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Policy Brief

EVALUATING HIGHER EDUCATION IN PAKISTAN: AN APPRAISAL OF RESEARCH PUBLICATION LANDSCAPE

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INTRODUCTION

Over the last two and a half decades, hundreds of millions of dollars have been invested in setting up new universities across the country, funding faculty development programs, launching research grant schemes, and operationalizing national centers, and incubation programs. The ultimate goal of this enterprise was to elevate universities and degree-awarding institutions as centers of excellence for education, research, and development, fostering a rich and vibrant knowledge-based economy in Pakistan. The outcomes of this ambitious program are unfortunately not encouraging.

We have analyzed 1,450 scholarly journals and conferences in engineering and computer science domain to dig out research papers originating from Pakistan. A new method of quality centric ranking of journals and conferences has been proposed which places journals in four categories: Alpha, Beta, Gamma and Delta, with Alpha category journals being the elite with extremely high prestige among research community. Our analysis shows that over the past 18 years, only 196 (0.51%) papers originating from Pakistan appeared in Alpha category journals. For the same period, we published 17,539 (45.94%) papers in journals listed in Delta category, the lowest category.

Interestingly, 9 out of 10 journals where we have published the most articles are open access journals requiring a significant amount (in US dollars) for publishing each paper, and all of these journals are in low categories (Gamma, Delta). It is surprising to see a country always complaining about low research funding, pays significant amount to publish in low category journals, and does not aim to publish in high quality journals which are mostly free of cost.

With these undeniable numbers, we formulate a setup of policy interventions for HEC which, if implemented, can significantly increase our representation in top quality journals and conferences, and improve our university ranking.

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METHODOLOGY

As described earlier, all major quality metrics used in journal ranking have their shortcomings and criticism. The impact factor is especially misused as this has become a de-facto standard in academia across the world. Many low quality and borderline predatory journals have managed to achieve a good impact factor.

In order to rank journals and conferences based on the reputation/perception among top researchers, and academicians affiliated with top universities and organizations, we use our novel idea of calculating the PEER PERCEPTION INDEX of a journal based on the following criteria.

λ_{c1} = No. of research publications in the journal/conference with first author affiliated to universities ranked 1st – 50th in THE global ranking.

λ_{c2} = No. of research publications in the journal/conference with first author affiliated to universities ranked 51st – 100th in THE global ranking.

λ_{c3} = No. of research publications in the journal/conference with first author affiliated to universities ranked 101st – 150th in THE global ranking.

λ_{c4} = No. of research publications in the journal/conference with first author affiliated to universities ranked 151st – 200th in THE global ranking.

λ = Total no. of publications in the journal/conference for the span of study

PPI = PEER PERCEPTION INDEX of the Journal/Conference

$$\mathbf{PPI} = \left[\mathbf{0.5}\left(\frac{\boldsymbol{\lambda_{c1}}}{\boldsymbol{\lambda}}\right) + \mathbf{0.25}\left(\frac{\boldsymbol{\lambda_{c2}}}{\boldsymbol{\lambda}}\right) + \mathbf{0.15}\left(\frac{\boldsymbol{\lambda_{c3}}}{\boldsymbol{\lambda}}\right) + \mathbf{0.1}\left(\frac{\boldsymbol{\lambda_{c4}}}{\boldsymbol{\lambda}}\right)\right] \times \mathbf{100}$$

*We use Times Higher Education (THE) ranking of universities for calculating PPI. Organizations such as Google, Facebook etc. who actively publish their research have been assigned rank after our inhouse deliberation.

We further categorize journals and conferences into four categories (Alpha, Beta, Gamma and Delta) based on their PPI scores, with Alpha being highest category containing elite journals in their respective domains. Journals not falling under any of these categorize have been tagged as 'None' category which is lowest of all categories.

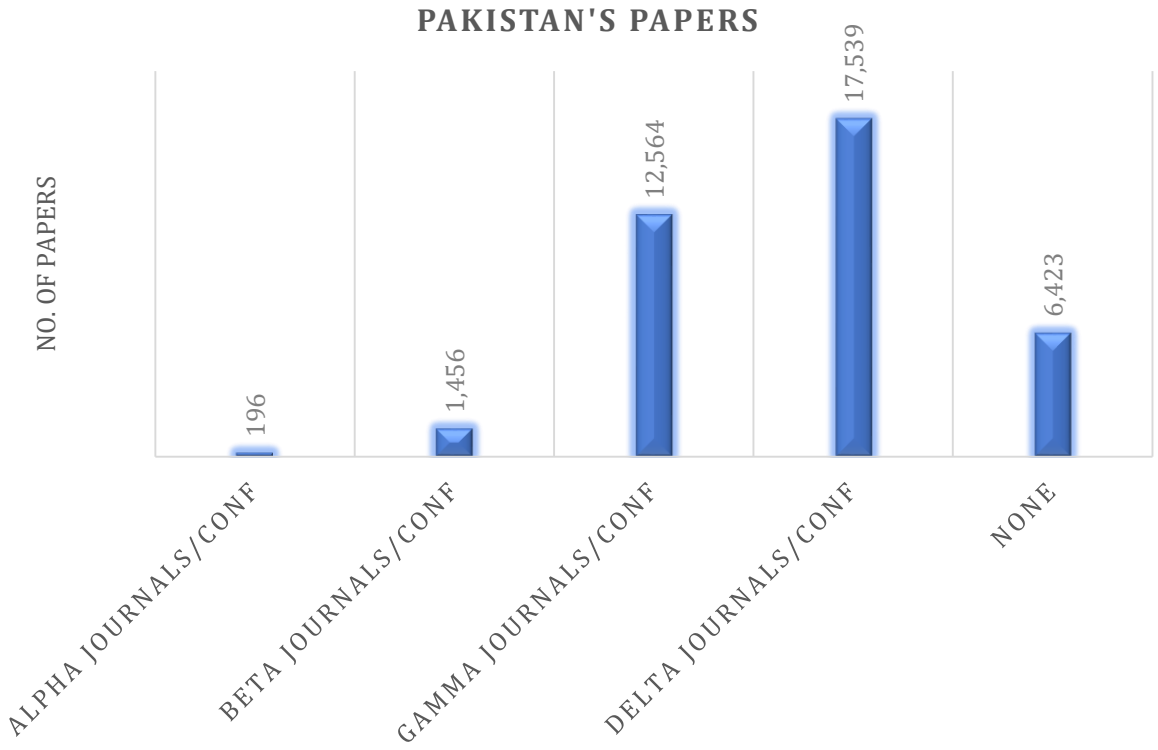
FINDINGS

The papers with first author affiliation from Pakistan have appeared in all four PPI categories as well as in journals not categorized by the PPI (category: None). Since 2008, there are 38,178 journal

papers with first author affiliation from Pakistan in 1450 engineering and computer science journals. While this looks like a good number, the depressing situation is that only 196 (0.51%) of these papers have been published in Alpha category journals. Figure 2 shows the distribution in each category. Unfortunately, most of these papers (17,539) have appeared in the last category (Gamma), while 6,423 papers have appeared in 'None' category.

Unfortunately, only 196 papers appeared in Alpha category, and 1,456 in Beta category over the past 18 years. The numbers are significantly large in lower categories.

Figure 1: Distribution of Pakistani Papers in PPI Categories



Source: Authors' computations.

CONCLUSION

Over the past 18 years, the number of research publications coming out of Pakistan is steadily increasing under the research policies introduced by the HEC. Unfortunately, the focus on these policies is on increasing the number (quantity) of publications, and not on the quality of these papers. Our study shows a dismal picture when looked through quality. Out of 38,178 research

papers originating from Pakistan in engineering and computer science over the past 18 years, only 196 (0.51%) have appeared in top category (Alpha) journals. The bulk of these papers, 17,539 (45.94%), have appeared in the lowest category i.e., Beta. Journals where Pakistanis have published the most during this period are all open – access and of extremely low quality. These research practices exact inverse of research practices in technologically advanced countries which focus more on top category journals. Even our neighbors i.e., India and Iran, publish significantly higher number of papers in top categories than us.

The situation requires immediate policy interventions from the responsible bodies, specifically the HEC. The policy should incentivize publications in top categories, and discourage mass publications in low and extremely low categories.

POLICY RECOMMENDATIONS

Our research shows closer to absolutely on representation of papers from Pakistan in top category of elite journals (Alpha), and very low representation in the next category, Beta. We believe this is due to HEC policies focusing on quantity rather than quality. We recommend following policy changes.

Way Forward – Paper Recognition Policy

HEC currently recognizes only W – category journal papers for Engineering, Computing and IT disciplines. There is absolutely no distinction between W – category papers. The 1450 journals we have analyzed are all W – category journals as per the HEC criteria. It is pertinent to mention that many journals, especially those categorized as Delta journals in our method, have a very negative perception and extremely low quality.

It is strongly recommended that HEC adopts a clearer quality metric for journal paper evaluation. Our Peer Perception Index can be expanded to include all journals, related to social sciences and medical research. This quality index serves the purpose and should be adopted for evaluation of papers. Below we propose key changes in relevant policies considering adoption of our PPI quality index.

Faculty Promotion Policy

HEC's Current promotion policy from Assistant Professor to Associate Professor in Engineering, Information Technology, and Computing disciplines requires following two eligibility conditions:

- PhD in relevant discipline
- Five years of post – PhD teaching/research experience (six years for TTS)

- 10 research publications in W category journals, with at least 4 publications in last five years

The policy does not differentiate between papers in top journals or bottom category journals. There is absolutely no reward/incentive for publishing in high quality journals.

Promotion from Assistant Professor to Associate Professor

Based on our study, we propose following eligibility requirement for promotion to Associate Professor.

1. PhD in the relevant discipline
2. Five years of post – PhD teaching/research experience (six years for TTS)
3. At least 10 research publication points. These points can be obtained based on the following criteria:
    - 3 points each for a paper published in Alpha category journal or conference (as first author, corresponding, or co – author)
    - 2 points each for a paper published in Beta category journals or conference (as first author, corresponding, or co – author)
    - 1 point each for a paper published in Gamma category journal or conference (as first author, corresponding, or co – author)
    - 0.5 point each for a paper published in Delta category journal or conference (as first author, corresponding, or co – author)
    - Zero point for a paper published in 'None' categorized journal or conference (as first author, corresponding, or co – author)
4. At least one post – PhD paper as first or corresponding author in Alpha or Beta journal or conference. In papers where first and corresponding authors are both faculty member, only first author will get the credit.

Promotion from Associate Professor to Professor

Similar to this, we propose changes in promotion policy from Associate Professor to Professor cadre. Each applicant for promotion to Professor should meet the following eligibility criteria:

1. PhD in the relevant discipline
2. Ten years of post – PhD teaching/research experience

3. At least 15 research publication points. These points can be obtained based on the following criteria:
    - 3 points each for a paper published in Alpha category journal or conference (as first author, corresponding, or co – author)
    - 2 points each for a paper published in Beta category journals or conference (as first author, corresponding, or co – author)
    - 1 point each for a paper published in Gamma category journal or conference (as first author, corresponding, or co – author)
    - 0.5 point each for a paper published in Delta category journal or conference (as first author, corresponding, or co – author)
    - Zero point for a paper published in 'None' categorized journal or conference (as first author, corresponding, or co – author)
4. At least one post – PhD paper as first/corresponding author in Alpha category journal or conference. In papers where first and corresponding authors are both faculty member, only first author will get the credit.
5. At least two post – PhD papers as first/corresponding author in Alpha or Beta category journal or conference. In papers where first and corresponding authors are both faculty member, only first author will get the credit.

These policy interventions will incentivize top quality publications, and faculty will be more inclined to publish their work in Alpha, Beta categories.

PhD Graduation Policy (Research Requirement)

Current HEC policy (Policy on PhD Degree Programs) requires each PhD student to publish at least on first author paper in HEC category Y or above journals. Some universities e.g., NUST, have increased that number to two journal papers. HEC Y category journals are extremely low category journals which have not even received impact factor. For engineering and computing disciplines, we recommend the following research requirement for each PhD student:

- At least one first author paper in Gamma (or above) category journal or conference

We strongly disagree with some universities internally requiring PhD students to publish two W category papers. This puts a lot of pressure on PhD students and they are forced to publish in extremely low W category, open access to fulfill the requirement. A PhD student who is forced to publish in low category journals is certainly not expected to publish in top quality when he/she becomes a faculty member.

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Open Access Journals APC Payment

Our study shows that all journals where Pakistanis have published the most are open access requirement a significant amount of payment (in US dollars) for each published paper in the name of Article Processing Charges (APCs). This payment is made by universities under HEC policies. Unfortunately, all of these journals are ranked in very low categories (Gamma, Delta, None). We recommend following changes to APC payment:

- Article Processing Charges (APCs) for open access journals will be paid by the university only if the journal is ranked in Alpha or Beta category.

This will not only lower a significant load on national exchequer, it will deter the researchers from excessively publishing in low quality journals.

Travel funding for conferences

Currently, conference papers are not considered for faculty promotion under the HEC's policy. Our proposed promotion criteria do not differentiate between a journal or a conference paper. It ranks conferences in categories along with the journals.

HEC and universities do have a travel/registration funding schemes to attend conferences. However, unfortunately, the funding is not enough, and many request are not entertained. We propose the following changes to the policy:

- HEC will ensure travel/registration funding to attend a conference ranked in Alpha or Beta category if first author of the paper is affiliated with an institution based in Pakistan.
- Conferences ranked in other categories will not funded for travel/registration.

The amount of funding saved from the changes in open access payment policy can be diverted towards funding travel to the conferences. Conferences ranked in Alpha or Beta category are well – respected by the research community. Well – known and active researchers from around the world attend these conferences. Attending these conferences will give Pakistani researchers a platform to connect with world top researchers, which will eventually lead towards collaboration. It must also be noted that a significant weightage in university ranking comes directly or indirectly from the 'research reputation' of the universities. Conference papers and the event present a unique opportunity to advertise/market the university in front of the academic fraternity which eventually vote on the 'research reputation' in ranking system.