

EDITORIAL VIEW

PERIOPERATIVE MEDICINE

Overcoming barriers to meaningful research in Pakistan: charting a path forward

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INTRODUCTION

Research is the most unwanted, and orphaned part of every discipline in Pakistan. Pakistan Medical & Dental Commission, Higher Education Commission (HEC) or numerous medical universities in the country have been responsible for promoting research, but their responsibilities are finished after counting the number of published papers by any candidate for promotion. HEC has developed a software - called HJRS, but you visit this site and find a jumbled-up data which is four years old. Out of 58 listed Pakistani medical journals only 4 are in 'W' category. Many of the journals have been derecognized, but listed. Research related software like plagiarism check, reference actuality check, reference accuracy check, language etc. are hard to find by the average researcher.

'Anaesthesia, Pain & Intensive Care' was started in 1997, with the objective to foster the culture of research in the members of the neglected specialty of anesthesia, and the journal engaged renowned research fellows to write on the research related topics and published. This invited editorial sheds some light on the barriers to research and the suggested measures to promote research in Pakistan.

Keywords: HEC, Pakistan, Research, Research paper, Software

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Pakistan has witnessed significant growth in its research landscape over the past few decades, with a noticeable increase in research output across various disciplines. While challenges persist, particularly in funding and infrastructure, positive strides have been made, contributing to both national development and global knowledge.¹

Several areas of research have emerged as focal points within Pakistan, driven by both national priorities and global trends. In the field of healthcare, research endeavors have aimed to tackle prevalent diseases, improve healthcare delivery systems, and advance medical technologies to enhance patient care.^{2,3}

In terms of volume, Pakistan has experienced a steady increase in research output, as evidenced by the rise in scientific publications and citations. According to data from the Web of Science, Pakistan's research output has more than doubled over the past decade, with a particularly notable increase in fields such as natural sciences, engineering, and medical sciences. This surge in research activity reflects a growing emphasis on scientific inquiry and innovation within the country.⁴

Researchers from Pakistan have made significant contributions to various scientific fields, publishing papers in reputable international journals and collaborating with scholars from around the world. This global engagement has not only facilitated the exchange of ideas and expertise but has also elevated Pakistan's standing in the international research community.^{5,6}

Despite these achievements, the research landscape in Pakistan faces several challenges that hinder its full potential. Limited funding opportunities, inadequate research infrastructure, and a shortage of qualified researchers pose significant barriers to research advancement. Additionally, issues such as brain drain, where talented researchers migrate abroad in search of better opportunities, further exacerbate the research ecosystem's challenges.⁷ Information technology related barriers highlight a myriad of challenges obstructing the adoption and advancement of IT in Pakistan. Several challenges such as limited infrastructure, unreliable electricity supply and erratic internet connectivity, considerably impede IT development. Moreover, the research identifies the lack of skilled human resources

and insufficient investment in IT education and training as critical barriers in the country.⁸

Pakistan has been making significant strides in its educational development over the past decade, with the number of degree-awarding institutions reaching nearly 250, according to the Higher Education Commission (HEC) in 2019. HEC, serving as a regulatory body, plays a pivotal role in overseeing public sector universities and ensuring their adherence to standards. In this regard, both local and international agencies continuously assess educational institutions based on diverse criteria. Research stands out as a crucial aspect in these evaluations, encompassing factors such as publications, citations, funding, collaborations, and the availability of research facilities. This emphasis on research underscores the HEC's dedication to fostering academic excellence, innovation, and the advancement of knowledge within Pakistani universities, ultimately enhancing their competitiveness and good standing on a global scale.^{9, 10}

Pakistan's commitment to achieve the United Nations Sustainable Development Goals (SDGs) has provided a framework for aligning research efforts with national development priorities. By focusing on areas such as health, education, clean energy, and sustainable development, research in Pakistan is poised to make meaningful contributions towards achieving these global targets.¹¹

However, it is important to acknowledge the positive strides that have been made in the recent years to address the existing challenges. Efforts to increase research funding, establish research centers of excellence, and promote industry-academia collaboration have been initiated to bolster the research ecosystem. Additionally, initiatives aimed at fostering a culture of innovation and entrepreneurship are underway to translate research findings into tangible societal benefits.¹² By all means, Pakistan's research landscape has witnessed significant growth and evolution, with a burgeoning research output across diverse fields. While challenges persist, efforts to address these challenges and capitalize on emerging opportunities are underway. By harnessing its research potential and fostering a culture of innovation, Pakistan can continue to make impactful contributions to both national development and global knowledge.

In Pakistan, as in many other developing countries, there are several barriers to meaningful research across various disciplines. Understanding these barriers is crucial for devising strategies to overcome them and foster a robust research culture. Here, we delve into some of the significant challenges faced by researchers in Pakistan. Funding is a cornerstone of any research endeavor, providing the necessary resources for conducting experiments, acquiring equipment, and

supporting researchers' salaries. However, in Pakistan, limited governmental and private sector investment in research severely constrains the funding available for scientific inquiry. HEC is the primary source of research grants and funding. Other funding sources include Pakistan Science Foundation (PSF), and Pakistan Agricultural Research Council (NARC).¹³ According to the UNESCO Institute for Statistics, Pakistan's expenditure on research and development (R&D) as a percentage of GDP was merely 0.29% in 2018; significantly lower than the global average of 1.72%. This scarcity of funding not only hampers the initiation of new research projects but also impedes the sustainability of ongoing endeavors, limiting the exploration of innovative ideas and solutions to pressing societal challenges.¹⁴

Research infrastructure comprises laboratories, libraries, digital resources, and other facilities essential for conducting high-quality research. However, in Pakistan, the availability and quality of research infrastructure remain inadequate, particularly in comparison to developed countries. Many academic institutions lack state-of-the-art laboratories and equipment, hindering researchers' ability to perform cutting-edge experiments and investigations. Moreover, access to up-to-date literature and digital resources is often limited, further constraining researchers' capacity to stay abreast of the latest developments in their respective fields. Addressing the dearth of research infrastructure requires substantial investment and strategic planning to upgrade existing facilities and establish new ones, thereby empowering researchers to pursue innovative avenues of inquiry.¹⁵

Brain drain refers to the emigration of highly skilled professionals and academics to countries offering better opportunities and facilities, resulting in the loss of talent and expertise from the local research community. Factors contributing to brain drain include limited funding and resources, inadequate career prospects, and concerns about political instability and security. The exodus of skilled professionals not only stagnates the growth of the local research community but also deprives the country of valuable intellectual capital that could drive innovation and economic development. Addressing brain drain requires concerted efforts to create an enabling environment that fosters career advancement and research excellence, thereby incentivizing talented individuals to stay in Pakistan and contribute to its scientific and technological progress.^{16, 17}

Bureaucratic processes and administrative red tape often pose significant challenges to researchers in Pakistan, leading to delays in project approvals, procurement of necessary permits, and disbursement of funds. Moreover, the lack of effective collaboration between academic institutions, government agencies, and industries further

impedes the translation of research findings into practical applications and solutions. Siloed approaches to research hinder interdisciplinary collaboration and knowledge exchange, limiting the holistic understanding of complex issues and constraining innovation. Overcoming bureaucratic hurdles and fostering collaboration requires streamlining administrative processes, promoting interdisciplinary research initiatives, and incentivizing partnerships between academia, industry, and government bodies to facilitate the seamless flow of knowledge and expertise.¹⁸

There have been concerns regarding the quality of research due to inadequate training in research methodology among scholars, coupled with instances of plagiarism and lack of originality in research outputs. Limited access to research mentors and resources exacerbates these challenges, resulting in substandard research practices and outputs. Addressing issues of research quality and plagiarism requires comprehensive training programs for researchers, stringent enforcement of ethical standards and academic integrity policies, and investment in initiatives to promote originality and innovation in research. Moreover, fostering a culture of peer review and constructive feedback can help improve the quality of research outputs and enhance the credibility of the scientific community.^{19, 20}

In addition to these barriers, other factors such as political instability, socio-cultural norms, and educational disparities also influence the research landscape in Pakistan. Addressing these challenges requires multi-stakeholder collaboration, long-term strategic planning, and sustained investment in research and innovation. Here, we outline comprehensive strategies aimed at addressing key challenges and propelling the research ecosystem towards greater excellence and impact:

To catalyze research activities, increased government and private sector *investment* are imperative. Government should allocate a higher percentage of the national budget to R&D, aiming to reach the global average expenditure on R&D as a percentage of GDP. Additionally, the establishment of endowments and grants specifically earmarked for research projects can provide sustained financial support to researchers and institutions. Endowments can be structured to generate perpetual income, while grants can be awarded competitively based on the merit and potential impact of proposed research initiatives. By diversifying funding sources and implementing transparent allocation mechanisms, researchers can access the resources needed to pursue innovative avenues of inquiry and contribute to knowledge creation.²¹

Universities and research institutions should prioritize investments in infrastructure upgrades, including the

acquisition of advanced laboratory equipment and the enhancement of digital resources. *Collaborative* efforts between academia, industry, and government bodies can facilitate the establishment of research hubs equipped with specialized facilities and resources tailored to address priority research areas. Moreover, *partnerships* with international institutions can provide access to expertise and resources not readily available at home, further bolstering the research infrastructure and capacity in Pakistan.^{22, 23}

Institutions must cultivate a culture that values and rewards research excellence. This entails recognizing and *incentivizing* high-quality research work through institutional policies and practices. Universities can establish research incentives such as research grants, awards, and fellowships to motivate faculty members and students to engage in impactful research endeavors. Moreover, tenure and promotion criteria should place greater emphasis on research productivity and impact, encouraging faculty members to prioritize research alongside teaching and service responsibilities.²⁴

Collaboration among universities, research institutions, and industries is essential to harness collective expertise and resources towards addressing complex societal challenges. Successful models of collaboration, such as *public-private partnerships* and research consortia, should be promoted and adapted to the Pakistani context. Universities can establish interdisciplinary research centers and institutes focused on priority areas, fostering collaboration across academic disciplines and facilitating knowledge exchange with industry partners. Government policies and funding initiatives can incentivize collaborative research projects that bridge academia and industry, ensuring that research findings translate into tangible societal benefits and economic growth.²⁵

Investing in comprehensive *research methodology training* for young researchers is critical to ensuring the integrity and rigor of research outputs. Universities should incorporate research methodology courses into their curriculum and offer workshops and seminars on research ethics and best practices. Furthermore, stringent anti-plagiarism measures should be implemented, including the adoption of plagiarism detection software and the establishment of clear guidelines for attribution and citation. To oversee research quality and ethics, the establishment of a *national body* or *regulatory authority* can provide oversight and guidance to researchers and institutions, promoting adherence to ethical standards and maintaining research integrity.²⁶

By implementing these strategies in a coordinated manner, Pakistan can overcome existing barriers to research and position itself as a hub of scientific excellence and innovation. Through sustained

investment, collaboration, and a commitment to fostering a vibrant research culture, Pakistan can realize its potential as a global leader in knowledge creation and dissemination, driving socioeconomic development and improving the quality of life for its citizens.

CONCLUSION

In conclusion, the barriers to meaningful research in Pakistan are multifaceted and complex, encompassing issues related to funding constraints, inadequate research infrastructure, brain drain, bureaucratic hurdles, and challenges in research quality and plagiarism. However, by addressing these barriers and implementing comprehensive strategies, Pakistan can unlock its vast potential for scientific innovation and contribute significantly to global knowledge and development.

Firstly, enhancing funding and investment in research is crucial, by increasing government and private sector investment, establishing endowments and grants, and diversifying funding sources.

Secondly, strengthening research infrastructure by developing state-of-the-art laboratories, digital libraries, and research hubs.

Thirdly, fostering a research culture that values and rewards excellence is essential for attracting and retaining top talent and nurturing a vibrant research ecosystem.

Moreover, promoting collaboration among universities, research institutions, and industries is essential for harnessing collective expertise and resources towards addressing complex challenges.

Finally, investing in training and quality assurance measures, providing researchers with comprehensive research methodology training and implementing stringent anti-plagiarism measures, is critical for upholding research integrity and rigor.

Overall, overcoming the barriers to meaningful research in Pakistan is not only essential for unlocking the country's potential for scientific innovation but also for addressing pressing societal challenges and contributing to global knowledge and development. With the right support and reforms, Pakistan has the capacity to emerge as a global leader in research and innovation, driving socioeconomic progress and improving the quality of life for its citizens. Through collective efforts and sustained commitment, Pakistan can overcome existing barriers and harness its immense potential to shape a brighter future for generations to come.

Conflict of interests

The author claims no conflict of interests. No funding was availed in the preparation of this manuscript.

Author's contribution

Syed Ali Hussain is the sole author of this invited editorial.

REFERENCES

- Jahangir T, Azam S, Bilal M. Publish or Perish: Deconstructing Research Culture In Higher Education Institutes Of Pakistan. *Pak J Soc Educ Lang*. 2021;7(1). [[FreeFullText](#)]
- Frison EA, Cherfas J, Hodgkin T. Agricultural biodiversity is essential for a sustainable improvement in food and nutrition security. *Sustainability*. 2011;3(1):238-53. DOI: [10.3390/su3010238](#)
- Katoue MG, Cerda AA, García LY, Jakovljevic M. Healthcare system development in the Middle East and North Africa region: challenges, endeavors and prospective opportunities. *Front Public Health*. 2022;10:1045739. [[PubMed](#)] DOI: [10.3389/fpubh.2022.1045739](#)
- Muborakshoeva M. Impediments to enhancing research within universities in developing context: the case of Pakistani universities. *J Int Comp Educ*. 2015;4(1):1-13. DOI: [10.14425/00.76.05](#)
- Nolan J. *Global engagement: cooperation and security in the 21st century*: Brookings Institution Press; 2010.
- Salager-Meyer F. Scientific publishing in developing countries: Challenges for the future. *J English Acad Purposes*. 2008;7(2):121-32. DOI: [10.1016/j.jeap.2008.03.009](#)
- Olatunji G, Emmanuel K, Osaghae OW, Timilehin I, Aderinto N, Abdulbasit MO. Enhancing clinical and translational research in Africa: a comprehensive exploration of challenges and opportunities for advancement. *J Clin Transl Res*. 2023;9(5):357-68. DOI: [10.18053/jctres.09.202305.23-00079](#)
- Shair W, Waheed A, Kamran MM, Kubra N. Digital Divide in Pakistan: Barriers to ICT Usage among the Individuals of Pakistan. *J Econ Impact*. 2022;4(3):196-204. DOI: [10.52223/jei4032206](#)
- Tanveer M. *Rankings and Performance in Higher Education: Pakistan's Perspective*; 2020.
- Khan BK, Mustafa G, Nawaz A. Flourishing the higher education in Pakistan: An exploratory analysis of the role of Higher Education Commission (HEC). *J Appl Econ Bus Stud*. 2021;5(3):1-18. DOI: [10.34260/jaeb.531](#)
- Razzaq S, Chaudhry K, Tabassum R, Kanwal N. *Policy research institutions and the health SDGs: building momentum in South Asia-Pakistan country study*; 2017.
- Bramwell A, Hepburn N, Wolfe DA. *Growing innovation ecosystems: University-industry knowledge transfer and regional economic development in Canada. Final Report to the Social Sciences and Humanities Research Council of Canada*. 2012;62. [[FreeFullText](#)]
- Khan T, Bibi MI, Khan RN. Higher education commission (HEC), Pakistan: its current role and responsibilities, problems in higher education, and suggested futuristic reforms (in a futuristic milieu). *Pak J Soc Educ Lang*. 2018;4(1):120-38. [[FreeFullText](#)]
- Yarris LM, Juve AM, Artino Jr AR, Sullivan GM, Rougas S, Joyce B, et al. Expertise, time, money, mentoring, and reward: systemic barriers that limit education researcher productivity-

- proceedings from the AAMC GEA workshop. *J Grad Med Educ.* 2014;6(3):430-6. [PubMed] DOI: [10.4300/JGME-D-14-00340.1](https://doi.org/10.4300/JGME-D-14-00340.1)
15. Shabbir A, Noor N, Saeed A, Ata G. Analysis of the extent to which individual and institutional factors are responsible for lack of inclination towards quality research in Pakistan. *J Qual Technol Manag.* 2015;11(1). [FreeFullText]
 16. Surani NH. Turning Brain Drain into Brain Gain: Harnessing Pakistan's Skilled Diaspora: University of Toronto (Canada); 2021.
 17. Roudgar I, Richards C. The policy challenge of the global brain drain: addressing the dilemmas of contributing push-pull factors. *Int J Public Policy.* 2015;11(1-3):73-85. DOI: [10.1504/IJPP.2015.068841](https://doi.org/10.1504/IJPP.2015.068841)
 18. Ion G, Iftimescu S, Proteasa C, Marin E. Understanding the role, expectations, and challenges that policy-makers face in using educational research. *Educ Sci.* 2019;9(2):81. DOI: [10.3390/educsci9020081](https://doi.org/10.3390/educsci9020081)
 19. Helgesson G, Eriksson S. Plagiarism in research. *Med Health Care Philos.* 2015;18:91-101. [PubMed] DOI: [10.1007/s11019-014-9583-8](https://doi.org/10.1007/s11019-014-9583-8)
 20. Zimba O, Gasparyan A. Plagiarism detection and prevention: a primer for researchers. *Reumatologia.* 2021;59(3):132-7. [PubMed] DOI: [10.5114/reum.2021.105974](https://doi.org/10.5114/reum.2021.105974)
 21. Wallsten SJ. The effects of government-industry R&D programs on private R&D: the case of the Small Business Innovation Research program. *RAND J Econ.* 2000:82-100.
 22. Nwuke TJ, Nwanguma TK. Provision and Utilization of Physical Resources for Effective Teaching and Learning Effectiveness in Public Universities in Rivers State; 2024.
 23. Allioui H, Mourdi Y. Exploring the full potentials of IoT for better financial growth and stability: A comprehensive survey. *Sensors.* 2023;23(19):8015. DOI: [10.3390/s23198015](https://doi.org/10.3390/s23198015)
 24. Babenko O, Gruneir A. Fostering collaborative research culture through research development rounds. *J Contin Educ Health Prof.* 2022;42(1):4. [PubMed] DOI: [10.1097/CEH.0000000000000367](https://doi.org/10.1097/CEH.0000000000000367)
 25. El-Ashry MA. International Journal of Innovation in Science, Technology, and Business. *Int Multidiscip J Sci Technol Bus.* 2023;2(3):35-44.
 26. Susiani TS, Salimi M, Hidayah R. Research based learning (RBL): How to improve critical thinking skills? *SHS Web Conf.* 2018;42(2018):00042. DOI: [10.1051/shsconf/20184200042](https://doi.org/10.1051/shsconf/20184200042)