985, a MSc. degree (DEA: Diplôme des Etudes Approfondies) in Solar Energy. He pursued his research and earned, in 1988, a PhD degree from the University of Caen Basse-Normandie - France. Dr. Ihlal started his teaching career on 1988 as an Assistant Professor in the faculty of Science at University Ibn Zohr. He holds a "Doctorat d'Etat" thesis in 1995. He is currently Full Professor in Faculty of Sciences, University Ibn Zohr, Agadir - Morocco.

He is head of the group working on developing cost effective processes for the fabrication of CIGS and CZTS absorber layers, buffer layers and TCOs. He is working on PV and CSP systems as well. He is developing materials and processes for atmospheric water harvesting He has published more than 145 scientific papers indexed in SCOPUS (google scholar h index: 27). He acted as a referee for numerous international journals. He has contributed to the organization of numerous national and international conferences and was a member of scientific committees for several international conferences. He is supervising PhD, MSc, and BSc students in the field of PV and CSP. He is an expert at the CNRST in the field of renewable energies. He can be contacted at email: [a.ihlal@uiz.ac.ma](mailto:a.ihlal@uiz.ac.ma), <https://www.scopus.com/authid/detail.uri?authorId=8711414300>



Prof. Dr. **Lahcen BAZZI** received a postgraduate doctorate degree from Mohamed V University of Rabat (École Normale Supérieure Takaddoum) in 1987, and he joined the University of Ibn Zohr University 1987. He received his PHD in 1995 from Ibn Zohr University of Agadir, Morocco. He is a co-author of 200+ research publications and has presented several communications in symposia and national/international meetings in subjects related to Interfacial Electrochemistry.

Applications such as: Electrodeposition of electrocatalytic thin films; Application for électrodégradation of organic pollutants. Green corrosion inhibitors (Medicinal and Aromatic Plants): Application for corrosion protection of metallic materials. Metallic and Bacteriological pollution of seawater. Impact of the biofilm formation on the corrosion resistance of metallic materials. He published 144 indexed papers reaching an impact factor of 39 and more than 4400 citations cited by 2715 documents. <https://www.scopus.com/authid/detail.uri?authorId=6601993667>



Prof. Dr. **Lhoussaine BOUCHOUA** has completed his PhD at the age of 27 years from University of Franche-Comté (France) and Doctorate of state from University of Cadi Ayyad in 1995. He is senior professor at Ibn Zohr University of Agadir since 1995. His research is focusing mainly on contribution of Chemical and isotopic tracers for water resources management in semi-arid areas, salinity of water and soil, karst hydrology, environment, climate change and its impact on natural resources in arid zones

He is Leader of several national and international research contracts (EU, IAEA, UNESCO, NATO, EU, CNRS, CNRST, IRD, ABH, ACADEMIE Hassan II,..) since 1990s and supervisor of about 30 PhD students. He has published more than 100 papers in reputed journals, serving as reviewer member of reputed journal and international expert in water resources topic. He was former president of Moroccan chapter of International Association of Hydrogeologists (IAH) 2003-2016. Affiliated professor to International Water Research Institute (IWRI) of private University Mohamed 6 Polytechnic (UM6P), Benguéir (Morocco) since July 2019. published 148 articles at present and reached an H-index of 32 and 3366 citations by 2227 documents. The most cited paper (246 times) published in Hydrology journal, (Bouchaou et al., 2008).

<https://www.scopus.com/authid/detail.uri?authorId=6603080991>



Prof. Dr. **Benlhachemi** is a Professor of Higher Education at Ibn Zohr University, Faculty of Sciences in Agadir, Morocco, specializing in Inorganic Chemistry and Materials Science. He holds multiple degrees, including two PhDs, from Mohamed V University in Rabat and University of Toulon in France. With a productive scientific output, Dr. Benlhachemi has authored over 180 indexed articles in the fields of photocatalysis, phosphates, bismuth compounds, and porous geopolymers, focusing on applications in environmental remediation and energy

He has supervised several PhD theses and contributed to numerous national and international research projects, including programs funded by CNRST, Ibn Zohr University and Campus France. He has served as an invited professor in France and continues collaborating on joint scientific works. His expertise is recognized in project evaluations for PHC Toubkal and other competitive research funding projects. Dr. Benlhachemi's work bridges fundamental material science and applied environmental technology, reflecting a career dedicated to innovation, sustainability, and education.



Prof. Dr. **Rachid LATIF** is... Rachid Latif He was born in Agadir, Morocco, on December 8, 1968. He received the PhD in signal processing in 2000 and the Habilitation degree in 2005, from Ibn Zohr University, Morocco. He is a Professor with the Department of Industrial Engineering, Ibn Zohr University, Agadir, Morocco. His research interests include biomedical signal processing,

fuzzy logic, time-frequency signal processing and he is working on the modeling, filtering, and analysing fetal cardiac signals.

Prof. Latif is the head of the signals systems and computer science group and is a member of the Moroccan Acoustical Society. He currently has 120 papers on Scopus, an H-index of 15, and 980 citations in 677 documents. <https://www.scopus.com/authid/detail.uri?authorId=7004392558>



Prof. Dr. **Bahcine BAKIZ** is a distinguished researcher and academic known for significant contributions in materials science and environmental chemistry. Currently affiliated with the Faculté des Sciences Rabat in Morocco, Dr. Bakiz has an extensive educational background, including positions at several prominent institutions in Morocco and France. Dr. Bakiz's research primarily focuses on photocatalytic processes, electrochemical degradation, and developing innovative materials for environmental applications.

Recent publications reflect a commitment to addressing pressing environmental issues, such as the degradation of organic pollutants and the sustainable management of waste materials. Notable works include studies on the photocatalytic degradation of dyes and antibiotics and the conversion of phosphogypsum waste into valuable products. Throughout a career spanning over a decade, Dr. Bakiz has collaborated with various international research organizations and has received sponsorship from esteemed institutions, including the National Research Foundation and the Deutsche Forschungsgemeinschaft. This collaborative spirit underscores a dedication to advancing scientific knowledge and fostering innovation. With a robust portfolio of publications in reputable journals, Dr. Bakiz continues to influence the academic community and contribute to the development of sustainable solutions for environmental challenges.

<https://www.scopus.com/authid/detail.uri?authorId=57217373876>



Prof. Dr. **Said GHARBY**, Associate Professor of analytical chemistry and quality control at the Polydisciplinary Faculty of Taroudant, Ibn Zohr University. (>120 papers, H-index=31, ([Scopus Author ID: 25927057100](https://www.scopus.com/authid/detail.uri?authorId=25927057100))). He received his Ph.D. in analytical chemistry and quality control, from Faculty of Science, University Mohammed V Rabat in 2012. He is currently head of research for the “Biotechnology, Analytical Sciences, and Quality Control research” team.

Before joining the university as a professor, Gharby has worked in the food industry at LESIEUR CRISTAL (2004–2011) in Casablanca, Morocco and then at the Ministry of Agriculture, Autonomous Establishment of Control and Coordination of Exports, currently known as Morocco Foodex (2011–2017).



Prof. Dr. **Abdallah ALBOURINE** is currently a full Professor in the Department of Chemistry, Faculty of Sciences, Ibnou Zohr University (Agadir, Morocco). Head of the Analytical Chemistry and Environment team. Throughout his scientific career, he has supervised more than 25 PhD students. His current research interests focus on the following topics: Analytical chemistry, quantum chemistry, conductive polymers, nanocomposite materials, surfaces and interfaces, catalysis, statistical modelling, and wastewater treatment.

His contribution to this field includes more than 100 indexed peer-reviewed articles and book chapters. He has collaborated with 164 co-authors to receive more than 2830 citations by 1725 documents. He has also contributed as a reviewer for more than 15 leading journals in the environmental chemical sciences. He is a member of the scientific and organizing committees of 20 International Conferences. He has participated in numerous national and international research projects. <https://www.scopus.com/authid/detail.uri?authorId=6506451640>



Prof. Dr. **Brahim El Ibrahimi** is a professor of physical chemistry at the Faculty of Applied Sciences, IBN ZOHR University, Morocco. His scientific activity mainly focuses on the metallic protection against corrosion using organic inhibitor compounds, including amino acids and biopolymers, as well as the application of diverse computational tools to investigate the inhibiting process at the electronic and atomic scales. Furthermore, he has carried out a series of investigations in various areas related to physical chemistry, namely electro-degradation of organic pollutants, wastewater treatments and anti-scaling.

He is author and co-author of over 120 scientific papers including review and full research papers and 23 book chapters. He has participated by more than 60 presentations in international and national conferences. Currently, he is an associate editor for Current Chinese Science journal - Corrosion section (Benthan) and an editorial board member for Journal of Bio- and Tribo-Corrosion (Springer). He has acted as a lead Guest Editor of several Special Issues dealing with corrosion protection. He is also an active Reviewer for many international journals.

<https://www.scopus.com/authid/detail.uri?authorId=57219292269>

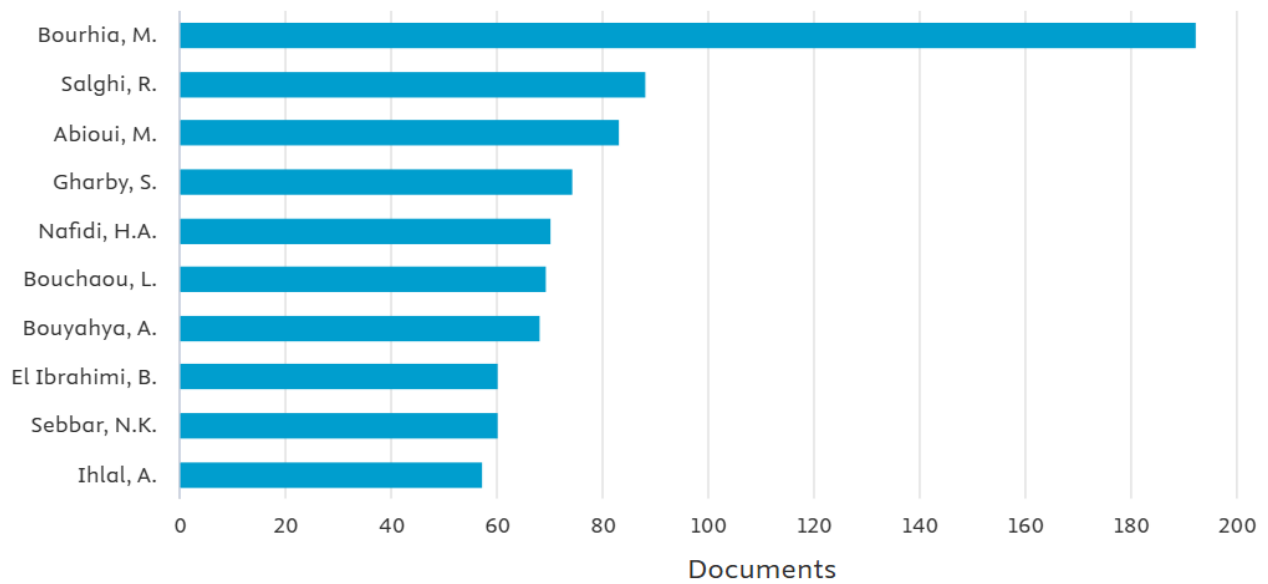
### 3.2. Most cited papers

Scopus Analysis also indicated that the paper that exceeded 1440 citations was published by Petit, Mousadik et Pons in 1998 (Petit *et al.*, 1998). However, his profile is at only 10 papers. The second paper of Berradi *et al.* (2019) on textile surpassed 600 citations. That of Eddouks et al., 2002 attained more than 520 citations (Eddouks *et al.*, 2002). The fourth cited (470 citations) belongs to Zakia Hammouch published in “*Applied Mathematics and Computation*” Q1, Impact factor 3.5 (Singh *et al.*, 2018). The fifth one cited 466 times on BACH: Grand challenge on breast cancer histology images, Medical Image Analysis, by Ismael Kone et coll. In Medical Image Analysis Q1, Impact factor 10.7 (Aresta *et al.*, 2019). The most cited paper of the high published author, Salghi, reached 290 times (Singh *et al.*, 2018), in corrosion protection and a collaboration between researchers in Morocco, China, India and Saud Arabia.

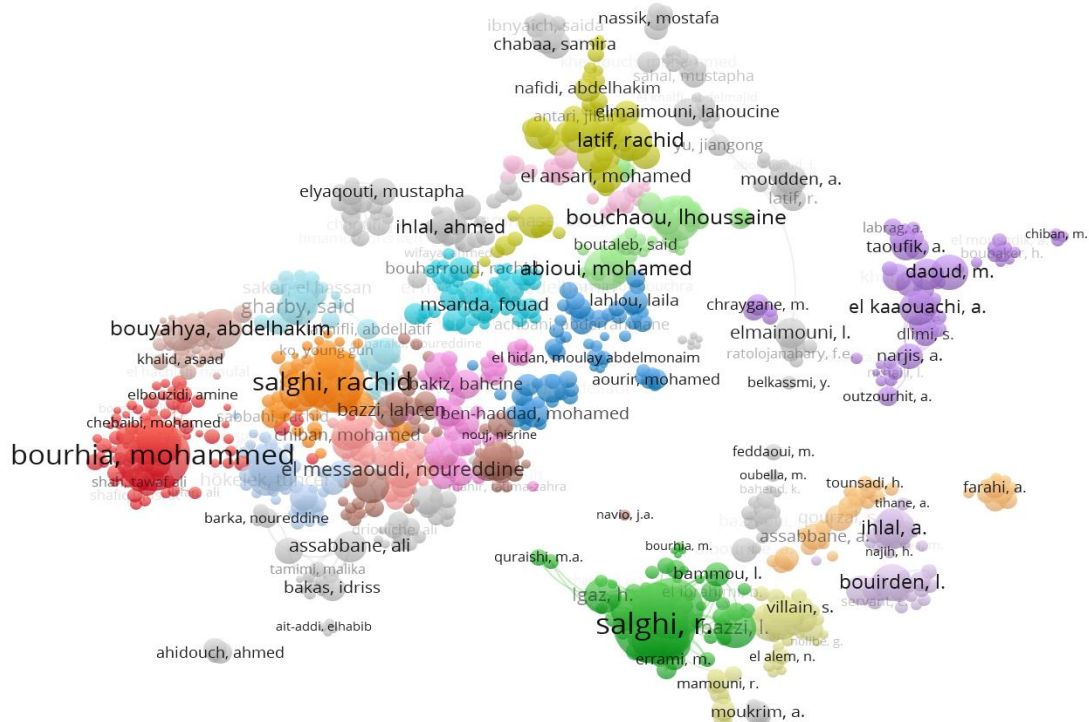
### 3.2. Most cited authors during last five years (2020-2024)

**Figure 9**, a bar chart, represents the total contribution of researchers in terms of published documents, with Mr. Bourhia as the most published researcher. Nevertheless, when analyzing the most recent 5 years (2020-2024), it becomes evident that there is a recent change in this hierarchy. Specifically, Mr. Salghi is now recognized, next to any Mr. Bourhia, in the hierarchy. This could indicate a change in the intensity of his scientific activity or an increase in the influence of recent papers in influencing his well-established hierarchy of contribution.

Further to this point, the presence of several new researchers not only represents a fresh approach but also an opening-up of the research environment at Ibn Zohr University, feeding back into an evolving change of individual contributions and newly established scientific customs. A more thorough analysis of the problem areas and the timing of the publications would assist in better interpreting the changes we have seen so far. The network map in **Figure 10**, complements the previous analysis of researchers as classified by Scopus (**Figure 9**), demonstrating clearly that the researchers represented by large bubbles are the researchers with a greater number of publications. An example of this is when Bourhia Mohammed, represented by a large red bubble, is compared to the most published researcher. Other researchers who are represented by comparatively large bubbles include.



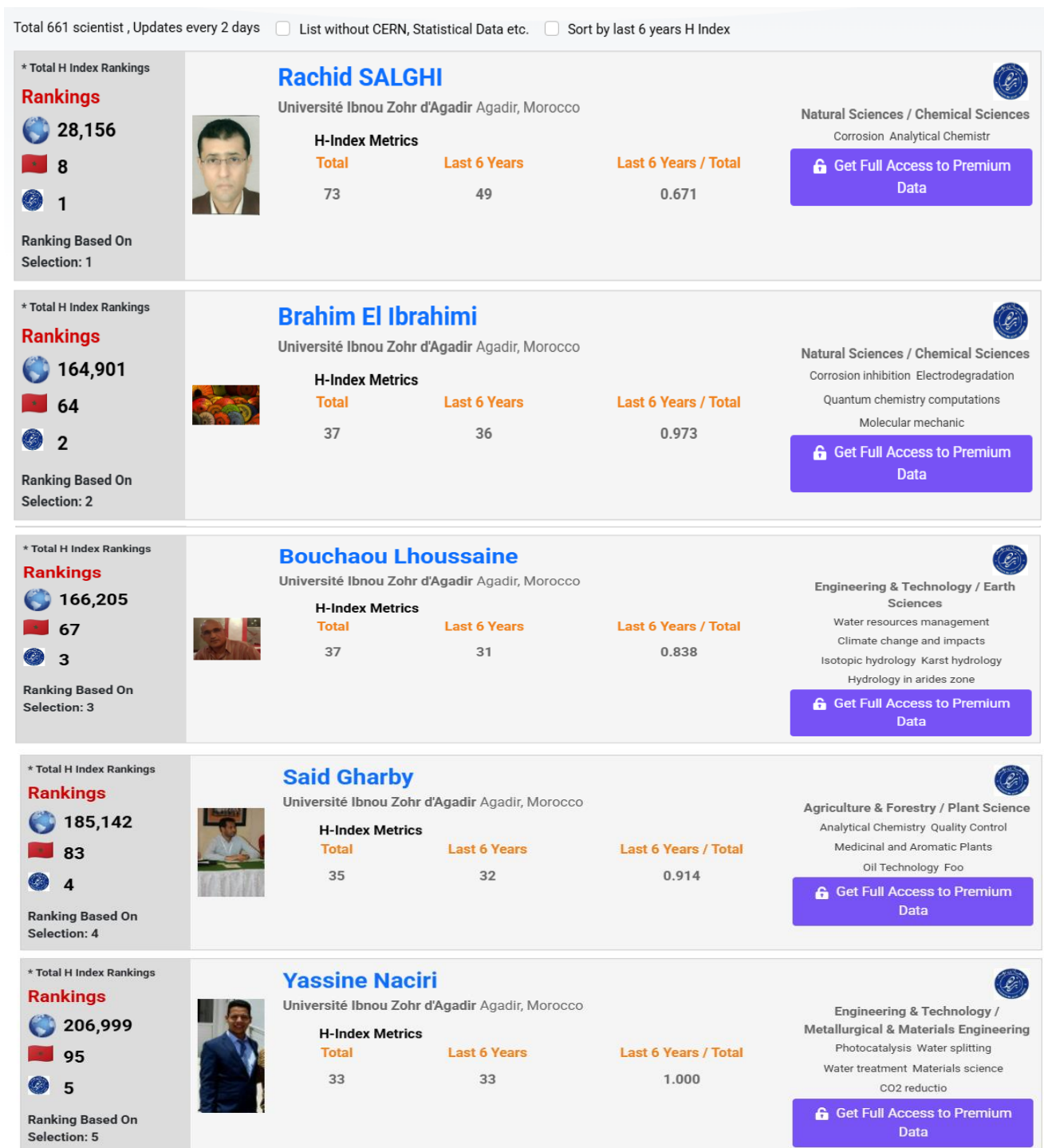
**Figure 9.** Evolution of the author’s ranking of UIZ from 2020 to 2024



**Figure 10.** Evolution of the author’s ranking of UIZ from 2020 to 2024

### 3.3. Adscientificindex tool

Adscientific (Alper-Doger Scientific Index) also offer rankings for Countries, Universities, and Authors. Based on its update on April 22, 2025, Adscientific covers 24,484 institutions and 2,625,160 scientists across 221 countries in 13 major academic fields and 197 disciplines ([www.adscientificindex.com](http://www.adscientificindex.com)). 190 675 are covered in Africa, which is presented by only 7% of the scientific community. Among 7044 scientists from 54 institutions in Morocco, only 611 scientists with profiles on Scholar Google appear on Adscientificindex. Rachid Salghi, Brahim El Ibrahimi, Lhoussaine Bouchaou, Said Gharby, Yassine Naciri, Mohamed Hamdani, Ali Assabbane, Abdeljlil Benlhachemi, Mohamed Laabd, Rida Bilak, etc., are the higher H-index (**Figure 11**). Some authors who did not appear, must subscribe to be added.



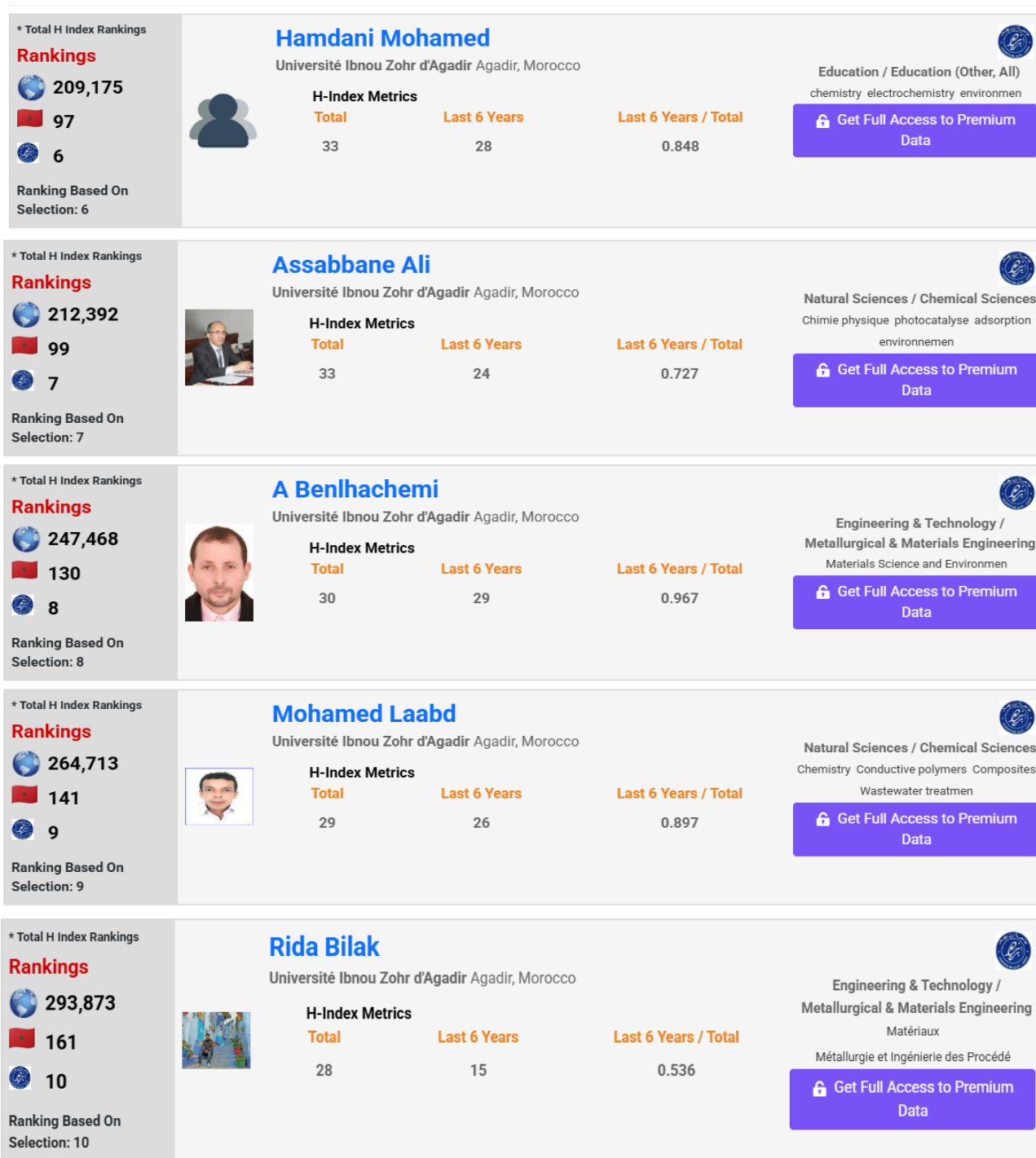


Figure 11. Author ranking of UIZ by the AdScientificIndex

## Conclusion

This bibliometric review examines the development and influence of Ibn Zohr University in terms of scientific output between 1988 and 2024. The results of this study reveal information about the growth, development, and dynamics of researchers at the university. First, the increase in the number of publications over the last ten years demonstrates the growing interest of Ibn Zohr University's faculty members in getting involved in scientific research and developing young researchers in multiple fields of inquiry. Second, the increased visibility in databases such as Google Scholar, Scopus, and Web of Science, and several international rankings, for example, the Academic index and Stanford University

ranking, have helped to encourage other senior and more experienced professors to enhance their publishing efforts while also trying to boost citations.

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## References

- Abdelwahab S. I. et al., « Bibliometric analysis: A few suggestions (Part Two) », *Current Problems in Cardiology*, vol. 50, no 3, p. 102982, mars 2025, doi: [10.1016/j.cpcardiol.2025.102982](https://doi.org/10.1016/j.cpcardiol.2025.102982).
- Ahmed M., Roslina Bt. Othman, et M. F. Noordin (2023), « Trends in open science: a bibliometric analysis of research topics, citations, journals, and productive entities », *JISDT*, 5, n° 2, 170-193, nov. 2023, <https://doi.org/10.31436/jisdt.v5i2.422>
- Ahn J., Yi E., Kim M. (2024), Blockchain Consensus Mechanisms: A Bibliometric Analysis (2014–2024) Using VOSviewer and R Bibliometrix, *Information*, 15(10), 644, <https://doi.org/10.3390/info15100644>
- Aichouch I., Kachbou Y., Bouklah M., Merimi C. (2025), Bibliometric analysis using VOSviewer: Analysis of Steel Corrosion using EIS, *J. Mater. Environ. Sci.*, 16(3), 411-421
- Bouchaou L., Michelot J.L., Vengosh A., Hsissou Y., Qurtobi M., Gaye C.B., Bullen T.D., Zuppi G.M. (2008), Application of multiple isotopic and geochemical tracers for investigation of recharge, salinization, and residence time of water in the Souss–Massa aquifer, southwest of Morocco, *Journal of Hydrology*, 352(3–4), 267-287, <https://doi.org/10.1016/j.jhydrol.2008.01.022>
- Bukar U. A., Sayeed M. S., S. F. A. Razak, S. Yogarayan, O. A. Amodu, R. A. R. Mahmood (2023), A method for analyzing text using VOSviewer, *MethodsX*, 11, 102339, <https://doi.org/10.1016/j.mex.2023.102339>
- Diem A., Wolter S.C. (2013) The Use of Bibliometrics to Measure Research Performance in Education Sciences. *Research in Higher Education*, 54(1), 86-114. <https://link.springer.com/article/10.1007/s11162-012-9264-5>
- Durazzo A. et al. (2022), Analytical Challenges and Metrological Approaches to Ensuring Dietary Supplement Quality: International Perspectives, *Front. Pharmacol.*, 12, 714434, <https://doi.org/10.3389/fphar.2021.714434>
- Iaqat W., M. T. Altaf, C. Barutçular, E. M. Zayed, et T. Hussain, « Drought and sorghum: a bibliometric analysis using VOS viewer », *Journal of Biomolecular Structure and Dynamics*, 42, n° 22, 12317-12329, déc. 2024, <https://doi.org/10.1080/07391102.2023.2269279>
- Hammouti B., Aichouch I., Kachbou Y., Azzaoui K., Touzani R. (2025) Bibliometric analysis of global research trends on UMI using Scopus database and VOS viewer from 1987–2024, *J. Mater. Environ. Sci.*, 16(4), 548-561
- Lemghili, R., Ait Taleb, A. and Khalifa, M. (2021), "A bibliometric indicators analysis of additive manufacturing research trends from 2010 to 2020", *Rapid Prototyping Journal*, 27 No. 7, 1432-1454. <https://doi.org/10.1108/RPJ-11-2020-0274>
- Leong, Y.R., Tajudeen, F.P. and Yeong, W.C. (2021), "Bibliometric and content analysis of the internet of things research: a social science perspective", *Online Information Review*, 45 No. 6, 1148-1166. <https://doi.org/10.1108/OIR-08-2020-0358>
- López-Robles J.R., Otegi-Olaso J.R., Porto-Gomez I., et al. (2020), Understanding the intellectual structure and evolution of Competitive Intelligence: a bibliometric analysis from 1984 to 2017, *Technology Analysis & Strategic Management*, 32, n° 5, 604-619, <https://doi.org/10.1080/09537325.2019.1686136>
- Martins J., Gonçalves R., F. Branco F. (2024), A bibliometric analysis and visualization of e-learning adoption using VOSviewer, *Univ Access Inf Soc*, 23(3), 1177-1191, <https://doi.org/10.1007/s10209-022-00953-0>

- Mukherje D., Lim W. M., S. Kumar, Donthu N. (2022), Guidelines for advancing theory and practice through bibliometric research, *Journal of Business Research*, 148, 101-115, <https://doi.org/10.1016/j.jbusres.2022.04.042>
- Nazlidou I., N. Efkolidis, K. Kakoulis, Kyratsis P. (2024), « Innovative and Interactive Technologies in Creative Product Design Education: A Review », *MTI*, 8, n° 12, 107, <https://doi.org/10.3390/mti8120107>
- N'diaye A.D., Hammouti B., Nandiyanto A. B. D., Al Husaeni D. F. (2022), A review of biomaterial as an adsorbent: From the bibliometric literature review, the definition of dyes and adsorbent, the adsorption phenomena and isotherm models, factors affecting the adsorption process, to the use of Typha species waste as a low-cost adsorbent, *Communications in Science and Technology*, 7 No.1, 140-153
- Ogondiek J. W., « Bibliometric Analysis of Research Productivity and Impact at the University of Dodoma: A 15-Year Review of Publications, Collaborations, and Knowledge Dissemination », *IJoL*, 10, n° 1, 69-88, mars 2025, <https://doi.org/10.23974/ijol.2025.vol10.1.450>
- Petit, R. J., Mousadik, A.E.L., Pons, O. (1998) Identifying populations for conservation on the basis of genetic markers, *Conservation Biology*, 12, Issue 4, 844 - 855
- Mohiuddin Md. F., Yasin I. Md., Latiff A. R. A. (2023), Knowledge base for social 742-772, <https://doi.org/10.1111/beer.12513>
- Singh A., Ansari K.R., Haque J., Dohare P., Lgaz H., Salghi R., Quraishi M.A. (2018), Effect of electron donating functional groups on corrosion inhibition of mild steel in hydrochloric acid: Experimental and quantum chemical study, *Journal of the Taiwan Institute of Chemical Engineers*, 82, 233-251, <https://doi.org/10.1016/j.jtice.2017.09.021>
- Skute I., Zalewska-Kurek K., et al. (2019). Mapping the field: a bibliometric analysis of the literature on university–industry collaborations, *J. Technol. Transf.* 44, 916–947, <https://doi.org/10.1007/s10961-017-9637-1>
- Hassan W. et A. E. Duarte, « Bibliometric analysis: A few suggestions », *Current Problems in Cardiology*, 49, n° 8, p. 102640, août 2024, <https://doi.org/10.1016/j.cpcardiol.2024.102640>.
- Wu H., Z. Sun, G. Zeng, J. Yang, C. Deng, Li C. (2025), Mapping Knowledge Structure and Themes Trends of Ewing Sarcoma: A Text-Mining Study, *Ann. Surg. Oncol.*, 32, n° 5, 3724-3740, <https://doi.org/10.1245/s10434-025-16978-7>

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