

## **Evolution of Research Culture in Pakistan: A SWOT Analysis from the Perspective of Humanities and Management Faculty**

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This qualitative study takes on to gauge the evolution of research culture in Pakistan. Primarily it revolves around SWOT analysis of past, present, and future. It seeks expert opinions of faculty members of the Departments of Humanities, and Management Sciences of COMSATS University Islamabad, Abbottabad Campus on open-ended questions. The study finds a recent emergence of certain features of research culture identified in the literature and foresees it's further strengthening in the coming days based on some assumptions .

**Keywords:** research culture, evolution, Universities, SWOT analysis

The research culture in developing countries, including Pakistan, is significantly different from that of developed nations. Unlike their counterparts in developed countries, these third-world nations often lack a strong research culture and tend to prioritize traditional teaching methods over active contribution to a knowledge-based economy (Salazar-Clemeña & Almonte-Acosta, 2007). This is evident in the low allocation of funds towards research and development (R&D) expenditure in South Asian countries, including Pakistan. While top countries dedicate an average of 2.5% (Germany) to 3.9% (Israel) of their GDP to R&D over the past 23 years, South Asian countries struggle to reach even 1%, with spending ranging from 0.1% (Sri Lanka) to 0.8% (India). Pakistan's investment in R&D stands at a mere 0.3% of its GDP (Graph 1).

This disparity in research investment is reflected in the number of researchers dedicated to R&D per million people. Israel, with its substantial investment, boasts an average of 7771 researchers in R&D per million people, while Pakistan lags behind with a count of only 157 researchers per million people, despite being the highest in the region (Graph 2). However, Pakistan has made efforts to improve its research culture, particularly with the establishment of the Higher Education Commission (HEC) in September 2002. In response to the challenges faced by higher education institutions, the HEC was created as an autonomous body specifically tasked with promoting research in higher education. The deficiencies identified by the HEC task force included ineffective administration, inadequate infrastructure, and the lack of research competence among academic staff (Akbari & Naqvi 2008).

The introduction of the HEC led to a significant increase in the higher education budget, which experienced a seven-fold growth from 2002 to 2008, setting a world record (Shaukat, 2012). Consequently, the number of universities in Pakistan rose from 74 in 2001 to 145 in 2012, accompanied by a surge in student enrollment from 276,000 to over a million during the same

period. This upward trend continued, resulting in a total of 195 universities by 2019. Moreover, Pakistan has witnessed notable growth in research output, emerging as the top country with the largest increase in publications from 2017 to 2018 (Graphs 3 and 4).

However, it is essential to recognize that the focus should not solely be on increasing the quantity of research output. Many universities in Pakistan still face a shortage of qualified faculty members. Nevertheless, the growing number of individuals holding PhD degrees provides a reasonable pool of resources for universities in general. Complicating matters, the HEC has faced budget cuts and encountered challenges under different government administrations (Shaukat, 2012).

Considering that existing studies primarily concentrate on developed countries and may not fully capture the cultural dynamics of less developed nations like Pakistan (Jan-Benedict, & Steenkamp, 2001), it is crucial to examine the evolution of the research culture in Pakistan at this juncture.

In the context of research culture in Pakistan, it is important to acknowledge that only a limited number of studies have been conducted in this area, highlighting the need to expand the body of knowledge. Among these studies, one particular research emphasizes the significance of leadership and available resources as critical factors influencing a positive research culture (Naseem, Tahir, et al., 2019). This study examines the overall academic subjects, shedding light on the broader aspects of research culture in Pakistan.

In a similar vein, another study builds upon these findings and provides contextual references specifically within the field of management sciences as an academic discipline (Naseem, Imran, et al., 2020). By focusing on a specific discipline, this study further reinforces the importance of leadership and resources in fostering a conducive research environment.

While the aforementioned studies primarily employ descriptive analysis to explore research culture, there is a need to incorporate additional dimensions into the body of knowledge. This study takes a different approach by utilizing SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to further enrich the understanding of research culture in Pakistan. By examining the strengths, weaknesses, opportunities, and threats associated with research culture, this study offers a comprehensive assessment of the current landscape.

Collectively, these studies contribute to the understanding of research culture in Pakistan by highlighting the role of leadership, resources, and discipline-specific factors. However, given the limited number of studies in this domain, it is evident that further research is required to gain a more comprehensive and nuanced understanding of the factors influencing research culture in Pakistan. By incorporating diverse methodologies and exploring various academic disciplines, future studies can broaden the scope of knowledge and provide valuable insights into the development of a robust research culture in the country.

### **Literature Review**

Research culture is a concept that has been defined in various ways by different scholars. Evans (2009) suggests that it is a vague concept due to the diverse aspects highlighted in different studies. Hill (1999) defines research culture as an environment that fosters the growth and proliferation of research. On the other hand, Rosas (2013) views it as a "blind date with the unknown," emphasizing the exploratory nature of research. Mapa (2017) describes research culture as "the way we do research round here," capturing the cultural norms and practices

associated with research. The concept of research culture within an organization is defined by the Hauer (1993) as the collective mindset, behavior, and decision-making processes of individuals with regard to research activities. Schein (1985) delineates six distinct dimensions of research culture, namely: behavioral regularities that are observable, research norms, prevailing research values, the research philosophy of the organization, the rules governing research within the organization, and the overall research climate.

The succeeding sections provide a comprehensive analysis of literature from diverse geographical viewpoints, elucidating the research ethos prevalent in distinct areas.

### **International Studies**

An examination of international studies reveals notable cultural distinctions across countries (Farley & Deshpandé, 2004) (Dilworth-Anderson, Williams, & Gibson, 2002). However, in today's interconnected world, these cultural differences are becoming interconnected with other cultures, leading to cross-pollination, diversity, and hybridization (Craig & Douglas, 2006). Another study views culture as an external variable to the organization, emphasizing the comparative management approach in a contextual context (Deshpande & Webster, 1989). The limitation of a limited set of variables in fully capturing the complexity of culture (Jan-Benedict, & Steenkamp, 2001) demonstrates the challenge researchers face in identifying a comprehensive set of variables that encompass universal aspects for theoretical purposes (Bhagat & McQuaid, 1982) (Shalom, Schwartz & Maria, 1995).

The diverse nature of culture and the difficulties associated with its measurement present significant hurdles for research at the group, organizational, and national levels (Leidner & Kayworth, 2006). One of these challenges involves researchers adhering to principles of transparency, openness, and reproducibility, which are globally recognized as disciplinary norms and values but are not consistently upheld (VandenBos et al., 2015).

Nevertheless, there are common factors that contribute to the development of a research culture, including effective leadership (Bland & Ruffin, 1992) and investment in management (Slade, Philip, & Morris, 2018). Effective leaders play a vital role at both individual and institutional levels by setting clear research objectives and effectively communicating them. Providing adequate resources for faculty training and support is a fundamental requirement for cultivating a robust research culture, and flexibility in resource allocation to accommodate faculty interests is crucial (Hanover, 2014). It is equally important to foster collaboration and synergy among individuals and organizations, rather than promoting isolation, to strengthen and sustain a research culture (Bland & Ruffin, 1992) (Slade et al., 2018). Establishing a national research culture necessitates a higher level of synergy and commitment. However, even with all the necessary prerequisites in place, the evolution of a research culture can take several years (Hanover, 2014).

Although several of the global studies referenced earlier were carried out by scholars from the United States, the subsequent sections emphasize diverse geographical areas and nations. The United Kingdom is a subject of distinct discussion owing to its significant position in the developed world, alongside the United States of America. The present study centers on the independent discussion of literature pertaining to Pakistan.

### **UK Studies**

According to a study conducted in the United Kingdom, there exists a well-established national mechanism for resource allocation that facilitates the direct provision of funding to

teachers and school-level groups (Ebbutt & Ebbutt, 2006). The United Kingdom has identified eight primary indicators of research culture, which encompass the promotion of high-quality research, recruitment practices, staff development initiatives, research discussions, departmental structure, cultural considerations, management strategies, and the support of doctoral researchers (“Fostering an effective research environment,” 2017). Notwithstanding the acknowledgement of the significance of competition and distinct evaluation, the research milieu in the United Kingdom exhibits a dearth of robust emphasis on teamwork and collaboration, (Sarah, 2018). The platform lacks adequate support for activities that researchers consider crucial for conducting high-quality research and fostering a conducive research environment (Notes, 2015).

### **Scandinavian Studies (Netherland, Denmark, Finland)**

The research conducted in the field of Scandinavian studies has provided insights into the noteworthy contribution of action research towards fostering a culture of research (Kjerholt & Hølge-Hazelton, 2018). Research emphasizes the significance of fostering competencies to promote efficient knowledge generation in a knowledge-driven economy, specifically with regards to the upcoming cohort of skilled knowledge workers (Kessels & Keursten, 2002). Within the field of digital humanities, there exists a continuous investigation into the concept of identity and the development of novel environments capable of addressing a diverse range of issues pertaining to research culture. The attainment of this objective requires the establishment of a collaborative effort at the national level, as well as the effective utilization of the capabilities of established digital humanities hubs (Matres, Oiva, & Tolonen, 2018).

### **Asia Pacific Studies (Australia, New Zealand)**

Numerous studies conducted across different regions, including international research (Bland & Ruffin, 1992) (Slade et al., 2018), (Hanover, 2014) as well as studies focused on specific areas such as Scandinavia (Kjerholt & Hølge-Hazelton, 2018) and the UK (“Fostering an effective research environment,” 2017), Southeast Asia Schein, (1985) Rosas, (2013), and Pakistan (Akbari & Naqvi 2008) , shed light on the significance of strong leadership in fostering a dynamic research culture. Additionally, decentralization of university management structures is highlighted as a supporting factor in developing a research-oriented outlook (Pratt, Margaritis, & Coy, 2007; Marchant, 2009). Strong leadership, in conjunction with optimal resource utilization, has the potential to transform traditional teaching-focused models into research-oriented institutions, facilitating the generation of new knowledge—a crucial aspect of universities' missions (Marchant, 2009).

In the pursuit of cultivating and sustaining a research culture, the mentorship of young researchers by senior researchers plays a vital role, as a mentoring network significantly contributes to the growth of research culture (Studman, 2003). Action research, as observed in Scandinavian countries, is considered an effective approach for developing research skills (Ferguson, 1999). Research culture is nurtured at both the institutional and individual levels. At the institutional level, key factors include cohesion and ease of knowledge sharing, research direction, research support, and resource availability. At the individual level, motivation, the development of research skills, and the alignment between the study of research culture and organizational culture are important considerations (Hill, 2002).

### **Southeast Asian studies (Malaysia, Philippines, Vietnam):**

While some studies highlight the aspiration for research, there is often a tepid response from officials in recognizing the policy-practice gap and fostering a more accommodating research culture. However, there is a growing appreciation for transitioning from conventional quantitative research to qualitative approaches (Scott, Miller, & Lloyd, 2006). The evolution of

research culture may involve stages such as creation, growth, development, and nurturing (Anuar & Abdul, 2013). Significant contributing factors to research culture encompass research policies, budget allocation, benefits and incentives, research committees, organizational culture and working environment, infrastructure, and inter-institute collaboration (Mapa, 2017). Institutional support plays a crucial role in encouraging individual faculty members to embrace the research culture, with research units, incentives, expertise, research programs, and institutional policies serving as key factors Dacles et al., (2016). However, relying solely on individually targeted external incentives is inadequate for fostering a robust research culture; administrators need to adopt a holistic approach that embeds research within the overall organizational culture (Teehankee, n.d.). It's worth noting that while a strong research culture can lead to high research productivity, the reverse is not necessarily true, contrary to popular belief (Anuar & Abdul, 2013).

Similarly, in India, there is a tendency to treat research and publication interchangeably, resulting in institutions lacking a genuine research focus. Publications often stem from individual needs for survival or promotion rather than a collective passion for research (Chakaraborty, 2017). Consequently, there is a critical need to prioritize research culture over research publications. Developing countries, including Mexico, have recently recognized the importance of research orientation, leading to a growing prominence of research in the academic environment (Mendez & Cruz, 2014). Likewise, China has experienced a surge in research enthusiasm, with annual government funding for research growing at a remarkable rate of over 20%, even surpassing the expectations of the most enthusiastic scientists (Shi & Rao, 2010)(Akbari & Naqvi 2008).

### **Pakistan Studies**

In Pakistan, the establishment of the Higher Education Commission in 2002 (Akbari & Naqvi, 2008) has resulted in an upward trend in internationally recognized publications and an increase in the number of PhD graduates (Lodhi, 2012; Naseem, Tahir, et al., 2019; Naseem, et al. 2020). Enrollment in Masters' and Doctoral programs has also seen a rise. However, despite these positive indicators, the research culture in Pakistan is still not considered inspiring. Challenges such as a shortage of third-party supervision and a lack of quality academic professionals have adversely affected the research culture (Agha, 2015). Lodhi, (2012) highlights the need for striking a balance between teaching traditions and a strong research culture in Pakistani universities.

There is an imbalance between the public and private sectors, with the public sector dominating in terms of research output (Naseem, Tahir, et al. 2019; Naseem, Imran, et al. 2020). However, it is expected that a more cohesive research culture will develop in the future as the private sector also makes significant contributions. The absence of third-party supervision and quality academic professionals has compromised the caliber of Pakistani students (Agha, 2015). The concept of research culture in Pakistan encompasses an individual's capacity for research activities, human development through an unspecified medium, and a set of common ideas, customs, and skills passed down to successors (Lodhi, 2012). Recent studies have emphasized the importance of leadership and resources as key factors in research (Naseem, Tahir, et al., 2019; Naseem, et al., 2020).

Although there has been an increase in scientific research productivity in Pakistan over the last decade, with a significant rise in the number of articles and highly cited papers (Herciu, 2016), skeptics like Hoodbhoy, (2016) question the ground reality and consider it as "playing the ranking game" and provide a different perspective.

## Method

In our research, we adopted a mixed-methods approach to gain a comprehensive understanding of the research culture within the university. While both quantitative and qualitative techniques were employed, this paper focuses specifically on the qualitative aspect, utilizing the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis method. By examining various SWOT aspects, we aimed to explore the rich research culture from the perspectives of university faculty members, considering the past, present, and future scenarios.

To collect data and capture expert opinions, we distributed open-ended questionnaires to faculty members from the Departments of Humanities and Management Sciences at COMSATS University Islamabad, Abbottabad Campus. This qualitative approach allowed us to delve into the subjective experiences and perceptions of the faculty members regarding the research culture at their institution.

Through the SWOT analysis, we aimed to assess the presence or absence of twelve crucial factors that contribute to a vibrant research culture, as identified by Bland and Ruffin, (1992). These factors encompass a wide range of elements essential for fostering a conducive research environment. They include:

1. Clear goals for coordination, ensuring alignment and coherence in research endeavors.
2. Research emphasis, highlighting the prioritization and significance of research within the university.
3. Distinctive culture, representing the unique values, norms, and practices that promote research activities.
4. Positive group climate, fostering a supportive and collaborative environment that encourages research collaboration and knowledge sharing.
5. Decentralized organization, allowing for autonomy and flexibility in research decision-making processes.
6. Participative governance, involving faculty members in decision-making and research-related policies.
7. Frequent communication, promoting regular and effective exchange of ideas, information, and feedback among researchers.
8. Resources, particularly human resources, acknowledging the importance of skilled and dedicated researchers to drive research productivity.
9. Groupage, size, and diversity, recognizing the benefits of diverse research groups and the advantages of different group sizes in generating innovative ideas and perspectives.
10. Appropriate rewards, providing incentives and recognition for research achievements to motivate faculty members and reinforce a research-oriented mindset.
11. Recruitment emphasis, prioritizing the selection of faculty members with research aptitude and potential.
12. Leadership with both research skills and management practice, emphasizing the importance of visionary leaders who possess not only strong research capabilities but also effective management skills to facilitate and nurture a research culture.

By exploring these twelve factors through qualitative analysis, we aimed to identify the strengths and weaknesses of the research culture within the university, uncover potential opportunities for growth and improvement, and recognize any threats or challenges that may hinder the development of a robust research culture.

Through this qualitative methodology, we sought to provide a deeper understanding of the research culture at COMSATS University Islamabad, Abbottabad Campus, and generate

insights that can inform strategies and initiatives to enhance the research environment, promote knowledge generation, and contribute to the institution's broader mission of academic excellence.

Though in our broader scope we used mixed methodologies using both quantitative (descriptive analysis) as well qualitative (SWOT analysis) techniques this paper would only elaborate qualitative approach to see through different SWOT aspects in past, present, and future through the eyes of university faculty. For this purpose, we distributed open-ended questionnaires to the faculty members of the Departments of Humanities, and Management Sciences of COMSATS University Islamabad, Abbottabad Campus to reflect their expert opinion. Hence, this study is primarily qualitative. Studies on research culture reflect the enabling environment leading to research productivity among faculty members in Higher Education Institutes. Through our SWOT analysis, we attempted to explore the absence or presence of 12 factors of rich research culture highlighted by Bland and Ruffin, (1992) such as 1) Clear goals for coordination, 2) research emphasis, 3) distinctive culture, 4) positive group climate, 5) decentralized organization, 6) participative governance, 7) frequent communication, 8) resources (particularly human resources), 9) groupage, size and diversity, 10) appropriate rewards, 11) recruitment emphasis, and 12) leadership with both research skill and management practice.

## **Results**

### **Findings: Strengths, Weaknesses, Opportunities, and Threats in Past:**

In terms of **strengths**, researchers in the past used to focus on theoretical concepts primarily focusing on pure research, though applied research was also undertaken. The research was conducted only by willing hearts hence academic research contribution was based on integral orientation rather than succumbing to any pressure under the garb of number game. Since promotion was not linked with the publication, no unfair means were applied for publication. Teachers were comparatively more dedicated. Thus young researchers were growing in number whose increasing interest in the internet also increased contact with international HEIs. The prevalence of literary activities at universities used to extend appreciation for the original research work.

### **Weaknesses**

However, there was only a shortlist of available Higher Education Programs. Less advanced technology could not facilitate easy access to information, literature, and resources resulting in poor grooming of research culture. Research Infrastructure was at a dismal stage. It was difficult to search for literature through libraries. Data gathering was much difficult than today. Research funding was not easily available. Resultantly, research had no link with policies. In absence of a conducive research environment, only a few publications were witnessed. Unstable governments coupled with rampant corruption in government institutes put a constraint on the financial health of the education sector. Less investment in the education sector barred the availability of quality mentors which further barred the number of PhDs in HEIs. Hence, the country had only a limited number of researchers resulting in minimum international collaboration.

### **Opportunities**

Annual System of Teaching was less rigorous and hence provided ample time for research. A relatively peaceful environment at HEIs and conducive international atmosphere gave peace of mind and ease in pursuit of research. IT and computing users were less in number and enjoyed a competitive edge over non-users in the conduct of research. Since genuine researchers were scarce, even the limited financial support was able to meet their research requirements. It was easy for the limited number of researchers to publish their papers in absence of real

competition. Pursuit a doctorate could give a relatively greater competitive advantage. Being in low competition they could avail themselves of almost every relevant avenue. Whereas experience at the doctorate level enhanced exposure to research activities, they could easily make their mark in the grooming of research culture.

### **Threats**

Where poor research culture restricted the increase in the number of good researchers, the same could also be blamed for wasting the less encouraged but qualitatively better researchers. Technology users could easily misuse it to produce plagiarized and pseudo research. With literally no means of authentic verification, there were no checks on copyrights infringements. Lack of enough funds also hindered research publications and resulted in low acceptance at the international level. In absence of government patronage either people became reluctant to research or opted for abroad in search of a better future. Lack of dedicated leadership paved way for the emergence of authoritarian culture with minimum freedom of expression. A narrow mindset at higher hierarchy coupled with nepotism produced ideational freaks.

### **Strengths, Weaknesses, Opportunities, and Threats in Present**

In terms of **strengths**, IT advancement boosted research culture through increased use of the internet, availability of advanced materials and tools, easy access to quality international journals through digital libraries etc. With HEC replacing UGC, funds increased tremendously resulting in a reasonable increased number of foreign and local qualified PhDs. This enabled availability of highly qualified faculty who is available as research mentors. Hence, an increased number of young and energetic researchers are witnessed. With the rapid growth of Higher Education Institutes, the number of HE programs also increased which fed research diversity and encouraged interaction with a multidisciplinary environment. Strength and diversity in research brought in industrial support and problem-based research got strengthened. Further, with strength and diversity also come opportunities for collaboration across the borders indicating international acknowledgement. This reflects a growth stage in research culture.

### **Weaknesses**

A bird's eye view highlights tendencies like lack of hard work, short cut approach, in spirited and low-quality research under the garb of workload pressure resulting in low linkages of research with policies. Further, the bureaucratic approach extends the ideational treatment of good and bad researchers. Universities still depict a bureaucratic environment and lack of direction in research. There is no clear guidance in terms of successful publication. Many quality journals still require high publication fee and seeking requisite funds are still a problem. Race for Impact Factor has barred local publications. The current focus seems quantity and in this number game, many a time one work is replicated variously and advanced tools help in plagiarizing the same resulting in infringement of Copy Rights. Number game has shadowed research on current issues of Pakistan and its social impact. With the advent of the IT era, book reading and study circles have become almost dysfunctional. Although new dimensions are emerging but without mutual and proper integration speed of patching the gap between national and international research culture is quite slow. Hence, our research culture is still immature.

### **Opportunities**

Interested scholars can benefit from the generous funding of HEC. Most of the recent governments have shown increased interest in education and we can benefit from the same. With the increasing HEIs and abundant youth large number of new vistas is open for research. With the improved quality, we can internationalize our universities, research, and ourselves. Excellence in quality research can help us adopt a research-based career growth path. Promoting



research at all levels of education, ideally beginning from the school level, could inculcate true and progressive research culture in the country.

### **Threats**

One of the most critical threats pertain to copyrights issues as many a time pseudo researchers imitate ideas and plagiarize earlier research. Improper cyber security mechanism facilitates unethical practices. Further with the ever-growing demand for PhDs, a huge number competes for the limited seats in the admission. Adding further, competition in research publications is also getting tougher day by day. With more research popping up every day, new scholars are facing problems in finding less unexplored areas. Similarly, with heated up competition, employment opportunities are getting saturated. Whereas the employed ones are facing increased pressure of publication to facilitate the employer in the number game. To give impetus to this race universities are inducting researchers without proper planning aiming just increased publications. Whereas pressure for publication is ever increasing, this is hardly complemented with proper training and motivation. Many a time, pseudo researchers receive undue acknowledgement and benefits. In absence of direction in research, conventional approaches are being more patronized in comparison to innovative ones. Number game has fueled fake race and time management for research has become increasingly challenging. Senior management expects a similar number of publications in natural and social sciences alike. This race is barring institutional coordination as it is all about number rather than relevance. Research delivery mechanism i.e. conversion into impact needs a secure environment, whereas the security issues of the country are major threats. With every changing government fund resources reflect volatility.

### **Strengths, Weaknesses, Opportunities, and Threats in Future**

In terms of **strengths**, awareness, facilities, modern tools, and online data-sharing seem to keep increasing in the future facilitating large data estimation. With increased maturity research publication may start reflecting both knowledge addition and proper application. This would not only help create impact-oriented research but would also contribute to economic development. With growing ease to contact fellow researchers, the future may bring increased multidisciplinary and improved quality research with better-networked universities. We also assume that with growing maturity the country would see local as well as international collaboration resulting in international recognition and hence internationalization of universities. Surely, this would depend on stable government and continuation in policies.

### **Weaknesses**

However, if the fears of past and present are not addressed, we may still be witnessing a lack of direction and coordination. The absence of a sound framework may also hinder erecting proper infrastructure. Political interference may still insist on the hiring of local faculty to earn so-called voter satisfaction instead of bringing in the intellectually enriched international academics. This would surely add to the gap between local and global research dynamics. Similarly, with continued fears, we might see inflation of scholars with scarce employment opportunities. Biased and unfair hiring may lack the motivation and required training. Resultantly, number game would still be steering the affairs with fake and plagiarized output. We fear that researchers of diversified backgrounds with little collaborations locally would keep on producing unwanted research without any societal context. Such sporadic research may also pose reliability challenges. We also fear that without strengthening and encouraging local publication, IF syndrome would keep draining valuable foreign exchange out of the country and contributing to negative effects. With the daunting legacy of unstable and frequently changing governments,

resource availability may remain volatile. Adverse law and order issues may also further hammer the cultivation of the desired research culture.

### **Opportunities**

With ever-growing awareness, the emergence of advanced IT tools and internet facilities interaction with experts through social media would further ease out. Similarly, membership of different research groups would be easily accessible. Increased awareness and public pressure may force government commitments towards education and with the provision of more scholarships and funding proper research infrastructure may emerge. This would bring in an increasingly more competent and motivated number of PhDs which would add to the research competition resulting in quality research production. Hence, international liaison and collaboration would also get strengthened and would bring acceptance at international forums. With the formulation of effective copyrights and patent legislation coupled with the strong implementation, we could make our positive imprints on global society.

### **Threats**

Unfortunately, we do not see this number game fading to any degree shortly. This would only add to difficulties in grooming a desired research culture. Without proper motivation and incentive system, ethical issues may also keep daunting shortly. Hence, shortcuts, data manipulation, copyrights infringements, and plagiarized publications may also remain prominent threats in the coming days. We also fear that in a class conscious society researchers may emerge as a new social class, considering themselves superior to others. Virtue and vice have always competed. This makes us fear that no matter how strong data security protocols may appear, hackers would keep sneaking in and privacy may also remain at risk. We also fear that bureaucratic attitudes may keep strengthening the ideational orientation of society, refusing to accept and recognize truth. Continued practices of red-tapism and nepotism may force spirited and desperate people to leave the country if opportunities are not fairly distributed. Brain drainage would only help other more eager nations to emerge and we would keep losing a valuable human asset. If our relations with the neighbouring countries and world powers remain hostile and their agencies are left at large, militancy and terrorism may continue as dominant forces and keep disturbing peace of mind which is a basic pre-requisite for research work.

### **Conclusion**

Based on the findings, we believe that the deficiencies in our research culture, such as the lack of clear goals for coordination, research emphasis, decentralized organization, participative governance, frequent communication, resources, appropriate rewards, recruitment emphasis, and leadership with both research skills and management practices, have persisted from the past and are still somewhat prevalent in the present. However, we remain hopeful that in the future, these shortcomings can be addressed and rectified to further enhance our research culture.

One positive aspect that has remained consistent throughout the past, present, and hopefully the future is the indicator of groupage, size, and diversity. The presence of diverse groups working together has proven to be beneficial for fostering innovation and generating new ideas. We should continue to encourage collaboration among researchers from various backgrounds to ensure a vibrant and inclusive research ecosystem.

On the other hand, the two indicators that we lacked in the past and have not seen emerging in the present are distinctive culture and a positive group climate. Unfortunately, it is unlikely that these aspects will materialize in the coming future. To improve our research culture,

it is crucial to address these gaps by creating an environment that fosters a sense of identity, shared values, and mutual respect among researchers. Building a positive group climate will lead to increased productivity, collaboration, and overall satisfaction within the research community.

In order to overcome the current challenges and propel our research culture forward, several suggestions for improvement can be considered. First and foremost, establishing a secure environment that encourages critical thinking and complex reasoning is imperative. This can be achieved by instilling integrity and honesty in our youth from an early age, emphasizing the importance of ethical practices, and discouraging data breaches and manipulation.

To keep pace with the rapidly developing world, it is essential to increase public awareness about the utility of research. This can be achieved through educational campaigns and outreach programs that highlight the value of research in solving societal problems. Additionally, providing necessary training and capacity development opportunities, improving infrastructure, and implementing effective planning processes are vital steps to cultivate a goal-oriented research culture.

In terms of resources, it is encouraging to note that universities are already offering free access to journals and theses. However, the scope of this access should be expanded further. It would be beneficial to establish a macro mechanism to finance publication costs and create research excellence centers within universities. These centers would be equipped with experts in the publication process and would provide valuable support to researchers across different fields.

Looking ahead, it is crucial for the future to focus on addressing the dominant national issues in Pakistan and anticipating upcoming challenges. By doing so, we can proactively work towards mitigating risks and finding sustainable solutions. Prioritizing quality over quantity and allocating sufficient financial resources to qualified researchers will enable us to effectively tackle our national problems.

Lastly, fostering both local and international collaborative mechanisms is essential for nurturing and sustaining our research culture. Collaboration provides opportunities for knowledge exchange, cross-disciplinary research, and exposure to different perspectives. By actively engaging in collaborative efforts, we can continually enrich our research endeavors.

In conclusion, while there are still areas of improvement, we have the opportunity to shape a more robust and thriving research culture in Pakistan. By implementing the suggested improvements and remaining dedicated to the advancement of knowledge, we can pave the way for a future where research is highly valued, impactful, and contributes significantly to the betterment of our society.

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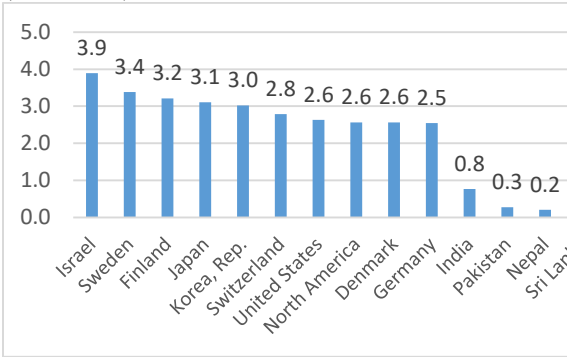
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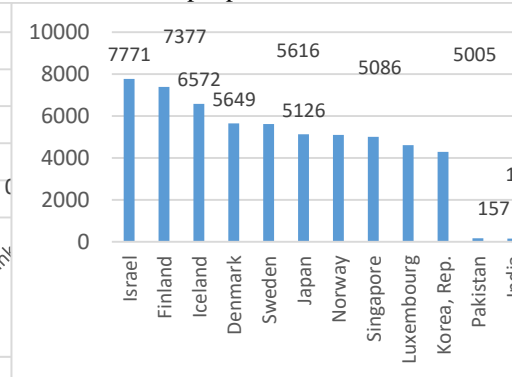
**Annex 1:**

**Graph 1: Average of 23 years' R&D Expenditure (% of GDP) 1996-2018**



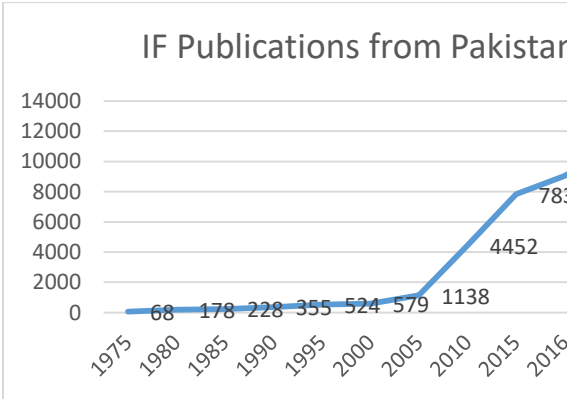
Source: (World Development Indicators, 2019)

**Graph 2: Average of 23 Years' Researchers in R&D/million people: 1996-18**



Source: Data from World Development Indicators 2019

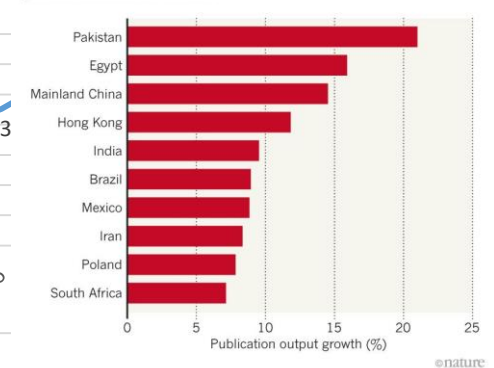
**Graph 3: IF Articles Published from Pakistan Over The Years**



Source: Data from World Development Indicators 2019

**Graph 4**

**COUNTRIES WITH BIGGEST RISES IN RESEARCH OUTPUT**  
Emerging economies top the list for percentage increase in publications from 2017 to 2018.



Source: Web of Science Analysis: ISI, Clarivate Analytics